

# Rosefield Solar Farm

## Preliminary Environmental Information Report

Volume 1  
Chapter 12: Noise and Vibration

September 2024



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## 12. Noise and Vibration

### 12.1. Introduction

12.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon noise and vibration and should be read in conjunction with the following figures and appendices in **Volume 2** and **Volume 3** respectively:

- **Figure 12.1: Study area for noise;**
- **Figure 12.2: Baseline noise monitoring locations;**
- **Figure 12.3: Noise contour map – Scenario 1 unmitigated;**
- **Figure 12.4: Noise contour map – Scenario 2 unmitigated;**
- **Figure 12.5: Noise contour map – Scenario 1 mitigated;**
- **Figure 12.6: Noise contour map – Scenario 2 mitigated;**
- **Appendix 12.1: Glossary of acoustic terminology;**
- **Appendix 12.2: Full list of noise-sensitive receptors assessed; and**
- **Appendix 12.3: Baseline noise survey report.**

### 12.2. Stakeholder engagement

12.2.1. **Table 12.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 12.1 – Engagement undertaken to date

| Stakeholder             | Date and method                    | Key matters discussed  |
|-------------------------|------------------------------------|--|
| Buckinghamshire Council | Email sent (dated 9 November 2023) | Discussed the proposed scope of the baseline noise survey, including monitoring locations and length of survey.<br><br>Response received from Buckinghamshire Council (dated 29 November 2023), stating acceptance of the monitoring approach. |
|                         | Email sent (dated 10 June 2024)    | The Applicant provided a copy of the baseline noise report to review results of the baseline noise monitoring.   |

| Stakeholder | Date and method | Key matters discussed |
|-------------|-----------------|-----------------------|
|-------------|-----------------|-----------------------|

Awaiting response at the time of writing.

12.2.2. It is anticipated that further consultation will be required with Buckinghamshire Council to seek agreement on appropriate acoustic design targets at sensitive receptors during the construction and operational (including maintenance) phases.

### 12.3. Legislative framework, planning policy and guidance

12.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

#### Legislation

- The Control of Pollution Act 1974<sup>1</sup>; and
- The Environmental Pollution Act 1990<sup>2</sup>.

#### National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)<sup>3</sup> – Section 5.12 that discusses noise and vibration;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)<sup>4</sup> – Section 2.10 that discusses noise and vibration arising from solar photovoltaic generation schemes;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)<sup>5</sup> which mentions issues relating to underground cables, in

<sup>1</sup> The Control of Pollution Act 1974. Available online:

<https://www.legislation.gov.uk/ukpga/1974/40>

<sup>2</sup> The Environmental Pollution Act 1990. Available online:

<https://www.legislation.gov.uk/ukpga/1990/43/contents>

<sup>3</sup> Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available online:

<https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1>

<sup>4</sup> Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online:

<https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3>

<sup>5</sup> Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online:

connection with noise and vibration, although predominantly dealing with high voltage overhead cables;

- National Planning Policy Framework (NPPF) (2023)<sup>6</sup> with reference to Section 15 ‘Conserving and enhancing the natural environment’, specifically paragraphs 180, 191 and 217; and
- Noise Policy Statement for England 2010<sup>7</sup>.

### Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)<sup>8</sup>, specifically Policy BE3 ‘Protection of the amenity of residents’, Policy NE4 ‘Landscape character and locally important landscape’, Policy NE5 ‘Pollution, air quality and contaminated land’, and Policy C3 ‘Renewable Energy’.

### Guidance

- BS 4142:2014+A1:2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’<sup>9</sup>;
- BS 4142:2014+A1:2019 – Technical Note (Association of Noise Consultants (ANC), 2020)<sup>10</sup>;
- BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise<sup>11</sup>;

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<https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5>

<sup>6</sup> Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities. (2023). Planning Policy Framework. Available online: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<sup>7</sup> Department for Environment, Food and Rural Affairs (2010). Noise Policy Statement for England. Available online: <https://www.gov.uk/government/publications/noise-policy-statement-for-england>

<sup>8</sup> Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury\\_local\\_plan\\_L46JWaT.pdf](https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf)

<sup>9</sup> British Standards Institution (2019). British Standard 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound. London: British Standard Institution.

<sup>10</sup> BS 4142:2014+A1:2019 – Technical Note (Association of Noise Consultants (ANC), 2020). Available online: <https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2020/05/ANC-BS-4142-Guide-March-2020.pdf>

<sup>11</sup> British Standards Institution (2014). British Standard 5228:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites (Part 1: Noise and Part 2: Vibration). London: British Standards Institution.

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- BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration<sup>11</sup>;
- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings<sup>12</sup>;
- BS 7445-1:2003 Guide to Quantities and Procedures<sup>13</sup>;
- BS EN 60942:2018 Electroacoustics – Sound Calibrators<sup>14</sup>;
- BS EN 61672-1:2013 Electroacoustics – Sound Level Meters<sup>15</sup>;
- Calculation of Road Traffic Noise Memorandum (Department for Transport, 1988)<sup>16</sup>;
- Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration (Standards for Highways, 2020)<sup>17</sup>;
- Planning Practice Guidance – Noise 2019<sup>18</sup>;
- Guidelines for Environmental Noise Impact Assessment (IEMA, 2014)<sup>19</sup>;
- ISO 9613-2:1996 Acoustics. Attenuation of Sound During Propagation Outdoors. Part 2: General Method of Calculation<sup>20</sup>;
- Guidelines for Community Noise (World Health Organisation, 1999)<sup>21</sup>;  
and

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<sup>12</sup> British Standards Institution (2014). British Standard 8233, Guidance on sound insulation and noise reduction for buildings. London: British Standards Institution.

<sup>13</sup> British Standards Institution (2003). British Standard 7445-1:2003, Description and measurement of environmental noise – Part 1: Guide to quantities and procedures. British Standards Institution, 2003.

<sup>14</sup> British Standards Institution (2018). British Standard IEC 60942:2018 'Electroacoustics, Sound calibrators'.

<sup>15</sup> British Standards Institution (2013). British Standard 61672-1:2013 'Electroacoustics. Sound level meters. Specifications'.

<sup>16</sup> Calculation of Road Traffic Noise Memorandum (Department for Transport, 1988).

<sup>17</sup> Standards for Highways (2020). DMRB LA 111 - Noise and Vibration. Available online: <https://www.standardsforhighways.co.uk/dmrbs/search/cc8cfcf7-c235-4052-8d32-d5398796b364>

<sup>18</sup> Department for Communities and Local Government (2019). Planning Practice Guidance – Noise. Available online: <https://www.gov.uk/guidance/noise--2>

<sup>19</sup> Institute of Environmental Management and Assessment (2014). Guidelines for Environmental Noise Impact Assessment. Available online: <https://www.iema.net/download-document/236678>

<sup>20</sup> ISO 9613-2:1996 Acoustics. Attenuation of Sound During Propagation Outdoors. Part 2: General Method of Calculation.

<sup>21</sup> World Health Organization (1999). Guidelines for community noise. Geneva, Switzerland: World Health Organization. Available online: <https://iris.who.int/handle/10665/66217>

- Night Noise Guidelines for Europe (World Health Organisation, 2009)<sup>22</sup>.

## 12.4. Study area

- 12.4.1. The noise and vibration Study area for the assessment of the construction and decommissioning phases of Rosefield Solar Farm considers noise and vibration sensitive receptors that are located within 300 m of the Site boundary. This has been determined based on the guidance set out in BS 5228-1, BS 5228-2 and other related guidance documents, including DMRB LA 111. The Study area is shown in **Figure 12.1** in **Volume 2**.
- 12.4.2. For the assessment of noise levels during the operational phase (including maintenance) of the Rosefield Solar Farm, the Study area extends out to the nearest or most exposed noise-sensitive receptors to the noise-producing elements of Rosefield Solar Farm as shown in **Figures 12.1 and 12.2** in **Volume 2**.

