

Cottam Solar Project

Preliminary Environmental Information Report Chapter 15: Noise and Vibration

Prepared by: Tetra Tech Limited
June 2022



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VOLUME 2 – APPENDICES (SEPARATE DOCUMENT)

- 15.1 Noise Survey Information
- 15.2 Acoustic Terminology

Issue Sheet

Report Prepared for: Cottam Solar Project Ltd.

Preliminary Environmental Information Report: Chapter 15: Noise and Vibration Report

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15 Noise and Vibration

15.1 Introduction

15.1.1 This chapter of the PEIR evaluates the likely significant effects of the Scheme as described in **Chapter 4: Development Proposal** on nearby noise and vibration sensitive receptors during construction, operation and decommissioning. The aim of this assessment is to predict the levels of noise and assess these against relevant guidelines.

15.1.2 This chapter is supported by the following Appendices:

- **Appendix 15.1:** Noise Survey Information
- **Appendix 15.2:** Acoustic Terminology

15.1.3 This chapter includes the following elements:

- Policy Content
- Assessment Methodology and Significance Criteria
- Baseline Conditions
- Identification and Evaluation of Key Effects
- In-combination Effects
- Cumulative Effects
- Mitigation Measures
- Residual Effects

15.2 Consultation

15.2.1 A summary of consultee comments relevant to this chapter, along with information about how comments have been responded to is outlined in Table 15.1.

Table 15.1: Summary of Consultation Responses

Date	Consultee and Response	Action
March 2022	PINS Scoping Opinion	
	The ES should assess noise impacts from construction traffic where significant effects are likely to occur; the noise assessment should characterise noise impacts based on the volume of traffic, percentage of HGVs and distance from the source using a recognised methodology such as BS5228.	At this stage details of HGV movements associated with the construction phase of the scheme are not known. Therefore, the assessment of construction traffic noise will be included in the ES.
	Scoping Report paragraph 15.4.6 states that there would be no significant sources of vibration during operation. Considering the nature of the Proposed Development during operation, the inspectorate is content to scope this matter out. The ES should describe the potential sources of vibration arising from the operation of e.g. substation and battery storage infrastructure and any measures to control emissions.	Assessment of construction vibration is discussed in section 15.7 of this report
	Scoping Report section 4.2 identifies that the type of panel to be used is not yet determined and tracking panels may be used. Should this type of panel be used, the ES should assess the potential for significant noise effects on ecological and human receptors during operation.	Should tracking panels be selected, the ES will assess the potential for significant noise effects on receptors.
May 2022	EHO and Planning Officer, West Lindsey District Council	
	Tetra Tech contacted WLDC to discuss the assessment methodology for the assessment. Scoping report was provided along with background monitoring	WLDC to confirm methodology.

	locations. It discussed use of absolute noise levels when existing background noise levels are very low.	
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15.3 Legislative and Policy Content

15.3.1 This section provides an overview of the legislative and planning policy framework against which the Scheme will be considered for noise and vibration. These policies identify the need for a site-specific noise assessment to consider the impacts of construction and operational phase noise on local noise-sensitive receptors.

Legislation

Control of Pollution Act 1974

15.3.2 The Control of Pollution Act 1974 (CoPA) requires that Best Practicable Means (BPM), as defined in Section 72 of the CoPA, are adopted to control construction noise on any given site. Sections 60 and 61 of the CoPA provide the main legislation regarding enabling works and construction site noise and vibration. If noise complaints are received, a Section 60 notice may be issued by the Local Authority with instructions to cease work until specific conditions to reduce noise have been adopted.

15.3.3 Section 61 of the CoPA provides a means to apply for prior consent to carry out noise generating activities during construction. Once prior consent has been agreed under Section 61, this provides a defence for any contravention of a Section 60 notice provided the agreed conditions are maintained on-site.

15.3.4 Prior to the commencement of any phase of the Scheme a Construction Environmental Management Plan (CEMP) will be submitted to and approved by the relevant planning authority, and this will be secured by a requirement in the DCO. The CEMP for each phase will be in accordance with the Outline CEMP which will be submitted as part of the DCO application. This will ensure the potential construction impacts are minimised including how the project will seek to manage noise generated during construction. A draft Outline CEMP is submitted as part of the PEIR and can be found in **Appendix 4.3**.

Environmental Protection Act 1990

15.3.5 The Environmental Protection Act 1990 (EPA) prescribes a statutory nuisance as noise (and vibration) emitted from premises (including land) that is prejudicial to health or a nuisance.

- 15.3.6 Local Authorities are required to investigate any public complaints of noise, and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they must serve a noise abatement notice. A notice is served on the person responsible for the nuisance. It requires either simply the abatement of the nuisance or works to abate the nuisance to be carried out, or it prohibits or restricts the activity.
- 15.3.7 In determining if a noise complaint amounts to a statutory nuisance the Local Authority can take account of various guidance documents and existing case law as no statutory noise limits currently exist for defining a statutory nuisance. Demonstrating the use of BPM to minimise noise levels is an accepted defence against failure to comply with a noise abatement notice.
- 15.3.8 The DCO Application will include a Statement of Statutory Nuisance, which will be informed by the noise and vibration chapter of the Environmental Statement.

National Planning Policy

- 15.3.9 The following planning policy, legislation, guidance and standards are of particular relevance to operational noise.
- Overarching National Policy Statement for Energy (EN-1);
 - National Policy Statement on Renewable Energy Infrastructure (EN-3);
 - Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)
 - National Planning Policy Statement for Electrical Networks (EN-5);
 - The National Planning Policy Framework (NPPF);
 - The Noise Policy Statement for England (NPSE); and
 - BS4142:2014 Methods for rating and assessing industrial and commercial sound.
- 15.3.10 The overarching NPS for Energy (EN-1) was adopted in July 2011 and sets out the overall national energy policy for delivering major energy infrastructure.
- 15.3.11 Section 5.11.4 of EN-1 deals with effects from noise and vibration, and states;
- “Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:*
- *a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive, tonal, impulsive or low frequency characteristics of the noise;*

- *identification of noise sensitive premises and noise sensitive areas that may be affected;*
- *the characteristics of the existing noise environment;*
- *a prediction of how the noise environment will change with the proposed development;*
- *in the shorter term such as during the construction period;*
- *in the longer term during the operating life of the infrastructure;*
- *at particular times of the day, evening and night as appropriate;*
- *an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and*
- *measures to be employed in mitigating noise."*

15.3.12 The information required above is detailed within sections 15.5 (Baseline Conditions), 15.6 (Embedded Design Mitigation) and 15.7 (Identification and Evaluation of Key Effects) of this chapter.

15.3.13 Paragraph 5.11.6 of EN-1 refers to the need to assess operational noise using the principles of the relevant British Standards, for example BS 4142 'Method for rating and assessing industrial and commercial sound'.

15.3.14 With regards to the decision-making process, EN-1 states (as paragraph 5.11.8) that the project should;

- Demonstrate good design through selection of the quietest cost-effective plant available;
- Containment of noise within buildings wherever possible;
- Optimisation of plant layout to minimise noise emissions; and, where possible
- Use landscaping, bunds or noise barriers to reduce noise transmission.

15.3.15 The overarching NPS for Energy (EN-3) was adopted in July 2011 and sets out the overall national energy policy for delivering renewable energy infrastructure.

15.3.16 Paragraph 2.4.2 of EN-3 refers to the need renewable energy infrastructure proposals to demonstrate noise mitigation in the design and refers to EN-1 for guidance on the undertaking of the noise and vibration assessment.

- 15.3.17 The National Policy Statement on Electricity Networks Infrastructure 5 (EN-5) was adopted in July 2011. Whilst EN-5 principally covers above-ground electricity lines of 132 kV and above, paragraph 1.8.2 confirms that EN-5 will also be relevant if the electricity network constitutes an associated development for which consent is sought, such as a generating station. EN-5 is therefore relevant to the Scheme, as a grid connection is proposed.
- 15.3.18 Noise and vibration is considered in Section 2.9 of EN-5 and refers to Section 5.11 of EN-1 with regard to generic noise considerations.
- 15.3.19 Section 2.9.7 of EN-5 states that audible noise effects can arise from substation equipment such as transformers, quadruple boosters and switched capacitors.
- 15.3.20 Section 2.9.12 of EN-5 suggests that applicants should have considered the following mitigation measures:
- The positioning of lines;
 - Ensuring that the appropriately sized conductor arrangement is used to minimise potential noise;
 - Avoiding damage to overhead line conductors which can increase potential noise effects; and
 - Ensuring conductors are kept clean and free of surface contaminants during stringing / installation.

The National Planning Policy Framework (NPPF)

- 15.3.21 The NPPF (updated July 2021) sets out the Government's planning policies for England, providing a framework within which local policies can be developed. The key principle of the NPPF is a presumption in favour of sustainable development (paragraph 11). With regards to noise, section 15, *Conserving and enhancing the natural environment* of the National Planning Policy Framework provides the following guidance in relation to noise impacts.

"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans..."

“185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason...”

“187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.

188. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

The Noise Policy Statement for England (NPSE)

15.3.22 The NPSE (published March 2010) sets out the role and purpose of noise policy, together with the Government’s Noise Policy Vision and Aims, consistent with the NPPF.

15.3.23 The aims of the NPSE (paragraph 1.7) require that:

- Significant adverse effects on health and quality of life are avoided, while taking into account the guiding principles of sustainable development;
- Adverse effects on health and quality of life are mitigated or minimised; and
- Where possible, noise management should seek to improve health and quality of life within the context of Government policy on sustainable development.

15.3.24 Paragraph 2.24 of the NPSE states that in relation to minimising and mitigating adverse effects:

“...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

15.3.25 At paragraphs 2.20 and 2.21, the NPSE introduces the following concepts with regard to noise effects:

- No Observed Effect Level (NOEL) – This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- Lowest Observed Adverse Effect Level (LOAEL) – This is the level above which adverse effects on health and quality of life can be detected but are not necessarily significant.
- Significant Observed Adverse Effect Level (SOAEL) – This is the level above which significant adverse effects on health and quality of life occur.

15.3.26 Paragraph 2.15 of the NPSE recognises that it is not possible to have a single set of noise levels relating to the above categories which are applicable to all sources of noise in all situations, and it is acknowledged that further research is required to increase the understanding of what may constitute a significant adverse effect on health and quality of life from noise.

Planning Practice Guidance – Noise

15.3.27 The Planning Practice Guidance – Noise (PPGN) (updated July 2019) sets out guidance on how planning can manage potential noise effects in a new development.

15.3.28 In terms of how to recognise when noise could be a concern, PPGN provides a table outlining perception, outcomes, effect level and action required. This table is reproduced in Table 15.2.

Table 15.2: Operational Noise Significance Criteria

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No Specific Measures Required
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
Lowest Observed Adverse Effect Level (LOAEL)			
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 character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
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
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BS4142:2014 Methods for rating and assessing industrial and commercial sound

- 15.3.29 BS4142:2014 describes methods for rating and assessing sound in order to provide an indication its likely effect upon nearby premises (typically residential dwellings).
- 15.3.30 When considering the level of effect, BS4142:2014 emphasises the importance of the context in which a sound occurs. The standard therefore takes great care in the use of the words ‘sound’ and ‘noise’. Sound can be measured by a sound level meter or other measuring system, whereas noise is related to a human response and is routinely described as unwanted sound, or sound that is considered undesirable or disruptive.
- 15.3.31 The specific sound emitted from the Scheme (dB, LAeq) is rated by taking into account both the level and character (i.e., tonal elements, impulsivity, intermittency and distinctiveness) of the sound. This is achieved by applying appropriate corrections to the specific sound level externally at the receptor location, which gives the rating level of the sound in question. This is then assessed against the existing prevailing background sound level (dB, LA90) at that location in order to determine a likely level of effect.
- 15.3.32 The level by which the rating level exceeds the prevailing background sound level indicates the following potential effects:
- A difference of 10 dB or more is likely to be an indication of a significant adverse effect, depending on the context;
 - A difference of around 5 dB is likely to be an indication of an adverse effect, depending on the context; and
 - Where the rating level does not exceed the background level, this is an indication of the specific sound source having a low effect, depending on the context.

15.4 Assessment Methodology and Significance Criteria

Construction Assessment Methodology

Noise

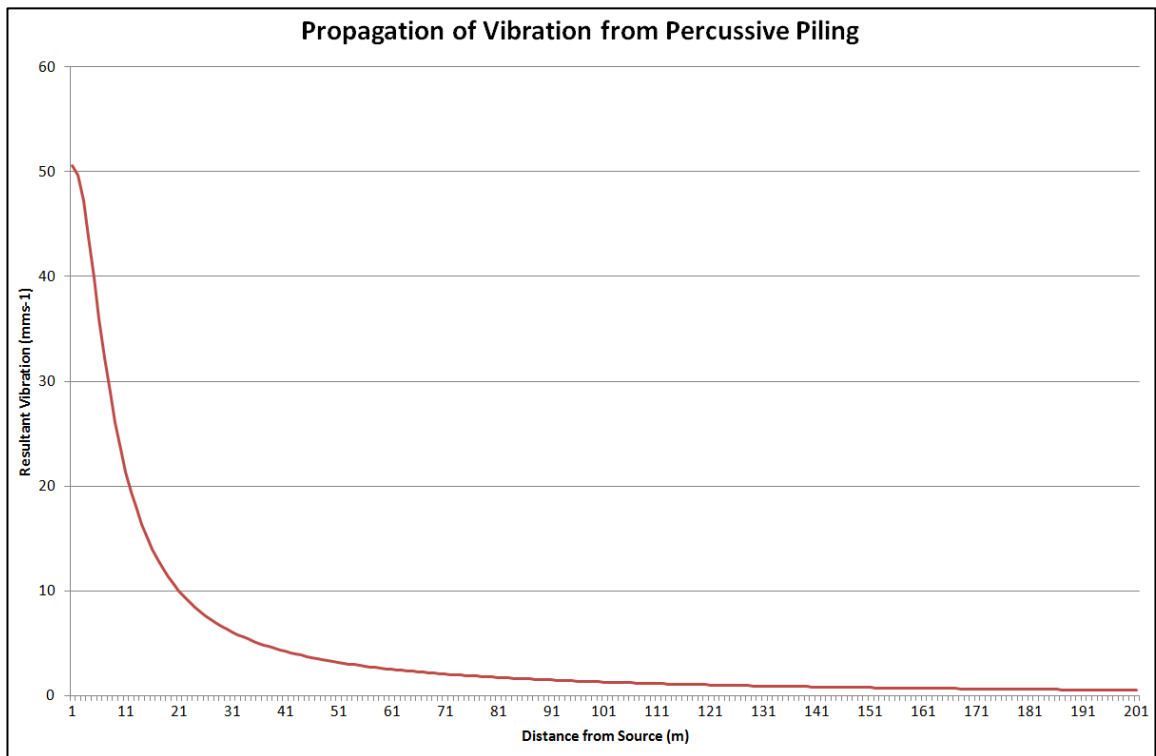
- 15.4.1 An assessment of the potential effects of noise during construction will be carried out for the closest, and therefore most noise sensitive, residential properties and ecological designations as identified in **Appendix 15.1**. An assessment of construction noise will be based on the ABC method of assessment using the methodology set out in British Standard 5228. The assessment is based upon typical solar farm construction activities and types and numbers of plant.
- 15.4.2 Under the ABC method, a threshold value noise level is determined by establishing the existing ambient noise level at each assessment location. This measured ambient noise level is then rounded to the nearest 5dB and the threshold value for each receptor is then established from Table E.1 of the standard (reproduced below as Table 15.3). This threshold value is then the L_{Aeq} noise level that should not be exceeded at the assessment location by construction activities.
- 15.4.3 The following construction activities are considered to be those with the most potential to result in adverse noise effects:
- Construction of tracks and hardstanding areas;
 - Installation of mounting frames (vibratory piling);
 - Installation of panels; and
 - Construction of the substation.
- 15.4.4 The distance between each noise sensitive receptor and the closest point at which each construction activity (excluding construction traffic on public roads) would occur will be identified and used to calculate worst case noise levels using the source data and methodology described in BS 5228-1:2014. These predicted levels will then be assessed against significance criteria derived from those suggested in BS 5228-1:2014.

