The Great Grid Upgrade

North Humber to High Marnham

Preliminary Environmental Information Report

Volume 1: Chapter 16 Noise and Vibration

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Contents

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16. Noise and Vibration

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16. Noise and Vibration

16.1 Introduction

16.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents information about the preliminary environmental assessment of the likely significant noise and vibration effects identified to date, that could result from the Proposed Overhead Line between the proposed Birkhill Wood Substation and the proposed High Marnham Substation as described in **Chapter 4 Description of the Project**.

16.1.2 **Chapter 1 Introduction** explains that the proposed Birkhill Wood Substation and proposed High Marnham Substation are proposed to be authorised through separate consenting procedures, however, they have also been included as part of the Project. As explained in **Chapter 5 Approach to Preparing the PEIR**, the environmental effects of these two substations including their associated overhead line reconfigurations, hereafter referred to as the Proposed Substation Works, have accordingly been considered within **Chapter 20 Substations and Associated Works**. For the purpose of this chapter the Proposed Overhead Line between the proposed Birkhill Wood Substation and the proposed High Marnham Substation is hereafter referred to as the Proposed Overhead Line.

16.1.3 To ensure that the Project as a whole has been assessed a summary has been included within this preliminary assessment of the likely significant effects on noise and vibration which brings together the assessment of the Proposed Overhead Line and Proposed Substation Works for noise and vibration.

16.1.4 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, mitigation and the preliminary noise and vibration residual significant effects that could result from the Proposed Overhead Line.

16.1.5 This chapter covers effects on the following during construction and operation and noting that decommissioning has been scoped out (Ref 16.14):

- construction noise;
- construction vibration;
- construction traffic noise; and
- operational noise from the Proposed Overhead Line.

16.1.6 Noise and vibration effects associated with maintenance during the operational phase of the Proposed Overhead Line have been scoped out of the assessment as agreed in the Scoping Opinion.

16.1.7 This chapter should be read in conjunction with:

- **Chapter 4 Description of the Project**;
- **Chapter 5 Approach to Preparing the PEIR**; and
- **Chapter 20 Substations and Associated Works.**

16.1.8 There are also interrelationships between the potential noise and vibration effects and other environmental topics. Therefore, please also refer to the following chapters:

- **Chapter 8 Ecology**;
- **Chapter 9 Ornithology;**
- **Chapter 10 Cultural Heritage**;
- **Chapter 14 Traffic and Transport**;
- **Chapter 17 Socio-economics, Recreation and Tourism**;
- **Chapter 18 Health and Wellbeing**; and
- **Chapter 21 Cumulative Effects.**

16.1.9 This chapter is supported by the following figures in Volume 2 and appendices in Volume 3:

- **Figure 16.1 Baseline Conditions**;
- **Figure 16.2 Construction Noise and Vibration Buffer Zone**;
- **Figure 16.3 Noise Sensitive Receptors Affected by Overhead Line Noise**
- **Appendix 4.1 Draft Outline Code of Construction Practice;**
- **Appendix 16.1 Construction Noise and Vibration Data**; and
- **Appendix 16.2 Construction Traffic Noise and Vibration Assessment**.

16.2 Regulatory and Planning Context

16.2.1 This section sets out the legislation and planning policy that is relevant to the preliminary noise and vibration assessment. A full review of compliance with relevant national and local planning policy will be provided within the Planning Statement that will be submitted as part of the application for Development Consent.

16.2.2 **Chapter 2 Regulatory and Planning Context** describes the overall regulatory and planning policy context for the Project. Key legislation, policy and planning guidance relevant to the assessment of potential noise and vibration effects associated with construction of the Project is presented below.

Legislation

16.2.3 The legislation listed below has been considered when identifying potential constraints to the Project, design options and mitigation.

- The Control of Pollution Act 1974 (Ref 16.1); and
- Environmental Protection Act 1990 (Ref 16.2).

The Control of Pollution Act 1974

16.2.4 The Control of Pollution Act 1974 (Ref 16.1) sets out the framework for the legislative control of construction noise and vibration on any given site. It also sets out the principle of 'best practicable means' (BPM) (as defined in Section 72 of the Act) and how that should be applied to construction activity noise. The Act refers to approved Codes of

Practice, which include British Standards 5228 Part 1 (Ref 16.17) and Part 2 (Ref 16.18), as being relevant for the purposes of determining the BPM.

16.2.5 Section 61 of the Act states that consent may be sought from the relevant local authorities prior to the construction works commencing. If prior consent is sought, the relevant local authorities will need to be provided with information about the proposed construction works and how construction noise will be managed, including the use of BPM.

Environmental Protection Act 1990

16.2.6 Under Part III of the Environmental Protection Act 1990 (Ref 16.2), as amended by the Noise and Statutory Nuisance Act 1993 (Ref 16.3), local authorities have a duty to investigate noise complaints relating to a variety of sources such as construction noise but excluding road traffic noise. If the local authority is satisfied that the noise amounts to a statutory nuisance it shall serve an Abatement Notice which may require that the noise be stopped altogether or limited to certain times.

National Policy Statements (NPSs)

16.2.7 **Chapter 2 Regulatory and Planning Context** sets out the overarching policy context relevant to the Project, including the Overarching NPS for Energy (EN-1) (Ref 16.4). This is supported by the NPS for Electricity Networks Infrastructure (EN-5) (Ref 16.5).

16.2.8 EN-1 (Ref 16.4) contains the following paragraphs relating to construction noise and vibration which have been considered within this chapter. Paragraphs 5.12.1 to 5.12.7 state:

- *'Excessive noise can have wide-ranging impacts on the quality of human life and health such as annoyance, sleep disturbance, cardiovascular disease and mental ill-health. It can also have an impact on the environment and the use and enjoyment of areas of value such as quiet places and areas with high landscape quality.'*
- *'The Government's policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references to 'noise' below apply equally to assessment of impacts of vibration.'*
- *'Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the Secretary of State in accordance with the Biodiversity and Geological Conservation section of this NPS...'*
- *Factors that will determine the likely noise impact of a proposed development include:*
  - *'The inherent operational noise from the proposed development, and its characteristics.'*
  - *'The proximity of the proposed development to noise sensitive premises (including residential properties, schools, and hospitals) and noise sensitive areas (including certain parks and open spaces).'*
  - *'The proximity of the proposed development to quiet places and other areas that are particularly valued for their soundscape or landscape quality.'*

- *'The proximity of the proposed development to sites where noise may have an adverse impact on protected species or other wildlife including migratory species.'*

- *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 characteristics, if the noise is impulsive, whether the noise contains particular high or low frequency content or any temporal characteristics of the noise.*
  - *identification of noise sensitive receptors 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 (and weekends) as appropriate, and at different times of year.*
  - *an assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and quality of life / well-being where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas.*
  - *all reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life*
- *'The nature and extent of the noise assessment should be proportionate to the likely noise impact.'*

16.2.9 Paragraph 5.12.8 states that:

'*Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation*.'

