

# Steeple Renewables Project

## Chapter 11: Noise and Vibration

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## Chapter 11: Noise and Vibration

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## 11.1 Noise & Vibration

### 11.1 Introduction

- 11.1.1 This Chapter provides an assessment of the potential effects in respect of noise and vibration resulting from the introduction of the Proposed Development, including that associated with changes in traffic, the inverters, transformers, substation and Battery Energy Storage System (BESS) to be installed, with due regard to all relevant legislation, planning policy and guidance.
- 11.1.2 Construction noise and vibration (including traffic and transportation) has been assessed with reference to BS 5228 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’<sup>1</sup> in terms of likely levels and assessment criteria typically applied to developments of this kind.
- 11.1.3 Operational noise, in an isolative and cumulative sense, has been assessed in accordance with BS 4142:2014 + A1:2019 ‘Methods for Rating and Assessing Industrial & Commercial Sound’<sup>2</sup>, as referenced within relevant planning policy.
- 11.1.4 Details of the lead author of this Chapter are set out in **Appendix 1.4 - EIA Statement of Competence [EN010163/APP/6.3.1]**.
- 11.1.5 This ES chapter is accompanied by the following figures:
- **Figure 11.1 - Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]**
  - **Figure 11.2 - Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]**

### 11.2 Legislation and Planning Policy

#### Environmental Protection Act 1990

- 11.2.1 The Environmental Protection Act 1990 (the Act)<sup>3</sup> sets out a framework for the control of pollution in general and includes provisions for local authorities to act on

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<sup>1</sup> The British Standards Institution (February 2014) BS 5228-1:2009 + A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise and British Standards Institution (June 2014) BS 5228-2:2009 + A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration

<sup>2</sup> The British Standards Institution (2019) BS 4142:2014 + A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

<sup>3</sup> Environmental Protection Act 1990

issues relating to noise generated by certain facilities via an abatement notice where a statutory nuisance is determined to exist.

- 11.2.2 Section 79 of the Act states that “(g) noise emitted from premises so as to be prejudicial to health or a nuisance” and/or “(ga) noise that is prejudicial to health or a nuisance and is emitted from or caused by a vehicle, machinery or equipment in a street” would constitute a statutory nuisance. There is no set threshold level and/or character of noise that applies in practice. Nuisance actions are generally considered on a case-by-case basis, with any necessary enforcement or remedial works adopted in the context of the specific circumstances relating to the identified disturbance and whether ‘best practicable means’ have been used to reduce or eliminate the issue. Given the low level of operational noise anticipated and the ability to mitigate construction and decommissioning noise using standard construction best practices, no Category 3 interests, being those individuals that might suffer a nuisance as a result of the Proposed Development, have been identified and as such they are not considered further in this assessment.

#### Control of Pollution Act 1974

- 11.2.3 The Control of Pollution Act 1974<sup>4</sup> (CoPA) enables local authorities controlling powers similar to the above with regard to various pollutants, to minimise potential impacts on human health and in respect of noise generated during construction or similar activities. The CoPA states the requirement for the use of ‘best practicable means’ to minimise levels.

#### The Overarching National Policy Statement for Energy (NPS EN-1)

- 11.2.4 The Overarching National Policy Statement for Energy<sup>5</sup> (NPS EN-1) outlines the need for new electricity capacity from renewable sources as the country transitions to a low carbon electricity system. However, the potential for energy infrastructure to impact on health and quality of life if it results in excessive noise is recognised when referring to the Noise Policy Statement for England<sup>6</sup> (NPSE) in Paragraph 5.12.2 (as discussed below). NPS EN1 goes on to state in Paragraph 5.12.9 that where noise impacts are likely to arise, they should be assessed according to the principles of the relevant British Standards. Of the examples provided, the standards BS 4142 and BS

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<sup>4</sup> Control of Pollution Act 1974

<sup>5</sup> Department for Energy Security & Net Zero (November 2023) Overarching National Policy Statement for Energy (EN-1)

<sup>6</sup> Department for Environment, Food and Rural Affairs (March 2010) Noise Policy Statement for England

8233<sup>7</sup> relate to operational noise and BS 5228 relates to construction noise and vibration.

### National Policy Statement for Renewable Energy Infrastructure (NPS EN-3)

- 11.2.5 The National Policy Statement for Renewable Energy Infrastructure<sup>8</sup> (NPS EN-3) refers back to NPS EN-1 in Paragraph 2.7.40 for the purposes of addressing noise impacts from renewable energy development on sensitive residential locations and provides additional general advice throughout the document as to potential mitigation measures for additional specific instances.

### The National Policy Statement for Electricity Networks Infrastructure (NPS EN-5)

- 11.2.6 The National Policy Statement for Electricity Networks Infrastructure<sup>9</sup> (NPS EN-5), relevant to the transmission and distribution parts of the electricity network along with any associated infrastructure, such as substations and converter stations, again points to the appropriateness of standards such as BS 4142 or similar in assessing the operational acoustic impact of such projects in Paragraph 2.9.39.

### National Policy Statements for Energy - Appraisal of Sustainability - Main Report

- 11.2.7 Appendix C of the National Policy Statements for Energy - Appraisal of Sustainability - Main Report<sup>10</sup> provides an overview of relevant planning policy, guidance and documentation applicable to the UK in general and provides an interpretation of the NPSE stating that the “... NPSE considers that the noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed levels fall between the LOAEL and the SOAEL the policy statement requires that: all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking

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<sup>7</sup> British Standards Institution (2014) BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

<sup>8</sup> Department for Energy Security & Net Zero (November 2023) National Policy Statement for Renewable Energy Infrastructure (EN-3)

<sup>9</sup> Department for Energy Security & Net Zero (November 2023) National Policy Statement for Electricity Networks Infrastructure (EN-5)

<sup>10</sup> Department for Energy Security & Net Zero (November 2023) National Policy Statements for Energy Appraisal of Sustainability - Main Report



*into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur but that efforts should be focused on minimising such effects. Where levels are below the LOAEL it is considered there will be no adverse effect. Once the levels are below the NOEL there will be no observable change. For the present guidance a numerical definition of LOAEL is given by the WHO Guidelines for Community Noise and BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.”* This indicates that, where proposals can meet the requirements of BS 8233 and the guideline values provided by the World Health Organisation (WHO), adverse impacts would be avoided.

### National Planning Policy Framework (NPPF)

- 11.2.8 The treatment of noise is defined in the context of planning by the National Planning Policy Framework (NPPF)<sup>11</sup> which details the UK Government’s planning policies and how these are expected to be applied. Whilst the NPPF does not apply to Nationally Significant Infrastructure Projects (NSIPs) such as that considered here it is useful in that it provides generalised advice on the role of the planning system in helping to prevent and limit potential adverse effects of noise, setting out that planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts, whilst at the same time mitigating and reducing other adverse impacts on health and quality of life to a minimum. The NPPF refers to the Noise Policy Statement for England<sup>6</sup> (NPSE) which provides guidance on the categorisation of impact levels.

### Noise Policy Statement for England (NPSE)

- 11.2.9 The Noise Policy Statement for England (NPSE)<sup>6</sup> sets out the long-term vision of UK Government noise policy which is to “... *promote good health and quality of life through effective noise management within the context of sustainable development.*” In order to weigh noise impacts against the economic and social benefits of the activity under consideration, the NPSE defines three categories of effect levels:
- “*No Observed Effect Level (NOEL) - noise levels below this have no detectable effect on health and quality of life;*
  - *Lowest Observed Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and,*

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<sup>11</sup> Department for Levelling Up, Housing and Communities (February 2025) National Planning Policy Framework

- *Significant Observed Adverse Effect Level (SOAEL) - the level above which effects on health and quality of life become significant.”*

### National Planning Practice Guidance (NPPG): Noise

11.2.10 The National Planning Practice Guidance (NPPG)<sup>12</sup> relating to noise, whilst not directly applicable to NSIPs, puts the effect levels defined by the NPSE into greater context by explaining how such noise levels might be perceived, providing examples of outcomes based on likely average response, and advising on appropriate actions. These are reproduced at Table 11.1.