Vibration

- 15.4.5 The construction activities considered are those with most potential to result in adverse vibratory effects, namely:
- Vibratory piling of PV panel framework; and
 - Vibratory compaction of tracks/hardstanding areas.

- 15.4.6 All other construction activities are considered to produce negligible levels of vibration and as such, do not require detailed assessment.
- 15.4.7 The levels of vibration at the specified receptors have been predicted using the formulae provided in Table E.1 of BS 5228-2:2009+A1:2014. The methodology for predicting vibration at each receptor uses the distance to the construction activity and a scaling factor based on the probability of the predicted value being exceeded. The propagation of ground-borne vibration is highly complex and is depended upon the specific geology of the propagation path from source to receptor. However, the formulae provide a reasonable estimation of the level of vibration likely to be experienced in practice. The formulae give a peak particle velocity (PPV) which can be compared to significance criteria derived from levels specified in BS 5228-2.

Graphical representation of the propagation of vibration from percussive piling



Construction Significance Criteria

Construction Noise Significance Criteria

- 15.4.8 The most notable impacts due to increases in noise and vibration during construction would be during periods of earthworks and construction of site

infrastructure. In addition to on-site sources, increased noise may be caused by HGV movements travelling to and from the site during construction.

15.4.9 Noise levels from potential construction activity associated with the Scheme will be assessed in accordance with BS 5228-1:2009 + A1 2014 criteria which indicate if a significant effect is likely to occur at noise sensitive properties. In order to ensure that the assessment is worst case, it is assumed that all proposed construction activity is occurring simultaneously.

15.4.10 In accordance with ABC method of assessment outlined in BS 5228-1:2009+A1 2014, a significant effect is deemed to occur if the site noise level exceeds the threshold level for the category appropriate to the Ambient Noise level. As shown in **Appendix 15.1** all nearby noise sensitive premises included in this assessment are currently exposed to ambient noise levels which comply with Category A.

Table 15.3: Construction Noise Thresholds at Residential Dwellings

Assessment category and threshold value period	Threshold Value $L_{Aeq,T}$ dB(A) – free-field		
	Category A (a)	Category B (b)	Category C (c)
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends (d)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the Application Site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (<i>i.e.</i> the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. NOTE 3: Applies to residential receptors only.			
(a) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. (b) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values. (c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values. (d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.			

15.4.11 Table 15.4 below gives noise criteria levels in respect to the ABC method of assessment.

Table 15.4: Noise Level Criteria (Construction Noise Assessment)

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level	Construction Noise Assessment	ABC Method Site L_{Aeq} noise levels are 10dB below the relevant threshold values	No Action Required Complaints Relating to Plant Noise Unlikely
Lowest Observed Adverse Effect Level (LOAEL)	Construction Noise Assessment	ABC Method Site L_{Aeq} noise levels are equal/ below the relevant threshold values	Mitigate to achieve site noise levels below relevant category threshold
Significant Observed Adverse Effect (SOAEL)	Construction Noise Assessment	ABC Method Site L_{Aeq} noise levels are higher than the relevant threshold values Or Construction activities cause noise levels to increase by more than 3dB (where ambient noise levels exceed threshold Values)	Mitigate to achieve site noise levels below relevant category threshold
Unacceptable Observed Adverse Effect	Construction Noise Assessment	ABC Method Site L_{Aeq} noise levels are higher than the relevant threshold values Or Construction activities cause noise levels to increase by more than 10dB (where ambient noise levels exceed threshold Values)	Mitigate to achieve site noise levels below relevant category threshold

Construction Vibration Significance Criteria

- 15.4.12 BS 5228:2009-2+A1:2014 provides guidance on the effects of vibration, including vibration levels at which effects are be perceptible to human receptors. Table 15.5 summarises this guidance.

Table 15.5: Vibration Significance Criteria

Vibration Level (mms^{-1})	Effect
0.3	Vibration might just be perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10.0	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

- 15.4.13 It is considered that the above guidance translates into the following magnitude criteria for the purposes of this assessment.

Table 15.6: Magnitude of Effect - Vibration

Magnitude of Effect	Criteria	Action / Justification
Negligible	< 0.3 mm/s	No Action Required. Complaints relating to vibration unlikely
Moderate	≥ 0.3 to < 1.0 mm/s	Mitigate to achieve vibration levels below relevant category threshold.
Major / Moderate	≥ 1.0 to < 10 mm/s	Mitigate to achieve vibration levels below relevant category threshold.
Major	≥ 10 mm/s	Mitigate to achieve vibration levels below relevant category threshold.

- 15.4.14 The recommended PPV vibration limits for transient vibration, above which cosmetic damage could occur for different types of buildings are provided in BS 5228-2 and presented in Table 15.7. For these limits, 'minor damage' is possible at vibration magnitudes that are greater than twice those given in Table 15.8, and 'major damage' can occur at values greater than four times the tabulated values. Consequently, the significance of effect has been provided based on the sensitivity of a building to vibration induced cosmetic damage.

Table 15.7: Transient Vibration Guide Values for Cosmetic Damage

Type of Building	Peak Component Particle Velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Residential or Light Commercial Type Buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 50 Hz and above

15.4.15 In this instance, Moderate or Major effects are regarded as being significant in terms of the EIA Regulations.

[Construction Traffic Assessment Methodology](#)

Noise

15.4.16 Noise from construction traffic on public roads will be assessed on the basis of the change in traffic noise levels due to the addition of traffic associated with construction of the Scheme. Baseline traffic flows for each location will be sourced from **Chapter 14: Access and Traffic**. The percentage increases in all traffic and for HGVs will be used together with the number of vehicles, proportion of HGVs and likely speed (based on the type of road) to calculate the likely change in traffic noise level due to construction traffic for the peak of the construction programme in terms of vehicle movements, using the method described in Calculation of Road Traffic Noise (CRTN).

Vibration

15.4.17 Vibration from traffic can be transmitted through the ground by the interaction of the vehicle tyres and the road surface. The passage of vehicles over irregularities in the road can create locally increased levels of vibration. The Design Manual for Roads and Bridges (DMRB) states that extensive research on a wide range of buildings has found no evidence of traffic induced ground borne vibration being a source of significant damage to buildings.

15.4.18 With regard to human perception, DMRB states that perceptible vibration only occurs in rare cases and notes that the normal use of a building, such as closing doors and operating domestic appliances, can produce levels of vibration similar to that of passing traffic.

15.4.19 In relation to ground-borne vibration Paragraph A5.26 of DMRB states: "Such vibrations are unlikely to be important when considering disturbance from new roads and an assessment will only be necessary in exceptional circumstances". The

Applicant will engage with West Lindsey District Council and Bassetlaw District Council to ensure that the delivery route is maintained and improved as appropriate, ensuring that levels of vibration are minimised as far as practicable.

- 15.4.20 No effects from traffic-induced ground-borne vibration are anticipated and such effects have therefore not been considered further.

Construction Traffic Significance Criteria

- 15.4.21 The magnitude of effects, in terms of the predicted change in traffic noise levels on public roads, expressed as $L_{A10,18\text{hour}}$ in accordance with CRTN, and based on criteria defined in DMRB are defined as follows:

Table 15.8: Magnitude of Effect – Construction Traffic

Magnitude of Effect	Criteria	Action / Justification
Negligible	Change in noise is: 0.0 - 0.9 dB $L_{A10,18\text{h}}$	No action required. Complaints relating to road traffic noise unlikely.
Moderate	Change in noise is: 1.0 - 2.9 dB $L_{A10,18\text{h}}$	Mitigate to achieve total noise levels below relevant category threshold.
Major / Moderate	Change in noise is: 3.0 - 4.9 dB $L_{A10,18\text{h}}$	Mitigate to achieve total noise levels below relevant category threshold.
Major	Depending on context, change in noise is: >5.0 dB $L_{A10,18\text{h}}$	Mitigate to achieve total noise levels below relevant category threshold.

- 15.4.22 Moderate or Major effects are regarded as being significant in terms of the EIA Regulations.

Operational Noise Assessment Criteria

- 15.4.23 In summary, the assessment process follows the methodology set out in BS 4142:2014+A1:2019, in accordance with paragraph 5.11.6 of EN-1, which comprises:

- Identification of potential receptors;
- Measurement of existing (baseline) background noise levels at a representative selection of potential receptors;
- Prediction of specific sound from the Scheme at each receptor;

- Application of appropriate corrections to the specific sound to account for the level and character of the sound (i.e., the rating level); and
- Assessment of the rating level against the prevailing background sound level, taking context into account.

15.4.24 The assessment of the potential effects of noise during operation of the Scheme will be carried out for the closest, and therefore most noise sensitive properties.

Operational Noise Significance Criteria

15.4.25 Operational noise effects at the nearest noise sensitive receptors will be assessed according to BS 4142:2014 and the guidance from the NPSE and PPGN.

15.4.26 Based upon this guidance, the following BS 4142:2014 rating differences are considered to apply:

Table 15.9: Magnitude of Effect – Operational Noise

Magnitude of Effect	Criteria	Action / Justification
Negligible	BS4142 score of zero or lower.	No action required. Score of zero or lower is an indication of the sound source having a low effect.
Moderate	BS4142 score of +5 or lower.	Difference of +5 dB likely to be an indication of an adverse effect. Mitigate to achieve: BS4142 score of plus 5 or lower.
Major / Moderate	BS4142 score greater than +5.	Difference of +10 dB likely to be an indication of a significant adverse effect. Mitigate to achieve: BS4142 score of plus 5 or lower.
Major	BS4142 score of +10 or higher.	Mitigate to achieve: BS4142 score of 5 dB or lower.

15.4.27 BS 4142 advises that where rating levels and background levels are low, the assessment of operational noise should take into context the absolute noise level. Assuming that, at night, residents will be inside their property, they would benefit from noise attenuation from the building envelope. BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ suggests that a building envelope with a partially open window is generally accepted to attenuate noise by up to 15 dB.

15.4.28 BS 8233 and the World Health Organization (WHO) 'Guidelines for Community Noise' (1999) provide guidance levels for internal noise within dwellings and bedrooms of 35 dB $L_{Aeq,16hr}$ during the daytime and 30 dB $L_{Aeq,8hr}$ during the night-time. BS 8233 also advises that internal noise levels 5 dB greater than the guidance levels are 'reasonable'. As such, where predicted rating levels exceed the background level at a receptor but are limited to an absolute external noise level of 50 dB $L_{Ar,Tr}$ during the daytime and 45 dB $L_{Ar,Tr}$ during the night-time then this will be considered as a low adverse magnitude impact. Absolute external noise levels up to 55 and 50 dB $L_{Ar,Tr}$ during the daytime and night-time will be considered as a medium adverse magnitude impact, and any greater will be considered a high adverse magnitude impact.

Assessment of Sensitivity

15.4.29 The nature or sensitivity on all identified environmental receptors, as well as the magnitude of impact on those receptors will be described as high, medium, low or very low. What this looks like for this topic is set out below.

Table 15.10: Sensitivity/Importance of the Identified Environmental Receptor

Sensitivity	Definition
High	Residential properties (permanent tenants), schools and hospitals and sensitive species
Medium	Offices, internal teaching / training spaces
Low	Commercial premises

Assessment of Significance

15.4.30 The level of significance of each effect is determined by combining the impact with the sensitivity of the receptor. Table 15.11 shows how the interaction of magnitude and sensitivity can be combined to determine the significance of an environmental effect.

Table 15.11: Criteria for Assessing the Significance of Noise Effects

Sensitivity	High	Medium	Low
Magnitude			
High	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Moderate/Minor
Low	Moderate	Moderate/Minor	Minor
Negligible	Moderate/Minor	Minor	Negligible

- 15.4.31 For the purposes of this assessment, moderate or major effects are considered to be significant in terms of the EIA Regulations.

15.5 Baseline Conditions

Background Survey

- 15.5.1 This section discusses the baseline information relevant to this chapter.
- 15.5.2 The baseline noise environment has been established following noise surveys undertaken at each of the three land parcels as outlined in **Appendix 15.1**. The locations and summary of these measurements can be found on **Appendix 15.1** below.

Cottam 1 Noise Survey

- 15.5.3 The baseline noise environment has been established following a noise survey undertaken from Thursday 9th September 2021 to Thursday 16th September 2021. Attended 15-minute short-term measures were undertaken at nine locations during the day, evening and night-time periods with four additional locations being measured unattended over a 161-hour period. Full details of the noise monitoring survey are presented within **Appendix 15.1**, with a brief summary provided below.
- 15.5.4 The existing ambient noise climate was mainly dominated by road traffic noise and occasional farming related noise. The main sources of this noise included: Kexby Road, Willingham Road, Stow Road, the A1500 and the B1241. A summary of the baseline noise monitoring survey is shown in **Appendix 15.1**.
- 15.5.5 Statistical analysis of the long-term measured data, to derive representative background noise levels for the daytime and night-time periods are shown in Figures 15.1 – 15.8 below.