## 12.5. Establishing baseline conditions

### Baseline noise survey

#### Measurement details

- 12.5.1. A baseline noise survey has been undertaken to establish the prevailing acoustic environment at the nearest, or most exposed, noise-sensitive receptors surrounding the Site. The results of the baseline noise survey have been used to inform the acoustic criteria for the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm.
- 12.5.2. Monitoring positions were determined through a desktop review of both aerial photography and mapping, in addition to the Rosefield Solar Farm plans.
- 12.5.3. The baseline noise survey comprised unattended noise monitoring at 10 monitoring positions as agreed with Buckinghamshire Council and defined in **Table 12.2** below and presented in **Figure 12.2** in **Volume 2**. The baseline noise surveys were undertaken between Wednesday 06 March 2024 and Thursday 04 April 2024.

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<sup>22</sup> World Health Organisation (2009). Night Noise Guidelines for Europe. Geneva, Switzerland: World Health Organization. Available online: <https://iris.who.int/bitstream/handle/10665/326486/9789289041737-eng.pdf?isAllowed=y&sequence=1>

Table 12.2 – Baseline noise measurement locations

| ID                 | Receptor                  | Location |          | Measurement dates   |
|--------------------|---------------------------|----------|----------|---------------------|
|                    |                           | Easting  | Northing |                     |
| MP1 <sup>(1)</sup> | Sion Hill Farm            | 475943   | 226058   | 06/03/24 – 20/03/24 |
| MP2                | Bernwood Farm             | 473413   | 224475   | 25/03/24 – 04/04/24 |
| MP3                | Borshaw Farm              | 473735   | 223234   | 06/03/24 – 14/03/24 |
| MP4                | Dry Leys Farm             | 473091   | 221837   | 06/03/24 – 18/03/24 |
| MP5                | Finmere Hill House        | 471608   | 222451   | 06/03/24 – 20/03/24 |
| MP6                | Knowlhill Farm            | 470837   | 223635   | 06/03/24 – 20/03/24 |
| MP7                | Catherine Cottages        | 471005   | 224855   | 06/03/24 – 20/03/24 |
| MP8                | Pond Farm                 | 469982   | 224828   | 20/03/24 – 04/04/24 |
| MP9                | Dwelling on Brickhill Way | 468907   | 224367   | 06/03/24 – 20/03/24 |
| MP10               | Muxwell Farm              | 471694   | 223911   | 25/03/24 – 04/04/24 |

Notes:

1. Proxy location adopted for Sion Hill Farm due to access constraints.

## Equipment

12.5.4. The baseline noise survey was undertaken using the equipment detailed in **Table 12.3**.

Table 12.3 – Baseline noise survey equipment

| Equipment         | Type       | Serial number | Calibration date |
|-------------------|------------|---------------|------------------|
| Sound level meter | Rion NL-52 | 197783        | 24/01/2023       |
| Sound level meter | Rion NL-52 | 976245        | 21/12/2023       |
| Sound level meter | Rion NL-52 | 976247        | 25/08/2023       |
| Sound level meter | Rion NL-52 | 142653        | 25/08/2022       |
| Sound level meter | Rion NL-52 | 1265456       | 26/09/2023       |



| Equipment           | Type       | Serial number | Calibration date |
|---------------------|------------|---------------|------------------|
| Sound level meter   | Rion NL-52 | 1276553       | 01/02/2023       |
| Sound level meter   | Rion NL-52 | 876025        | 25/01/2024       |
| Sound level meter   | Fusion     | 14598         | 30/05/2022       |
| Acoustic Calibrator | Rion NC-74 | 34615260      | 03/05/2023       |
| Acoustic Calibrator | Rion NC-74 | 34167506      | 14/08/2023       |

- 12.5.5. The sound level meters used conform to the Class 1 requirements of BS EN 61672-1:2013 ‘Electroacoustics. Sound level meter, Specifications’. The calibrator used conforms to the Class 1 requirements of BS EN IEC 60942:2018 ‘Electroacoustics, Sound calibrators’.
- 12.5.6. The equipment used has a calibration history that is traceable to a certified calibration institution. The calibration of the sound level meters was checked before and after the measurements, with no significant calibration drift noted i.e. within a +/- 0.5 dB tolerance.
- 12.5.7. The noise monitoring equipment at all monitoring positions was located at least 3.5 m from any prominent vertical reflective surfaces. All measurements were taken with the microphone situated approximately 1.5 m above ground level.

## 12.6. Environmental baseline

### Noise survey results

- 12.6.1. **Table 12.4** presents the results of the baseline noise survey undertaken at representative positions, indicative of the nearest, or most exposed, receptors surrounding Rosefield Solar Farm. **Table 12.4** also provides the representative background sound level (dB LA90,T) for the daytime and night-time periods following a statistical analysis undertaken in accordance with BS 4142. Further information regarding the baseline survey methodology is provided in **Appendix 12.2** in **Volume 3**.
- 12.6.2. The data is presented for both daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods.
- 12.6.3. Weather information throughout the duration of the noise survey was obtained via two Davis Vantage Pro 2 weather stations installed in the vicinity of monitoring locations MP4 and MP7. Where the weather conditions are considered outside of the parameters for environmental noise monitoring (in accordance with the requirements of BS 7445-1:2003), the corresponding noise data has been omitted from the resultant analysis.

Table 12.4 – Measured noise levels

| ID   | Period     | Average measured noise levels, dB |                    | Representative background sound level dB |
|------|------------|-----------------------------------|--------------------|--|
|      |            | L <sub>Aeq,T</sub>                | L <sub>A90,T</sub> | L <sub>A90,T</sub>                       |
| MP1  | Daytime    | 43                                | 35                 | 32                                       |
|      | Night-time | 38                                | 30                 | 30                                       |
| MP2  | Daytime    | 49                                | 37                 | 34                                       |
|      | Night-time | 51                                | 31                 | 30                                       |
| MP3  | Daytime    | 46                                | 36                 | 29                                       |
|      | Night-time | 40                                | 29                 | 24                                       |
| MP4  | Daytime    | 57                                | 43                 | 36                                       |
|      | Night-time | 49                                | 35                 | 29                                       |
| MP5  | Daytime    | 48                                | 38                 | 33                                       |
|      | Night-time | 46                                | 33                 | 29                                       |
| MP6  | Daytime    | 47                                | 38                 | 32                                       |
|      | Night-time | 41                                | 34                 | 30                                       |
| MP7  | Daytime    | 45                                | 35                 | 31                                       |
|      | Night-time | 41                                | 29                 | 23                                       |
| MP8  | Daytime    | 46                                | 36                 | 29                                       |
|      | Night-time | 46                                | 31                 | 25                                       |
| MP9  | Daytime    | 49                                | 40                 | 34                                       |
|      | Night-time | 41                                | 34                 | 30                                       |
| MP10 | Daytime    | 48                                | 40                 | 29                                       |
|      | Night-time | 44                                | 34                 | 27                                       |

### Sensitive receptors

12.6.4. Noise-sensitive receptors considered within this preliminary assessment are summarised in **Table 12.5**. In certain instances, the identified noise-sensitive receptors represent a number of dwellings adjacent to or within the proximity of the receptor listed in **Table 12.5**, as it can be reasonably assumed the baseline acoustic conditions and predicted noise levels from Rosefield Solar Farm would be similar.

Table 12.5 – Noise sensitive receptors

| ID  | Name                    | Type        | Corresponding monitoring location |
|-----|-------------------------|-------------|-----------------------------------|
| R1  | Beachfield              | Residential | MP5                               |
| R2  | Bernwood Farm           | Residential | MP2                               |
| R3  | Borshaw Farm            | Residential | MP3                               |
| R4  | Botolph Claydon         | Residential | MP2                               |
| R5  | Brickhill Way (Calvert) | Residential | MP9                               |
| R6  | Calvert Cottages        | Residential | MP9                               |
| R7  | Catherine Cottages      | Residential | MP7                               |
| R8  | Catherine Farm          | Residential | MP7                               |
| R9  | Clayton Rd              | Residential | MP3                               |
| R10 | Dry Leys Farmhouse      | Residential | MP4                               |
| R11 | Finmere Hill House      | Residential | MP5                               |
| R12 | Hogshaw Farm            | Residential | MP3                               |
| R13 | Knowhill Farm           | Residential | MP6                               |
| R14 | Lower Farm              | Residential | MP3                               |
| R15 | Muxwell Farm            | Residential | MP10                              |
| R16 | Pond Farm               | Residential | MP8                               |
| R17 | Sion Hill Farm          | Residential | MP1                               |
| R18 | Woodland Barn           | Residential | MP4                               |

### Future baseline

- 12.6.5. On the basis that the majority of Rosefield Solar Farm is located within a rural setting, typically comprising agricultural land use, there is generally not expected to be significant changes to the baseline conditions in the future.
- 12.6.6. In instances where Rosefield Solar Farm is located close to transport infrastructure, such as roads and railway lines, there is potential for increase in the traffic flows in the future baseline scenario. In the absence of significant alterations to the wider road or rail 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.
- 12.6.7. However, other existing development and/or approved development(s), such as High Speed Rail 2 and East West Rail, are considered within

**Chapter 18: Cumulative Effects.** A full assessment considering the potential for cumulative effects will be outlined within the ES.