16.2.10 Paragraph 5.12.16 states:

'*A development must be undertaken in accordance with statutory requirements for noise. Due regard must be given to the relevant sections of the Noise Policy Statement for England, the NPPF* [National Planning Policy Framework]*, and the government's associated planning guidance on noise*…'

16.2.11 EN-5 (Ref 16.5) contains the following paragraphs relating to noise and vibration which have been considered within this chapter. Paragraph 2.9.26 to 2.9.43 states:

- *'All high voltage transmission lines have the potential to generate noise under certain conditions.'*
- *'Line noise is most commonly caused by corona noise when the conductor surface electric stress exceeds the inception level for corona discharge activity which is*

released as acoustic energy and radiates into the air as sound. Transmission line conductors are normally designed to operate below this threshold.'

- *'Surface contamination on a conductor or accidental damage during transport or installation can cause local enhancement of electric stress and initiate discharge activity leading to the generation of additional noise.'*
- *'The highest noise levels generated by a line generally occur during rain.'*
- *'Water droplets may collect on the surface of the conductor and initiate corona discharges with noise levels being dependent on the level of rainfall. Fog may also give rise to increased noise levels, although these levels are lower than those during rain.'*
- *'After a prolonged spell of dry weather without rain to wash the conductors, contamination may accumulate at sufficient levels to result in increased noise. After heavy rain, these discharge sources are washed away and the line will resume normal quieter operating sound.'*
- *'Surface grease on conductors can also give rise to audible noise effects as grease is able to move slowly under the influence of an electric field, tending to form points which then initiate discharge activity. Surface grease is likely to occur along the entire length of a conductor. Hence there may be many potential discharge sources and, consequently, a higher noise level.'*
- *'This will only occur if substandard grease has been used during manufacture or if the conductor has been overheated by carrying excessive electrical load. This can be mitigated through good design or by replacement.'*
- *'Transmission line audible noise is generally categorised as 'crackle' or 'hum', according to its tonal content.'*
- *'Crackle may occur alone, but hum will usually occur only in conjunction with crackle. Crackle is a sound containing a random mixture of frequencies over a wide range, typically 1kHz to 10kHz. No individual pure tone can be identified for any significant duration. Crackle has a generally similar spectral content to the sound of rainfall. Hum is only likely to occur during rain when rates of rainfall exceed 1mm/hr. Hum is a sound consisting of a single pure tone or tones.'*
- *'Noise may also arise from discharges on overhead line fittings such as spacers, insulators and clamps. Such noise should be mitigated through good design.'*
- *'When assessing the impact of noise generated by overhead lines in wet weather relative to existing background sound levels, the applicant should consider the effect of varying background sound levels due to rainfall.'*
- *'The Secretary of State is likely to regard it as acceptable for the applicant to use a methodology that demonstrably addresses their criteria.'*

16.2.12 Paragraph 2.10.31 of EN-5 (Ref 16.5) states that:

'Applications must consider the following measures (including)… Selection of quieter cost-effective plants.'

Other National Policy

16.2.13 Although the Project will be tested in line with the National Policy stated above, the preliminary assessment has also been undertaken with reference to the following national policy:

- National Planning Policy Framework (NPPF) 2024 (Ref 16.6);
- Planning Practice Guidance for Noise (PPGN) 2019 (Ref 16.7); and
- Noise Policy Statement for England 2010 (Ref 16.8).

16.2.14 The NPPF sets out the Government's planning policies for England and how these are expected to be applied. The NPPF includes statements relating to noise and the requirement to take it into account in the planning process. Section 187 of the NPPF indicates that the planning system should contribute to and enhance the natural and local environment.

16.2.15 PPGN advises on how planning can manage potential noise, and vibration impacts in new development. It sets out a noise exposure hierarchy, based on the average response to noise and vibration of those affected, and provides guidance on defining noise and vibration affect levels in terms of Lowest Observed Adverse Effect Levels (LOAELs) and Significant Observed Adverse Effect Levels (SOAELs). Lowest Observed Adverse Effect Levels (LOAELs). LOAELs indicate a level of noise or vibration exposure above which adverse effects on health and quality of life can be detected. SOAELs indicate a level of noise or vibration exposure above which significant adverse effects on health and quality of life occur.

16.2.16 Section 1.7 of the NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

Regional and Local Policy

16.2.17 **Chapter 2 Regulatory and Planning Context** lists relevant regional and local policy documents. Key policies relevant to noise and vibration that have informed this preliminary assessment, and will inform the final assessment reported within the Environmental Statement (ES), comprise:

- East Riding Local Plan 2012-2029, Adopted 2016 (Ref 16.9):
  - Section 7: A Prosperous Economy; and
  - Section 8: A High-Quality Environment.
- Bassetlaw Local Plan 2020-2038, Adopted 2024 (Ref 16.10):
  - Section 9: Health Community; and
  - Policy 48: Protecting Amenity.
- East Riding of Yorkshire Local Plan Update 2020-2039 (Ref 16.11):
  - Policy EC5: supporting the renewable and low carbon energy sector;

  - Policy ENV1: Integrating high quality design; and
  - Policy ENV6: Managing environmental hazards.
- North Lincolnshire Local Development Framework Core Strategy Adopted 2011 (Ref 16.12):
  - Core Strategy CS27: planning obligations.

16.2.18 North Lincolnshire Council submitted the New Local Plan for Examination in November 2022. However, the authority took the decision to formally withdraw the New Local Plan from the Examination in September 2024. The Saved Policies in the Local Plan (2003) as updated in October 2024 (Ref 16.13), North Lincolnshire Local Development Framework Core Strategy (2011) (Ref 16.12) from the adopted Development Plan have been considered in the PEIR where relevant.

16.3 Scoping Opinion and Consultation

Scoping Opinion

16.3.1 The scope of the assessment has been informed by the Scoping Opinion (Ref 16.14) provided by the Planning Inspectorate on behalf of the Secretary of State, following submission of the Environmental Impact Assessment (EIA) Scoping Report (Ref 16.15). A summary of the Scoping Opinion, together with a response from National Grid against each point of relevance to noise and vibration, is provided in Table 16.1.