Figure 15.1: Existing Daytime Background Noise Level – Statistical Analysis LT1

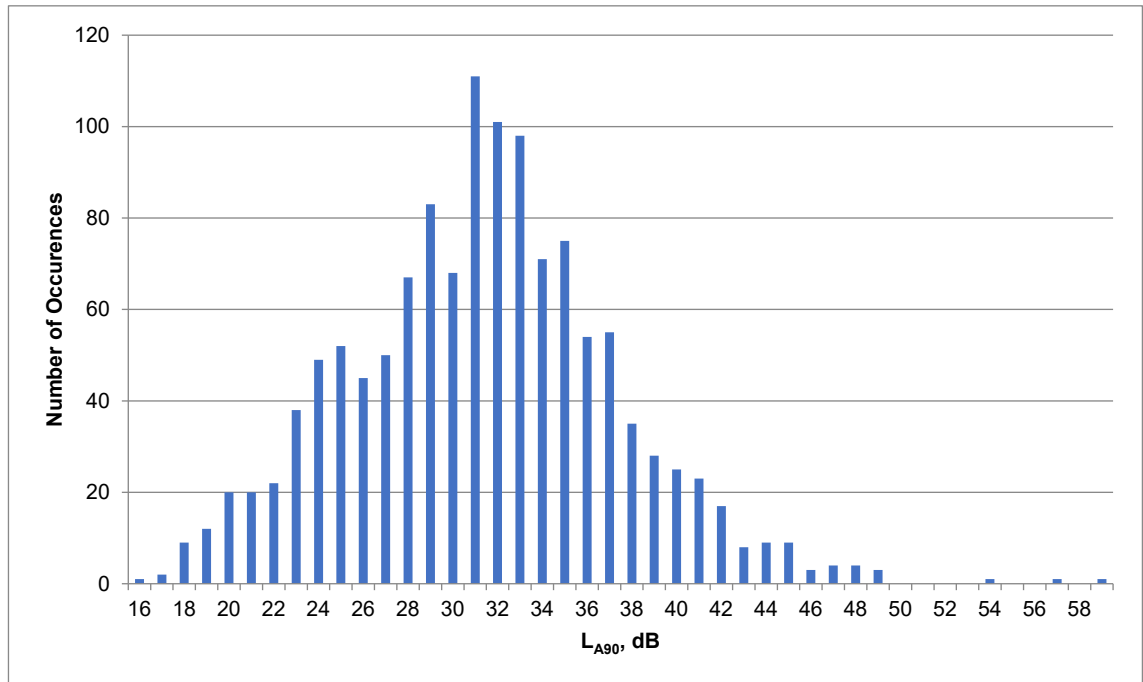


Figure 15.2: Existing Night-time Background Noise Level – Statistical Analysis LT1

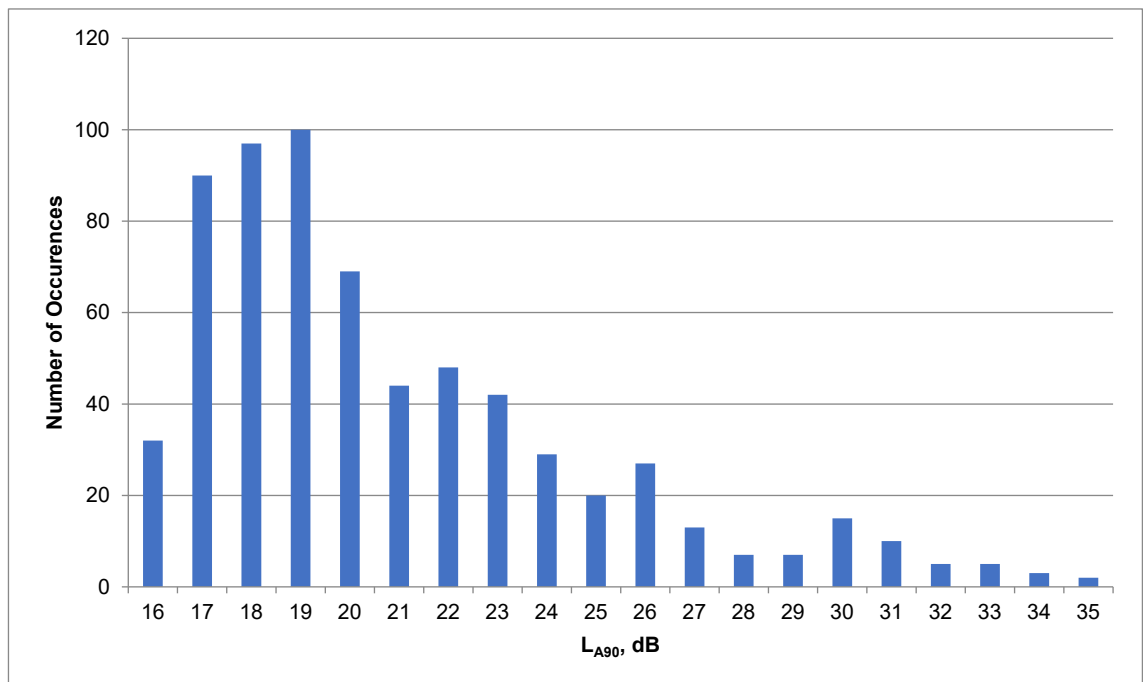


Figure 15.3: Existing Daytime Background Noise Level – Statistical Analysis LT2

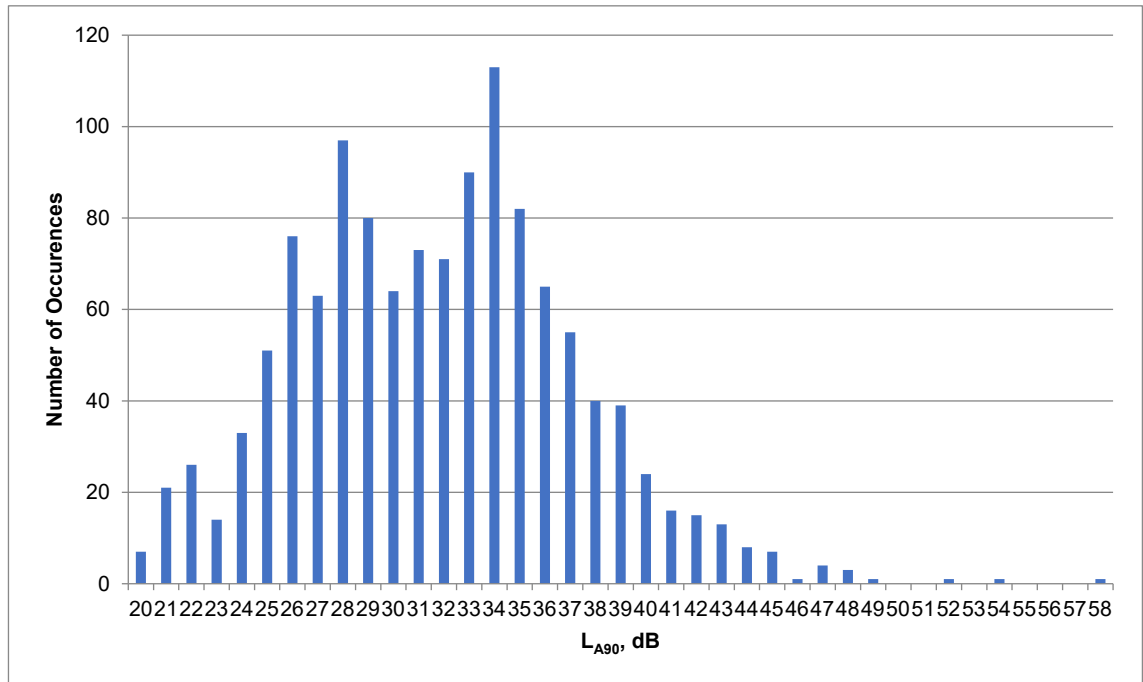


Figure 15.4: Existing Night-time Background Noise Level – Statistical Analysis LT2

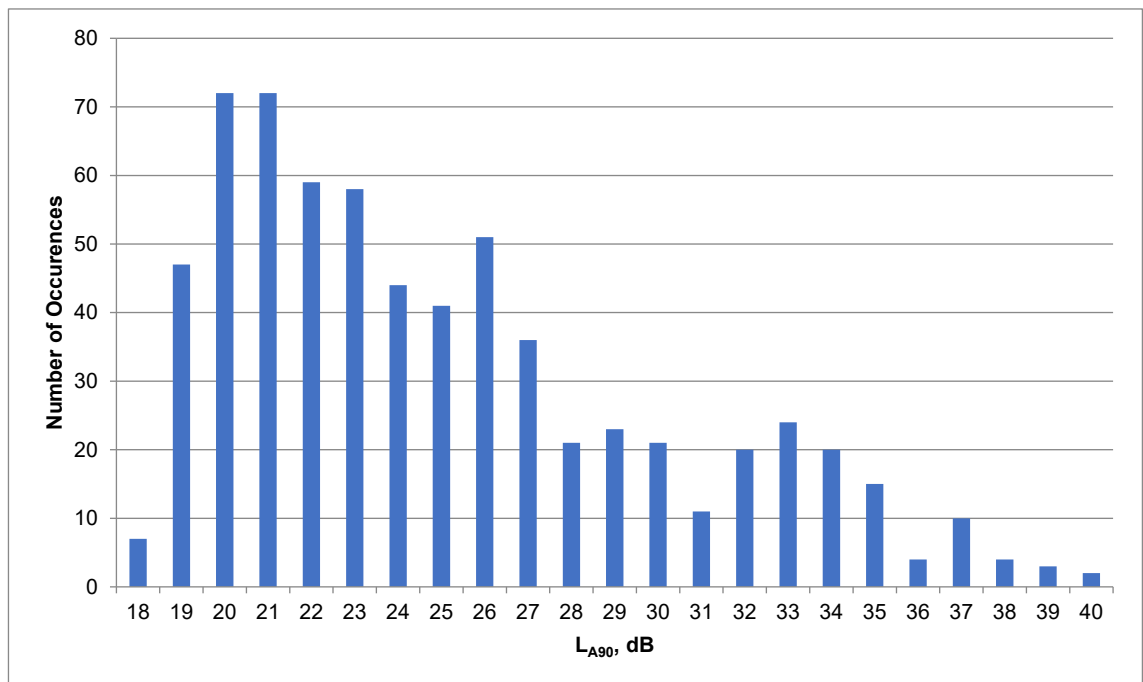


Figure 15.5: Existing Daytime Background Noise Level – Statistical Analysis LT3

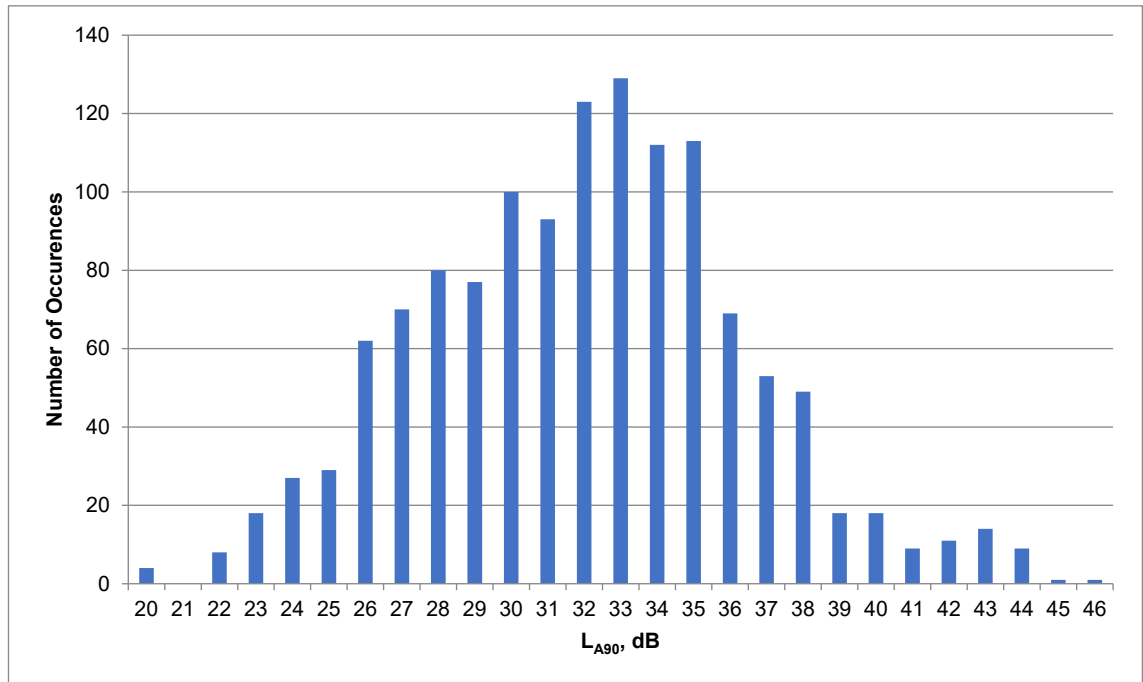


Figure 15.6: Existing Night-time Background Noise Level – Statistical Analysis LT3