## 12.7. Mitigation embedded into the design

- 12.7.1. This preliminary assessment has been based on the principle that measures have been ‘embedded’ into the design of Rosefield Solar Farm to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to noise and vibration and the benefits these provide are outlined in **Table 12.6** below.

Table 12.6 – Embedded mitigation measures relevant to noise and vibration

| Embedded mitigation measures relevant to noise and vibration  | Benefit  |
|---|--|
| Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable. This includes a minimum 250 m offset from the fence line around ITS, BESS, Rosefield Substation and Collector Compounds to residential properties, determined on a case-by-case basis. | Noise impact at the nearest noise sensitive receptors/residential properties is reduced. |
| Use of equipment with low noise emissions, where feasible.  | Noise impact at the nearest noise sensitive receptors/residential properties is reduced. |
| Orientating noise emitting equipment to reduce noise level beyond the Site boundary.  | Noise impact at the nearest noise sensitive receptors/residential properties is reduced. |

## 12.8. Optionality

- 12.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.
- 12.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1 to 3.5 in Volume 2**) set out the reasonable ‘worst case scenario’ that has been assessed within this chapter.

12.8.3. Further to the optionality options discussed in **Chapter 5**, the following scenarios have been assessed for this preliminary noise and vibration assessment. It is expected that operating scenarios will be refined as part of the ongoing design post submission of the PEIR. This design development may include consideration of alternative equipment specifications, locations and number of noise emitting equipment within the Site boundary. Prospective design solutions will not be progressed if the associated residual noise levels post-mitigation result in significant adverse effects.

Table 12.7 – Optionality scenarios assessed

| Project element               | Scenario assessed for this preliminary assessment  |
|-------------------------------|--|
| Balance of Solar System       | <p>The location of the BoSS has not yet been defined. Generally, the BoSS would comprise locating the inverter, transformer and switchgear equipment, independently outdoors, or within an enclosed ITS located throughout the fields shown in light blue on <b>Figure 1.2: Zonal Masterplan in Volume 2</b> and there is the option for either the inverters to be centralised or a hybrid solution of centralised and string inverters, as outlined in <b>Chapter 3: Description of Rosefield Solar Farm</b>.</p> <p>This preliminary assessment assumes the use of 29 central inverter/ITS stations distributed centrally across 18 fields.</p> |
| Satellite Collector Compounds | <p>There are five fields that are considered suitable for the two Satellite Collector Compounds, as shown in <b>Figure 1.2: Zonal Masterplan in Volume 2</b>. However, it is anticipated that one Collector Compound will be required in each Parcel containing Solar PV modules (Parcel 1 and Parcel 2).</p> <p>This preliminary assessment assumes the Satellite Collector Compounds will be located in Fields B10 and D17.</p>  |
| Main Collector Compound       | <p>There are four fields that are considered suitable for the Main Collector Compound, which are located in Parcel 3, as shown in <b>Figure 1.2: Zonal Masterplan in Volume 2</b> and detailed below.</p> <ul style="list-style-type: none"> <li>• Field E23</li> <li>• Field E22</li> <li>• Field E21</li> <li>• Field E20</li> </ul>   |

| Project element      | Scenario assessed for this preliminary assessment  |
|----------------------|--|
| BESS                 | <p>This preliminary assessment assumes the Main Collector Compound will be located in Field E23.</p> <p>There are several fields that are being considered for the siting of the BESS, as shown in <b>Figure 1.2: Zonal Masterplan in Volume 2</b>.</p> <p>For the purposes of the preliminary assessment, there are two options for the BESS locations in conjunction with the Rosefield Substation:</p> <p>Scenario 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (<b>Figure 5.1: Zonal Masterplan Scenario 1 in Volume 2</b>).</p> <p>Scenario 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (<b>Figure 5.2: Zonal Masterplan Scenario 2 in Volume 2</b>).</p> <p>For the purposes of this preliminary assessment, both options have been assessed.</p> |
| Rosefield Substation | <p>Two fields are being considered for the location of the Rosefield Substation, as indicated as 'Rosefield Substation Indicative Siting Zones' (marked as S) in <b>Figure 1.2: Zonal Masterplan in Volume 2</b>.</p> <p>For the purposes of the preliminary worst-case assessment, the following Rosefield Substation locations in conjunction with the BESS, have been considered:</p> <p>Scenario 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (<b>Figure 5.1: Zonal Masterplan Scenario 1 in Volume 2</b>).</p> <p>Scenario 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (<b>Figure 5.2: Zonal Masterplan Scenario 2 in Volume 2</b>).</p> <p>For the purposes of this preliminary assessment, both options have been assessed.</p>                  |

## Preliminary assessment assumptions

### Construction and decommissioning phases

- 12.8.4. At this preliminary assessment stage, detailed construction and decommissioning methodologies and plant lists have not been defined. The details of noise emitting plant/equipment suitable to inform a full assessment are therefore not yet available nor sufficient to quantify impacts (and the significance of the resultant effects). As a result, a number of assumptions have been made as part of a qualitative impact assessment, including the anticipated construction methodology and associated plant/equipment lists.
- 12.8.5. The qualitative construction assessment has assumed the use of standard construction techniques appropriate for the type of works being undertaken.
- 12.8.6. During the decommissioning phase of Rosefield Solar Farm, it is assumed that the resultant noise levels will be broadly similar to the construction phase.
- 12.8.7. It is assumed that the normal construction working hours will be 07:00 to 19:00 hours Monday to Friday and 07:00 – 12:00 hours on Saturdays. No construction works shall be carried out on Sundays or Bank or Public Holidays without the prior arrangement/agreement with Buckinghamshire Council.

### Operational (including maintenance) phase

- 12.8.8. Initial details of noise emitting plant/equipment associated with the operational phase fixed plant have been provided in **Table 12.8**. It should be noted that the final equipment supplier and selection may be subject to change; however, the assumed inputs currently available are sufficient to inform an understanding of potential impacts for the purposes of this preliminary assessment. It is expected that noise emitting plant/equipment will be refined as part of the ongoing design post submission of the PEIR. Alternative design solutions will not be progressed if the associated residual noise levels post-mitigation result in significant adverse effects.
- 12.8.9. At this stage, it has been assumed that all operational phase plant/equipment will operate continuously during both daytime and night-time periods i.e. no allowance has been made for reduced noise emissions during the hours of darkness. This represents the worst case scenario as the noise emissions from the BESS units and inverters are expected to reduce during hours of darkness.

## 12.9. Approach to the preliminary assessment

### Construction and decommissioning phases - onsite construction activities

- 12.9.1. In the absence of detailed construction and decommissioning methodologies, a qualitative construction and decommissioning phase assessment has been undertaken.
- 12.9.2. The qualitative assessment has been undertaken based on the guidance contained within BS 5228, and has been used to determine whether the construction phase and decommissioning phase activities have the potential to result in significant adverse effects at the surrounding sensitive receptors.
- 12.9.3. Construction and decommissioning activities will involve the use of a variety of working methods, with the resultant noise and vibration levels experienced by a receptor varying over time as the distances to plant items change and the type of construction activity change.
- 12.9.4. For the purposes of the qualitative assessment, the following construction activities have been considered:
- Main construction compound;
  - Constructing access tracks (temporary and permanent);
  - Site preparation and earthworks;
  - Installation of boundary fencing;
  - Foundations for solar PV modules;
  - Substructure works for proposed infrastructure e.g. transformers, BESS, Rosefield Substation, central inverters/ITS; and
  - Installation of proposed infrastructure.
- 12.9.5. The significance criteria given in Annex E of BS 5228-1 have been used to assess the potential for noise effects during the construction phase. Section E.3.2 details the 'ABC Method' of determining the potential significance of noise effects. This method defines threshold noise levels for different time periods which are dictated by the pre-construction ambient noise levels. If the construction phase noise levels exceed the appropriate threshold value, then a potential significant effect is indicated. On the basis of the measured ambient noise levels from the baseline survey, the lower bound daytime cut-off value of 65 dB  $L_{Aeq,T}$  has formed the basis of the significance threshold.