*Table 11.1 - Noise Exposure Hierarchy*

Response	Examples of Outcomes	Increasing Effect Level	Action
<b>No Observed Effect Level (NOEL)</b>			
Not present	No Effect	No Observed Effect	No specific measures required
<b>No Observed Adverse Effect Level (NOAEL)</b>			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
<b>Lowest Observed Adverse Effect Level (LOAEL)</b>			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic	Observed Adverse Effect	Mitigate and reduce to a minimum

<sup>12</sup> Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (July 2019) National Planning Practice Guidance: Noise



Response	Examples of Outcomes	Increasing Effect Level	Action
	character of the area such that there is a small actual or perceived change in the quality of life.		
<b>Significant Observed Adverse Effect Level (SOAEL)</b>			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

### BS 5228 Code of Practice for Noise and Vibration Control on Construction and Open Sites (BS 5228)

- 11.2.11 BS 5228-1:2009 + A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise'<sup>13</sup> has been identified as being the appropriate source of guidance on methods for minimising noise from construction activities and is adopted herein. The document provides guidance on construction

<sup>13</sup> The British Standards Institution (February 2014) BS 5228-1:2009 + A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise

- limits, modelling techniques and best practicable measures for the reduction of noise generated during construction activities.
- 11.2.12 Annex E of BS 5228-1:2009 + A1:2014 provides guidance on setting environmental noise criteria for construction activities. Several methods of assessing the significance of the expected noise levels are presented with the most applicable being the ABC method. This method sets threshold levels for construction activities for specific time periods based on the pre-existing ambient noise levels, subject to average lower Category A limiting values of 65, 55 and 45 dB  $L_{Aeq}$  for daytime (07:00 – 19:00 weekdays and Saturdays 07:00 – 13:00), evenings and weekends (19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays) and night-time (23:00 – 07:00) periods respectively in instances where existing ambient noise levels are low in relation to these values, which is the case for the Proposed Development.
- 11.2.13 BS 5228-2:2009 + A1:2014 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration’<sup>14</sup> provides a method for assessing levels of vibration. The document provides guidance on construction vibration limits, vibration modelling techniques and best practicable measures for the reduction of vibration generated during construction activities.
- 11.2.14 The generally accepted maximum satisfactory magnitude of vibration due to construction activities, at residential premises during daytime periods (08:00 – 18:00 Monday to Friday and 08:00 – 13:00 on Saturdays), is a peak particle velocity (ppv) of 6 to 10 mm.s<sup>-1</sup>. In practice, the lower satisfactory magnitude is typically used with the higher magnitude being justified on a case-by-case basis.
- BS 4142 Methods for Rating and Assessing Industrial & Commercial Sound (BS 4142)**
- 11.2.15 BS 4142<sup>2</sup> describes methods for rating and assessing sound of an industrial or commercial nature. Outdoor sound levels are used to assess the likely effects on people who might be inside or outside a residential property via the comparison of the pre-existing background sound levels with the predicted/modelled sound associated with the introduction of a particular development, known as the ‘rating’ level, which also accounts for any distinguishing characteristics of the emitted sound.

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<sup>14</sup> British Standards Institution (June 2014) BS 5228-2:2009 + A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration

- 11.2.16 To determine a value for the background sound level at a specific assessment point, a series of measurements are made at a location at, or representative of, a dwelling or receptor of interest. The standard requires that the background sound measurements ( $\text{dB } L_{A90, T}$  – the sound level exceeded for 90% of the time, or the lowest 10 % of sound, for the reference time-period, T) should be measured during times when the sound source in question could or will be operating and that the individual measurement intervals should not normally be less than 15-minutes in length. The objective is then to determine a justifiable representative background sound level for time periods of interest via statistical analysis and/or observations of the data set collected. The standard states that the representative background sound level “... *should not automatically be assumed to be either the minimum or modal value.*”
- 11.2.17 The ‘rating’ level is defined as the ‘specific’ sound level ( $\text{dB } L_{Aeq}$  – the average sound level) plus any adjustment for the characteristic features of the sound generated by the source in question. In instances where the source is not expected to have a specific character at the assessment location then the ‘rating’ level can be assumed to be equal to the ‘specific’ sound level. Where tones are present a correction of 2 to 6 dB can be added to the ‘specific’ sound level to determine the ‘rating’ level and further adjustments may be added where the source has other applicable characteristics.
- 11.2.18 The defined representative background sound level(s) and rating level(s) are then compared to determine the possible impact but with consideration of the context in which the industrial or commercial sound source to be introduced presents itself in respect of other sound sources and the existing character of the area. Table 11.2 provides a summary of expected impacts when comparing background and rating levels.
- 11.2.19 In accordance with BS 4142, the resultant impact may need to be modified in relation to the context in which the sound occurs, particularly when either the sound level associated with the new source and the pre-existing background sound levels are considered to be low at neighbouring receptors. The previous version of BS 4142<sup>15</sup> stated that this version of the standard is not appropriate for use in instances

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<sup>15</sup> The British Standards Institution (1997) BS 4142:1997 Rating Industrial Noise Affecting Mixed Residential and Industrial Areas

where background and rating levels are below a certain level and that background sound levels “... below about 30 dB and rating levels below about 35 dB are considered to be very low.” This applies to the majority of receptors surrounding the Proposed Development.

Table 11.2 - BS 4142 Assessment Criteria

Rating Level	BS 4142 Assessment Criteria
<b>Equal to or below background</b>	‘...an indication of the specific sound source having a low impact, depending on the context’.
<b>Approximately +5 dB greater than the background sound level</b>	‘...an indication of an adverse impact, depending on the context’.
<b>Approximately +10 dB or more greater than the background sound level</b>	‘...an indication of a significant adverse impact, depending on the context’.

### World Health Organisation (WHO)

- 11.2.20 The WHO document Guidelines for Community Noise<sup>16</sup> provides guideline values for overall desirable internal and external levels for a variety of situations which are intended to minimise health impacts for certain environments. The guidance informs much of the standards and guidance relating to the protection of external and internal amenity in relation to the impacts of noise on residences such as BS 8233<sup>7</sup>.
- 11.2.21 The guidelines state that overall internal night-time noise levels should not be above 30 dB  $L_{Aeq}$  within bedrooms such that people may sleep with minimal disturbance while the windows are open and it is stated that this corresponds to an external night-time level of 45 dB  $L_{Aeq}$ , when assuming a 15 dB attenuation in noise levels externally to internally. Furthermore, the guidance recommends that daytime external levels should not exceed 50 dB  $L_{Aeq}$  to protect the majority of people from being moderately annoyed.
- 11.2.22 The Night Noise Guidelines for Europe<sup>17</sup> are described as complementary to the Guidelines for Community Noise and recommend a limit of 40 dB  $L_{night}$  outside. This is a yearly average night-time noise level which could potentially be exceeded on some nights of the year such that it is not necessarily inconsistent with the

<sup>16</sup> World Health Organisation (2000) Guidelines for Community Noise

<sup>17</sup> World Health Organisation (2009) Night Noise Guidelines for Europe

Guidelines for Community Noise if the noise levels do not exceed 45 dB L<sub>Aeq</sub> on those nights.

- 11.2.23 The WHO Environmental Noise Guidelines for the European Region<sup>18</sup> was published in 2018 and provides “... *recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise*” and make a series of strong or conditional noise exposure recommendations for each based on the weight of evidence available at the time the report was being drafted. The document does not consider noise from industrial sources as the specific features of these sources are typically very localised and vary between different kinds of development.

#### BS 8233 Guidance on Sound Insulation and Noise Reduction for Buildings (BS 8233)

- 11.2.24 BS 8233<sup>7</sup> provides guidance on the control of noise for new buildings or those undergoing refurbishment rather than providing guidance on assessing the effect of changes in external noise levels on occupants of existing buildings. The document provides a range of desirable internal average levels for dwellings which may be achieved via appropriate design where necessary. The levels are provided in Table 11.3 for reference and include additional detail as provided within the ProPG: Professional Practice Guidance on Planning & Noise document discussed below.

#### ProPG: Professional Practice Guidance on Planning & Noise (ProPG)

- 11.2.25 The ProPG: Professional Practice Guidance on Planning & Noise<sup>19</sup> document, as authored by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), similarly to BS 8233, is intended to provide guidance in terms of assessment and design of new or newly refurbished housing development in terms of pre-existing airborne noise sources impacting on them (typically from transportation) and the requirements to achieve a suitable internal noise environment for potential inhabitants. Table 11.3 shows the desirable noise levels detailed within BS 8233 for reference and with the additional detail and notes the ProPG provides.

<sup>18</sup> World Health Organisation (2018) Environmental Noise Guidelines for the European Region

<sup>19</sup> Association of Noise Consultants, Institute of Acoustics & Chartered Institute of Environmental Health (2017) ProPG: Planning & Noise: Professional Practice Guidance on Planning & Noise: New Residential Development

Table 11.3 - Internal Noise Criteria

Activity	Location	Daytime	Night-time
		07:00 - 23:00 hrs	23:00 - 07:00 hrs
<b>Resting</b>	Living room	35 dB $L_{Aeq, 16 \text{ hr}}$	-
<b>Dining</b>	Dining room/area	40 dB $L_{Aeq, 16 \text{ hr}}$	-
<b>Sleeping</b>	Bedroom	35 dB $L_{Aeq, 16 \text{ hr}}$	30 dB $L_{Aeq, 8 \text{ hr}}$ 45 dB $L_{Amax,F}$ (Note 4)

**NOTE 4:** Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$ , depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB  $L_{Amax,F}$  more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A of the ProPG: Professional Practice Guidance on Planning & Noise).

## 11.3 Assessment Methodology

### Construction and Decommissioning

#### Study Area & Receptors

- 11.3.1 A selection of residential receptors surrounding and located closest to the Site have been identified as potentially most sensitive to construction noise associated with the introduction of the Proposed Development. These are shown in **Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]** and **Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]**. Potential receptors are typically located within 2 km of the Order Limits.
- 11.3.2 Noise and vibration effects on the users of public rights of way (PRoWs) are not considered within current planning guidance. However, a discussion of the potential construction effects is provided in Section 11.9 'Residual Effects and Section 11.10 'Cumulative and In-Combination Effects'.