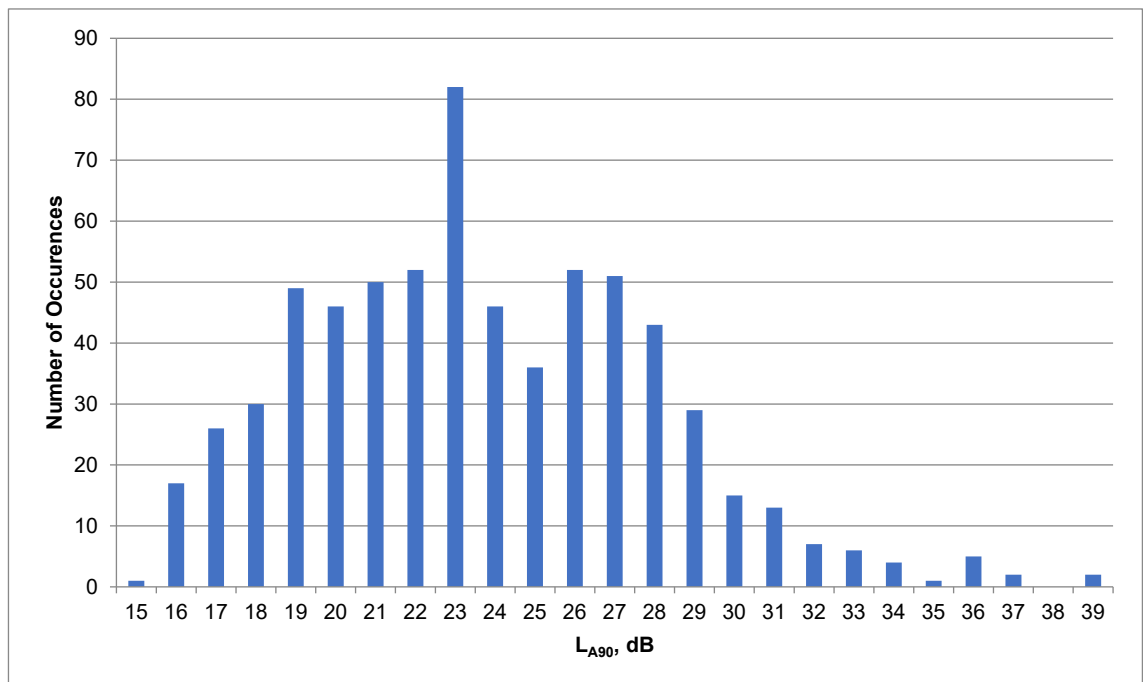


Figure 15.7: Existing Daytime Background Noise Level – Statistical Analysis LT4

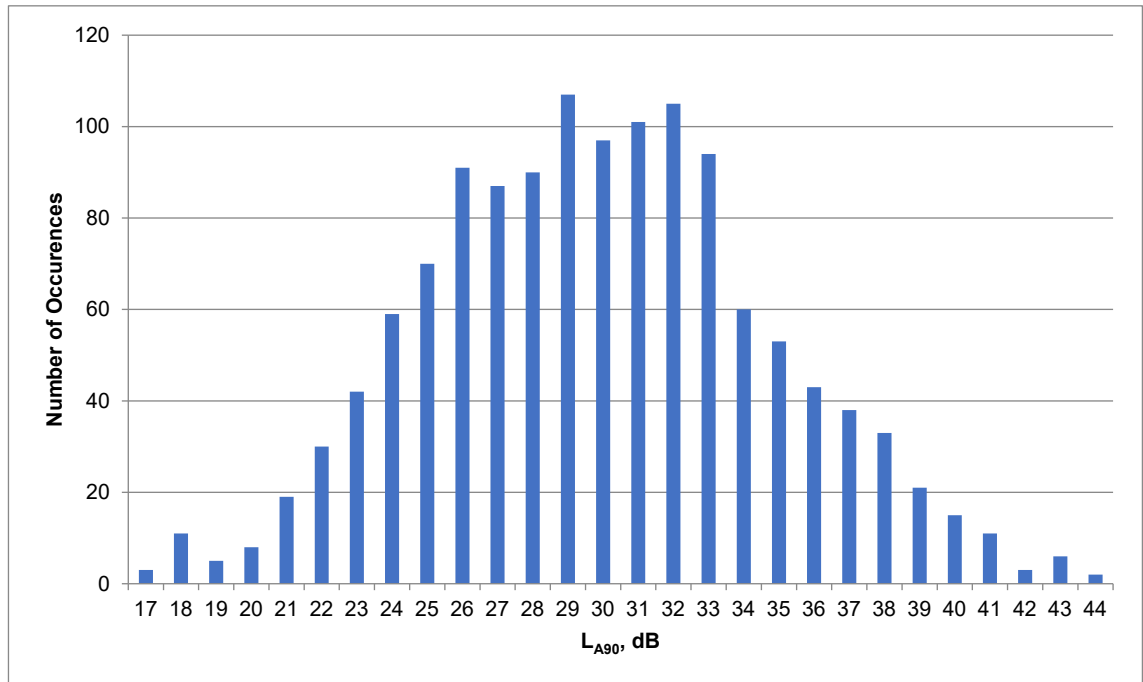
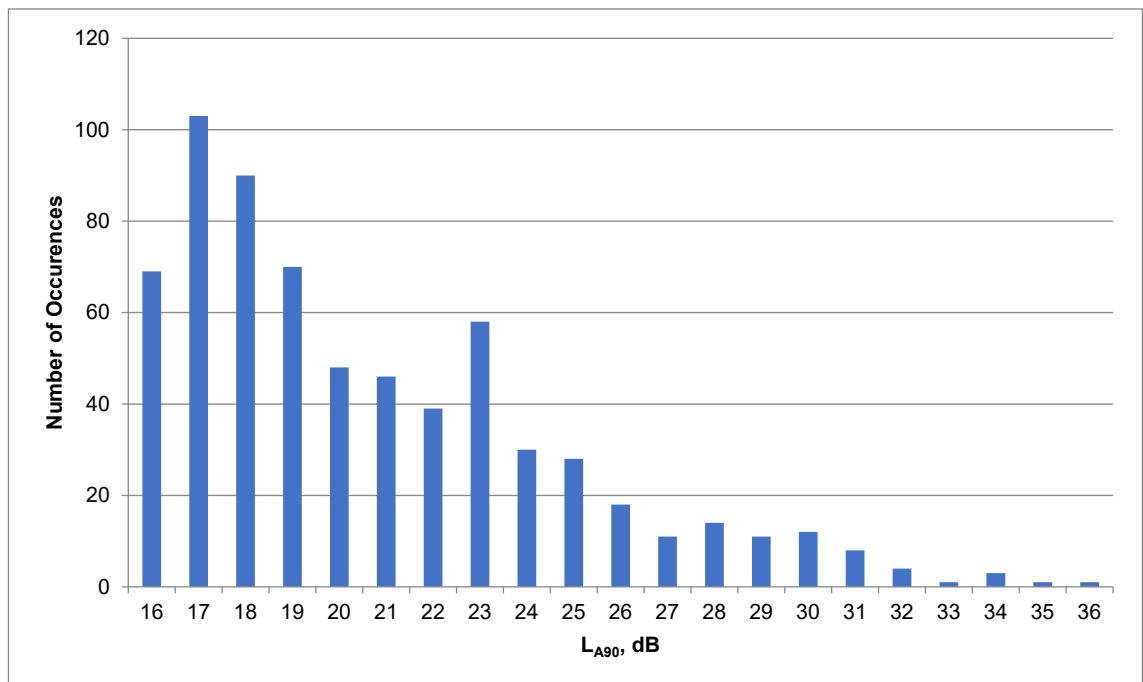


Figure 15.8: Existing Night-time Background Noise Level – Statistical Analysis LT4



Assessment Locations

- 15.5.6 Residential properties located closest to the Scheme’s infrastructure were identified using the site layout contained in **Appendix 4.1** and are shown in Figure 15.9. These closest sensitive receptors are considered to be the most noise sensitive, as effects from the Scheme will be higher at these locations than at sensitive receptors located further from the Scheme.
- 15.5.7 Background sound levels measured at the properties detailed in Table 15.13 are considered to be representative of the background noise environments at other properties in similar nearby locations. Should the predicted noise levels from the Scheme comply with limits at the assessed receptors, predicted noise levels at receptors further from the Scheme will also comply.
- 15.5.8 Assessment locations are identified in Figure 15.9.

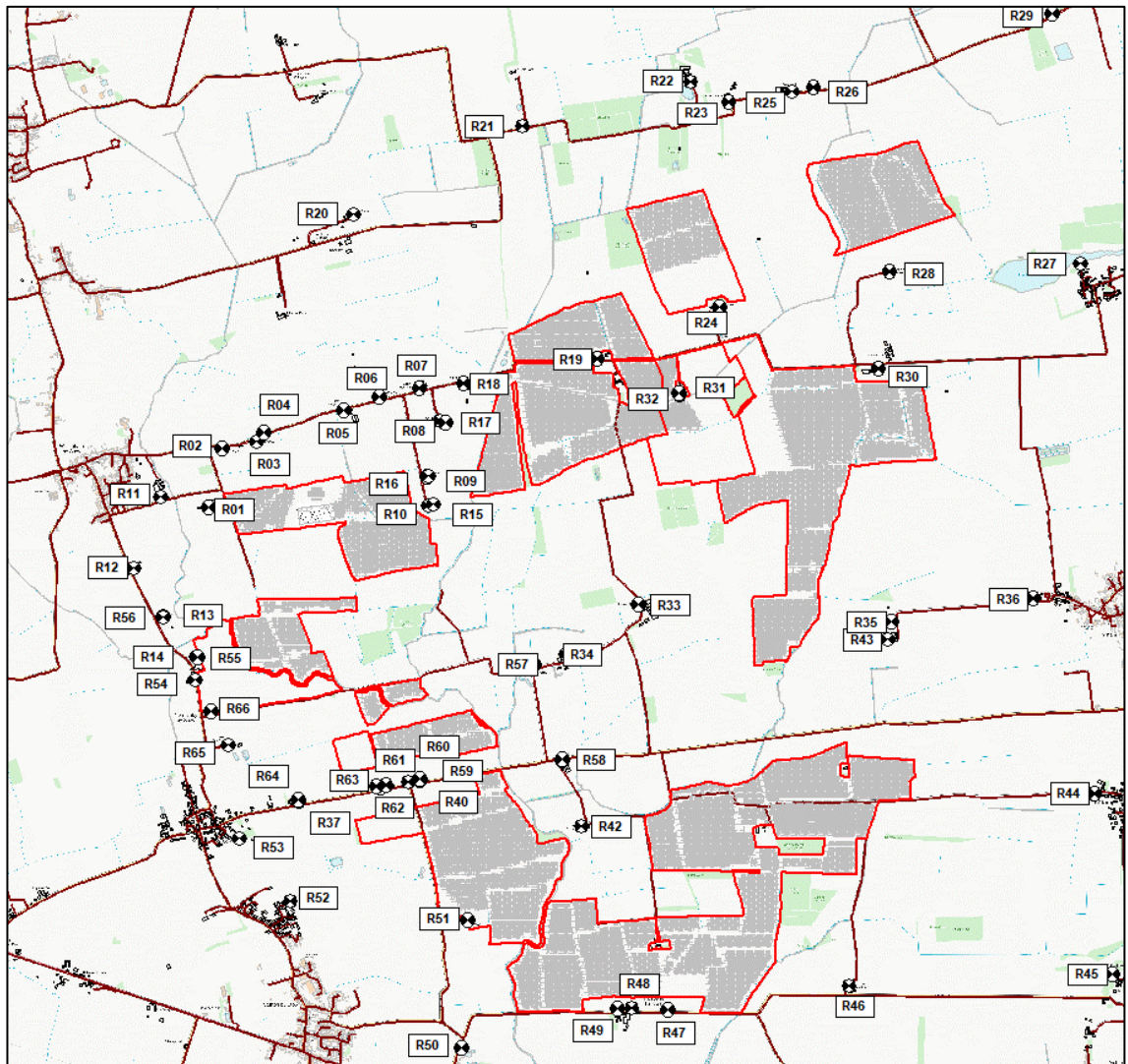
Table 15.12: Noise Assessment Locations

I.D.	Description	Land Use Classification	Approximate Distance from Red-line Boundary (m)	Height of Receptors (m)
R01	Woods Farm	Residential	140	1.5 / 4.0
R02	The Cottage	Residential	320	1.5 / 4.0
R03	Carisbrooke	Residential	320	1.5 / 4.0
R04	Uppermill Farm	Residential	380	1.5
R05	Slate House Farm	Residential	460	1.5 / 4.0
R06	South View	Residential	550	1.5 / 4.0
R07	Magin Moor Farm	Residential	550	1.5 / 4.0
R08	Chestnut Manor	Residential	340	1.5 / 4.0
R09	Lowfield Farm	Residential	140	1.5 / 4.0
R10	Moor Farm	Residential	70	1.5 / 4.0
R11	Grange Farm	Residential	460	1.5 / 4.0
R12	West View	Residential	780	1.5 / 4.0
R13	Tilby-Dale	Residential	260	1.5 / 4.0
R14	East Farm	Residential	15	1.5 / 4.0
R15	Moor Farm	Residential	100	1.5 / 4.0
R16	Lowfield Farm	Residential	150	1.5 / 4.0
R17	Chestnut Manor	Residential	290	1.5 / 4.0
R18	The Hollies	Residential	200	1.5 / 4.0
R19	Turpins Bungalows	Residential	30	1.5
R20	Glebe Farm	Residential	1,300	1.5 / 4.0

I.D.	Description	Land Use Classification	Approximate Distance from Red-line Boundary (m)	Height of Receptors (m)
R21	Low Field Farm	Residential	1,300	1.5 / 4.0
R22	Westlands Farm	Residential	780	1.5 / 4.0
R23	Orchard House	Residential	630	1.5 / 4.0
R24	North Farm	Residential	80	1.5 / 4.0
R25	Glentworth Grange	Residential	520	1.5 / 4.0
R26	Kexby Road	Residential	530	1.5 / 4.0
R27	Lakeside Cottage	Residential	960	1.5 / 4.0
R28	Fillingham Grange	Residential	230	1.5 / 4.0
R29	20 Kexby Road	Residential	1,300	1.5 / 4.0
R30	Glebe Farm	Residential	90	1.5 / 4.0
R31	Side Farm S	Residential	15	1.5 / 4.0
R32	Side Farm N	Residential	15	1.5 / 4.0
R33	Grange Farm	Residential	800	1.5 / 4.0
R34	Hall Farm	Residential	770	1.5 / 4.0
R35	Low Farm	Residential	520	1.5 / 4.0
R36	Kincraig Cottage	Residential	1,500	1.5 / 4.0
R37	17 Ingham Road	Residential	370	1.5 / 4.0
R38	25 Ingham Road	Residential	150	1.5 / 4.0
R39	31 Ingham Road	Residential	170	1.5 / 4.0
R40	The Pastures	Residential	75	1.5 / 4.0
R41	Furze Hill	Residential	450	1.5 / 4.0
R42	Lower Furze Hill	Residential	140	1.5 / 4.0
R43	Low Farm	Residential	520	1.5 / 4.0
R44	Walk House	Residential	1,300	1.5 / 4.0
R45	Brattleby Hall	Residential	2,000	1.5 / 4.0
R46	Thorpe Lane Farm	Residential	550	1.5 / 4.0
R47	The Lodge	Residential	90	1.5 / 4.0
R48	Clandon House	Residential	80	1.5 / 4.0
R49	1 Thorpe Lane	Residential	90	1.5 / 4.0
R50	The White Cottage	Residential	470	1.5 / 4.0
R51	Fleets Cottages	Residential	10	1.5 / 4.0
R52	9 Allan Close	Residential	1,000	1.5 / 4.0
R53		Residential	830	1.5 / 4.0
R54	West Farm	Residential	10	1.5 / 4.0

I.D.	Description	Land Use Classification	Approximate Distance from Red-line Boundary (m)	Height of Receptors (m)
R55	East Farm Cottage	Residential	10	1.5 / 4.0
R56	Tilby Dale	Residential	270	1.5 / 4.0
R57	The Bungalows	Residential	540	1.5 / 4.0
R58	Furze Hill	Residential	450	1.5 / 4.0
R59	The Pastures	Residential	80	1.5 / 4.0
R60	31 Ingham Road	Residential	150	1.5 / 4.0
R61	29 Ingham Road	Residential	160	1.5 / 4.0
R62	27 Ingham Road	Residential	190	1.5 / 4.0
R63	19 Ingham Road	Residential	130	1.5 / 4.0
R64	17 Ingham Road	Residential	360	1.5 / 4.0
R65	Church Farm View	Residential	240	1.5 / 4.0
R66	4 Flat Tops	Residential	10	1.5 / 4.0

Figure 15.9: Sensitive Receptor Location Plan



Not to scale

Cottam 2 Noise Survey

- 15.5.9 The baseline noise environment has been established following a noise survey undertaken from Thursday 9th September 2021 to Thursday 16th September 2021. Attended 15-minute short-term measures were undertaken at three locations during the day, evening and night-time periods with two additional locations being measured unattended over a 161-hour period. Full details of the noise monitoring survey are presented within **Appendix 15.1**, with a brief summary provided below. The locations of these measurements are presented in the Figures below.

- 15.5.10 The existing ambient noise climate was dominated by road traffic noise with the main sources being the A631 and Corringbeck Road during the daytime and evening, the road traffic noise is reduced at night-time with the dominant noise source being background animal noises.
- 15.5.11 Statistical analysis of the long-term measured data, to derive representative background noise levels for the daytime and night-time periods are shown in Figures 15.10 – 15.13 below.