### Construction and decommissioning phases – road traffic

- 12.9.6. **Chapter 14: Traffic and Transport** provides details of the proposed routing of road traffic associated with the construction and



decommissioning of Rosefield Solar Farm. Normal construction traffic will utilise the following road links, with abnormal (large) loads following an alternative route (**Figures 3.5a to 3.5d, Volume 2**):

- A34;
- M40 North;
- M40 South;
- A41;
- Station Road;
- Snake Lane;
- Clayton Road; and
- Granborough Road.

- 12.9.7. Baseline and construction traffic flows for each road link have been assessed for a 2028 construction year. Current traffic projections identify that peak construction traffic will occur in Month 4 of 2028 which has therefore been used to provide a worst-case assessment. At this stage, the baseline traffic has been provided as daily flows; however, this will be refined for the ES to consider the specific hours of construction.
- 12.9.8. The methodology contained within the Calculation of Road Traffic Noise Memorandum (CRTN) has predominantly been used to calculate the noise levels associated with increased road traffic flows, with the BS 5228-1 haul road calculation formula used for local road links on the basis that the minimal pre-development flows would mean that it would be beyond the scope of the CRTN. The CRTN method uses a number of input variables including traffic flow volume, vehicle speed, percentage of heavy goods vehicles, type of road surface, site geometry and the presence of noise barriers or acoustically absorbent ground to predict road traffic noise levels.
- 12.9.9. The CRTN traffic assessment focuses on the change in noise levels that are likely to occur on road links as a result of the construction phase works. Traffic noise predictions have been carried out at notional receptors located 10 m from the edge of the carriageway and 1.5 m above ground level to determine the change in noise level. Notional receptors are used because it is the change in traffic noise level that is of interest, not the absolute noise levels at any given receptor. The predicted changes in noise level would occur at noise-sensitive receptors along each of the roads considered, regardless of whether they have been specifically considered or not.

## Operational (including maintenance) phase

- 12.9.10. Operational (including maintenance) phase impacts have been predicted using a computer noise model of the Rosefield Solar Farm layouts, using SoundPLAN v9.0. The model adopts the calculation method in ISO 9613-2, which is suitable for a wide range of engineering applications where the noise level outdoors is of interest. The calculation method considers the mechanisms of noise propagation, including geometrical divergence (also known as distance loss or geometric damping), atmospheric absorption, ground effect, reflection from surfaces and screening by obstacles, barriers and buildings.
- 12.9.11. The ISO 9613-2 method predicts noise levels under meteorological conditions favourable to noise propagation from the sound source to the noise-sensitive receptor e.g., downwind propagation or equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.
- 12.9.12. The operational phase noise emissions that have been used to carry out the preliminary assessment are presented in **Table 12.8**.

Table 12.8 – Operational phase noise emissions

| Equipment                                     | Quantity | Noise level  | Notes  |
|---|----------|--|--|
| <b>BESS</b>                                   |          |  |  |
| BESS generic containers                       | 500      | 65 dB(A) at 1 m distance (from the relevant kit).  | Noise emitting from one side and one end. Noise emitting faces orientated inwards.                       |
| BESS Sungrow MVS SCC control and transformers | 51       | <i>Varying depending on unit surface:</i><br>59 dB(A) at 1 m (front)<br>52 dB(A) at 1 m (right)<br>71 dB(A) at 1 m (back)<br>61 dB(A) at 1 m (left)<br>62 dB(A) at 1 m (top) | Noise emitting from all sides of unit, orientated with the front of the containing facing the north-east |
| BESS auxiliary transformers                   | 12       | 40 dB(A) at 1 m  | Noise emitting from all sides of unit – 2.4 m x 2.5 m x 4.0 m (LxWxH)                                    |
| <b>Main Collector Compound</b>                |          |  |  |

| Equipment                                     | Quantity | Noise level                  | Notes   |
|---|----------|------------------------------|---|
| Auxiliary transformers                        | 12       | 40 dB(A) at 1 m              | Noise emitting from all sides of unit – 2.4 m x 2.5 m x 4.0 m (LxWxH)   |
| <b>Satellite Collector Compound</b>           |          |                              |   |
| Main transformer                              | 1        | 75 dB(A) at 1 m              | Noise emitting from all sides of unit - 6.72 m x 2.74 m x 4.65 m (LxWxH)  |
| Auxiliary transformers                        | 1        | 40 dB(A) at 1 m              | Noise emitting from all sides of unit – 2.4 m x 2.5 m x 4.0 m (LxWxH)   |
| <b>Rosefield Substation</b>                   |          |                              |   |
| Main transformers                             | 5        | 75 dB(A) at 1 m              | Noise emitting from all sides of unit - 6.72 m x 2.74 m x 4.65 m (LxWxH)  |
| <b>Solar PV modules</b>                       |          |                              |   |
| 7.6MVA INGECON central inverters/ITS stations | 29       | 60 dB(A) at 10 m per station | 29 central inverter/ITS stations distributed centrally across 19 fields. Each of the 29 stations includes 2 no. inverters each emitting 57 dB(A) at 10 m. |

### Receptor sensitivity

12.9.13. Receptor sensitivity has been categorised for a range of receptor types, as shown in **Table 12.9**, which has been informed from guidance contained in the following documents:

- DMRB LA 111; and
- Guidelines for Environmental Noise Impact Assessment.

**Table 12.9 – Receptor sensitivity**

| Receptor sensitivity | Type of receptor   |
|----------------------|--|
| High                 | Residential properties, educational establishments, hospitals, places of worship, hotels, children’s nurseries, nursing homes. |

| Receptor sensitivity | Type of receptor  |
|----------------------|---|
| 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

12.9.14. The magnitude of the impact within this preliminary assessment has been described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

12.9.15. Although the lowest measure of magnitude of impact is defined as ‘negligible’, it should be noted that noise and vibration levels may still be audible/perceptible during the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm.

12.9.16. The criteria in **Table 12.10** have been adopted for the assessment of magnitude of impact.

Table 12.10 – Magnitude of impact criteria for noise and vibration

| Impact  | Relevant guidance        | Magnitude criteria                            |  |  |  |
|---|--------------------------|---|--|--|--|
|   |                          | Negligible                                    | Low  | Medium                                       | High                                   |
| Construction and decommissioning phases – daytime noise <sup>[1][2]</sup> | BS 5228-1:2009 + A1+2014 | Less than 55 dB LAeq,T                        | Between 55 & 65 dB LAeq,T                    | Between 65 & 75 dB LAeq,T                    | Greater than 75 dB LAeq,T              |
| Construction phase - road traffic noise <sup>[3]</sup>                    | DMRB LA 111              | 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 |
| Construction and decommissioning phases - vibration                       | BS 5228-2:2009 + A1:2014 | Less than 0.3 mm/s PPV                        | 0.3 to less than 1.0 mm/s PPV                | 1.0 to 9.9 mm/s PPV                          | Greater than or equal to 10 mm/s PPV   |

| Impact   | Relevant guidance      | Magnitude criteria  |   |   |   |
|--|------------------------|---|---|---|---|
|  |                        | Negligible  | Low   | Medium  | High  |
| Operational phase – daytime noise <sup>[4][5]</sup>    | BS 4142:2014 + A1:2019 | Rating level less than 5 dB(A) below background sound level | In the range of 5 dB(A) below and 5 dB(A) above background sound level or rated noise level of up to 40 dB L <sub>Ar, T</sub> | Between 5 and 10 dB(A) above background sound level or rated noise level of between 41 & 49 dB L <sub>Ar, T</sub> | In excess of 10 dB(A) above background sound level or rated noise level equal to or greater than 50 dB L <sub>Ar, T</sub> |
| Operational phase – night-time noise <sup>[4][5]</sup> | BS 4142:2014 + A1:2019 | In excess of 5 dB(A) below background sound level           | In the range of 5 dB(A) below and 5 dB(A) above background sound level or rated noise level of up to 35 dB L <sub>Ar, T</sub> | Between 5 and 10 dB(A) above background sound level or rated noise level of between 36 & 44 dB L <sub>Ar, T</sub> | In excess of 10 dB(A) above background sound level or rated noise level equal to or greater than 45 dB L <sub>Ar, T</sub> |

Notes:

1. Daytime construction phase noise levels are based on a time period ‘T’ which equates to the duration of a working day on site.
2. The construction noise impact criteria will apply if the works occur for a duration exceeding 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months.
3. Where baseline traffic flows are low, consideration will be given to the absolute criteria for general construction works.
4. Operational (including maintenance) phase noise criteria are based on Rating Levels as defined in BS 4142 and refer to a time interval of 1-hour for the daytime period and 15-minute for the night-time period.
5. Magnitude impact subject to whichever is highest between daytime and night-time.