Table 16.1 - Comments raised in the Scoping Opinion

ID	Inspectorate's comments	Response
3.10.1	**Vibration impact on structures due to construction activities – Construction.** The Applicant proposes to scope out this matter for the phase identified on the basis that construction vibration would not be expected to cause damage to buildings or structures unless very high levels of vibration are generated within approximately 10 m, although this would be reviewed during the iterative design process and avoided where possible. The Inspectorate considers that there is insufficient information at present to scope this matter out from further assessment.	Potential construction vibration effects on buildings and structures has been scoped into the assessment. A further assessment will be undertaken and reported in the ES. Construction vibration impacts on flood defences will be assessed in the ES.
3.10.2	**Vibration impact at Noise Sensitive Receptors (NSRs) due to construction traffic – Construction** The Applicant proposes to scope out this matter for the phase identified on the basis that vibration from traffic on the public highway is caused by irregularities in the road surface. Where the road surface is free from irregularities, such as potholes, significant vibration effects would not be expected, even at relatively short distances. The Inspectorate considers that there is insufficient information at present to scope this matter out from further assessment.	Potential construction traffic vibration effects has been scoped into the assessment.
3.10.3	**Noise impact at NSRs from the overhead line – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that operational noise from the overhead line is not likely to be significant at nearby NSRs under any weather conditions owing to the proposed 'triple Araucaria' conductor	In the Scoping Opinion the Applicant detailed the Proposed Overhead Line system of triple Araucaria conductor bundle would be utilised for the Project. Following further design work, it is now considered that twin conductors are a potential conductor technology option which could be used for the Project. Therefore, operational noise has been scoped into the

ID	Inspectorate's comments	Response
	bundle (Section 15.5 of the Scoping Report). The Applicant also proposes that, should the iterative design process result in alternative conductor types being used, consideration for this would be assessed within the noise and vibration assessment and technical information would be submitted as part of the application for development consent to support scoping out noise associated with overhead lines from the noise and vibration assessment. The Inspectorate is content with this approach, however, should alternative conductor types be proposed, the Applicant should submit further technical information as part of the development consent to support scoping out this matter from the noise and vibration assessment.	assessment on the basis twin conductors could be used in the Project.
3.10.4	**CSEC Noise impact at NSRs – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that the source of operational noise is the same as that from an overhead line (i.e. which would be 'practically quiet' during operation) and therefore significant effects would not be likely. The Inspectorate is content with this approach.	It has been confirmed that cable sealing end compounds (CSEC) would not be proposed for the Project. No assessments for CSEC are considered further.
3.10.5	**Noise impact at NSRs due to underground cables – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that underground cables are practically quiet and therefore not considered likely to cause significant effects. The Inspectorate is content with this approach.	The Applicant has been confirmed that underground cables would not be proposed for this Project. No assessments for underground cables are considered further.
3.10.6	**Vibration impact at NSRs due to operational vibration – Operation**	No sources of operational vibration have been proposed as part of the Project. Therefore, operational

ID	Inspectorate's comments	Response
	The Applicant proposes to scope out this matter for the phase identified on the basis that there are no sources of operational vibration proposed as part of the Proposed Development. The Inspectorate is content with this approach subject to no sources of operational vibration proposed for the phase identified.	vibration has been scoped out and its impacts are not further considered.
3.10.7	**Noise or vibration impact at NSRs due to maintenance for the overhead line, potential underground cables, cable sealing end compounds, and/or tunnel head houses – Operation (maintenance activity)** The Applicant proposes to scope out this matter for the phase identified on the basis that the maintenance of the overhead line, underground cables, and substations would be infrequent and localised and short term in duration. Maintenance activities would follow standard measures to reduce noise and vibration where required. The Inspectorate draws the Applicant's attention to ID 2.1.11. The Inspectorate is content to scope out the specific maintenance activities that are planned to occur during the operational phase in relation to the receptors identified on the basis of low-level activity associated with the phase identified and subject to the implementation of standard measures to reduce noise and vibration where required.	No underground cables, CSEC's and tunnel head houses are proposed as part of the Project. Noise and vibration impacts from maintenance of the Proposed Overhead Line have been scoped out and their impacts are not further considered.
3.10.8	**References to table 15.4** Table 15.4 refers only to Table 15.4. The Inspectorate assumes this is a typographical error and this should refer to Table 15.3. The Applicant should ensure that all cross-references within the ES are correct.	Noted. All cross references within the ES will be checked and reviewed for accuracy, prior to publication.

ID	Inspectorate's comments	Response
3.10.9	**Scope of Assessment – Vibration monitoring** The Inspectorate advises that vibration from the installation of structures may adversely affect flood defences, therefore vibration monitoring should be scoped into further assessment to ensure that the associated vibrations will not adversely affect any flood defence structures. Depending on proximity, vibration from HGV traffic/plant may also be necessary.	Construction vibration and construction traffic vibration impacts on structures and flood defences have been scoped into the assessment. Monitoring would be conducted during the works if appropriate.

Project Engagement and Consultation

16.3.2 The noise assessment will be informed by consultation and engagement with stakeholders, including Bassetlaw District Council, East Riding of Yorkshire Council, Newark and Sherwood District Council, North Lincolnshire Council and Nottinghamshire County Council. Correspondence of these discussions will be presented in the ES.

16.4 Assessment Approach and Methods

16.4.1 **Chapter 5 Approach to Preparing the PEIR** sets out the overarching approach which has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the baseline conditions, sensitivity of receptors and magnitude of impacts and sets out the criteria that have been used for the preliminary noise and vibration assessment. This section also identifies further assessment required to be undertaken and reported within the ES.

Guidance Specific to the Noise and Vibration Assessment

16.4.2 Relevant guidance specific to noise and vibration that has informed the approach to the preliminary assessment, and which will inform the assessment reported within the ES, comprises:

- BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BS 5228-1) (Ref 16.17);
- BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (BS 5228-2) (Ref 16.18);
- Calculation of Road Traffic Noise, 1988 (CRTN) (Ref 16.19);
- ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors, 2024 (Ref 16.24);
- DMRB LA 111: Noise and Vibration, 2020 (DMRB LA 111) (Ref 16.16);
- Determining Significance for Human Health in Environmental Impact Assessment Institute of Environmental Management and Assessment, (IEMA), 2022 (Ref 16.20);
- IEMA Guidelines for Environmental Noise Impact Assessment, 2014 (Ref 16.21);

- National Grid Policy Statement PS(T)134 - Operational Audible Noise Policy for Overhead Lines (PS(T)134), 2021 (Ref 16.22); and
- BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound, 2019 (Ref 16.23)

Study Area

16.4.3 The study areas for noise and vibration are described below. These are presented for the Project inclusive of both the Proposed Overhead Line and Proposed Substation Works.