Figure 15.10: Existing Daytime Background Noise Level – Statistical Analysis LT1

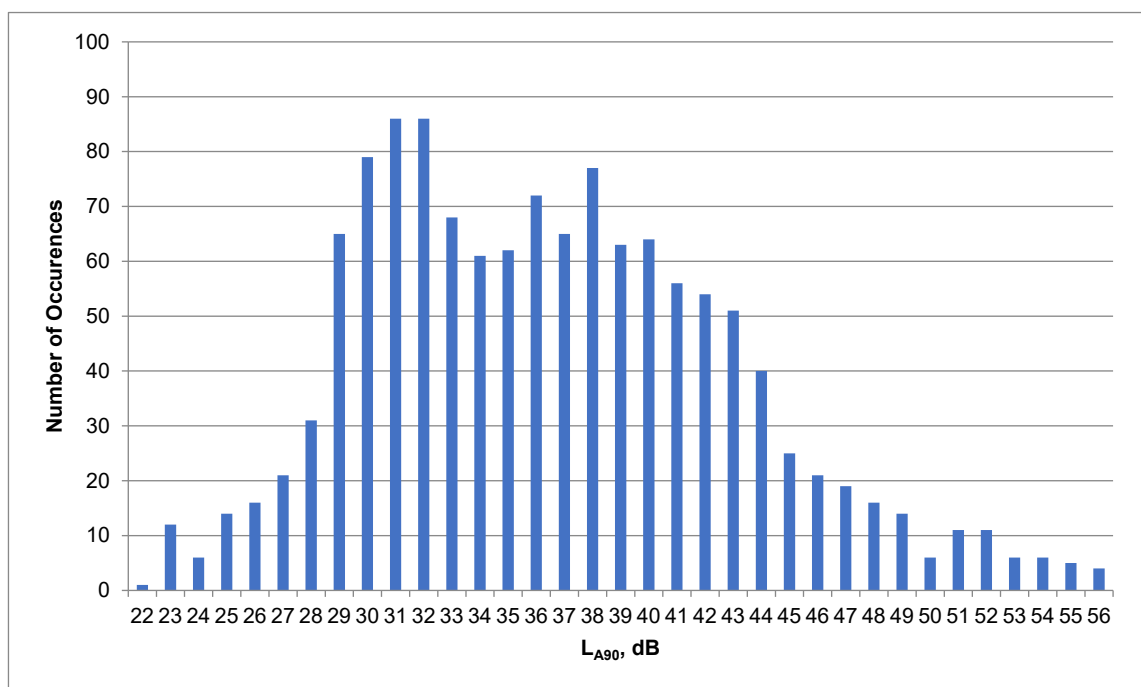


Figure 15.11: Existing Night-time Background Noise Level – Statistical Analysis LT1

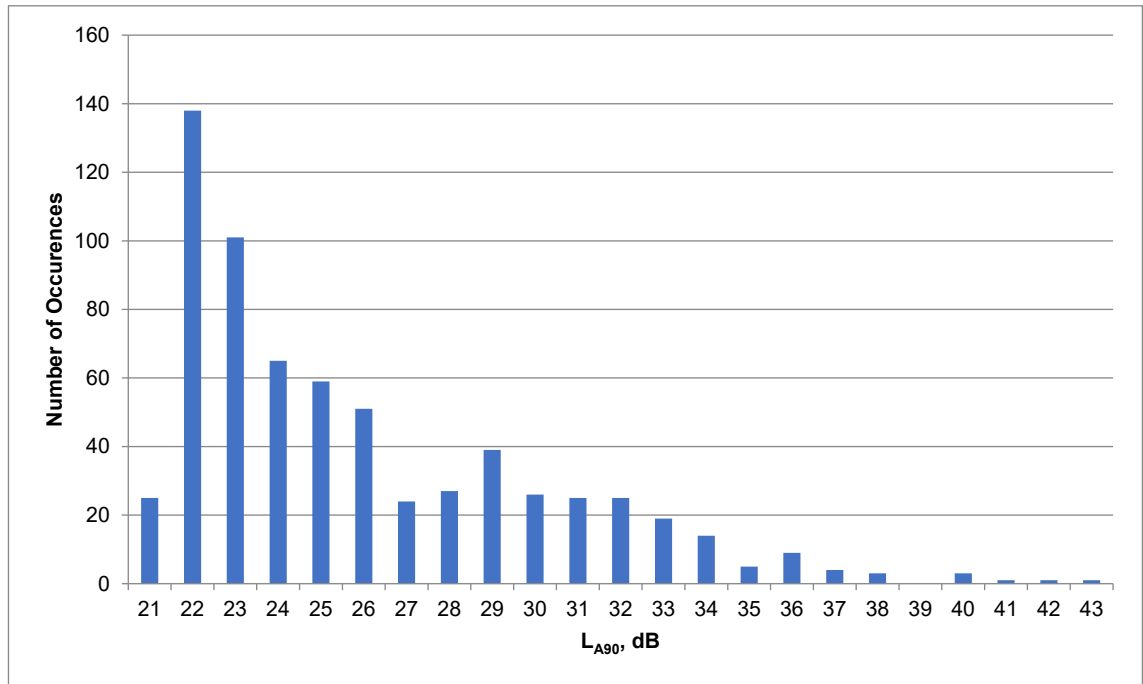


Figure 15.12: Existing Daytime Background Noise Level – Statistical Analysis LT2

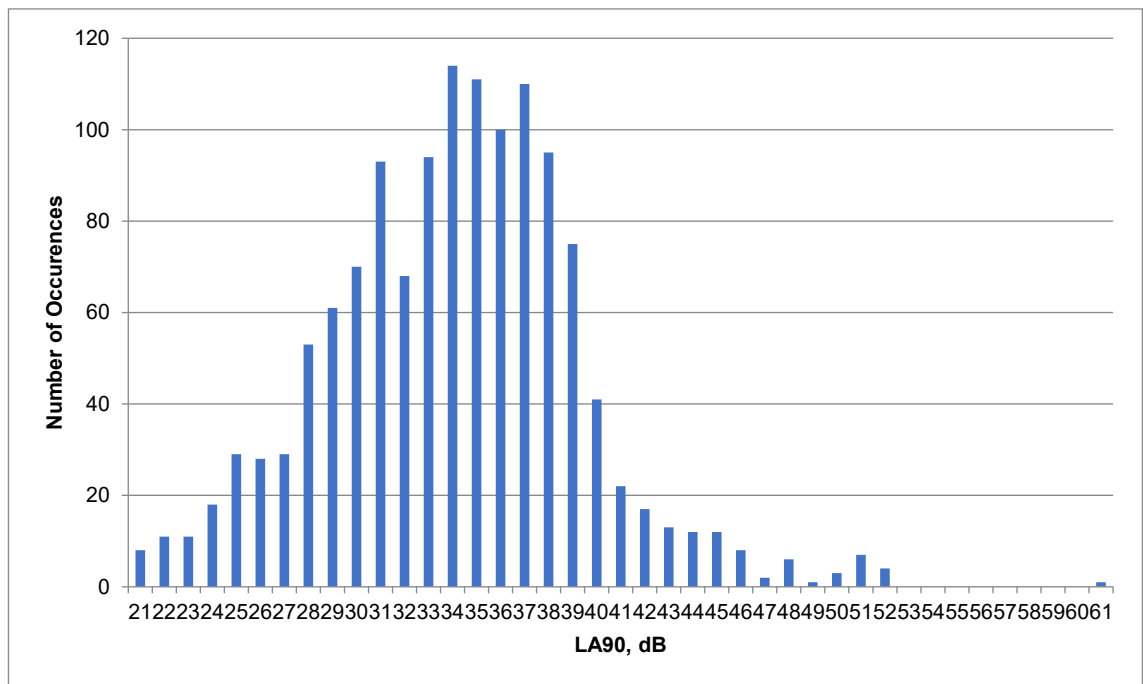
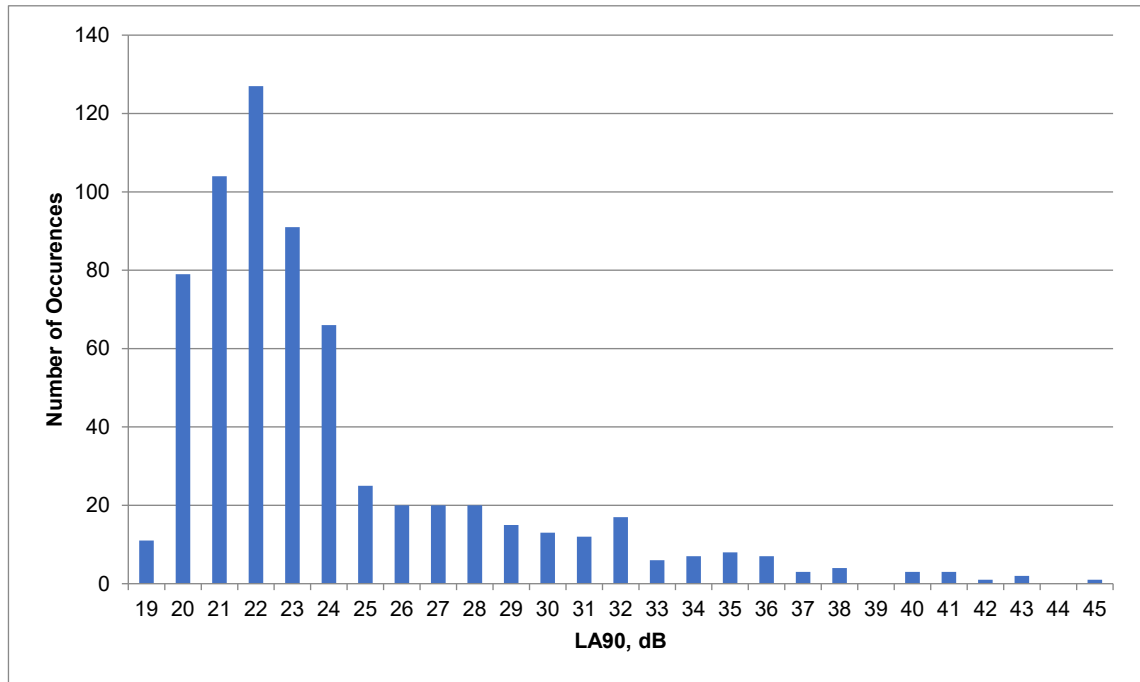


Figure 15.13: Existing Night-time Background Noise Level – Statistical Analysis LT2



Assessment Locations

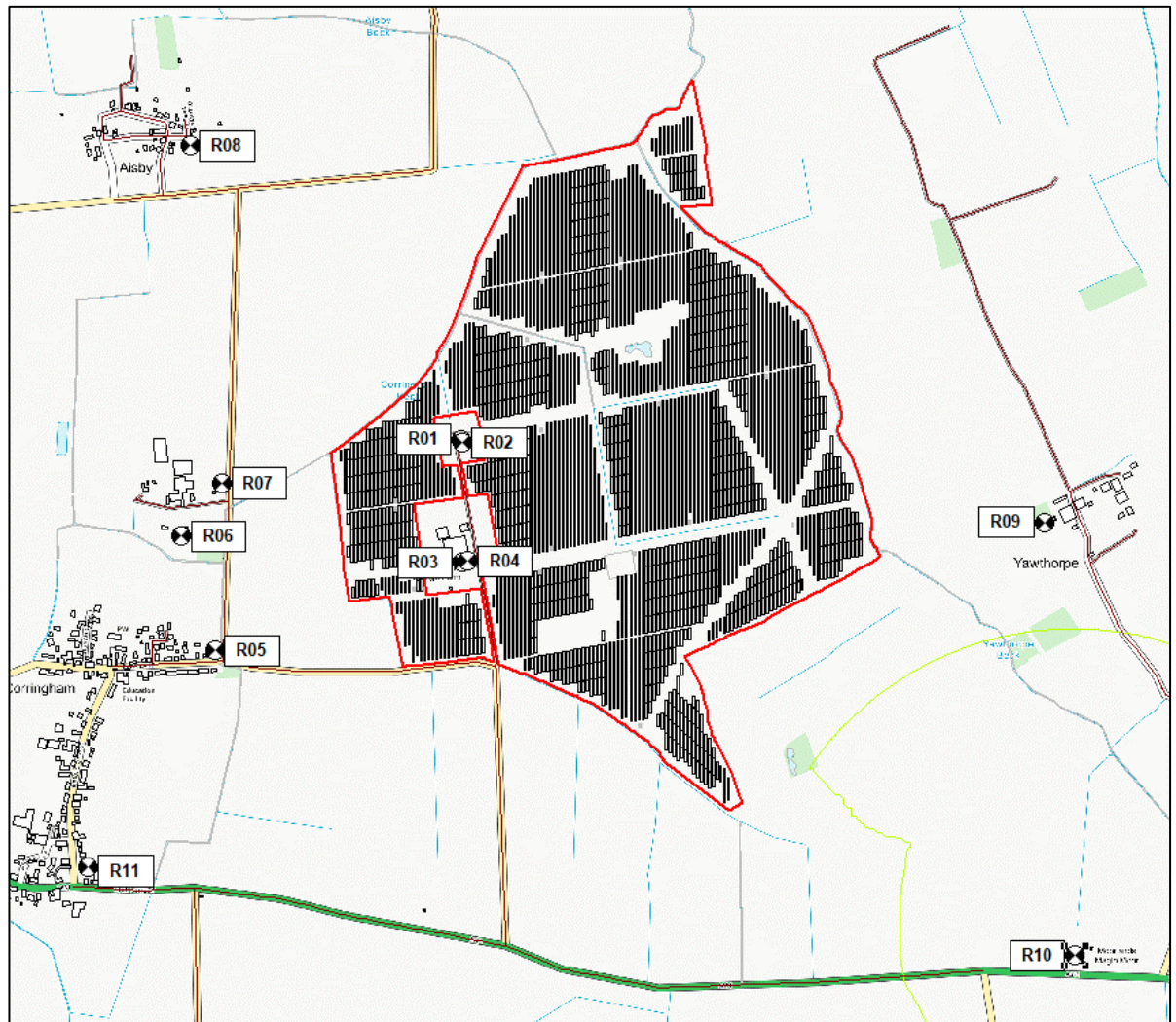
- 15.5.12 Residential properties located closest to the Scheme’s infrastructure were identified using the site layout, presented in **Appendix 4.1**. These closest sensitive receptors are considered to be the most noise sensitive, as effects from the Scheme will be higher at these locations than at sensitive receptors located further from the Scheme.
- 15.5.13 Background sound levels measured at the properties detailed in Table 15.14 are considered to be representative of the background noise environments at other properties in similar nearby locations. Should the predicted noise levels from the Scheme comply with limits at the assessed receptors, predicted noise levels at receptors further from the Scheme will also comply.

15.5.14 Assessment locations are identified in Figure 15.14.

Table 15.13: Noise Assessment Locations

Ref	Description	Land Use Classification	Approximate Distance from Red-line Boundary (m)	Height of Receptors (m)
R01	The Cottage N	Residential	60	1.5 / 4.0
R02	The Cottage S	Residential	60	1.5 / 4.0
R03	Corringham Grange Farm W	Residential	70	1.5 / 4.0
R04	Corringham Grange Farm E	Residential	70	1.5 / 4.0
R05	25 East Lane	Residential	360	1.5 / 4.0
R06	The Old Hall	Residential	400	1.5 / 4.0
R07	Keepers Cottage	Residential	280	1.5 / 4.0
R08	54 Old Stack yard Lane	Residential	790	1.5 / 4.0
R09	Taskers Cottage	Residential	430	1.5 / 4.0
R10	Moorlands Magin Moor	Residential	950	1.5 / 4.0
R11	2 Middle Street	Residential	950	1.5 / 4.0

Figure 15.14: Sensitive Receptor Location Plan



Not to scale

Cottam 3a Noise Survey

- 15.5.15 The baseline noise environment has been established following a noise survey undertaken from Thursday 9th September 2021 to Thursday 16th September 2021. Attended 15-minute short-term measures were undertaken at four locations during the day, evening and night-time periods with two additional locations being measured unattended over a 169-hour period. Full details of the noise monitoring survey are presented within **Appendix 15.1**, with a brief summary provided below.
- 15.5.16 The dominant noise source found in the area is road traffic noise from Laughton Road, Kirkton Road and Church Road.