12.9.17. Regarding the operational magnitude of impact criteria, BS 4142 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 ANC Guide to BS 4142 provides context 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 35 dB  $L_{Ar,Tr}$ .*

12.9.18. The ANC Guide 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”.*

12.9.19. In this case, it is considered that a minimum rating level of 40 dB  $L_{Ar,Tr}$  during the daytime, and 35 dB  $L_{Ar,Tr}$  during the night, for the low magnitude impact criteria, would align with guidance in Planning Practice Guidance 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.”*

12.9.20. Furthermore, BS 8233:2014 and the Guidelines for Community Noise provide guidance levels which account for a range of potential adverse health effects from noise. For dwellings, the guidelines are focussed on sleep disturbance, as this occurs at a lower magnitude of exposure to noise and has the potential to lead to other, more severe physical and psychological health effects over time. For internal noise within dwellings, a value of 30 dB  $L_{Aeq, T}$  is stipulated for good sleeping conditions at night. However residents are likely to be inside their properties at night. BS 8233:2014 states that building envelope attenuation would be reduced by approximately 15 dB for a partially open window. Consequently, an external high-magnitude criterion, indicating a significantly adverse effect level (SOAEL) of 45 dB  $L_{Ar,Tr}$  has been adopted for night-time.

12.9.21. Based on the adaptation of absolute limits, the World Health Organization provides its guidance on permissible levels, above which adverse effects are likely to occur. Therefore the criteria for LOAEL and SOAEL adopted within this preliminary assessment are considered as a design limit, above which the onset of LOAEL and SOAEL would occur.

### Significance of effects

12.9.22. The overall significance of an effect is determined by combining the sensitivity of the receptor and magnitude of impact (as presented in **Table 12.11**). The assessment of significance relies on best practice and the relevant published standards and guidance documents as defined in **Section 12.3**.

12.9.23. The significance of an effect is reported as either ‘**significant**’ or ‘**not significant**’. Where significance of effect is assessed as ‘**negligible**’ or

‘minor’, the effect is **not significant**. Where the significance of effect is assessed as ‘moderate’ or ‘major’, the effect is **significant**.

Table 12.11 – Determining significance of effects for noise and vibration

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

### 12.10. Assessment of likely effects (without additional mitigation)

12.10.1. This section considers the effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Table 12.6** and assessing the reasonable worst case scenarios as outlined in **Table 12.7**.

#### Construction phase – onsite construction activities

12.10.2. **Table 12.12** provides indicative noise levels that would be generated by the primary construction activities, together with the corresponding distance from the works at which the daytime 65 dB  $L_{Aeq,T}$  threshold criterion is likely to be met.

Table 12.12 – Predicted construction phase noise levels

| Construction activity                                | Indicative activity noise level at 10 m distance | Approximate distance at which 65 dB $L_{Aeq,T}$ threshold will be met |
|--|--|---|
| Main Compound Construction                           | 86 dB $L_{Aeq,T}$                                | 110 m   |
| Constructing access tracks (temporary and permanent) | 87 dB $L_{Aeq,T}$                                | 120 m   |
| Installation of boundary fencing                     | 77 dB $L_{Aeq,T}$                                | 50 m  |

| Construction activity   | Indicative activity noise level at 10 m distance | Approximate distance at which 65 dB L <sub>Aeq,T</sub> threshold will be met |
|---|--|--|
| Site preparation and earthworks   | 87 dB L <sub>Aeq,T</sub>                         | 120 m  |
| Foundations for solar PV modules  | 87 dB L <sub>Aeq,T</sub>                         | 120 m  |
| Substructure works for proposed infrastructure e.g. transformers, BESS, central inverters/ITS | 83 dB L <sub>Aeq,T</sub>                         | 65 m   |
| Installation of proposed infrastructure   | 82 dB L <sub>Aeq,T</sub>                         | 55 m   |

- 12.10.3. Based on the separation distances presented in **Table 12.14**, it is expected that the majority of the construction works could be undertaken without causing an exceedance of the daytime 65 dB L<sub>Aeq,T</sub> threshold criterion.
- 12.10.4. Where works are being undertaken close to the Site boundary, there is potential that the construction works will result in an exceedance of the daytime criterion. On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**, resulting in a temporary **moderate adverse** effect, which is considered **significant**.
- 12.10.5. Construction induced vibration will be generated by certain construction activities, such as piling, breaking and/or vibratory compaction, which may result in potential disturbance or interference with activities at the surrounding sensitive receptors when works are taking place close to the Site boundary. On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**, resulting in a temporary **moderate adverse** effect, which is considered **significant**.

### Construction phase – road traffic

- 12.10.6. The traffic data used to carry out the assessment road traffic assessment is presented in **Table 12.13**.



Table 12.13 – Traffic data

| Road link | Road name                       | Daily traffic flow by scenario  |          |                             |         |
|-----------|---------------------------------|---------------------------------|----------|-----------------------------|---------|
|           |                                 | Baseline (no construction) 2028 |          | Baseline + development 2028 |         |
| 1         | A34                             | 70,987                          | 12 % HGV | 71,122                      | 12% HGV |
| 2         | M40 North                       | 109,940                         | 14% HGV  | 109,959                     | 14% HGV |
| 3         | M40 South                       | 70,862                          | 11% HGV  | 70,880                      | 11% HGV |
| 4         | A41                             | 34,006                          | 6% HGV   | 34,178                      | 7% HGV  |
| 5         | A41 Bicester                    | 23,660                          | 8% HGV   | 23,909                      | 9% HGV  |
| 6         | A41 West                        | 13,105                          | 18% HGV  | 13,354                      | 19% HGV |
| 7         | A41 East                        | 12,027                          | 20% HGV  | 12,142                      | 19% HGV |
| 8         | Station Road                    | 1,093                           | 23% HGV  | 1,455                       | 27% HGV |
| 9         | Snake Lane                      | 123                             | 25% HGV  | 485                         | 36% HGV |
| 10        | Clayton Road                    | 1,510                           | 16% HGV  | 1,873                       | 21% HGV |
| 11        | Granborough Road <sup>[1]</sup> | -                               | -        | 157                         | 53% HGV |

Notes:

1. No baseline data provided at PEIR stage (to be assessed as part of the ES).

12.10.7. **Table 12.14** summarises the predicted change in noise levels resulting from increased traffic flow during the construction phase of Rosefield Solar Farm.