#### Magnitude of Change

- 11.3.3 The most appropriate method for assessing the construction and decommissioning noise impacts is the ABC Method specified within Annex E of BS 5228-1. This sets threshold levels for specific periods based on the pre-existing ambient levels,



subject to average lower Category A limiting values of 65, 55 and 45 dB  $L_{Aeq}$  for daytime (07:00 - 19:00 weekdays and Saturdays 07:00 - 13:00), evenings and weekends (19:00 - 23:00 weekdays, 13:00 - 23:00 Saturdays and 07:00 - 23:00 Sundays) and night-time (23:00 - 07:00) periods respectively, for instances where existing ambient noise levels are low in relation to these values, which is the case for the Proposed Development.

11.3.4 The magnitude of change relating to construction and decommissioning impacts is described as follows:

- Negligible - where expected construction or decommissioning noise levels are 10 dB below the limits discussed above,
- Low - where expected noise levels are at the construction limits,
- Medium - where expected noise levels are up to 10 dB over the limits; and,
- High - where expected noise levels are more than 10 dB above the limits.

#### *Sensitivity of Receptor*

11.3.5 The sensitivity of receptors neighbouring the Proposed Development are defined as follows:

- Low – industrial buildings/premises and PRowS;
- Medium - commercial offices and workspaces; and,
- High – residential locations including schools and hospitals.

11.3.6 The receptors considered as part of the noise and vibration assessment relate to residential locations (high sensitivity) and PRowS (low sensitivity).

#### *Assessment of Significance*

11.3.7 The significance of a potential effect is determined using the matrix in Table 11.4. Effects identified as ‘major’ and ‘major/moderate’ are considered to be significant.

*Table 11.4 - Significance of Effects Matrix*

Magnitude	Sensitivity		
	High	Medium	Low
<b>High</b>	Major	Major/Moderate	Moderate
<b>Medium</b>	Major/Moderate	Moderate	Moderate/Minor
<b>Low</b>	Moderate/Minor	Moderate/Minor	Minor
<b>Negligible</b>	Minor	Minor	Negligible

*Assessment Scope & Methodology*

- 11.3.8 Noise and vibration generated during the various activities required to construct and decommission the Proposed Development may well be perceptible to residents in the vicinity of the Site. However, the resultant levels are unlikely to breach typical construction noise and vibration limiting requirements with standard mitigation measures in place as the majority of construction and decommissioning activities would occur at distances greater than 200 m from neighbouring properties and all potential impacts would be temporary in any case. Where receptors are located within 200 m of construction activities consideration will be given to applying mitigation measures in line with the principle of ‘best practicable means’.
- 11.3.9 Vibration resulting from the most potentially impactful construction plant (e.g. piling activities, horizontal directional drilling and the use of vibratory rollers) could only be considered significant in close proximity to neighbouring receptors (within 50 m) and given the large setback distances to dwellings and sensitive structures, it is highly unlikely to cause issues in terms of perceptibility and certainly of no concern in terms of potential cosmetic damage to buildings or otherwise.
- 11.3.10 Nevertheless, construction and decommissioning noise and vibration emissions are discussed and assessed with reference to BS 5228 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’.
- 11.3.11 BS 5228 Parts 1 & 2 provides various means of predicting construction noise and vibration levels from a wide selection of plant. A large list of construction plant with corresponding generic source levels are specified for this purpose.
- 11.3.12 A specific detailed construction plan for the Proposed Development is not available at this time and qualitative construction noise and vibration assessment, taking into

account proportionate expected impacts resulting from typical construction practices resulting from developments of this kind, has been undertaken as a result.

- 11.3.13 Traffic volumes generated during the construction and decommissioning of the Proposed Development are detailed within **Chapter 13: Transport & Access [EN010163/APP/6.2.13]**. The comparative baseline and total traffic volumes, when considering the introduction of the Proposed Development (including any cumulative schemes), have been reviewed to determine whether the resultant increase in traffic would result in an appreciable difference in the existing overall average ambient noise levels at the Site as a typical basis of assessment.
- 11.3.14 Given the ability to mitigate construction and decommissioning noise using standard construction best practices, no Category 3 interests, being those individuals that might suffer a nuisance as a result of the Proposed Development, have been identified and as such they are not considered further in this assessment.

## Operation

### *Study Area & Receptors*

- 11.3.15 The receptors identified as part of the construction and decommissioning and shown in **Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]** and **Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]** are also used for the operational noise assessment.
- 11.3.16 Similarly to noise and vibration effects associated with construction and decommissioning, the effect of operational noise and vibration on the users of PRowS is not considered within current planning guidance. However, a discussion of the potential operational effects is provided in Section 11.9 'Residual Effects and Section 11.10 'Cumulative and In-Combination Effects'.

### *Magnitude of Change*

- 11.3.17 The magnitude of change at residences is described as follows:
- Negligible - if the rating level associated with the introduction of the Proposed Development is 10 dB or more below the adopted background sound level;
  - Low - if less than or equal to the adopted background sound level plus 5 dB;
  - Medium - if not more than 10 dB above the background level; and,

- High - if more than 10 dB above.

- 11.3.18 All points are subject to a lower limiting value of 35 dB  $L_{Ar}$ , where the magnitude of change is considered 'low' regardless.
- 11.3.19 These criteria compare to the categories defined by the NPPG (see Section 11.2 'Legislation and Planning Policy'), with rating levels less than or equal to 5 dB above background sound level representing the NOAEL, between 5 and 10 dB above background representing the LOAEL and 10 dB or more above background the SOAEL, notwithstanding the lower limiting value for which impacts are described as low regardless (i.e. in instances where existing background and rating levels are low, the corresponding impact may need to be modified as a result and an assessment in relation to absolute levels could be considered more appropriate).

#### *Sensitivity of Receptor*

- 11.3.20 The sensitivity of receptors (residences and PROWs) is defined in the same way as specified for the construction and decommissioning assessment. Therefore, the residential locations scoped into the assessment are assessed as high sensitivity and PROWs low sensitivity.

#### *Assessment of Significance*

- 11.3.21 The significance of a potential effect is, similarly to the construction assessment, determined using the matrix in Table 11.4 with the effects deemed not significant if 'major/moderate' and 'major' effects are avoided.

#### *Assessment Scope & Methodology*

- 11.3.22 The operational assessment methodology, both in isolative (see Section 11.7 'Assessment of Likely Significant Effects') and cumulative terms (see Section 11.10 'Cumulative and In-Combination Effects'), follows the procedures described within BS 4142 via the comparison of the existing background sound levels with the predicted levels associated with the introduction of the Proposed Development, accounting for any potential character in the sound, and the sound associated with other relevant neighbouring developments of a similar nature. The assessment also incorporates the potential limitations associated with the BS 4142 standard where background sound and operational rating levels are considered low.
- 11.3.23 Existing background and ambient sound levels for a variety of residences neighbouring the Proposed Development have been taken from publicly available information relating to other neighbouring development in the area, as described

- in Section 11.6 'Baseline Conditions' of this Chapter and as agreed with Bassetlaw District Council (BDC)'s Environmental Health Officer (EHO).
- 11.3.24 The predominant sources of sound to be introduced as part of the Proposed Development will be the inverters/power conversion system (PCS) units and linked transformers associated with the solar facilities; further inverters, transformers and battery storage containers forming the proposed BESS; and, a number of substation transformers located at the northern extent of the site.
- 11.3.25 The source levels associated with the BESS and the solar inverter/transformer combinations forming part of the Proposed Development are based on the expected maximum sound output for anticipatory units, as advised as appropriate by candidate manufacturers.
- 11.3.26 In relation to the assessment scope and methodology of cumulative operational effects seventeen 'other development' proposals, that have the potential to create cumulative noise and vibration effects, have been identified in Table 2.9 of **Chapter 2: EIA Methodology [EN010163/APP/6.2.2]**. These 'other development' proposals have been reviewed in context of the zone of influence (ZOI) for noise and vibration effects; this is 2km from the Order Limits, and the majority 'other developments', including Sturton le Steeple Quarry (Planning Reference. 1/22/00047/CDM), Gate Burton Energy Park (Planning Reference. EN010133) and the West Burton Solar Project (Planning Reference. EN010132), have been scoped out of the assessment of cumulative operational effects. In these instances, the noise generating equipment from these other developments have been determined to be sufficiently far from dwellings potentially affected by the Proposed Development or have a different nature of noise generated (i.e. in the case of Sturton-le-Steeple Quarry), such that cumulative effects of any potential significance would be avoided. In the case of the other planned, consented, under construction or constructed residential developments, these are located further from the Proposed Development than residences considered within the assessment. The sites considered above have therefore been omitted from the combined/cumulative noise impact assessment provided in Section 11.10 'Cumulative and In-Combination Effects' as a result.
- 11.3.27 The two 'other developments' considered to have the potential to generate cumulative operational effects are the West Burton C Battery Storage Project

(Planning Reference. 22/01713/FUL) and the consented Wood Lane Solar Farm (Application No. 20/00117/FUL).

11.3.28 A model of the Proposed Development operating in isolation and operating cumulatively with both the neighbouring West Burton C Battery Storage Project (Planning Reference. 22/01713/FUL) and the consented Wood Lane Solar Farm (Application No. 20/00117/FUL) has been developed using CadnaA<sup>20</sup> software.