Construction noise study area

16.4.4 The study area as shown in **Figure 16.1 Baseline Conditions,** for construction noise effects includes NSRs within 300 m of the construction works associated with the Project, excluding traffic on the public highway which is considered separately. This is based on guidance in BS 5228-1 (Ref 16.17) and DMRB LA 111 (Ref 16.16).

Construction vibration study area

16.4.5 The study area as shown in **Figure 16.1 Baseline Conditions,** for construction vibration effects, based on guidance in BS 5228-2 (Ref 16.18) and DMRB LA 111 (Ref 16.16), comprises 100 m from the closest construction activity with the potential to generate vibration effects at NSRs.

Construction traffic noise and vibration study area

16.4.6 Noise from construction traffic on the existing road network has been assessed for each applicable road understood to be affected. The assessment considers the change in Basic Noise Level (BNL), calculated in line with the methodology described in CRTN (Ref 16.19), with a subsequent assessment of the effects on NSRs within 50 m of routes, as shown in **Figure 16.1 Baseline Conditions**. Potential significant effects are identified in accordance with the methodology described in DMRB LA 111 (Ref 16.16). The study area of the construction traffic vibration is considered to be the same as the construction traffic noise.

Operational noise study area

16.4.7 The study area for operational noise has been determined based on the limit of deviation of the Proposed Overhead Line and the screening distance set out below, as shown in **Figure 16.3 Noise Sensitive Receptors Affected by Overhead Line Noise**. The screening distance is the distance beyond which operational noise from the Proposed Overhead Line is unlikely to result in adverse noise effects at receptors.

16.4.8 The choice of conductor system for the Proposed Overhead Line has been left open for the reasons set out in **Chapter 4 Description of the Project**. The screening distance has therefore been determined based on the potential worst-case conductor type (which is a twin conductor bundle) under combined wet and dry weather conditions. NSRs which are further than the screening distance will not experience significant operational noise effects and have therefore not been considered further within this assessment.

16.4.9 The study area is based on the distance within which there is the potential for adverse effects from operational noise from the worst-case potential conductor type during wet

conditions. According to National Grid Policy Statement PS(T) 134, overhead line noise source prediction is calculated using noise prediction software EFC 400 using the internationally recognised Electrical Power Research Institute method. This software is widely used across the electricity industry to calculate conductor surface electrical stress, to assess compliance with electric and magnetic field guidelines and to predict transmission line noise levels under a range of weather conditions. Propagation either side of a modelled line is calculated according to ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors' (Ref 16.24). Based on National Grid noise predictions from the worst-case potential conductor type, the screening distance is 130 m for highly sensitive receptors such as hospices, care homes or community facilities (further examples are outlined in Table 16.2). Receptors of high sensitivity are considered vulnerable as defined by the World Health Organization (Ref 16.24). The screening distance for different receptors has been grouped. For residential receptors, and non-residential receptors classified as being of medium, low and negligible sensitivity, the screening distance is 60 m.

Baseline Data Gathering and Forecasting Methods

Data sources

16.4.10 The baseline information has been informed by a desk study which has drawn on the following information sources:

- Department for Environment, Food and Rural Affairs (DEFRA) strategic noise mapping (Ref 16.25 and Ref 16.26);
- Ordnance Survey (OS) 1:10,000, 1:25,000, 1:50,000 and 1:250,000 base mapping;
- OS AddressBase Plus data; and
- Baseline traffic data, in the form of annual average daily traffic (AADT) and annual average of weekday traffic (AAWT) provided by the traffic and transport consultant.

Baseline noise survey methodology

16.4.11 Baseline noise surveys are not proposed as part of the assessment of construction noise. In lieu of baseline noise data, worst-case lower thresholds would be used for the assessment of construction noise, as detailed in paragraph 16.4.19, below. Where DEFRA strategic noise mapping data could be utilised to justify a higher threshold, the higher threshold would be used in the assessment.

16.4.12 A baseline noise survey will be carried out at locations which are considered to be representative of NSR within the study area to inform the final assessment of operational noise from the proposed overhead line.

16.4.13 The relevant local authorities will be consulted prior to the noise surveys to confirm the proposed survey locations and methods are agreed.

Further data to be collected to inform the ES

16.4.14 In addition to the data collected for this assessment, the noise and vibration assessment to be reported in the ES will be informed by updated baseline data, if required, for example if there are changes to the study area as a consequence of updated draft Order Limits or changes to traffic flows or to account for any changes to the design of the Project.

Assessment Methods and Criteria

Sensitivity

16.4.15 The sensitivity of a NSR is determined partly on property type, for example occupants of residential properties have a higher sensitivity to noise than those working in factories and offices.

16.4.16 Although all residential NSRs are sensitive to noise and vibration, there are also cases where the sensitivity of an NSR may be influenced by the pre-existing noise climate. For example, a NSR falling with existing high noise areas (such as Noise Important Areas[1] (NIA)) may be more sensitive to increases in noise than those outside the NIA. Consideration has been given to such instances as part of the assessment of noise impacts.

16.4.17 The sensitivity of residential NSRs is factored into the assessment methodologies. However, additional consideration of sensitivity may be required in certain cases for non-residential NSRs. The criteria used to determine the sensitivity of non-residential NSRs are set out in Table 16.2. These values are based on standard practice.

Table 16.2 - Criteria for determining sensitivity – Non-residential NSR

Sensitivity	Impact
High	Schools and education premises, hospitals, clinics, care homes, places of worship, community centres, libraries, hospices
Medium	Areas primarily used for leisure activities including Public Rights of Way, sports facilities and sites of historic or cultural importance, camp sites, hotels, gardens, parks.
Low	Offices, cafes/bars with external areas.
Negligible	Industrial or retail premises.

Magnitude

16.4.18 Impact magnitudes have been set, where applicable, relative to LOAELs and SOAELs for each noise and vibration source. The LOAEL indicates a level of noise exposure above which adverse effects on health and quality of life can be detected. The SOAEL indicates a level of noise exposure above which significant adverse effects on health and quality of life occur.