Table 12.14 – Assessment of likely significant effects during construction – increased traffic flow

| Road link | Road name    | Short-term noise level change, dB               |
|-----------|--------------|---|
|           |              | 2028 baseline to '2028 baseline + construction' |
| 1         | A34          | 0.0   |
| 2         | M40 North    | 0.0   |
| 3         | M40 South    | 0.0   |
| 4         | A41          | 0.1   |
| 5         | A41 Bicester | 0.1   |
| 6         | A41 West     | 0.2   |
| 7         | A41 East     | 0.1   |
| 8         | Station Road | 2.4   |

| Road link | Road name | Short-term noise level change,<br>dB               |
|-----------|-----------|--|
|           |           | 2028 baseline to '2028 baseline +<br>construction' |

|    |                                 |     |
|----|---------------------------------|-----|
| 9  | Snake Lane                      | 8.1 |
| 10 | Clayton Road                    | 2.0 |
| 11 | Granborough Road <sup>[1]</sup> | -   |

Notes:

1. No baseline data provided at PEIR stage (to be assessed as part of the ES).

- 12.10.8. It can be seen that construction traffic has the potential to increase noise levels by up to 8 dB along Snake Lane. The substantial increase in noise levels is a function of the low volume of traffic in the baseline scenario on this road link. There are limited noise sensitive receptors along this road which are set back by approximately 40 m and 300 m from the roadside. The resultant absolute noise levels at the affected receptors are therefore likely to fall below the negligible criteria for the construction phase (55 dB  $L_{Aeq,T}$ ). On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be **low**, resulting in a temporary **minor adverse** effect, which is considered **not significant**.
- 12.10.9. Noise predictions indicate that the effect of construction traffic elsewhere would increase noise levels by up to of 2.4 dB, with the greatest change occurring on local road links e.g. Station Road and Clayton Road. Where **high** sensitivity receptors are situated along these roads, the magnitude of impact would be considered **low**, resulting in a temporary **minor adverse** effect, which is considered **not significant**.
- 12.10.10. For the remaining road links that have been assessed, the noise levels are not likely to increase by more than 1 dB. As such, the magnitude of impact for **high** sensitivity receptors along the remaining roads considered is **negligible**, resulting in a **negligible** effect, which is considered **not significant**.

### Operational (including maintenance) phase

- 12.10.11. Predicted noise levels from the operation (including maintenance) of the Rosefield Solar Farm are provided in **Table 12.15** and **Table 12.16** for Scenario 1 and Scenario 2 respectively, along with a preliminary assessment against the representative background sound levels ( $L_{A90,T}$ ) and adopted low magnitude design targets. Predictions include the input plant source levels as identified in **Section 12.9**.
- 12.10.12. In accordance with the BS 4142 assessment methodology, where certain features of the specific noise level can increase the significance of impact

of a sound level, a character correction is applied to provide a 'Rating Level'. The characteristics of the specific sound that would attract a character correction are tonality, impulsivity, intermittency (as defined by BS 4142) or other characteristic features that are readily discernible against the residual acoustic environment.

- 12.10.13. BS 4142 includes the addition of rating penalties (to the specific noise) as a factor of 'perceptibility', where the prominence of tonal or impulsive sound from a source can be readily distinguishable over the residual sound. For the purposes of this preliminary assessment, the addition of rating penalties considers the numerical comparison of the specific noise from operational fixed plant against the baseline residual sound level at each noise-sensitive receptor in order to determine perceptibility.
- 12.10.14. For the purposes of this preliminary assessment, either a 2 dB or 3 dB rating correction has been applied to the predicted specific levels. This would account for a situation either where a tone is just perceptible at the nearest noise sensitive receptor, or where specific sound is likely to be readily distinctive against the residual acoustic environment respectively. The rating correction has been determined through interrogation of the noise model results including the source contributions at each individual receptor.
- 12.10.15. Rating levels for Scenario 1 and Scenario 2, accounting for the cumulative impact of all operational-phase plant items running concurrently, are itemised in **Table 12.15** and **Table 12.16** respectively. The corresponding noise contour plots are presented in **Figures 12.3** and **12.4** in **Volume 2**.

Table 12.15 – Predicted operational phase rating levels and preliminary assessment – Scenario 1 (unmitigated)

| Ref | Name                    | Rating level, dB L <sub>Ar,Tr</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|-------------------------|-------------------------------------|--|------------|--|------------|
|     |                         |                                     | Daytime  | Night-time | Daytime  | Night-time |
| R1  | Beachfield              | 26                                  | -7   | -3         | -14  | -9         |
| R2  | Bernwood Farm           | 35                                  | 6  | 5          | -5   | 0          |
| R3  | Borshaw Farm            | 36                                  | 7  | 12         | -4   | 1          |
| R4  | Botolph Claydon         | 34                                  | 0  | 4          | -6   | -1         |
| R5  | Brickhill Way (Calvert) | 33                                  | -2   | 3          | -8   | -3         |

| Ref | Name               | Rating level, dB L <sub>Ar,Tr</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|--------------------|-------------------------------------|--|------------|--|------------|
|     |                    |                                     | Daytime  | Night-time | Daytime  | Night-time |
| R6  | Calvert Cottages   | 39                                  | 5  | 9          | -1   | 4          |
| R7  | Catherine Cottages | 38                                  | 7  | 15         | -2   | 3          |
| R8  | Catherine Farm     | 32                                  | 1  | 9          | -8   | -3         |
| R9  | Clayton Rd         | 29                                  | -1   | 5          | -12  | -7         |
| R10 | Dry Leys Farmhouse | 27                                  | -9   | -2         | -13  | -8         |
| R11 | Finmere Hill House | 33                                  | 0  | 4          | -7   | -2         |
| R12 | Hogshaw Farm       | 38                                  | 9  | 14         | -2   | 3          |
| R13 | Knowhill Farm      | 35                                  | 3  | 5          | -5   | 0          |
| R14 | Lower Farm         | 34                                  | 5  | 10         | -6   | -1         |
| R15 | Muxwell Farm       | 30                                  | 1  | 3          | -11  | -6         |
| R16 | Pond Farm          | 39                                  | 10   | 14         | -1   | 4          |
| R17 | Sion Hill Farm     | 40                                  | 8  | 10         | 0  | 5          |
| R18 | Woodland Barn      | 25                                  | -10  | -3         | -14  | -9         |

Notes:

1. LOAEL aligned with the low impact criteria i.e. 40 dB L<sub>Ar</sub> daytime, 35 dB L<sub>Ar</sub> night-time.

12.10.16. Noise levels from the unmitigated Rosefield Solar Farm Scenario 1 are predicted to be highest at R17 Sion Hill Farm with levels of 40 dB L<sub>Ar</sub> (exceeding the LOAEL design targets 5 dB(A) during the night-time).

12.10.17. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 1 exceed the LOAEL design target and are therefore likely to result in a **medium** magnitude of impact at the following sensitive receptors:

- R6 – Calvert Cottages;
- R7 – Catherine Cottages;
- R12 – Hogshaw Farm;
- R16 – Pond Farm; and

- R17 – Sion Hill Farm.

12.10.18. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 1, the magnitude of impact at the above **high** sensitivity receptors is considered to be up to **medium** resulting in a long-term **moderate adverse** effect, which is considered to be **significant**.

12.10.19. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 1, are likely to result in a **low** magnitude of impact at the following sensitive receptors:

- R1 – Beachfield;
- R2 – Bernwood Farm;
- R3 – Borshaw Farm;
- R4 – Boltoph Claydon;
- R5 – Brickhill Way (Calvert);
- R8 – Catherine Farm;
- R9 – Clayton Road;
- R10 – Dry Lees Farmhouse;
- R11 – Finmere Hill House;
- R13 – Knowhill Farm;
- R14 – Lower Farm;
- R15 – Muxwell Farm; and
- R18 – Woodland Barn.

12.10.20. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 1, the magnitude of impact at the above **high** sensitivity receptors is considered to be **low** resulting in a long-term **minor adverse** effect, which is considered to be **not significant**.