11.3.29 The ISO 9613-2<sup>21</sup> propagation methodology has been employed to predict the sound levels resulting from the Proposed Development and cumulative schemes at nearby residential properties, incorporating various assumptions and factors which are considered appropriate for use here:

- The various plant to be installed as part of the Proposed Development and that associated with neighbouring solar sites has been modelled as point sources with a height of 2 m;
- The neighbouring West Burton C Battery Storage Project (Planning Reference. 22/01713/FUL) has been modelled using an 8 m source height (as described within the planning application for that scheme);
- Soft ground conditions, as defined within ISO 9613-2, have been assumed (i.e. G=1) as representative of the farmland surrounding the Proposed Development. The ISO 9613-2 standard allows for a range of ground conditions to be applied, from porous ground conditions (G=1), which includes surfaces suitable for the growth of vegetation (i.e. farmland), to hard ground (G=0), such as paving, water and concrete;
- All receptors have been assigned a height of 1.5 m;
- Atmospheric attenuation corresponding to a temperature and relative humidity of 10 °C and 70 % respectively, as defined within ISO 9613-1<sup>22</sup>, which represents relatively low levels of sound absorption in the atmosphere;

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<sup>20</sup> <https://www.datakustik.com/>

<sup>21</sup> International Organisation for Standardisation (January 2024) ISO 9613-2:2024 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: Engineering Method for the Prediction of Sound Pressure Levels Outdoors

<sup>22</sup> International Organisation for Standardisation (June 1993) ISO 9613-1:1993 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere



- The inclusion of the topography of the site and surroundings within the model; and,
- The photovoltaic panels to be introduced as part of the Proposed Development and the consented Wood Lane Solar Farm (Application No. 20/00117/FUL), have also been incorporated into the prediction model as ‘floating barriers’ 0.75 m from the ground and with an overall height of 3 m (with any panel rows less than 130 m in length removed in order to simplify the model). This provides some shielding of sound generated by the equipment to be installed, where certain panels are located directly between residences or PRoWs and the respective ancillary electrical equipment.

- 11.3.30 Furthermore, ISO 9613-2 is a downwind propagation model. Where conditions less favourable to sound propagation occur, such as when the assessment locations are upwind of the Proposed Development, the levels would be expected to be less and the downwind predictions presented as part of this report would be regarded as conservative, i.e. greater than those likely to be experienced in practice.
- 11.3.31 The predominant sources of noise to be associated with the consented Wood Lane Solar Farm are the ancillary inverters and transformers attached to the photovoltaic panels, as located at several positions across that site. The Wood Lane Solar Farm (Application No. 20/00117/FUL) site was considered to have such a low impact in terms of operational noise levels that a noise and vibration assessment was not submitted in support of the associated planning application and no controls were imposed as conditions of consent. The consented Wood Land Solar Farm is at a far more advanced stage of development and may have higher source levels for the installed equipment. As a result, higher source sound power levels have been assumed for the inverter to be installed at that site as compared with that for the Proposed Development as a conservative basis of cumulative assessment.
- 11.3.32 Similarly to the BESS aspect of the Proposed Development, the proposed West Burton C Battery Storage Project (Planning Reference. 22/01713/FUL) is expected to have noise sources of a similar nature. The expected sound levels associated with the potential introduction of the West Burton C Battery Storage Project are based on information supporting the associated planning application which indicates that, as a maximum, approximately 2200 BESS units, 550 inverter/transformer

- combinations and 2 main transformers could be installed. The source levels stated within the noise assessment have been summed together to provide an overall representative sound power level for the West Burton C Battery Storage Project development as a whole and are modelled as an 8 m high source at the centre of the developable area (similar to the modelling parameters used as part of the noise assessment for the West Burton C Battery Storage Project development). This approach represents a suitable basis of assessment given the large distances between the site and the residential locations relevant to the Proposed Development and results in sound pressure levels that are similar to that presented within the assessment supporting the West Burton C Battery Storage Project planning application.
- 11.3.33 The inverters (PCS units) associated with the solar aspect of the Proposed Development and consented neighbouring Wood Lane Solar Farm (Application No. 20/00117/FUL) are assumed not to be operational during night-time periods. However, these sites may start becoming operational in early hours of the morning during particularly bright summer months, although this will occur very rarely and this equipment will be operating under a much-reduced electrical load during these periods, substantially reducing the expected sound power levels as compared with the daytime scenario.
- 11.3.34 The BESS aspects of the Proposed Development and the neighbouring proposed West Burton C BESS facility (Planning Reference. 22/01713/FUL) are assumed to be operating at their typical maximum output continuously.
- 11.3.35 The assumed sound power data for the assessment are provided in Table 11.5. The overall levels correspond to the expected maximum noise output for each of the respective plant, as advised by the candidate manufacturers, taken from historical source information or extracted from documentation supporting the cumulative schemes considered here, where appropriate. The propagation modelling therefore represents a conservative scenario and the actual levels would be less when the respective sites are not operating at their maximum expected capacity.

Table 11.5 - Overall Sound Power Levels, dB L<sub>WA</sub>

Equipment & ID	Sound Power Level, dB L <sub>WA</sub>
Power Conversion System (PCS)	80
Battery Energy Storage System (BESS)	68
Transformer (TRA)	76
Substation (SUB)	90
Wood Lane Power Conversion System (WLPCS)	88
West Burton C BESS (WBC) Overall Total	113

- 11.3.36 The various equipment has been located at the associated hard standings relating to each inverter/transformer combination and BESS location for all the sites considered.
- 11.3.37 The sound emitted by the various equipment to be introduced as part of the Proposed Development can have distinctive tonal character (i.e. a whine, whistle or hum). Under the subjective method described in BS 4142, a correction of 2 dB has been applied to account for this feature. However, the assessed specific and rating levels detailed in the 'Assessment of Likely Significant Effects' section are particularly low and, in most instances, potential tonal component in the sound emitted from the various plant may well be masked by existing sources of background/ambient sound in the area.
- 11.3.38 Traffic generated for the maintenance and general operational requirements of the Proposed Development will be light, resulting in small increases in traffic along local roads, notwithstanding exceptional circumstances where increased vehicle movements could be expected in emergency or critical situations. Traffic volumes generated during the operation of the Proposed Development are detailed within **Chapter 13: Transport & Access [EN010163/APP/6.2.13]**. The comparative baseline and total traffic volumes, when considering the introduction of the Proposed Development (including any cumulative schemes), have been reviewed to determine whether the resultant increase in traffic would result in an appreciable difference in the existing overall average ambient noise levels at the Site as a typical basis of assessment.

- 11.3.39 Given the low level of operational noise anticipated, no Category 3 interests, being those individuals that might suffer a nuisance as a result of the Proposed Development, have been identified and as such they are not considered further in this assessment.

## 11.4 Assessment Assumptions and Limitations

### Construction and Decommissioning

- 11.4.1 A qualitative construction and decommissioning noise assessment has been undertaken. Due to the generic nature of the impacts, the well-known and well-tested mitigation measures that may be applied and the lack of detail as to the exact timing of construction activities at this stage in the development proposals for the Site, specific predicted construction noise and vibration levels have not been provided.

### Operation

- 11.4.2 The combination of assumptions detailed within Section 11.3 'Assessment Methodology' are considered to provide a conservative prediction/modelling basis overall and can be considered to provide a suitable basis for decision making as a result.

## 11.5 Stakeholder Engagement

- 11.5.1 A Scoping Report<sup>23</sup> for the Proposed Development was submitted to the Planning Inspectorate (PINS) in April 2024 (see **Appendix 1.1-Steeple Renewables Project EIA Scoping Report [EN010163/APP/6.3.1]**). This provides details as to the general proposed assessment approach to operational and construction noise and vibration resulting from the introduction of the Proposed Development.
- 11.5.2 The EIA Scoping Report provided details as to the extent of assessment provided within this Chapter and no direct response was received as to the suitability of the proposals in the Scoping Opinion. However, PINS requested that noise and vibration impacts were considered in relation to receptors associated with landscape and visual impacts, cultural heritage assets and potential ecological receptors via the cross-referencing of relevant Chapters, depending on the

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<sup>23</sup> RES/Pegasus Group (April 2024) DT I P22-1144 - Steeple Renewables Project - Environmental Impact Assessment Scoping Report - Land at Sturton le Steeple, Nottinghamshire

discipline, where considered appropriate and on a basis to be agreed with certain consultees (PINS Response ID 3.6.2).

- 11.5.3 A summary of further points raised in the Scoping Opinion are provided in Table 11.6.