Impact magnitude – construction noise

16.4.19 Construction noise impacts have been assessed in accordance with BS 5228-1 and with the guidance of DMRB LA 111 (Ref 16.16).

16.4.20 Distances within which the various construction noise magnitude threshold values would be exceeded have been calculated for each construction activity in accordance with the methodology described in Annex F of BS 5228-1 (Ref 16.17). The thresholds of SOAEL

[1] Noise Important Areas (NIAs) are determined via strategic noise maps and highlight the residential areas experiencing the highest 1% of noise levels from road and rail sources in England.

are set relative to the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the 'ABC' method) (Ref 16.17). The Category A construction noise thresholds represent the lowest assessment criteria (typically used to assess impacts in rural areas) have been used throughout the Project as a worst-case unless there is a justification for a higher threshold to be set at specific locations.

Table 16.3 - Construction noise LOAELs and SOAELs

Time Period	LOAEL	SOAEL
Weekdays 07:00 to 19:00, and Saturdays 07:00 to 13:00	50 decibel (dB) $L_{Aeq,T}$*	65 dB $L_{Aeq,T}$
Weekdays 19:00 to 23:00, Saturdays 13:00 to 23:00, and Sundays 07:00 to 23:00	50 dB $L_{Aeq,T}$	55 dB $L_{Aeq,T}$
Night-time 23:00 to 07:00	40 dB $L_{Aeq,T}$	45 dB $L_{Aeq,T}$

* $L_{Aeq,T}$ is the equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.

16.4.21 The magnitude of impact of construction noise has been determined against the criteria specified by DMRB LA 111 (Ref 16.16), as detailed in Table 16.4.

Table 16.4 - Magnitude of impact from construction noise

Magnitude	Construction noise level
Major	Above or equal to SOAEL +5 dB
Moderate	Above or equal to SOAEL and below SOAEL +5 dB
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Impact magnitude – construction traffic noise

16.4.22 Noise levels from construction traffic on the public highway have been calculated in accordance with CRTN and assessed against the criteria detailed in DMRB LA 111. The BNL from roads within the construction traffic study area have been calculated in accordance with CRTN for the 'do-minimum' (without the Project) and 'do-something' (with the Project) scenarios in the construction year. In the 'do-minimum' scenario, the BNL does not include noise from the Project, whilst in the 'do-something' scenario, the BNL includes noise from the Project. The calculated BNL values have been compared to determine the magnitude of the impact.

16.4.23 The calculated BNL values for the 'do-minimum' and 'do-something' scenarios in the peak construction year scheduled for 2028, as detailed in **Chapter 4 Description of the Project**, have been compared to determine the magnitude of the impact in accordance with criteria specified by DMRB LA 111 (Ref 16.16). This is detailed in Table 16.5 below.

Table 16.5 - Magnitude of impact from construction traffic noise

Magnitude	Increase in BNL of closest public road used for construction traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

Impact magnitude – construction vibration on humans within buildings

16.4.24 Construction vibration levels have been calculated and assessed in accordance with the methodologies described in BS 5228-2 (Ref 16.18). Construction vibration levels have been compared against fixed assessment criteria appropriate detailed in BS 5228-2 (Ref 16.18).

16.4.25 Vibration levels from construction activities have been calculated in accordance with the methodology described in Annex E of BS 5228-2 (Ref 16.18). Construction vibration effect threshold levels, including applicable LOAELs and SOAELs, are presented in Table 16.6.

Table 16.6 - Construction vibration effects

Vibration Level mm/s PPV	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments (LOAEL).
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 (SOAEL).
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

16.4.26 The magnitude of impact of construction vibration have been determined against the criteria specified by DMRB LA 111 (Ref 16.16), as detailed in Table 16.7.

Table 16.7 - Magnitude of impact of construction vibration

Magnitude	Construction vibration level
Major	Above or equal to 10 mm/s PPV
Moderate	Above or equal to SOAEL and below 10 mm/s PPV
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Impact magnitude – construction vibration on buildings and structures

16.4.27 As above, construction vibration levels have been calculated and assessed in accordance with the methodologies described in BS 5228-2 (Ref 16.18).

16.4.28 In the case of potential structural damage, an impact magnitude scale is not deemed appropriate. Rather, the assessment should consider whether there is a likelihood of potential damage or not. As such a fixed threshold has been used.

16.4.29 BS 5228-2 (Ref 16.18) notes that the probability of damage tends towards zero at 12.5 mm/s PPV. Buildings and structures where the predicted vibration level is above or approaching this value will be highlighted such that measures can be put in place by the contractor to reduce and manage vibration levels. The specific threshold may be reviewed for specific structures as deemed appropriate.

Impact magnitude – construction traffic vibration

16.4.30 The impact from vibration caused by construction traffic is the same as construction vibration. The impact magnitude for construction vibration on humans within buildings has been adapted for the assessment of construction traffic vibration.

Impact magnitude – operational overhead line noise

16.4.31 Operational noise from the Proposed Overhead Line is assessed in accordance with National Grid Policy Statement PS(T)134 Operational Audible Noise Policy for Overhead Lines (PS(T)134) (Ref 16.22). The policy describes a three-tier assessment process and sets noise impact criteria against which predicted levels of operational noise from the Proposed Overhead Line can be assessed.

16.4.32 PS(T)134 describes a method for predicting the environmental impact due to audible noise caused by new, reconductored, diverted or uprated overhead transmission lines. The method uses internationally recognised line noise prediction methodology to calculate noise emission levels based on operating voltage, conductor design and pylon geometry. PS(T)134 also sets out noise criteria against which predicted levels of operational noise from the Proposed Overhead Line can be assessed.

16.4.33 The PS(T)134 criteria applies a +6 dB character correction to wet noise effects to account for the additional ‘hum’ generated during worst-case wet weather conditions. Under dry conditions, a +3 dB correction is used to account for the ‘crackle’. This means that the assessment method is consistent with guidance contained in Section 9 of BS 4142 (Ref 16.23), which takes account of acoustic features by applying a character correction to the specific sound level to calculate a BS 4142 rating level.