Table 12.16 – Predicted operational phase rating levels and preliminary assessment – Scenario 2 (unmitigated)

| Ref | Name          | Rating level, dB L <sub>Ar,Tr</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|---------------|-------------------------------------|--|------------|--|------------|
|     |               |                                     | Daytime  | Night-time | Daytime  | Night-time |
| R1  | Beachfield    | 26                                  | -7   | -3         | -9   | -9         |
| R2  | Bernwood Farm | 35                                  | 6  | 5          | 0  | 0          |

| Ref | Name                    | Rating level, dB L <sub>Ar,Tr</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|-------------------------|-------------------------------------|--|------------|--|------------|
|     |                         |                                     | Daytime  | Night-time | Daytime  | Night-time |
| R3  | Borshaw Farm            | 37                                  | 8  | 13         | 2  | 2          |
| R4  | Botolph Claydon         | 35                                  | 1  | 5          | 0  | 0          |
| R5  | Brickhill Way (Calvert) | 33                                  | -2   | 3          | -3   | -3         |
| R6  | Calvert Cottages        | 39                                  | 5  | 9          | 4  | 4          |
| R7  | Catherine Cottages      | 38                                  | 7  | 15         | 3  | 3          |
| R8  | Catherine Farm          | 32                                  | 1  | 9          | -3   | -3         |
| R9  | Clayton Rd              | 29                                  | 0  | 5          | -6   | -6         |
| R10 | Dry Leys Farmhouse      | 27                                  | -9   | -2         | -8   | -8         |
| R11 | Finmere Hill House      | 33                                  | 0  | 4          | -2   | -2         |
| R12 | Hogshaw Farm            | 38                                  | 9  | 14         | 3  | 3          |
| R13 | Knowhill Farm           | 35                                  | 3  | 5          | 0  | 0          |
| R14 | Lower Farm              | 35                                  | 6  | 11         | 0  | 0          |
| R15 | Muxwell Farm            | 30                                  | 1  | 3          | -5   | -5         |
| R16 | Pond Farm               | 39                                  | 10   | 14         | 4  | 4          |
| R17 | Sion Hill Farm          | 38                                  | 6  | 8          | 3  | 3          |
| R18 | Woodland Barn           | 26                                  | -10  | -3         | -9   | -9         |

Notes:

1. LOAEL aligned with the low impact criteria i.e. 40 dB L<sub>Ar</sub> daytime, 35 dB L<sub>Ar</sub> night-time.

12.10.21. Noise levels from the unmitigated Rosefield Solar Farm Scenario 2 are predicted to be highest at R16 Pond Farm and R6 Calvert Cottages with levels of 38 dB L<sub>Ar</sub> (exceeding the LOAEL design target by 3 dB(A) during the night-time).

12.10.22. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 2 exceed the LOAEL design target and are therefore likely to result in a **medium** magnitude of impact at the following sensitive receptors:

- R3 – Borshaw Farm;
- R6 – Calvert Cottages;
- R7 – Catherine Cottages;
- R12 – Hogshaw Farm;
- R16 – Pond Farm; and
- R17 – Sion Hill Farm.

12.10.23. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 2, the magnitude of impact at the above **high** sensitivity receptors is considered to be up to **medium** resulting in a long-term **moderate adverse** effect, which is considered to be **significant**.

12.10.24. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 2 are likely to result in a **low** magnitude of impact at the following sensitive receptors:

- R1 – Beachfield;
- R2 – Bernwood Farm;
- R4 – Boltoph Claydon;
- R5 – Brickhill Way (Calvert);
- R8 – Catherine Farm;
- R9 – Clayton Road;
- R10 – Dry Lees Farmhouse;
- R11 – Finmere Hill House;
- R13 – Knowhill Farm;
- R14 – Lower Farm;
- R15 – Muxwell Farm; and
- R18 – Woodland Barn.

12.10.25. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 2, the magnitude of impact at the above **high** sensitivity receptors is considered to be **low** resulting in a long-term **minor adverse** effect, which is considered to be **not significant**.

## Decommissioning phase

12.10.26. The likely noise and vibration impacts during the decommissioning phase are considered to be consistent with the construction phase, as it is envisaged that similar plant and works would be used. On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**, resulting in a temporary **moderate adverse** effect, which is considered **significant**.

### 12.11. Additional mitigation measures

12.11.1. **Table 12.17** outlines the additional mitigation measures considered necessary for the construction, operational (including maintenance) and decommissioning phases. These are subject to the final design and will be refined during the preparation of the ES.

**Table 12.17 – Additional mitigation for construction, operation (including maintenance) and decommissioning phases**

| Phase                                    | Additional (secondary and tertiary) mitigation  |
|--|---|
| Construction and decommissioning traffic | <p>Best Practicable Means (BPM) as defined by the Control of Pollution Act 1974 would be implemented, which would serve to minimise the noise and vibration impacts at noise-sensitive receptors in the vicinity of the construction and decommissioning works.</p> <p>These include (amongst others):</p> <ul style="list-style-type: none"> <li>• Careful selection of plant and construction methods. Only plant conforming to relevant national standards, directives and recommendations on noise and vibration emissions shall be used.</li> <li>• Use of site enclosures, housing and temporary stockpiles/barriers, where reasonably practicable and necessary, to provide acoustic screening at the earliest opportunity.</li> <li>• Plant and equipment liable to create noise and/or vibration whilst in operation to be located, as far as reasonably practicable, away from sensitive receptors and away from walls reflecting towards sensitive receptors.</li> <li>• Careful selection of routing options within the Site for construction vehicles.</li> <li>• Machines in intermittent use to be shut down or throttled down to a minimum during periods between works.</li> </ul> |



| Phase             | Additional (secondary and tertiary) mitigation  |
|-------------------|---|
|                   | <ul style="list-style-type: none"> <li>• All plant, equipment and noise control measures applied to plant and equipment to be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable. Any plant, equipment or items fitted with noise control equipment found to be defective will not be operated until repaired.</li> <li>• Minimise drop heights of materials (i.e. lorry with lifting boom or dumper carefully depositing materials).</li> <li>• As far as is reasonably practicable, locate and orientate semi-static equipment in a manner which minimises the noise impact on sensitive receptors.</li> <li>• Regular briefings for operators of moving plant to emphasise the importance of noise mitigation, specifically avoiding movement over irregular surfaces (which tends to create more noise / vibration emissions).</li> <li>• A programme of community liaison to be carried out, including notification of works and details of the complaints process.</li> </ul> <p>An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan will include noise and vibration management measures that are based on the results of the ES (once construction methods, plant and programme have been defined).</p> <p>An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will include noise and vibration management measures that are based on the results of the ES (once construction methods, plant and programme have been defined).</p> |
| Operational noise | <p>Implementation/adoption of further acoustic mitigation measures as part of the ongoing design to inform the ES, which could include:</p> <ul style="list-style-type: none"> <li>• Reducing the number of plant items (following engineering review);</li> <li>• Increasing the distance between source and receiver i.e. locating central inverters at the furthest point practicable from receptors;</li> </ul>   |

| Phase | Additional (secondary and tertiary) mitigation  |
|-------|---|
|       | <ul style="list-style-type: none"><li>• Reducing noise at source through refinement of the engineering requirements in order to adopt lower noise emitting operational plant items; and</li><li>• Use of barriers and/or enclosures where reasonably practicable including the following:<ul style="list-style-type: none"><li>– 3.5 m high barrier around the BESS container areas;</li><li>– 5 m high barrier around sections of the boundary of the project substation;</li><li>– 3.5 m high absorptive barriers around central inverters that are located in close proximity to noise sensitive receptors; and</li><li>– Introduction of enclosures and/or barriers around the main transformers within the project substation and satellite collector compound.</li></ul></li></ul> <p>An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. The Outline Operational Environmental Management Plan will include noise management measures that are based on the results of the ES.</p> |

## 12.12. Assessment of residual effects (with additional mitigation)

### Construction phase – onsite construction activities

12.12.1. Following the implementation of the additional mitigation measures outlined above, the magnitude of impact at **high** sensitivity receptors during the construction and decommissioning phases is expected to be **low**, resulting in a temporary **minor adverse** residual effect, which is considered **not significant**.

### Operational (including maintenance) phase

12.12.2. Rating levels for Scenario 1 and Scenario 2, accounting for the cumulative impact of all operational-phase plant items running concurrently following the implementation of the additional mitigation measures, are itemised in **Table 12.18** and **Table 12.19** respectively. The corresponding noise contour plots are presented in **Figures 12.5** and **12.6** in **Volume 2**.