*Table 11.6 - EIA Scoping Responses and Actions Taken*

Consultee and Date	Summary of Consultation Response	How is this addressed in the ES
PINS (June 2024)	Response ID 3.6.3  The study area is defined, with a plan of relevant sensitive receptors provided and that these are also agreed with relevant consultees.	A plan of the relevant sensitive receptors for assessment for the operation and construction of the Proposed Development was provided with the Scoping Report, an updated version (reflecting the Draft Order Limits) was provided as part of the PEIR and the finalised version (reflecting the finalised Order Limits) is provided in <b>Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]</b> and <b>Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]</b> of this Environmental Statement (ES).
PINS (June 2024)	Response ID 3.6.4  Noise from operational and construction traffic is considered in combination with the noise resulting from the equipment to be installed as ancillary to the Proposed Development.	Traffic and industrial noise sources are very different in character and separate assessment processes apply due to the general stable and consistent levels of noise generated by industrial equipment and the sporadic nature of noise generated by vehicle movements. As a result, it is not considered appropriate or necessary to provide an assessment of the in-combination overall levels.  However, reference is made to the expected generation of traffic in relation to construction and operation detailed within <b>Chapter 13: Transport &amp; Access [EN010163/APP/6.2.13]</b> and the expected relevant/relative impacts as a result.
PINS (June 2024)	Response ID 3.6.5  The impact of noise and vibration during construction on ecology should be considered.	The noise and vibration generated by construction in relation to ecological receptors can generally be considered secondary to the far more direct impacts from these activities such that, if the direct impacts can be timed and/or controlled appropriately, noise and vibration impacts would

Consultee and Date	Summary of Consultation Response	How is this addressed in the ES
		also be mitigated sufficiently to result in impacts that are considered not significant. <b>Chapter 7: Ecology &amp; Biodiversity [EN010163/APP/6.2.7]</b> indicates that there are no species at the Site that would be considered particularly sensitive to noise and vibration generated by the introduction and operation of the Proposed Development.
PINS (June 2024)	Response ID 3.6.5  Potential sources of operational vibration from the introduction of the substation and battery storage aspects of the Proposed Development should be considered.	There is no evidence to suggest that the ancillary equipment to be installed as part of the Proposed Development (including the proposed BESS and transformers forming the substation) would generate any substantial/perceptible ground-borne vibration close to each piece of equipment, certainly not at residential distances, and this aspect is not considered further as a result.
PINS (June 2024)	Response ID 3.7.2  The potential for higher noise levels from the equipment to be installed as part of the Proposed Development is considered due to the potential for increased cooling requirements as a result of increased temperatures associated with climate change.	Despite the upward trend in temperatures in the UK and globally as a result of climate change, it is not expected that these increases would be so substantial as to significantly affect equipment cooling requirements and the corresponding noise output of the equipment to be installed at the Proposed Development. Temperatures in the UK will remain relatively mild and indicative manufacturers data indicates that normal operational modes for a wide range of ambient temperatures would still apply in practice.

11.5.4 A summary of the Statutory Consultation undertaken, responses given and how these are addressed here is provided in Table 11.7.

*Table 11.7 - Statutory Consultation Responses and Actions Taken*

Consultee and Date	Summary of Consultation Response	How is this addressed in the ES
BDC	A letter outlining the main points of the noise and vibration assessment undertaken in this	The assessment has been undertaken in line with the agreed methodology.



Consultee and Date	Summary of Consultation Response	How is this addressed in the ES
(November 2024)	Chapter was provided to the EHO and, subject to some minor clarifications, was agreed.	
Hayton Parish Council (February 2025)	General commentary regarding the potential for noise impacts associated with the site with specific reference to the proposed battery storage facilities and the potential requirement for barriers/screening of noise generating equipment.	<p>The Applicant acknowledges that some noise and vibration could be generated during the construction, operation and decommissioning of the Proposed Development via the use of certain construction plant, the operation of various ancillary electrical equipment and the additional traffic generated by the Proposed Development in isolative and cumulative terms.</p> <p>This chapter addresses all relevant potential noise and vibratory effects from the introduction of the Proposed Development, concluding that noise and vibration generated during the temporary construction, operation and decommissioning of the site is considered not significant in the context of normal planning requirements, provided that typical mitigation measures are implemented, and that best practice is followed.</p>
Campaign to Protect Rural England (February 2025)	General commentary as to potential noise impacts during construction of the Proposed Development.	See above.
Sturton le Steeple Parish Council (February 2025)	General commentary regarding the potential for construction noise with specific reference to cumulative construction noise impacts.	See above.

## 11.6 Baseline Conditions

- 11.6.1 The existing environment at the majority of properties neighbouring the Proposed Development is typical of a relatively rural area and consists of noise generated by vehicle movements along the local and more distant wider road network, birds and wildlife, farm machinery, localised human activities and aircraft overhead with some industrial noise from existing industry located to the north of the Proposed Development.
- 11.6.2 Existing sources of vibration are expected to primarily emanate from traffic movements in the area, and from Heavy Goods Vehicles (HGVs) in particular. Some existing vibration may also result from the very occasional tremor and as a result of demolition works at the West Burton Power Plant, potentially when using explosives to remove the existing infrastructure.
- 11.6.3 A representative selection of properties, which are located closest to and surround the Proposed Development (within approximately 2 km of the Order Limits), along with the locations of relevant PROWs are shown in **Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]** and **Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]**. The residential receptors are listed out in Table 11.8.

*Table 11.8 - Residential Assessment Locations*

ID	Name <sup>24</sup>	Co-Ordinates (OSGB)	
		Easting	Northing
H1	Sturton High House	475790	383281
H2	Clarborough Grange	474900	383834
H3	Whinleys House Farm	475035	382889
H4	Caddow Wood Farm	477078	381990
H5	Caddow Farm	475960	381679
H6	North Leverton Windmill	477508	382012
H7	Mill Close	478096	382171
H8	Manor Grove	478274	382195

<sup>24</sup> Names are provided by Ordnance Survey mapping data. Where a name in Table 11.8 is “Dwelling”, this is the name provided by Ordnance Survey mapping data.

ID	Name <sup>24</sup>	Co-Ordinates (OSGB)	
		Easting	Northing
H9	Sturton Road Farm	478488	382328
H10	Dwelling	478593	382437
H11	Dwelling	478552	382610
H12	Dwelling	478677	382616
H13	Leverton Road (Dwelling)	478590	382946
H14	Northside Lane	479336	382319
H15	Northfield Road	479637	382287
H16	Field House Farm	480265	382277
H17	Toll Bar Cottage	481479	383068
H18	Littleborough	482280	382540
H19	Fingle Street	478853	382337
H20	Fenton Lane	479438	383013
H21	Three Leys Lane	479291	383023
H22	30 Leverton Road	478725	383635
H23	Springs Lane	478466	383850
H24	Low Holland Lane	479333	383955
H25	Manor Farm	479119	383981
H26	West End Farm	478242	384042
H27	Caddow View	478544	384332
H28	4 Brickings Way	478761	384044
H29	North Street	479008	384514
H30	Watkins Lane	478618	384650
H31	Gainsborough Road	478495	384717
H32	Station Road (Dwelling)	478271	384527
H33	Station Road (Dwelling)	478324	384596
H34	St Ives	478670	385073
H35	Woodland Farm	477892	384665

ID	Name <sup>24</sup>	Co-Ordinates (OSGB)	
		Easting	Northing
H36	Dwelling	478220	384857
H37	Dwelling	478140	384805
H38	Dwelling	477865	384813
H39	Dwelling	477801	384825
H40	Dwelling	477512	384984
H41	Dwelling	476762	385353
H42	Wheatley Road (Dwelling)	477098	385234
H43	South Wheatley	476753	385447
H44	Dwelling	476570	385427
H45	Mudsplit Lane	476285	385405

- 11.6.4 All residential assessment locations are considered to have a high sensitivity, as defined in Section 11.3 ‘Assessment Methodology’.
- 11.6.5 The background sound levels for a variety of residences neighbouring the Proposed Development have been taken from publicly available information<sup>25</sup> relating to the neighbouring West Burton C 500 MW Battery Energy Storage System development (Planning Reference. 22/01713/FUL) and applied to relevant dwellings located closest to the Proposed Development. This information is considered suitable for use here as the levels remain consistent with information supporting previous planning applications in the area. This approach has been agreed with the EHO representing BDC.
- 11.6.6 Table 11.9 shows the determined background and residual/ambient sound levels at each of the measurement locations, as marked in **Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]** and **Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]**.

<sup>25</sup> AECOM Limited (December 2022) Document Ref: PA-005 - West Burton C Battery Energy Storage System - Land to the north of the West Burton B Power Station, Nottinghamshire - Operational Noise Assessment

*Table 11.9 - Existing Background & Ambient Sound Levels*

ID	Co-Ordinates (OSGB)		Background Sound Level, dB L <sub>A90</sub>		Residual Sound Level, dB L <sub>Aeq</sub>	
	Easting	Northing	Day	Night	Day	Night
L1	478870	384505	31	26	50	46
L2	478603	385406	34	33	55	51
L3	478791	386454	37	34	50	43
L4	479505	387048	37	34	49	45
L5	482143	387850	36	29	49	41
L6	482491	387018	35	29	49	43
L7	482924	384669	36	24	50	42

- 11.6.7 The levels from L1 & L2 have been used to represent the properties located to the north of the Proposed Development (i.e. H34 – St Ives and the H29, H30 & H31 dwellings located on North Street, Watkins Road and Gainsborough Road respectively) as both these survey locations are in close proximity to these residences.
- 11.6.8 A 31 dB L<sub>A90</sub> daytime and 24 dB L<sub>A90</sub> night-time background with a 49 dB L<sub>Aeq</sub> daytime and 41 dB L<sub>Aeq</sub> night-time residual/ambient sound level have been used to represent the remainder of the assessment locations. These levels are representative of the lowest measured at all the survey positions and therefore represent an approach that can be considered conservative.