16.4.34 The Proposed Overhead Line operational noise assessment process set out in PS(T)134 follows a three-tier 'screening' approach based on predicted source noise level and the distance to NSR. If predicted worst case wet-noise levels fail the Tier 1 test, a Tier 2 assessment would be undertaken and if predicted noise levels fail the Tier 2 test, a Tier 3 assessment would be undertaken. The three-tier approach comprises the following steps which are designed to screen out of further assessment where there would be no adverse impact:

- Tier 1: A primary screening step based on 'worst-case' absolute wet noise effects and the pre-determined assessment criteria set out in PS(T)134;
- Tier 2: A further screening step based on combined absolute wet noise and dry noise effects and recalculated assessment criteria. This step takes account of the fact that wet noise occurs only during periods of wet weather and therefore does not occur all the time; and
- Tier 3: Full assessment following the principles of BS 4142 (Ref 16.23) for both wet noise and dry noise.

16.4.35 The criteria have been developed by National Grid based on health impact data associated with the night-time period. The night-time period is considered more sensitive than the daytime, as background sound levels are normally lower, and people are trying to sleep. National Grid Technical Report TR(E)564 explains the reasoning behind the noise criteria set out in PS(T)134.

16.4.36 The Tier 1 Assessment criteria set out in PS(T)134 are shown in Table 3.1. The 'No Adverse Impact' criteria applicable to residential NSR for worst-case wet weather noise is 34 dBA. In the case of the Tier 1 assessment, this is a rating level which includes a +6 dB character correction to account for the occurrence of transmission line 'hum' in wet weather. The criteria for NSR that may be regarded as highly sensitive to noise (for example vulnerable subgroups as defined by the World Health Organisation (Ref 16.24) is 5 dB lower, while the criteria for NSR that may be regarded as less sensitive to noise (for example those not used at night and those used for commercial purposes) is 5 dB higher.

Table 16.8 - Tier 1 Noise Impact Criteria (Wet Noise), from PS(T)134

NSR group	No adverse impact (Screened out)	Further assessment necessary (Tier 2 assessment required)
Vulnerable subgroups	< 29 dBA	≥ 29 dBA
Residential	< 34 dBA	≥ 34 dBA
Schools and hotels	< 39 dBA	≥ 39 dBA

16.4.37 For the purposes of the Tier 1 assessment, 34 dBA is considered to be the LOAEL for residential NSR used for sleeping at night. These levels are free-field and apply at the façade of an NSR.

16.4.38 For the purposes of the PEIR, a Tier 1 assessment has been undertaken to determine NSR that may exceed the Tier 1 Noise Impact Criteria. This would not be a direct indication of adverse or significant adverse effect, but rather an indication that such effects have not been ruled out. Further Tier 2 and Tire 3 assessments would be conducted as part of the ES to determine the magnitude and significance of effect at NSR not screened out by the Tier 1 assessment.

Significance of effects

16.4.39 The significance of effects have been then expressed as a result of the sensitivity and magnitude of impact on receptors, experienced as a result of the Project.

Residential NSR

16.4.40 At residential NSRs, major and moderate magnitude impacts are typically considered to be significant, whilst minor and negligible impacts are considered to be not significant.

16.4.41 Noise from construction activities, construction traffic noise, and construction vibration would constitute a significant adverse effect at residential NSRs where it is determined that a major or moderate magnitude of impact would occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights; and/or
- a total number of days exceeding 40 in any six consecutive months.

Non-residential NSR

16.4.42 With regards to non-residential receptors, the significance of effect has been determined via the matrix shown in Table 16.9, taking account of the sensitivity of the NSR and the impact magnitude. For construction impacts, the duration of impact would also be taken into account, as above.

Table 16.9 - Significance matrix at non-residential NSR

Magnitude	NSR sensitivity			
	High	Medium	Low	Negligible
Major	Major	Major	Moderate	Minor
Moderate	Moderate	Moderate	Minor	Negligible
Minor	Moderate	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

16.4.43 Major and moderate effects are typically considered to be significant, whilst minor and negligible effects are not considered to be significant. However, professional judgement has also been applied in reaching conclusions as to the significance of effects at specific non-residential NSRs.

Approach to defining significance in the PEIR

16.4.44 As set out in **Chapter 5 Approach to Preparing the PEIR** the general approach taken to determining the significance of effect in this preliminary assessment is only to state whether effects are likely or unlikely to be significant, rather than assigning a significance levels.

16.4.45 Following on from the identification of whether an effect is considered likely to be significant or not significant, a confidence in the prediction is given a rating of high, moderate or low in line with the confidence level definitions presented in **Chapter 5 Approach to Preparing the PEIR**.

Preliminary Assessment Assumptions and Limitations

16.4.46 The assessment has been undertaken based on preliminary design information for the Proposed Overhead Line as described in **Chapter 4 Description of the Project**. This information is likely to develop further in response to ongoing design, assessment and stakeholder feedback, and will be updated for the ES as the design evolves.

16.4.47 All conclusions and assessments are, by their nature, preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a conservative representative scenario has been assessed.

16.4.48 The assessment comprises assessing the sensitivity of the receptor, the magnitude of impact (change in the baseline conditions) the receptor would experience due to the Proposed Overhead Line, and the resulting significance of effect, which is determined by combining the impact with the above stated factors. Where there is potential for significant effects significant effects at NSR resulting from the Proposed Overhead Line, these have been identified.

16.4.49 Although in practice BPM will be employed to reduce construction noise and vibration levels, for the purposes of this assessment specific mitigation measures are not included in the construction noise and vibration calculations. This is so that construction noise and vibration ‘hot spots’ can be highlighted, and specific noise and vibration mitigation measures can be identified to avoid or reduce significant adverse effects.

16.4.50 In addition to the BPM, specific construction noise and vibration mitigation measures will be determined by the contractor(s) following their own detailed assessment prior to the start of construction.

16.4.51 It is assumed that the majority of construction works would be expected to occur during normal core construction working hours, as described in **Chapter 4 Description of the Project**. However, there may be some construction activities where works outside of these periods is required. Typical activities proposed that may take place outside of the proposed core construction working hours are set out in **Chapter 4 Description of the Project**. These activities tend to be a short duration and would not be expected to generate significant effects. Works outside of the core construction working hours are therefore not considered in this preliminary assessment, but the potential need to consider them will remain under review as part of the assessment process.

16.4.52 The operational noise assessment for the Proposed Overhead Line noise assumes that the worst-case potential conductor type and arrangement with regards to noise generation is used.

16.4.53 The key parameters and assumptions will be reviewed based on the final design and, where required, updated or refined. The ES will present the final key parameters and assumptions used within that assessment, particularly drawing attention to any areas that may have changed from what is presented in this preliminary assessment.