15.5.17 Statistical analysis of the long-term measured data, to derive representative background noise levels for the daytime and night-time periods are shown in Figures 15.15 – 15.20 below.

Figure 15.15: Existing Daytime Background Noise Level – Statistical Analysis LT1

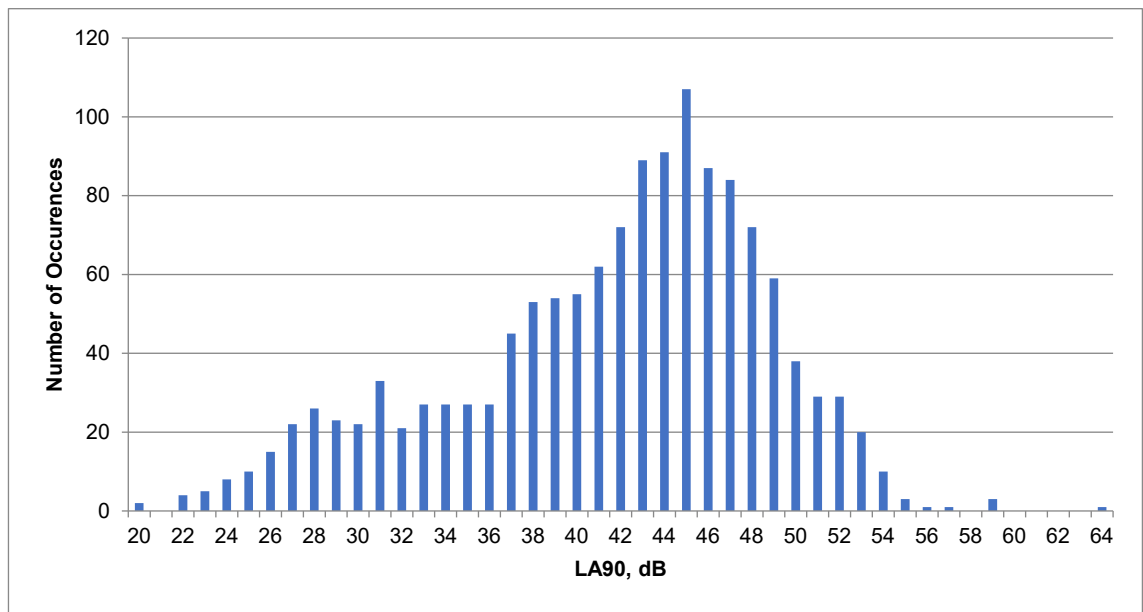


Figure 15.16: Existing Night-time Background Noise Level – Statistical Analysis LT1

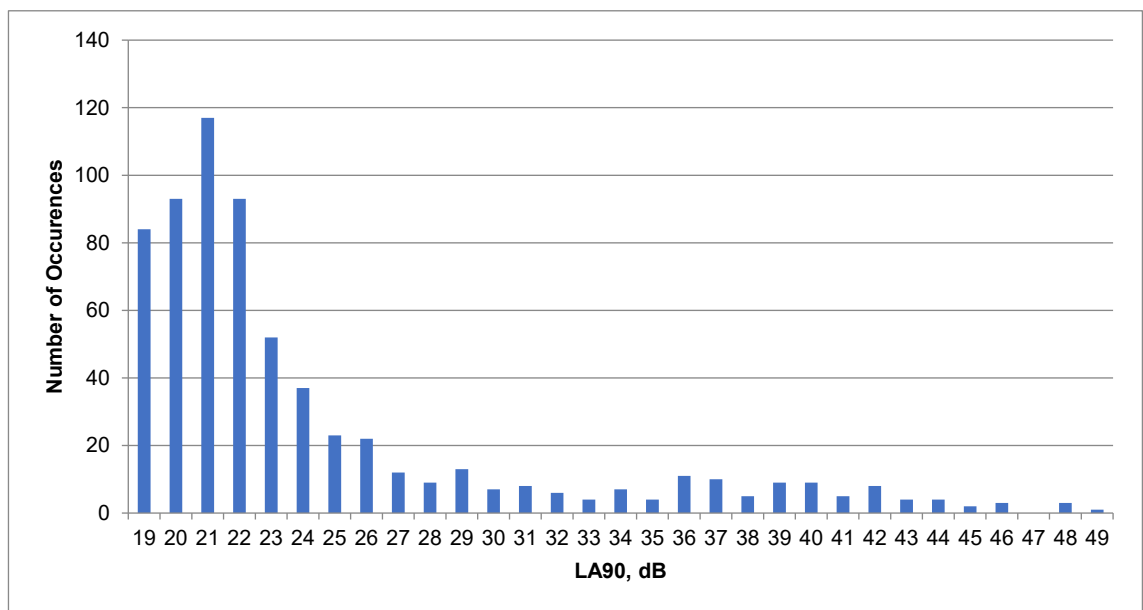


Figure 15.17: Existing Daytime Background Noise Level – Statistical Analysis LT2

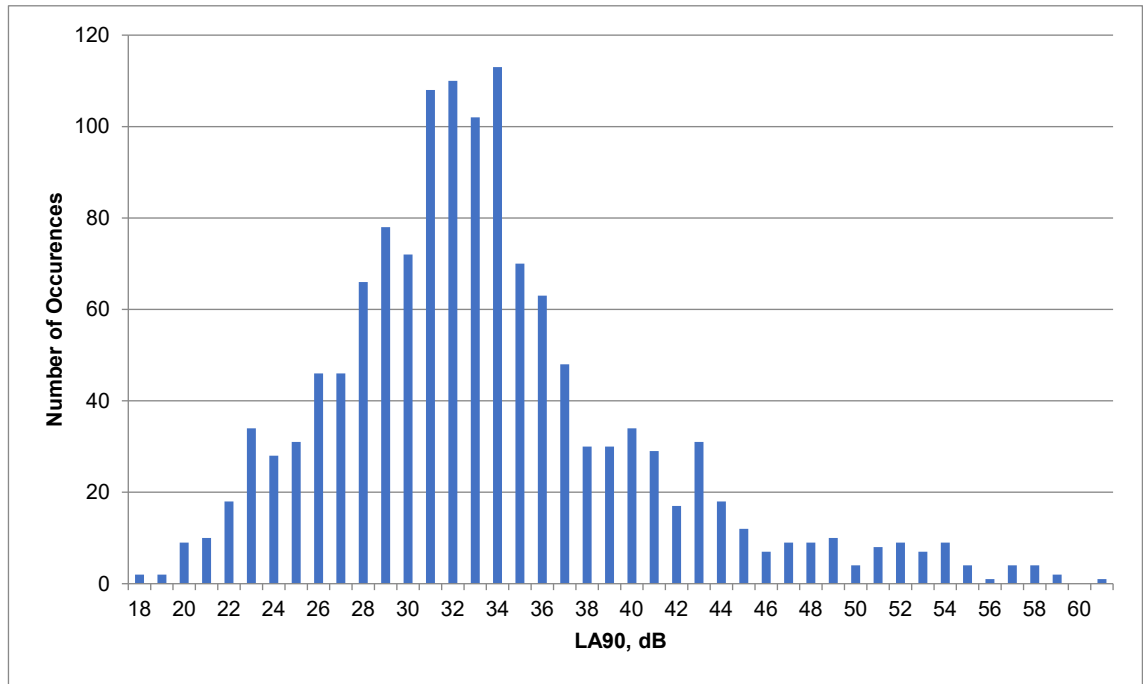


Figure 15.18: Existing Night-time Background Noise Level – Statistical Analysis LT2

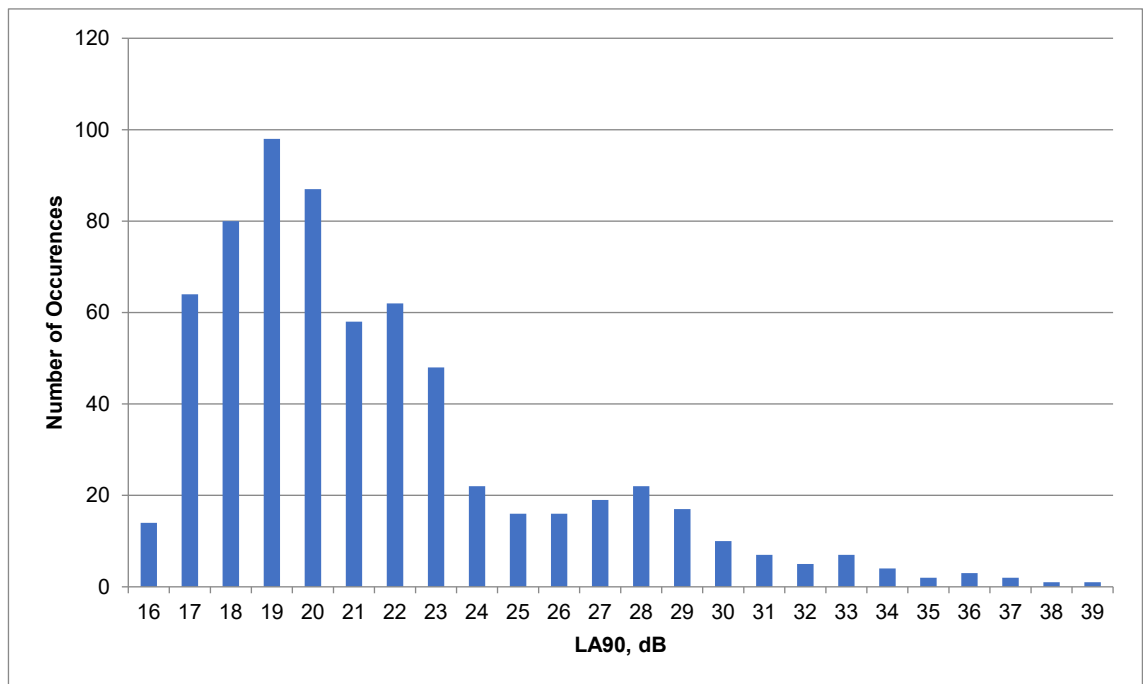


Figure 15.19: Existing Daytime Background Noise Level – Statistical Analysis LT3

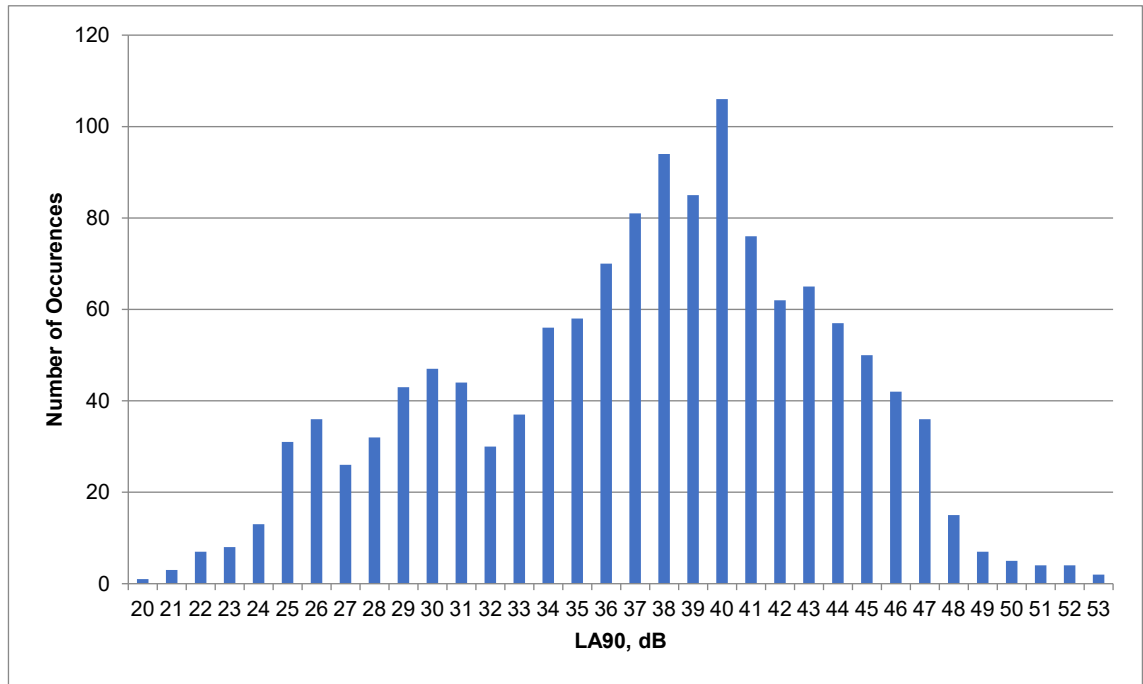
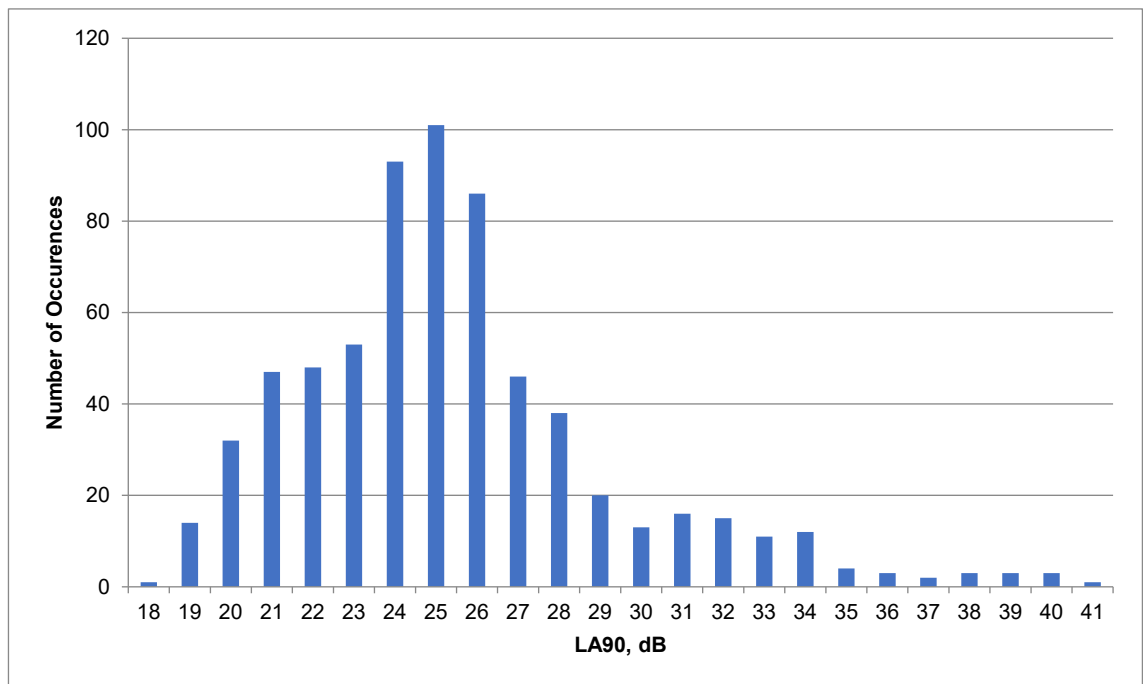