## 11.7 Assessment of Likely Significant Effects

### Construction and Decommissioning

- 11.7.1 The main activities which have the potential to generate noise and vibration during construction and decommissioning are the formation or removal of the access tracks; installation/removal of the solar panel frame supports (which may involve piling); construction/break-up of hard-standings; Horizontal Directional Drilling (HDD), cable trenching and landscaping (including the removal and reinstatement of the land) when occurring in proximity to neighbouring residences; the subsequent construction of the battery storage and any ancillary solar equipment; installation of transmission connection; and, the installation of any necessary

- ecological and landscape mitigation measures. However, the majority of works will be undertaken at substantial distances (> 200 m) from neighbouring properties and corresponding levels of noise and vibration generated would be unlikely to breach normal limiting requirements during standard working hours. A similar rationale can be applied to the decommissioning of the Proposed Development and noise and vibration effects pertaining to both construction and decommissioning activities. Given the high sensitivity of neighbouring residences and the expected low magnitude of change the overall effect in these instances can be considered **moderate/minor** (see Table 11.4) and **not significant** as a result.
- 11.7.2 Other activities will either occur at distances which are very unlikely to result in levels that would breach typical construction noise limits or involve relatively light construction methods/techniques that would equally result in the generation of comparably low temporary levels of noise and vibration.
- 11.7.3 Additional traffic movements generated during the construction phase, along existing local roads and access tracks, also have the potential to have sporadic noise and vibration impacts at residences adjacent to these. However, this only tends to result in a relatively minor increase over the existing average noise levels from pre-existing roads, with the most noticeable noise and perceptible vibration effects resulting from the sporadic and increased number of HGVs passing by residences along the access routes, with resulting levels for individual events being similar to that created by existing HGV movements. In the case of the use of the introduced access tracks, overall levels are highly unlikely to breach typical construction noise limits due to the sporadic noise generating nature of the vehicle movements and the relatively high daily average noise limits that apply.
- 11.7.4 **Chapter 13: Transport & Access [EN010163/APP/6.2.13]** provides details as to the expected number of vehicle movements along local roads during the construction of the Proposed Development and a review indicates that the total road traffic volumes for all access routes, would increase by up to ~40 % during the most intensive period(s) of construction, when assuming a conservative basis of assessment, substantially less during operation. This increase corresponds to a very minimal difference in overall average daily ambient noise levels due to traffic of less than three decibels (dB), depending on the overall percentage of heavy goods vehicles (HGVs), and will have no effect on the outcomes of the operational and construction/decommissioning assessments in both isolative and cumulative terms



- regardless. The relative low magnitude of change at the high-sensitivity receptors is considered to have a **moderate/minor** (see Table 11.4) effect and therefore is **not significant**. In reality, the most noticeable noise and perceptible vibration effects will result from the sporadic and increased number of HGVs passing by residences along the various access routes, with resulting levels for individual events being similar to that created by existing HGV and light vehicle movements.
- 11.7.5 Overall, it is expected that the maximum potential impacts due to the construction of the Proposed Development at residences located closest to the Proposed Development, without typical mitigation measures (for example, a selection of those listed in Section 1.8 ‘Mitigation and Enhancement’) being applied, may temporarily exceed typical planning requirements and could be considered to have a medium magnitude of change at the high sensitivity receptors with the corresponding significance of effects being **major/moderate** (see Table 11.4) and therefore **significant**.
- 11.7.6 Occasional temporary noise and vibration generated during the construction phase may well be perceptible to users of the PROWs passing through and surrounding the Site and could be considered a medium magnitude of change at these low sensitivity receptors with a corresponding significance of effects being **moderate/minor** (see Table 11.4) and therefore **not significant** even without typical/standard mitigation measures in place.

### Operation

- 11.7.7 The predicted daytime and night-time specific sound levels and corresponding rating levels (i.e. including a 2 dB penalty for tones) at the properties located nearest to the Proposed Development are shown in Table 11.10. The rating level is compared to the adopted background levels for daytime and night-time periods to provide the associated magnitude of change at each residential location, notwithstanding the 35 dB L<sub>Ar</sub> lower limiting point at which the magnitude of change is considered to be low regardless (see Section 11.3 ‘Assessment Methodology’).
- 11.7.8 The background levels, as taken from the assessment provided in support of the West Burton C BESS Development (Planning Reference. 22/01713/FUL), have been used to represent each residential location referenced herein and is considered to provide a conservative basis of assessment (see Section 11.6 ‘Baseline Conditions’).

Table 11.10 - BS 4142 Assessment

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
<b>Daytime</b>					
H1	16	18	31	-13	Negligible
H2	9	11	31	-20	Negligible
H3	10	12	31	-19	Negligible
H4	19	21	31	-10	Negligible
H5	12	14	31	-17	Negligible
H6	19	21	31	-10	Negligible
H7	19	21	31	-10	Negligible
H8	18	20	31	-11	Negligible
H9	18	20	31	-11	Negligible
H10	19	21	31	-10	Negligible
H11	20	22	31	-9	Low
H12	19	21	31	-10	Negligible
H13	22	24	31	-7	Low
H14	17	19	31	-12	Negligible
H15	17	19	31	-12	Negligible
H16	18	20	31	-11	Negligible
H17	18	20	31	-11	Negligible
H18	10	12	31	-19	Negligible
H19	17	19	31	-12	Negligible
H20	22	24	31	-7	Low
H21	21	23	31	-8	Low
H22	21	23	31	-8	Low
H23	22	24	31	-7	Low
H24	25	27	31	-4	Low
H25	24	26	31	-5	Low

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
H26	24	26	31	-5	Low
H27	23	25	31	-6	Low
H28	23	25	31	-6	Low
H29	29	31	31	0	Low
H30	25	27	31	-4	Low
H31	24	26	31	-5	Low
H32	23	25	31	-6	Low
H33	23	25	31	-6	Low
H34	29	31	34	-3	Low
H35	22	24	31	-7	Low
H36	22	24	31	-7	Low
H37	22	24	31	-7	Low
H38	21	23	31	-8	Low
H39	21	23	31	-8	Low
H40	21	23	31	-8	Low
H41	17	19	31	-12	Negligible
H42	21	23	31	-8	Low
H43	16	18	31	-13	Negligible
H44	15	17	31	-14	Negligible
H45	13	15	31	-16	Negligible
Night-time					
H1	11	13	24	-11	Negligible
H2	5	7	24	-17	Negligible
H3	6	8	24	-16	Negligible
H4	13	15	24	-9	Low
H5	7	9	24	-15	Negligible
H6	14	16	24	-8	Low

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
H7	14	16	24	-8	Low
H8	13	15	24	-9	Low
H9	14	16	24	-8	Low
H10	14	16	24	-8	Low
H11	15	17	24	-7	Low
H12	15	17	24	-7	Low
H13	17	19	24	-5	Low
H14	13	15	24	-9	Low
H15	13	15	24	-9	Low
H16	13	15	24	-9	Low
H17	13	15	24	-9	Low
H18	7	9	24	-15	Negligible
H19	13	15	24	-9	Low
H20	17	19	24	-5	Low
H21	17	19	24	-5	Low
H22	19	21	24	-3	Low
H23	19	21	24	-3	Low
H24	23	25	24	1	Low
H25	23	25	24	1	Low
H26	20	22	24	-2	Low
H27	22	24	24	0	Low
H28	21	23	24	-1	Low
H29	28	30	26	4	Low
H30	25	27	26	1	Low
H31	24	26	26	0	Low
H32	21	23	24	-1	Low
H33	21	23	24	-1	Low

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
H34	29	31	33	-2	Low
H35	19	21	24	-3	Low
H36	21	23	24	-1	Low
H37	20	22	24	-2	Low
H38	18	20	24	-4	Low
H39	18	20	24	-4	Low
H40	17	19	24	-5	Low
H41	12	14	24	-10	Negligible
H42	16	18	24	-6	Low
H43	12	14	24	-10	Negligible
H44	11	13	24	-11	Negligible
H45	9	11	24	-13	Negligible

- 11.7.9 The assessment indicates that the predicted magnitude of change from the Proposed Development at the nearest neighbouring high sensitivity residences is low-to-negligible for both daytime and night-time periods. This corresponds to **moderate/minor** effects (see Table 11.4) and is considered **not significant** as a result.
- 11.7.10 Further to the above, the introduction of the Proposed Development is not predicted to make any appreciable difference to the existing levels of ambient noise in the area (i.e. an increase of 1 dB or less) during operation and the generalised levels to minimise health effects, as set out within WHO guidance and which BS 8233 also references, would not be exceeded (see Section 11.2 'Legislation and Planning Policy') unless existing levels are already at or above the suggested thresholds.
- 11.7.11 The noise emitted by the Proposed Development can also be considered 'present and not intrusive' in terms of guidance provided within the NPPG (see Section 11.2 'Legislation and Planning Policy'). This corresponds to the 'No Observed Adverse Effect Level' (NOAEL) and no specific action is therefore required to further mitigate operational noise associated with the introduction of the Proposed Development.

- 11.7.12 The effects arising from the Proposed Development, upon users of the various PRoWs during the operational phase, will be entirely subjective. However, an indication of the levels of operational noise generated by the Proposed Development on the PRoWs crossing and near to the Site is shown in **Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]** and **Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]**. The resultant operational noise generated by the Proposed Development will be at a level for which it would be easy to hold a conversation, even when positioned directly adjacent to any electrical equipment installed as ancillary to the panels comprising the Proposed Development. Furthermore, there is no evidence these typical acoustic levels of onsite operational noise would result in any potential health impacts. The low magnitude of change at these low sensitivity receptors corresponds to **minor** effects (see Table 11.4) and the overall impact is therefore considered **not significant**.