Further Assessment within the ES

16.4.54 The ES will present a further detailed assessment of construction noise and vibration and operational noise effects, taking account of the information available at the ES stage.

16.5 Baseline Conditions

16.5.1 This section describes the baseline noise and vibration conditions in the study area (comprising the construction noise and vibration study area, the construction traffic study area and the operational noise study area) where it relates to the Proposed Overhead Line. The baseline noise and vibration conditions in the study area in relation to the Proposed Substation Works is presented in **Chapter 20 Substations and Associated Works**.

16.5.2 Ecological and heritage sites that may be affected by noise and vibration are considered within **Chapter 8 Ecology, Chapter 9 Ornithology** and **Chapter 10 Cultural Heritage** of the PEIR.

16.5.3 The noise climate is expected to vary along the draft Order Limits depending on the nature of the area. For example, close to noise sources, such as roads and railways and in built up areas, ambient noise levels are expected to be higher. Further away from road and rail sources and in rural areas, ambient and background noise levels would be expected to be lower. Daytime noise level contours from existing road and railway sources are presented in **Figure 16.1 Baseline Conditions**, showing how existing noise levels vary within and surrounding the draft Order Limits. Areas outside of the shown noise contours are generally considered to have low ambient and background noise levels. Areas where the road and rail noise contours overlap are considered to experience noise effects from both sources.

16.5.4 It is assumed that existing vibration levels are negligible within the draft Order Limits compared to construction vibration threshold values, which is likely to be the case even close to railways or busy main roads.

Route Section 1: Creyke Beck to Skidby

16.5.5 This section provides the baseline for the Proposed Overhead Line. The baseline for the Proposed Substation Works at Birkhill Wood is presented in **Chapter 20 Substations and Associated Works**.

Noise sensitive receptors

16.5.6 There are no settlements within the study area in this Route Section. The NSRs within this study area are detailed in Table 16.10 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.7 No NIAs are located within the 300 m study area in this Route Section.

Table 16.10 - Route Section 1 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within the 300 m study area
Residential	Residential properties	4
High	None within the study area	0
Medium	None within the study area	0
Low	None within the study area	0
Negligible	Utility	1

Noise climate

16.5.8 The main existing sources of noise in this Route Section include road traffic from the A1079 to the east of the draft Order Limits, and A164 which crosses the draft Order Limits from north to south in the centre of this Route Section. There are also relatively low levels of traffic on Dunflat Road which is located to the north of the draft Order Limits.

16.5.9 All NSRs in this Route Section are more than 300 m from the A1079 and A164. DEFRA Road Noise mapping (Ref 16.26) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at the identified NSRs.

16.5.10 Away from road traffic sources, ambient and background sound levels are expected to be low.

Route Section 2: Skidby to A63 Dual Carriageway

Noise sensitive receptors

16.5.11 The draft Order Limits extend into Little Weighton and are located approximately 150m south of Brantingham[2]. There are several villages located within the 300m study area. Several lower sensitivity NSRs such as offices and pet care facilities are also within the study area. The NSRs within this study area are detailed in Table 16.11 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.12 No NIAs are within the 300 m study area in this Route Section.

Table 16.11 - Route Section 2 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	43
High	None within the study area	0
Medium	Community services	1
Low	Offices	1
Negligible	Development, manufacturing, engineering and maintenance facility, retail	9

[2] Skidby is considered under Route Section 1 to avoid repetition.

Noise climate

16.5.13 The main existing source of noise is the A63 which is crossed by the draft Order Limits at the boundary of this Route Section and Route Section 3. There are also relatively low levels of traffic on Little Weighton Road, Rowley Road, Lambwell Hill Road, Dale Road, Riplingham Road and Brantingham Road.

16.5.14 DEFRA Road Noise mapping (Ref 16.26) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at the majority of the identified NSRs. For residential properties (at Burrill Lane and Main Road) close to A63 the existing ambient noise levels are between 50 dB and 55 dB $L_{Aeq,T}$.

16.5.15 Away from road traffic sources, ambient sound levels are expected to be low.

Route Section 3: A63 Dual Carriageway to River Ouse Crossing

Noise sensitive receptors

16.5.16 The draft Order Limits pass in proximity to several settlements, including (north to south) Ellerker located approximately 20 m to the north, Broomfleet 150 m to the south, and Yokefleet located approximately 50 m to the west of the draft Order Limits. A large number of residential properties and farmhouses are located within the study area. Several lower sensitivity NSRs such as offices, cafés and pet care facilities are also within the study area. The NSRs within this study area are detailed in Table 16.12 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.17 No NIAs are within the 300 m study area in this Route Section.

Table 16.12 - Route Section 3 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	190
High	None within the study area	0
Medium	Community services, hotels	3
Low	None within the study area	0
Negligible	Industrial or retail premises.	34

Noise climate

16.5.18 The main existing sources of noise are the A63 crossing the draft Order Limits on the boundary of this Route Section and Route Section 2, and the Selby to Hull railway line (west to east) crossing through the centre of this Route Section. There are also relatively low levels of traffic on Brough Road, Sands Lane, Ings Lane, Carr Lane, Crabley Lane, Sleights Lane, Tongue Lane, Broad Lane, Common Road, Walingfen Lane and Blacktoft Lane.

16.5.19 DEFRA Road and Rail Noise mapping (Ref 16.26 and Ref 16.25) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at the majority of the identified NSRs. For several

NSRs close to A63 the existing ambient noise levels are between 50 dB and 55 dB $L_{Aeq,T}$. The existing ambient noise levels are higher than 65 dB $L_{Aeq,T}$ at several NSRs close to the railway line.

16.5.20 Away from road and rail traffic sources, ambient sound levels are expected to be low.

Route Section 4: River Ouse Crossing

Noise sensitive receptors

16.5.21 The draft Order Limits are directly adjacent to the settlements of Ousefleet and Whitgift, which form a clustered residential area. A number of residential properties are located along Pennyhill Cottages Road crossing the Route Section from west to east. The NSRs within this study area are detailed in Table 16.13 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.22 No NIAs are within the 300 m study area in this Route Section.

Table 16.13 - Route Section 4 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	51
High	Place of Worship	1
Medium	Community services, hotels	2
Low	None within the study area	0
Negligible	Industrial, utility or retail premises.	6

Noise climate

16.5.23 The main existing source of noise is Pennyhill Cottages Road crossing the draft Order Limits from west to east. There are also relatively low levels of traffic on Narrow Lane.