Figure 15.20: Existing Night-time Background Noise Level – Statistical Analysis LT3



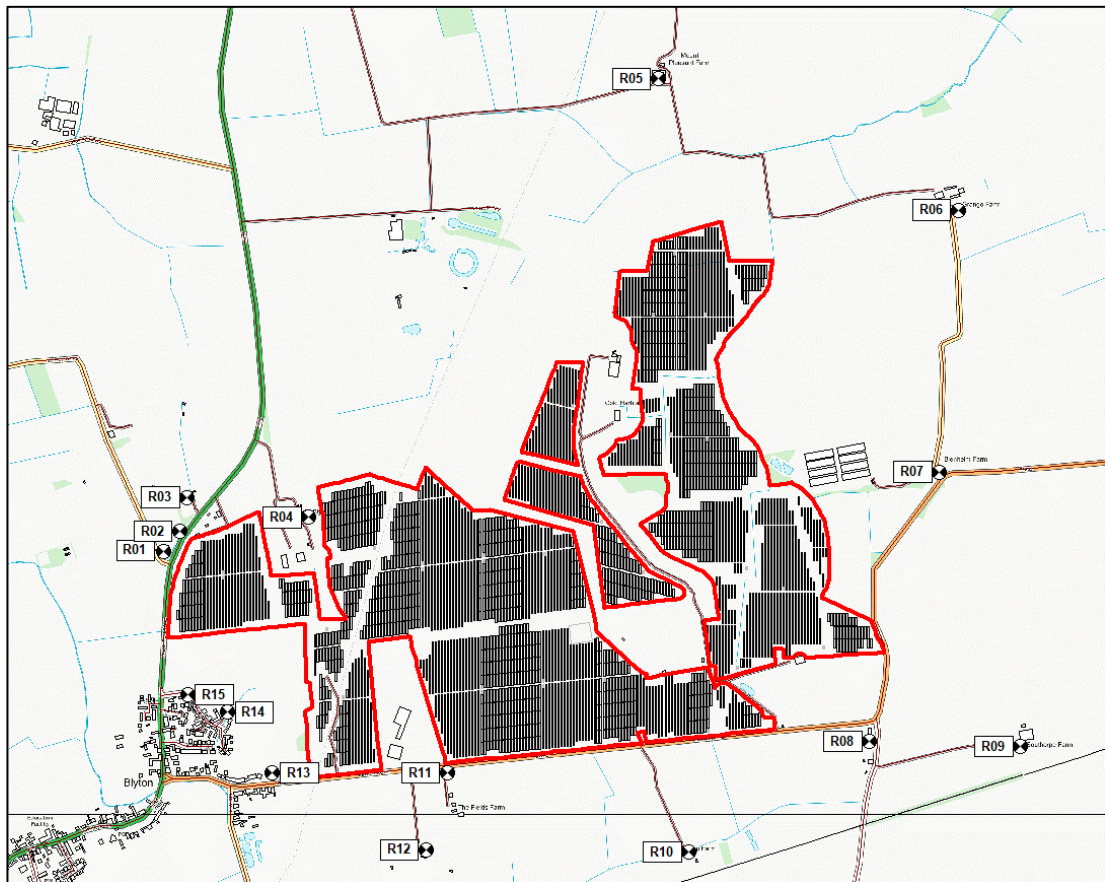
Assessment Locations

- 15.5.18 Residential properties located closest to the Scheme’s infrastructure were identified using the site layout, presented in **Appendix 4.1**. These closest sensitive receptors are considered to be the most noise sensitive, as effects from the Scheme will be higher at these locations than at sensitive receptors located further from the Scheme.
- 15.5.19 Background sound levels measured at the properties detailed in Table 15.14 are considered to be representative of the background noise environments at other properties in similar nearby locations. Should the predicted noise levels from the Scheme comply with limits at the assessed receptors, predicted noise levels at receptors further from the Scheme will also comply.
- 15.5.20 Assessment locations are identified in Figure 15.21.

Table 15.14: Noise Assessment Locations

Ref	Description	Land Use Classification	Approximate Distance from Red-line Boundary (m)	Height of Receptors (m)
R01	Inglenook	Residential	65	1.5 / 4.0
R02	Grace Park Managers Residence	Residential	50	1.5 / 4.0
R03	Grace Park Caravan and Camping Site	Residential	130	1.5 / 4.0
R04	Blyton Grange	Residential	40	1.5 / 4.0
R05	Mount Pleasant Farm	Residential	510	1.5 / 4.0
R06	Grange Farm	Residential	640	1.5 / 4.0
R07	Blenheim Farm	Residential	410	1.5 / 4.0
R08	El-Bon	Residential	310	1.5 / 4.0
R09	Southorpe Farm	Residential	560	1.5 / 4.0
R10	Top Farm	Residential	380	1.5 / 4.0
R11	The Fields	Residential	950	1.5 / 4.0
R12	Grange Farm	Residential	300	1.5 / 4.0
R13	65 Kirton Road	Residential	120	1.5 / 4.0
R14	41 Irwin Road	Residential	250	1.5 / 4.0
R15	3 Irwin Road	Residential	200	1.5 / 4.0

Figure 15.21: Sensitive Receptor Location Plan



Not to scale

Cottam 3b Noise Survey

- 15.5.21 The baseline noise environment has been established following a noise survey undertaken from Thursday 9th September 2021 to Thursday 16th September 2021. Attended 15-minute short-term measures were undertaken at four locations during the day, evening and night-time periods with two additional locations being measured unattended over a 164-hour period. Full details of the noise monitoring survey are presented within **Appendix 15.1**, with a brief summary provided below.
- 15.5.22 The dominant noise source found in the area is road traffic noise from Station Road and Pilham Lane.
- 15.5.23 Statistical analysis of the long-term measured data, to derive representative background noise levels for the daytime and night-time periods are shown in Figures 15.22 – 15.25 below.

Figure 15.22: Existing Daytime Background Noise Level – Statistical Analysis LT1

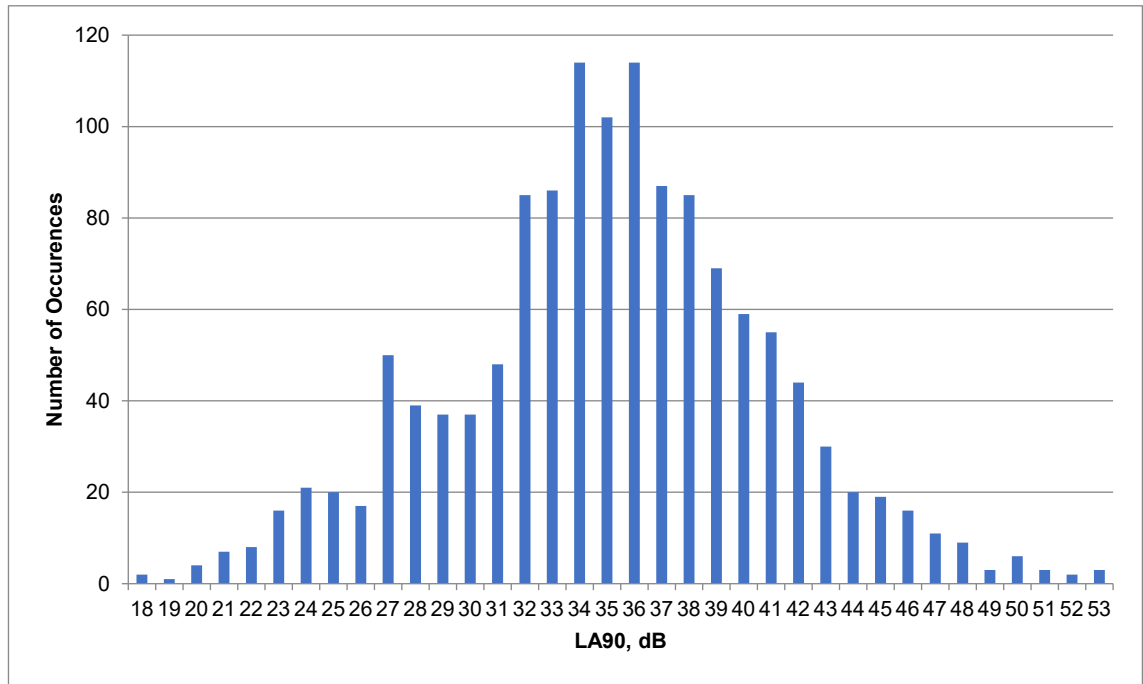


Figure 15.23: Existing Night-time Background Noise Level – Statistical Analysis LT1

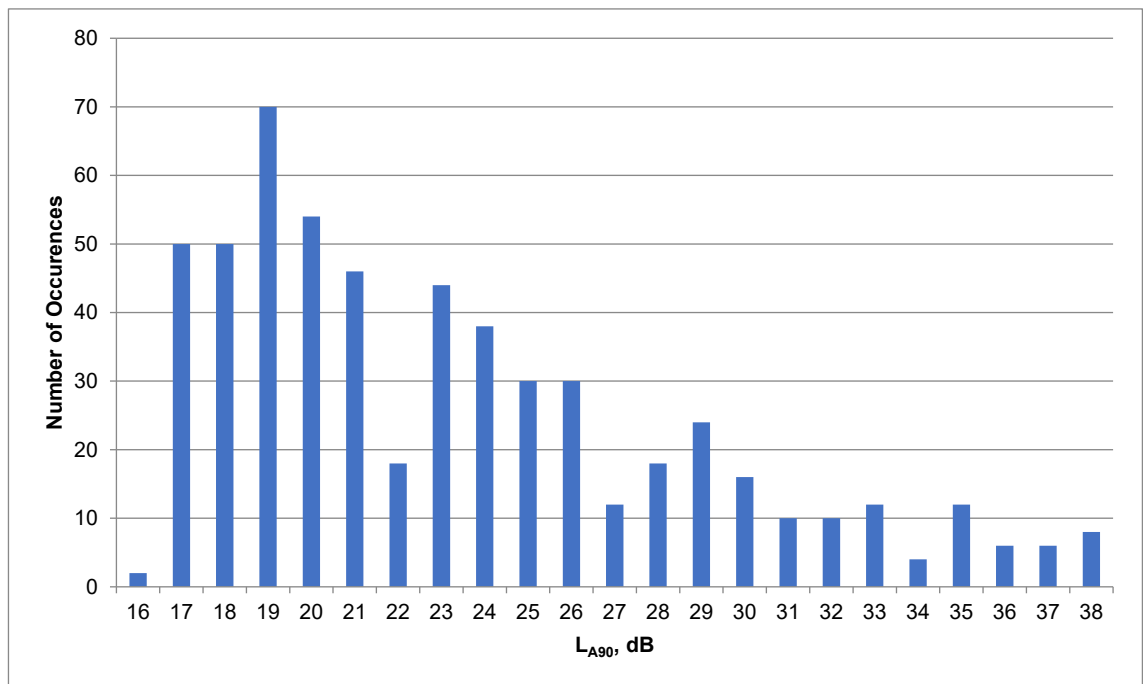


Figure 15.24: Existing Daytime Background Noise Level – Statistical Analysis LT2

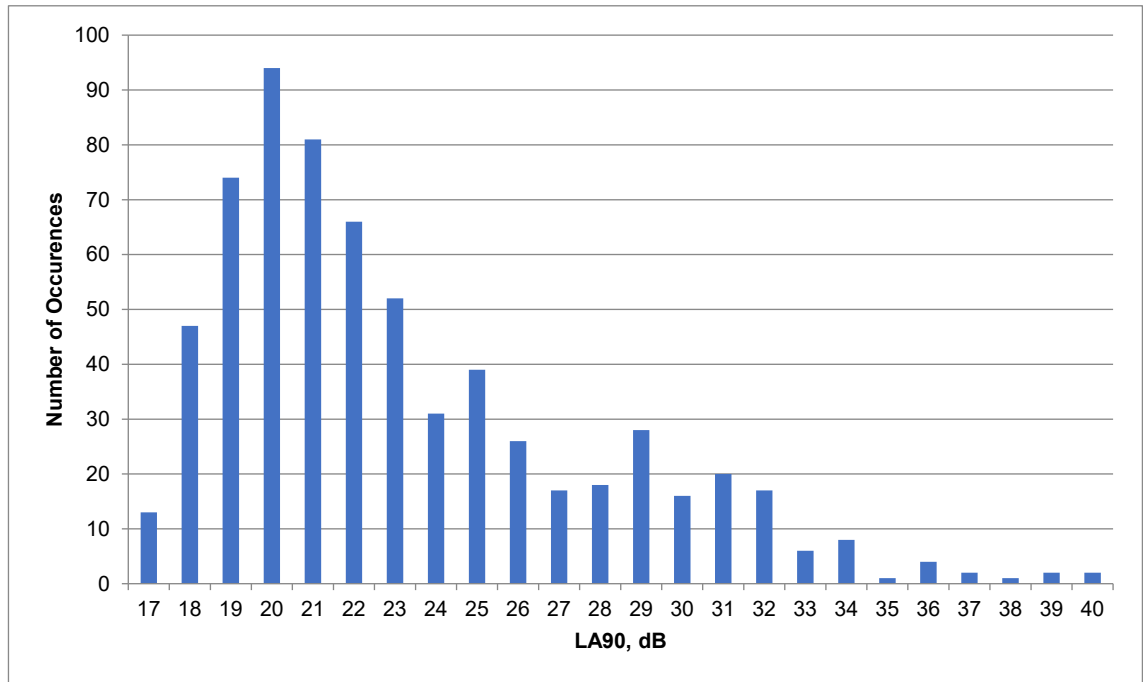
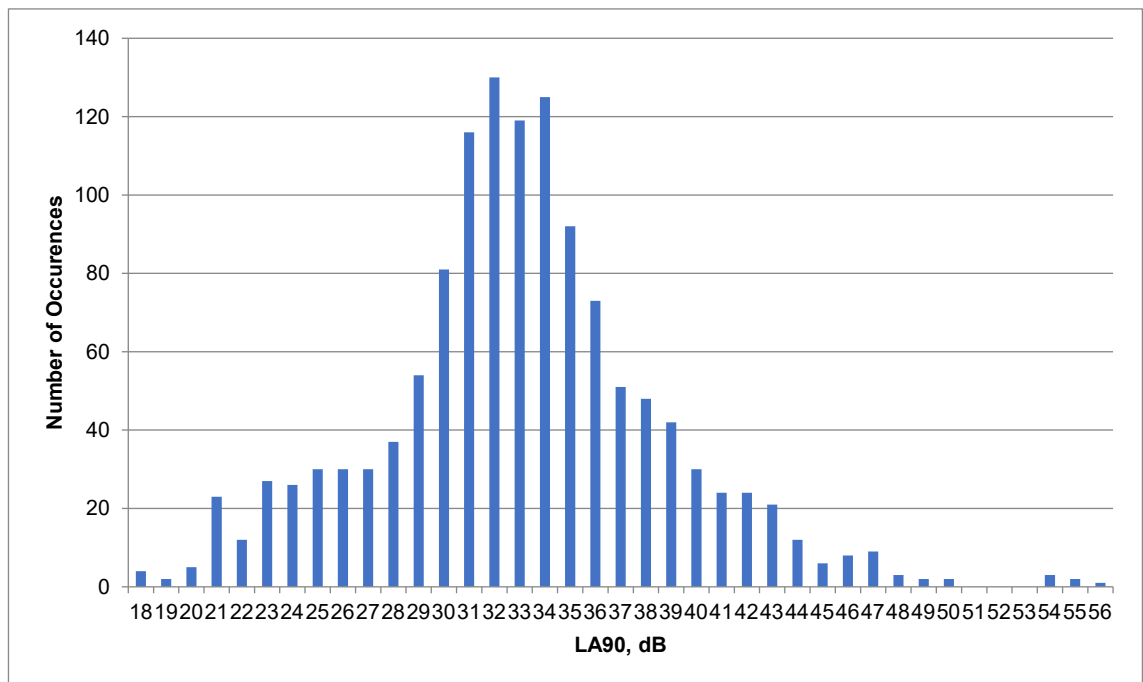