## 11.8 Mitigation and Enhancement

### Construction and Decommissioning

- 11.8.1 For all activities, measures will be taken to reduce noise levels in accordance with the concept of ‘best practicable means’ (see Section 72 of the CoPA), which BS 5228-1 makes reference to. The BS 5228 standards state that community relations are important in minimising the likelihood of complaints and therefore liaison with the local authority and members of the public will take place to ensure that residents are informed of the intended activities.
- 11.8.2 Activities that have the potential to generate the highest levels of noise and vibration will occur during normal working hours (07:00 - 19:00 weekdays and Saturdays 07:00 – 13:00) with less intensive activities potentially occurring outside these hours depending on the location and sensitivity of the works.
- 11.8.3 The following construction noise and vibration mitigation measures will be implemented where appropriate and proportionate, facilitated via a Construction and Environmental Management Plan (CEMP):
- Consideration shall be given to noise and vibration emissions when selecting or modifying the plant and equipment to be used on the Site, with quieter variants given preference;

- All plant and equipment will be used in accordance with manufacturers' instructions, maintained in good working order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable;
- Where noise generated from a specific activity is expected to be directional, steps will be taken to orientate the equipment such that noise is directed away from any sensitive areas;
- Stationary noise sources shall be sited as far away as reasonably possible from residential properties and consideration given as to whether it is necessary to install acoustic barriers to provide screening;
- The movement of vehicles to and from the Site shall be controlled and employees instructed to ensure compliance with the noise control measures adopted;
- Reducing the number of construction activities occurring simultaneously;
- The re-routing and/or temporary closure of relevant PRowS;
- Restricting activities being performed within a certain distance of sensitive locations; and,
- Minimising the level of construction traffic associated with the Proposed Development.

### Operation

- 11.8.4 The Proposed Development has been designed on an iterative basis with a view to minimising, as far as practicably possible, the projected operational noise levels with due regard to the relative sensitivity of neighbouring premises, PRowS and all other site constraints.
- 11.8.5 Section 11.7 'Assessment of Likely Significant Effects' indicates that predicted operational noise levels resulting from the introduction of the Proposed Development results in a negligible-to-low magnitude of change during both daytime and night-time periods, meeting the typical requirements of BS 4142 and other relevant planning policy and no specific mitigation is required to further reduce operational noise levels as a result. However, further mitigation measures may be incorporated into the Proposed Development at the detailed design stage depending on the specific equipment/plant to be installed in order to ensure that any potential operational noise impacts remain low.



## 11.9 Residual Effects

### Construction and Decommissioning

- 11.9.1 Noise and vibration during the construction of the Proposed Development may well be audible and/or perceptible to people residing in the area and the users of PRowS, but the levels will be below established limits and planning requirements in this respect due to the typical large distances (>200 m) between the Proposed Development and the surrounding dwellings and the low sensitivity of PRow users considered here. Where construction noise relating to the provision of access to the Site, including the upgrade of local roads and their use thereof, is expected to occur in closer proximity to residences, enhanced mitigation measures, such as those set out in Section 11.8 'Mitigation and Enhancement, would be adopted to reduce noise and vibration where necessary. The expected maximum noise and vibration levels due to the construction of the Proposed Development, with the application of appropriate and applicable mitigation measures in potentially sensitive areas, will not exceed typical planning requirements and can be considered to have a low magnitude of change with the corresponding significance of effects being **moderate/minor** at residential receptors and **minor** at PRowS (see Table 11.4) and therefore **not significant**.

### Operation

- 11.9.2 The operational assessment demonstrates that predicted noise levels from the Proposed Development at the high sensitivity residential properties and low sensitivity PRowS users represent a low-to-negligible magnitude of change. Therefore, a maximum of **moderate/minor** effects at residences and **minor** effects at PRowS corresponds to **no significant** impacts with respect to the operational phase.
- 11.9.3 Furthermore, the levels can be considered 'present and not intrusive' in terms of Government policy and guidance provided within the NPPG (see Section 11.2 'Legislation and Planning Policy). This corresponds to the 'No Observed Adverse Effect Level' (NOAEL) and no specific action is therefore required to further mitigate operational noise associated with the introduction of the Proposed Development.

## 11.10 Cumulative and In-Combination Effects

### Construction and Decommissioning

#### *Cumulative Effects*

- 11.10.1 The construction and/or decommissioning of ‘other developments’ in the area, including the decommissioning of the West Burton A Power Station (Planning Reference. 23/00485/DEM), is unlikely to result in any substantial cumulative impacts when considered to be occurring at the same time as the construction of the Proposed Development. Standard controls and mitigation for construction noise and vibration will likely apply in any case. As a result, it is considered that this aspect is not required to be considered in any specific detail, with the expected maximum resultant magnitude of change to be low at the high sensitivity residences and low sensitivity PRowS, with the corresponding significance of effect being **moderate/minor** at residences and **minor** at PRowS (see Table 11.4), similarly to the isolative assessment, and therefore **not significant**.

#### *In-combination Effects*

- 11.10.2 In-combination effects such as noise (including vibration) with the effects of other topics during the construction and/or decommissioning of the Proposed Development, at local residences and on users of PRowS, are not expected to be greater than that provided for each individual technical aspect considered in isolation. Where the highest and most direct effects from other topics are predicted, the overall magnitude of in-combination effects would not be expected to increase as a result of concurrent noise and vibration effects.

### Operation

#### *Cumulative Effects*

- 11.10.3 A further assessment has been undertaken to establish the overall cumulative effects of the Proposed Development operating at the same time as other neighbouring developments of a similar industrial nature. The sound levels from the neighbouring consented West Burton C Battery Storage Project (Planning Reference. 22/01713/FUL) and the consented Wood Lane Solar Farm (Planning Reference. 20/00117/FUL) have been established by incorporating those sites into the prediction model (see Section 11.3 ‘Assessment Methodology’).
- 11.10.4 The predicted specific sound levels from each of those ‘other developments’ have been added logarithmically, an overall 2 dB penalty has been applied, and the

overall rating level is compared with the adopted background sound levels in the same manner as for the isolative assessment, notwithstanding the 35 dB  $L_{Ar}$  lower limiting point at which the magnitude of change are considered to be low regardless (see Section 11.3 'Assessment Methodology').

- 11.10.5 Table 11.11 shows the assessment of the combined effect from the Proposed Development, the neighbouring consented West Burton C Battery Storage Project (Planning Reference. 22/01713/FUL) and the consented Wood Lane Solar Farm (Planning Reference. 20/00117/FUL).

*Table 11.11 - Cumulative BS 4142 Assessment*

House ID	Specific Level, dB $L_{Aeq}$	Rating Level, dB $L_{Ar}$	Background Level, dB $L_{A90}$	$L_{Ar} - L_{A90}$ , dB	Potential Impact
<b>Daytime</b>					
H1	21	23	31	-8	Low
H2	17	19	31	-12	Negligible
H3	16	18	31	-13	Negligible
H4	20	22	31	-9	Low
H5	15	17	31	-14	Negligible
H6	20	22	31	-9	Low
H7	20	22	31	-9	Low
H8	20	22	31	-9	Low
H9	20	22	31	-9	Low
H10	20	22	31	-9	Low
H11	21	23	31	-8	Low
H12	21	23	31	-8	Low
H13	23	25	31	-6	Low
H14	19	21	31	-10	Negligible
H15	19	21	31	-10	Negligible
H16	19	21	31	-10	Negligible
H17	21	23	31	-8	Low

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
H18	15	17	31	-14	Negligible
H19	19	21	31	-10	Negligible
H20	23	25	31	-6	Low
H21	22	24	31	-7	Low
H22	23	25	31	-6	Low
H23	24	26	31	-5	Low
H24	27	29	31	-2	Low
H25	26	28	31	-3	Low
H26	26	28	31	-3	Low
H27	25	27	31	-4	Low
H28	25	27	31	-4	Low
H29	30	32	31	1	Low
H30	27	29	31	-2	Low
H31	27	29	31	-2	Low
H32	26	28	31	-3	Low
H33	26	28	31	-3	Low
H34	30	32	34	-2	Low
H35	25	27	31	-4	Low
H36	25	27	31	-4	Low
H37	25	27	31	-4	Low
H38	25	27	31	-4	Low
H39	25	27	31	-4	Low
H40	25	27	31	-4	Low
H41	23	25	31	-6	Low
H42	24	26	31	-5	Low
H43	22	24	31	-7	Low
H44	21	23	31	-8	Low

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
H45	21	23	31	-8	Low
Night-time					
H1	15	17	24	-7	Low
H2	11	13	24	-11	Negligible
H3	10	12	24	-12	Negligible
H4	15	17	24	-7	Low
H5	10	12	24	-12	Negligible
H6	15	17	24	-7	Low
H7	16	18	24	-6	Low
H8	16	18	24	-6	Low
H9	16	18	24	-6	Low
H10	17	19	24	-5	Low
H11	18	20	24	-4	Low
H12	18	20	24	-4	Low
H13	19	21	24	-3	Low
H14	16	18	24	-6	Low
H15	17	19	24	-5	Low
H16	17	19	24	-5	Low
H17	18	20	24	-4	Low
H18	14	16	24	-8	Low
H19	16	18	24	-6	Low
H20	20	22	24	-2	Low
H21	20	22	24	-2	Low
H22	21	23	24	-1	Low
H23	22	24	24	0	Low
H24	25	27	24	3	Low
H25	25	27	24	3	Low

House ID	Specific Level, dB L <sub>Aeq</sub>	Rating Level, dB L <sub>Ar</sub>	Background Level, dB L <sub>A90</sub>	L <sub>Ar</sub> - L <sub>A90</sub> , dB	Potential Impact
H26	22	24	24	0	Low
H27	24	26	24	2	Low
H28	24	26	24	2	Low
H29	29	31	26	5	Low
H30	27	29	26	3	Low
H31	26	28	26	2	Low
H32	24	26	24	2	Low
H33	24	26	24	2	Low
H34	30	32	33	-1	Low
H35	22	24	24	0	Low
H36	24	26	24	2	Low
H37	23	25	24	1	Low
H38	22	24	24	0	Low
H39	22	24	24	0	Low
H40	21	23	24	-1	Low
H41	18	20	24	-4	Low
H42	20	22	24	-2	Low
H43	18	20	24	-4	Low
H44	17	19	24	-5	Low
H45	16	18	24	-6	Low

11.10.6 The cumulative assessment of effects indicates that the predicted magnitude of change at the nearest neighbouring high sensitivity residences are, similarly to the isolative assessment, negligible-to-low for both daytime and night-time periods. This corresponds to a maximum of **moderate/minor** effects and are therefore considered **not significant**.