Table 12.18 – Predicted operational phase rating levels and preliminary assessment – Scenario 1 (mitigated)

| Ref | Name                    | Rating level, dB L <sub>Ar,T</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|-------------------------|------------------------------------|--|------------|--|------------|
|     |                         |                                    | Daytime  | Night-time | Daytime  | Night-time |
| R1  | Beachfield              | 25                                 | -8   | -4         | -15  | -10        |
| R2  | Bernwood Farm           | 34                                 | 5  | 4          | -7   | -2         |
| R3  | Borshaw Farm            | 34                                 | 5  | 10         | -6   | -1         |
| R4  | Botolph Claydon         | 32                                 | -2   | 2          | -8   | -3         |
| R5  | Brickhill Way (Calvert) | 29                                 | -5   | -1         | -11  | -6         |
| R6  | Calvert Cottages        | 35                                 | 1  | 5          | -6   | -1         |
| R7  | Catherine Cottages      | 35                                 | 4  | 12         | -5   | 0          |
| R8  | Catherine Farm          | 30                                 | -1   | 7          | -10  | -5         |
| R9  | Clayton Rd              | 32                                 | 3  | 8          | -9   | -4         |
| R10 | Dry Leys Farmhouse      | 23                                 | -13  | -6         | -17  | -12        |
| R11 | Finmere Hill House      | 33                                 | 0  | 4          | -7   | -2         |
| R12 | Hogshaw Farm            | 35                                 | 6  | 11         | -5   | 0          |
| R13 | Knowhill Farm           | 34                                 | 2  | 4          | -6   | -1         |
| R14 | Lower Farm              | 32                                 | 3  | 8          | -8   | -3         |
| R15 | Muxwell Farm            | 28                                 | -1   | 1          | -12  | -7         |
| R16 | Pond Farm               | 34                                 | 5  | 9          | -6   | -1         |
| R17 | Sion Hill Farm          | 33                                 | 1  | 3          | -7   | -2         |
| R18 | Woodland Barn           | 25                                 | -11  | -4         | -15  | -10        |

Notes:

1. LOAEL aligned with the low impact criteria i.e. 40 dB L<sub>Ar</sub> daytime, 35 dB L<sub>Ar</sub> night-time.

- 12.12.3. Predicted noise levels from Rosefield Solar Farm Scenario 1 following the implementation of the additional mitigation are likely to result in a **low** magnitude of impact at all of the noise sensitive receptors.
- 12.12.4. As such, a **low** magnitude of impact upon these **high** sensitivity receptors would result in a long-term **minor adverse** residual effect, which is considered to be **not significant**.

Table 12.19 – Predicted operational phase rating levels and preliminary assessment – Scenario 2 (mitigated)

| Ref | Name                    | Rating level, dB L <sub>Ar,T</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|-------------------------|------------------------------------|--|------------|--|------------|
|     |                         |                                    | Daytime  | Night-time | Daytime  | Night-time |
| R1  | Beachfield              | 25                                 | -8   | -4         | -15  | -10        |
| R2  | Bernwood Farm           | 33                                 | 4  | 3          | -7   | -2         |
| R3  | Borshaw Farm            | 35                                 | 6  | 11         | -6   | -1         |
| R4  | Botolph Claydon         | 32                                 | -2   | 2          | -8   | -3         |
| R5  | Brickhill Way (Calvert) | 29                                 | -5   | -1         | -11  | -6         |
| R6  | Calvert Cottages        | 35                                 | 1  | 5          | -6   | -1         |
| R7  | Catherine Cottages      | 35                                 | 4  | 12         | -5   | 0          |
| R8  | Catherine Farm          | 30                                 | -1   | 7          | -10  | -5         |
| R9  | Clayton Rd              | 26                                 | -3   | 2          | -14  | -9         |
| R10 | Dry Leys Farmhouse      | 23                                 | -13  | -6         | -17  | -12        |
| R11 | Finmere Hill House      | 33                                 | -1   | 4          | -8   | -3         |
| R12 | Hogshaw Farm            | 35                                 | 6  | 11         | -5   | 0          |
| R13 | Knowhill Farm           | 34                                 | 2  | 4          | -6   | -1         |
| R14 | Lower Farm              | 31                                 | 2  | 7          | -9   | -4         |
| R15 | Muxwell Farm            | 28                                 | -2   | 1          | -13  | -8         |
| R16 | Pond Farm               | 34                                 | 5  | 9          | -6   | -1         |

| Ref | Name           | Rating level, dB L <sub>Ar,Tr</sub> | Exceedance above representative background sound level, dB |            | Exceedance above LOAEL criteria, dB L <sub>Ar,T</sub> <sup>[1]</sup> |            |
|-----|----------------|-------------------------------------|--|------------|--|------------|
|     |                |                                     | Daytime  | Night-time | Daytime  | Night-time |
| R17 | Sion Hill Farm | 33                                  | 1  | 3          | -7   | -2         |
| R18 | Woodland Barn  | 25                                  | -11  | -4         | -15  | -10        |

Notes:

1. LOAEL aligned with the low impact criteria i.e. 40 dB L<sub>Ar</sub> daytime, 35 dB L<sub>Ar</sub> night-time.

12.12.5. Predicted noise levels from Rosefield Solar Farm Scenario 2 following the implementation of the additional mitigation are likely to result in a **low** magnitude of impact at all of the noise sensitive receptors.

12.12.6. As such, a **low** magnitude of impact upon these **high** sensitivity receptors would result in a long-term **minor adverse** residual effect, which is considered to be **not significant**.

### 12.13. Opportunities for enhancement

12.13.1. Opportunities for enhancement in relation to noise and vibration are not available, given Rosefield Solar Farm would introduce new sources of noise and vibration which previously did not exist in the prevailing environment.

### 12.14. Difficulties and uncertainties

12.14.1. Three of the baseline noise survey locations incorporated measurements during both school holidays and school term time (MP2, MP8 and MP10). This was necessary following equipment installed on site being tampered with by third parties, which resulted in the survey duration being extended. Given the rural setting of the measurement locations and distance from strategic transport infrastructure, it is not considered that measurements taken during the school holiday period had an influence on the resulting dataset. This is corroborated when comparing the data with the measured noise levels at the same positions taken during school term time.

12.14.2. Details of plant/equipment during the construction and decommissioning stages have not yet been defined. The preliminary assessment of likely effects has therefore been considered in qualitative terms. The construction methodology, plant selection and programme will be defined during the preparation of the ES, as further information becomes available.

12.14.3. Details of the noise emitting plant/equipment associated with the operational (including maintenance) phase of the Rosefield Solar Farm

have not yet been finalised at this stage, including quantity, their operating scenarios and location. Further refinement of the design of the Rosefield Solar Farm would be undertaken to ensure compliance with the appropriate acoustic criteria.

- 12.14.4. Consultation has been undertaken with Buckinghamshire Council concerning the application of the relevant standards which are pertinent to the initial assessment of operational noise. As expected, baseline noise monitoring identified the residual noise environment to be of 'low' order. Further consultation is proposed with Buckinghamshire Council to confirm the contextual assessment and application of absolute limits to define the LOAEL and SOAEL, as identified within this preliminary assessment.

## 12.15. Further work required to inform the ES

- 12.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered.

### Construction and decommissioning phases

- Assessment of likely noise and vibration levels generated by the onsite works in accordance with BS 5228.
- Further detailed assessment of construction traffic flow fluctuations on the public highway (and private roads where applicable) during the various construction phases of Rosefield Solar Farm. This will be calculated using the methodology set out in the CRTN publication, using flow data provided by the traffic consultant.
- Assessment of construction traffic on the various temporary site access routes where possible, using the haul route method outlined in Section F.2.5 of BS 5228-1. The assessment will consider the flow data provided by the traffic consultant.
- Consideration of potential cumulative effects as a result of Rosefield Solar Farm in combination with other existing development and/or approved developments.

### Operational (including maintenance) phase

- Refinement of the noise prediction model for the operational fixed plant, which will account for the proposed and/or revised site layout, noise emitting plant/equipment (in octave bands where such data is available) to be introduced and any embedded acoustic mitigation measures.
- An operational phase noise assessment for the operational fixed plant undertaken in accordance with the methodology outlined in BS 4142. This will identify the requirement for additional mitigation measures.
- Further details of operational (including maintenance) phase plant and equipment will be outlined in the ES which demonstrates that it would

not generate a perceptible level of vibration, or alternatively, would be used in locations unlikely to result in significant vibration effects at either human or ecological sensitive receptors.

- Further consideration of potential cumulative effects as a result of the Rosefield Solar Farm in combination with other existing development and/or approved developments (refer to **Chapter 18: Cumulative Effects**).



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