Figure 15.25: Existing Night-time Background Noise Level – Statistical Analysis LT2



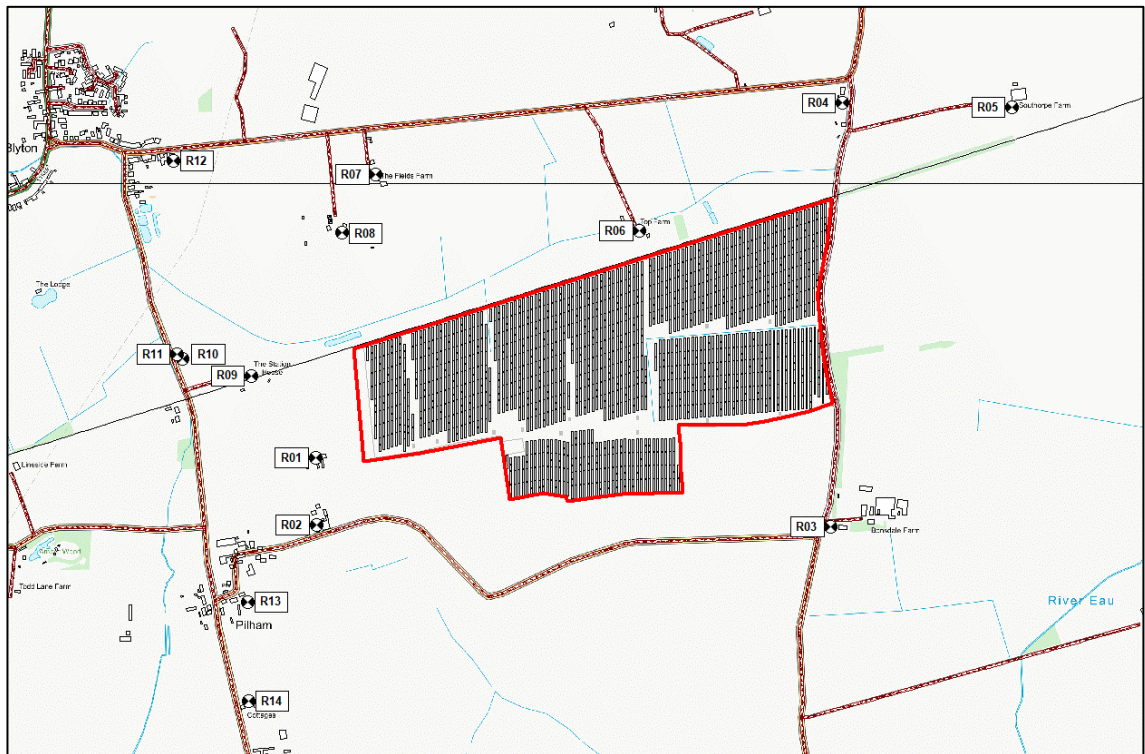
Assessment Locations

- 15.5.24 Residential properties located closest to the Scheme’s infrastructure were identified using the site layout. These closest sensitive receptors are considered to be the most noise sensitive, as effects from the Scheme will be higher at these locations than at sensitive receptors located further from the Scheme.
- 15.5.25 Background sound levels measured at the properties detailed in Table 15.15 are considered to be representative of the background noise environments at other properties in similar nearby locations. Should the predicted noise levels from the Scheme comply with limits at the assessed receptors, predicted noise levels at receptors further from the Scheme will also comply.

Table 15.15: Noise Assessment Locations

Ref	Description	Land Use Classification	Approximate Distance from Red-line Boundary (m)	Height of Receptors (m)
R01	Glebe Farm	Residential	140	1.5 / 4.0
R02	Home Farm	Residential	230	1.5 / 4.0
R03	Tawny House	Residential	350	1.5 / 4.0
R04	El-Bon	Residential	280	1.5 / 4.0
R05	Southorpe Farm	Residential	600	1.5 / 4.0
R06	Top Farm	Residential	80	1.5 / 4.0
R07	The Fields Farm	Residential	460	1.5 / 4.0
R08	Grange Farm	Residential	320	1.5 / 4.0
R09	The Station House	Residential	300	1.5 / 4.0
R10	Kenroyd	Residential	490	1.5 / 4.0
R11	Fern Lea	Residential	510	1.5 / 4.0
R12	22 Kirton Road	Residential	770	1.5 / 4.0
R13	The Old Rectory	Residential	540	1.5 / 4.0
R14	Gilby Cottages	Residential	780	1.5 / 4.0

Figure 15.26: Sensitive Receptor Location Plan



Not to scale

15.6 Embedded Design Mitigation

15.6.1 The way that potential environmental impacts have been or will be prevented, avoided or mitigated to reduce impacts to a minimum through design and/or management of the Scheme is outlined in this section and will be taken into account as part of the assessment of the potential effects. Most of the equipment and activities utilised during construction and decommissioning will be the same and therefore noise emissions during these processes are expected to be similar. Proposed environmental enhancements are also described where relevant. The mitigation measures for both the construction/decommissioning and operational phases, are outlined below.

Construction

15.6.2 Measures to control noise as defined in Annex B of BS 5228-1 and measures to control vibration as defined in Section 8 of BS 5228-2 will be adopted where reasonably practicable. These measures represent BPM and are included within the Framework CEMP **Appendix 4.3**.

15.6.3 Examples of BPM that will be implemented during construction works are presented below:

- Unnecessary revving of engines will be avoided, and equipment will be switched off when not in use;
- Appropriate routing of construction traffic on public roads and along access tracks;
- Drop heights of materials will be minimised;
- Plant and vehicles will be sequentially started up rather than all together;
- Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise- sensitive areas. Where possible, loading and unloading will also be carried out away from such areas; and
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturer's specifications.

15.6.4 Working hours onsite are likely to be carried out Monday to Friday 07:00 – 18:00 and between 08:00 and 13:30 on Saturdays. However, some activities may be required outside of these times (such as the delivery of abnormal loads, night-time working for cable construction works in public highways or horizontal direction drill activities).

15.6.5 A construction noise monitoring scheme shall be developed in the Outline CEMP (**Appendix 4.3**) and agreed with appropriate stakeholders following appointment of a principal contractor and prior to commencement of construction works as part of any Section 61 consent applications. Requirements for monitoring during the decommissioning stages will be outlined in the Decommissioning Environmental Management Plan which will be secured through the Requirements in the DCO.

15.6.6 Consideration will also be given to traffic routing, timing and access points to the DCO Site to minimise noise impacts at existing receptors as detailed construction working methods are developed. Management of Heavy Goods Vehicles (HGV) within the DCO Site and being let onto the highway network will be managed through a Framework Construction Traffic Management Plan (CTMP) and secured through a requirement in the DCO.

Operational Phase

15.6.7 Preliminary assessment of operational noise has been undertaken based on worst-case assessment criteria. The results of these assessments have been used to inform the design of development layouts. At this stage, due to very low existing

background noise levels at many of the receptor locations, it is unclear whether guidance contained within BS4142:2014+A1:2019 or WHO guidance on internal noise levels will be the appropriate guidance for the noise assessment.

15.7 Identification and Evaluation of Key Effects

Construction Noise

- 15.7.1 The following main noise-generating activities will be assessed, although this does not cover all activities that could take place (e.g. works involving other static or moving plant items that will produce lower levels of noise):
- Site preparation, which will likely include the use of excavators and dozers;
 - Installation of solar PV panels, which will likely include the use of push press piling rigs and excavators; and
 - Trenching and installation of the cable route, which will likely include the use of excavators and dozers.
- 15.7.2 Typical noise levels from these types of activities with multiple plant carrying out heavy ground works can be up to 85 dB $L_{Aeq,T}$ at a distance of 10m, without the use of any noise reduction measures e.g. equipment in continuous use and no site hoarding or acoustic barriers in place.
- 15.7.3 Construction noise levels at surrounding receptors will vary depending on the locations and types of works taking place. Due to the variation in construction works activities and locations across the DCO Site, it is considered that any periods of regular high construction noise levels experienced at a receptor would be of a limited short-term duration (i.e. less than one month). Occupants of nearby receptors are likely to be more tolerable of these events if they are provided with timings and duration of high noise generating events.
- 15.7.4 In practice, for the majority of the construction activities, high-noise works will take place at farther distances from a receptor such that construction noise levels would only likely exceed the LOAEL. As exceedances of the LOAEL are likely to occur throughout the construction programme, all reasonable steps will be taken to mitigate and minimise the effects through adoption of BPM.
- 15.7.5 Exceedances of the SOAEL are unlikely to take place due to the fact that BPM will be adopted and secured through the CEMP. For example, the use of temporary acoustic barriers can provide approximately 10 dB of noise attenuation which can reduce noise levels to below the SOAEL.

- 15.7.6 Typical construction noise levels across the overall duration of the construction programme will likely be limited to a low magnitude impact; for receptors of high sensitivity this equates to a moderate adverse effect which is not significant.

Construction Vibration

- 15.7.7 BS 5228-2 makes reference to the Transport Research Laboratory (TRL) report 429 'Groundborne Vibration Caused by Mechanised Construction Works' (2000). Figure 50 of the TRL report indicates that ground vibration from miscellaneous vehicle operations on construction sites (including scrapers, rollers, dumpers, breakers, dozers and HGVs) are in the region of 1 mm/s PPV at approximately 10m, decreasing to the region of 0.1 mm/s PPV at approximately 50m.
- 15.7.8 Actual vibration levels from works are dependent on a number of factors including ground conditions, plant or vehicle size, the nature of the works (in particular piling methods), the speed of HGV movements and the quality of surface of haul or other temporary roads. Based on the assumed HGV speeds on access routes and regular maintenance of access route road surfaces, vibration from vehicles on the access roads will be minimised.
- 15.7.9 BS 5228-2 indicates that impact or vibratory piling activities generally only generate vibration impacts when they are located less than 20m from sensitive locations. The impact depends on the type of piling, ground conditions, and receptor distance. Vibration from smaller scale push piling techniques, which are proposed be used for the installation of solar module mounting structures, are generally limited to 1mm/s for distances up to 10m.
- 15.7.10 Based on the distances between the DCO boundary and surrounding receptors to locations where heavy ground works (excavation, push piling) may take place, it is considered that vibration from construction works experienced at sensitive receptors will be below the LOAEL and therefore limited to very low adverse magnitude impacts as per the criteria. For receptors of high sensitivity this would be equivalent to a moderate effect, which is not significant.
- 15.7.11 Vibration levels from activities (including on-site works and construction HGV traffic) are anticipated to be below the level at which there is any potential for cosmetic damage to structures as per the criteria in Table 15.6 and as such is a negligible effect which is not significant.
- 15.7.12 It is considered that any periods of construction vibration experienced at a receptor would unlikely exceed one month, with no permanent residual effect once works are completed. As such, any construction vibration effects are considered to be short-term in duration

Construction Traffic Noise

15.7.13 At this stage details of HGV movements associated with the construction phase of the scheme are not yet confirmed. Therefore, the assessment of construction traffic noise will be included in the ES. However, Table 14.9 in Chapter 14 (Transport and access) of the PEIR provides a forecast of construction vehicle trips for each of the three Sites considered. Based on the worst-case value of 23 trips per day at Cottam 1, the impact of noise from construction related HGV movements is likely to be insignificant.

Operational Noise

15.7.14 At this stage, we are currently in discussions with the LPAs regarding assessment criteria, with regard to the rural settings of the scheme and the relatively low existing background noise levels. Therefore, the operational noise assessment will be included in the ES. However, through the use of careful design and mitigation including barriers and enclosures, the impact of operational noise on sensitive receptors is expected to be insignificant.

15.8 In-Combination Effects

15.8.1 In-combination effects will be assessed in the ES.

15.9 Cumulative Effects

15.9.1 A 'long list' of potential cumulative development sites is provided in **Appendix 2.2** of the PEIR and the more substantial developments are shown on the plan at **Appendix 2.3**. Of particular relevance to any cumulative assessment is the West Burton Solar Project and Gate Burton Solar Project (both NSIP schemes).

15.9.2 We have examined the following projects (or potential projects) for the cumulative assessment, which are considered to have the potential to have a transport impact effect on the Study Area:

- West Burton Solar Project
- Gate Burton Energy Park
- EDF West Burton C
- Decommissioning of West Burton A
- Saxilby Heights
- Development at Land off Sturton Road

- Blyton Driving Centre
- Wood Lane Solar Farm

15.9.3 Cumulative noise effects during construction and operation phases may occur when developments are within 500m of a common receptor. At greater distances, any noise emissions would be attenuated such that there would normally be no combined effect.

15.9.4 At this stage of the EIA, developments that may give rise to cumulative noise effects with the Scheme have not yet been fully assessed and will be addressed in the ES. Whilst it is not possible to definitely state the significance of cumulative impacts, based on an initial review of the list and their nature and distance from the developments, it is not expected that cumulative schemes would elevate any of the residual effects identified in this assessment. At worst, the cumulative effect is expected to be moderate adverse, for example if any construction phases associated with any cumulative schemes overlap with the Scheme or if they include noisy operational emissions within 500m of the Scheme Site.

15.10 Additional Mitigation Measures

15.10.1 At this stage, no additional mitigation measures for the construction/decommissioning phases are considered to be required given that no significant adverse effects are expected. However, this will be investigated further within the ES.

15.11 Residual Effects

15.11.1 Whilst at this stage of the project, residual effects have not been fully assessed, it is anticipated that through the use of further mitigation measures (e.g. selection of quieter plant, positioning of noise-emitting equipment away from sensitive receptors, and the use of enclosures, louvres and/or acoustic barriers around inverters and energy storage system cooling fans), operational noise from associated solar farm plant will result in no significant residual adverse effects.