11.10.7 The operation of the Proposed Development at the same time as the 'other developments' considered for the cumulative effects assessment is not predicted to

- make any appreciable difference to the existing levels of ambient noise in the area (i.e. an increase less than 1 dB). These levels would not be above the generalised limits to minimise health effects specified within WHO guidance which BS 8233 also references (see Section 11.2 'Legislation and Planning Policy') unless existing levels are already at or above the suggested thresholds, in which case the contribution and magnitude of change resulting from the introduction of the Proposed Development could be considered negligible at the high sensitivity receptors resulting in a **minor** effect at most and therefore **not significant**.
- 11.10.8 Furthermore, the noise emitted by the Proposed Development can also be considered 'present and not intrusive' in terms of Government policy and guidance provided within the NPPG (see Section 11.2 'Legislation and Planning Policy'. This corresponds to the 'No Observed Adverse Effect Level' (NOAEL) and no specific action is therefore required to further mitigate operational noise associated with the introduction of the Proposed Development.
- 11.10.9 An indication of the cumulative operational noise levels generated by the Proposed Development and other neighbouring schemes operating at the same time, on the residences and PROWs, for daytime and night-time periods respectively, are shown in **Figure 11.1 Assessment Locations and Daytime Specific Sound Levels [EN010163/APP/6.4.11]** and **Figure 11.2 Assessment Locations and Night-time Specific Sound Levels [EN010163/APP/6.4.11]**.
- 11.10.10 The combined operational impact of the Proposed Development and other cumulative schemes on the users of the low sensitivity PROWs is not expected to result in any significant increase to the low magnitude of change considered for the isolative assessment, resulting in **moderate/minor** effects at residences and **minor** effects at PROWs, and this aspect is therefore considered **not significant**.
- In-Combination Effects*
- 11.10.11 In-combination effects due to noise/vibration and the effects of other topics during the operation of the Proposed Development are, similarly to construction effects, not expected to be greater than that provided for each individual technical aspect considered in isolation. Where the highest and most direct effects from other topics are predicted, the overall magnitude of in-combination effects would not be expected to increase as a result of concurrent noise and vibration effects.



## 11.11 Summary

### Introduction

- 11.11.1 An operational and construction assessment relating to noise and vibration resulting from introduction of the Proposed Development on nearby residential properties and PRoWs has been provided.

### Baseline Conditions

- 11.11.2 The existing environment at the majority of properties neighbouring the Proposed Development is typical of a relatively rural area and consists of noise generated by vehicle movements along the local and more distant wider road network, birds and wildlife, farm machinery, localised human activities and aircraft overhead with some industrial noise from existing industry located to the north of the Proposed Development.
- 11.11.3 Existing sources of vibration are expected to primarily emanate from traffic movements in the area, and from Heavy Goods Vehicles (HGVs) in particular. Some existing vibration may also result from the very occasional tremor and as a result of demolition works at the West Burton Power Plant, potentially when using explosives to remove the existing infrastructure.
- 11.11.4 Baseline ambient and background sound levels have been taken from information in the public domain which relates to a neighbouring development, for which the derived levels have been shown to be representative, especially for receptors considered most sensitive to noise and vibration from the introduction of the Proposed Development. This approach has been agreed with the EHO representing BDC.

### Likely Significant Effects

- 11.11.5 Construction and decommissioning noise and vibration from the introduction and removal of the Proposed Development could be **significant** at residences and **not significant** at PRoWs in the absence of standard mitigation measures which would incorporate the adoption of a CEMP and the use of ‘best practicable means’ to reduce and mitigate construction noise and vibration levels as far as reasonably possible.
- 11.11.6 A low-to-negligible magnitude of change associated with the operation of the Proposed Development at high sensitivity residences and low sensitivity PRoWs, in

isolation and cumulatively, can be considered to result in a maximal **moderate/minor** effect at residences and **minor** effect at PROWs and therefore **not significant**.

- 11.11.7 Traffic generated during construction, decommissioning, maintenance and general operational requirements of the Proposed Development will result in relatively small increases in average daily traffic noise from along local roads. This aspect is therefore also considered **not significant**.

### Mitigation and Enhancement

- 11.11.8 Provided that appropriate mitigation measures during the construction and decommissioning of the Proposed Development are adopted as a matter of due course, which will be facilitated via the CEMP, and that particular attention is paid to potentially sensitive locations, levels are unlikely to exceed typical limiting criteria at nearby properties.
- 11.11.9 The Proposed Development has been designed on an iterative basis with a view to minimising, as far as practicably possible, the projected operational noise levels with due regard to the relative sensitivity of neighbouring premises, PROWs and all other site constraints.

### Cumulative and In-Combination Effects

- 11.11.10 Cumulative noise and vibration during the construction of the Proposed Development may well be audible and/or perceptible to people residing in the area and the users of PROWs, but the levels will be below established limits and planning requirements in this respect due to the typical large distances (>200 m) between the Proposed Development and the surrounding dwellings and the low sensitivity of PROW users. The construction and/or decommissioning of 'other developments' in the area, including the decommissioning of the West Burton Power Station, is unlikely to result in any substantial cumulative impacts when considered to be occurring at the same time as the construction of the Proposed Development. Standard controls and mitigation for construction noise and vibration will likely apply in any case. The maximum resultant magnitude of change due to cumulative construction activities is expected to be low at the high sensitivity residences and low sensitivity PROWs, with the corresponding significance of effect being **moderate/minor** at residences, **minor** at PROWs and therefore **not significant**.

- 11.11.11 The cumulative operational assessment demonstrates that predicted noise levels from the Proposed Development at the high sensitivity residential properties and low sensitivity PRow users result in a **low-to-negligible** magnitude of change. Therefore, the resultant effects with respect to the operational phase are considered **moderate/minor** at residential receptors and **minor** at PRow and the corresponding impacts are considered **not significant**.
- 11.11.12 In-combination effects at local residences and on users of PRow due to noise/vibration and concurrent impacts from other assessment disciplines, during the construction/decommissioning and operation of the Proposed Development, are not expected to be greater than that provided for each individual topic considered in isolation. Where the most direct effects from other topics are expected, the overall magnitude of in-combination effects would not be expected to increase as a result of concurrent noise and vibration effects.

### Conclusion

- 11.11.13 An assessment of the potential noise and vibration impacts associated with the introduction of the Proposed Development has been undertaken which demonstrates that, isolative and cumulative impacts associated with operation and construction/decommissioning of the Site can be considered **not significant** provided that established and typical mitigation measures are applied during the construction and decommissioning of the Site.

Table 11.12 - Summary and Residual Effects

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Construction								
Residences	Noise & Vibration	Temporary	High	Medium	Local	Major/Moderate (Significant)	Best practicable means, enhanced mitigation where necessary and via a CEMP.	Moderate/Minor (Not Significant)
PRoWs	Noise & Vibration	Temporary	Low	Medium	Local	Moderate/Minor (Not Significant)		Minor (Not Significant)
Operation								
Residences	Noise & Vibration	Permanent	High	Low	Local	Moderate/Minor (Not Significant)	Embedded in site design.	Moderate/Minor (Not Significant)
PRoWs	Noise & Vibration	Permanent	Low	Low	Local	Minor (Not Significant)		Minor (Not Significant)

Receptor/ Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation/ Enhancement Measures	Residual Effects
Cumulative Construction								
Residences	Noise & Vibration	Temporary	High	Medium	Local	Major/Moderate (Significant)	Best practicable means,  enhanced mitigation where necessary and via a CEMP.	Moderate/Minor (Not Significant)
PRoWs	Noise & Vibration	Temporary	Low	Medium	Local	Moderate/Minor (Not Significant)		Minor (Not Significant)
Cumulative Operation								
Residences	Noise & Vibration	Permanent	High	Low	Local	Moderate/Minor (Not Significant)	Embedded in site design.	Moderate/Minor (Not Significant)
PRoWs	Noise & Vibration	Permanent	Low	Low	Local	Minor (Not Significant)		Minor (Not Significant)