16.5.24 Since the traffic flow on these roads are too low to be indicated in DEFRA Road Noise mapping (Ref 16.26), the existing ambient noise levels in this Route Section are likely to be below 50 dB $L_{Aeq,T}$.

16.5.25 Away from road traffic sources, ambient sound levels are expected to be low.

Route Section 5: River Ouse Crossing to Luddington

Noise sensitive receptors

16.5.26 The draft Order Limits pass in proximity to two settlements, including, Garthorpe located to the east, and Luddington located to the west of the draft Order Limits. Several residential houses and farmhouses are within the study area. The NSRs within this study area are detailed in Table 16.14 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.27 No NIAs are within the 300 m study area in this Route Section.

Table 16.14 - Route Section 5 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	4
High	None within the study area	0
Medium	None within the study area	0
Low	None within the study area	0
Negligible	Agricultural and utility	3

Noise climate

16.5.28 The main existing source of noise is Meredyke Road on the boundary of this Route Section and Route Section 6. There are also relatively low levels of traffic on Carr Lane and Garthorpe Road which links the settlements of Garthorpe and Luddington.

16.5.29 Since the traffic flows on these road are too low to be indicated in DEFRA Road Noise mapping (Ref 16.26), the existing ambient noise levels in this Route Section are likely to be below 50 dB $L_{Aeq,T}$.

16.5.30 Away from road traffic sources, ambient sound levels are expected to be low.

Route Section 6: Luddington to M180 Motorway

Noise sensitive receptors

16.5.31 The draft Order Limits pass in proximity to two settlements: Crowle (directly adjacent to the draft Order Limits); and Ealand (directly adjacent to the draft Order Limits). A large number of residential properties and farmhouses are within the study area. Several lower sensitivity NSRs such as offices, a leisure centre and shops are also within the study area. The NSRs within this study area are detailed in Table 16.15 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.32 No NIAs are within the 300 m study area in this Route Section.

Table 16.15 - Route Section 6 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	285
High	Education	1
Medium	Leisure	3
Low	Offices	1
Negligible	Industrial or retail premises.	11

Noise climate

16.5.33 The main existing source of noise is the M180 crossing the draft Order Limits at the boundary of this Route Section and Route Section 7. The Doncaster to Scunthorpe railway line crosses the draft Order Limits to the south of Ealand and Keadby Power Station. The A18 Trunk Road is located between the M180 and the Doncaster to Scunthorpe railway line. There are also relatively low levels of traffic on Carr Lane, Meredyke Road, Ox Pasture Lane, B1392 Luddington Road, Washinghall Lane, Outgate, and Bonnyhale Road.

16.5.34 DEFRA Road and Rail Noise mapping (Ref 16.26 and Ref 16.25) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at the majority of the identified NSRs. For several NSRs close to the railway line, the existing ambient noise levels are higher than 65 dB $L_{Aeq,T}$.

16.5.35 Away from road and rail traffic sources ambient sound levels are expected to be low.

Route Section 7: M180 Motorway to Graizelound

Noise sensitive receptors

16.5.36 The draft Order Limits pass in proximity to four settlements, Beltoft, Belton, Epworth and East Lound. Beltoft is located approximately 60 m to the east of the draft Order Limits. The draft Order Limits extend to the settlement boundaries (Belton, East Lound and Epworth) to allow for highway widening. A large number of residential properties and farmhouses are within the study area. Several lower sensitivity NSRs such as pet care facilities and shops are also within the study area. The NSRs within this study area are detailed in Table 16.16 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.37 No NIAs are within the 300 m study area in this Route Section.

Table 16.16 - Route Section 7 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	53
High	None within the study area	0
Medium	Leisure	1
Low	Offices	1
Negligible	Industrial or retail premises.	8

Noise climate

16.5.38 The main existing source of noise is the M180 crossing the draft Order Limits at the boundary of this Route Section and Route Section 6. There are also relatively low levels of traffic on local roads which link these settlements including Belton Road, Beltoft Road, Epworth Road, Burnham Road, East Lound Road, Ferry Road, Stockwith Road, Newlands Lane and Gunthore Road.

16.5.39 DEFRA Road Noise mapping (Ref 16.26) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at all the identified NSRs.

16.5.40 Away from road traffic sources ambient sound levels are expected to be low.

Route Section 8: Graizelound to Chesterfield Canal

Noise sensitive receptors

16.5.41 The draft Order Limits extend to the settlement boundary of Misterton in this Route Section to allow for a section of highway widening. Several residential houses and farmhouses are within the study area. The NSRs within this study area are detailed in Table 16.17 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.42 No NIAs are within the 300 m study area in this Route Section.

Table 16.17 - Route Section 8 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	18
High	None within the study area	0
Medium	Leisure	1
Low	None within the study area	0
Negligible	Industrial or retail premises.	12

Noise climate

16.5.43 The main existing sources of noise are the A161 crossing the draft Order Limits from north to south, and the Doncaster to Gainsborough railway line which passes through the northern part of this Route Section. There are also relatively low levels of traffic on Cornley Road, Cattle Road and Tindale Bank Road.

16.5.44 DEFRA Road Noise mapping (Ref 16.26) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at all the identified NSRs.

16.5.45 Away from road and rail traffic sources ambient sound levels are expected to be low.

Route Section 9: Chesterfield Canal to A620 east of North Wheatley

Noise sensitive receptors

16.5.46 The closest settlement to the draft Order Limits in this Route Section is Gringley on the Hill which is approximately 400 m to the west of the draft Order Limits. Several residential houses and farmhouses are also located within the study area. The NSRs within this study area are detailed in Table 16.18 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.47 No NIAs are within the 300 m study area in this Route Section.

Table 16.18 - Route Section 9 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	17
High	None within the study area	0
Medium	None within the study area	0
Low	None within the study area	0
Negligible	Industrial or retail premises	22

Noise climate

16.5.48 The main existing source of noise is the A631 crossing the draft Order Limits in the northern part of this Route Section. There is traffic on A620 and relatively low levels of traffic on, Wooden Beck Hill Road, and Wood Lane.

16.5.49 DEFRA Road Noise mapping (Ref 16.26) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at the majority of the identified NSRs. For several NSRs close to A631, the existing ambient noise levels are between 50 dB and 55 dB $L_{Aeq,T}$.

16.5.50 Away from road traffic sources ambient sound levels are expected to be low.

Route Section 10: A620 east of North Wheatley to Fledborough

16.5.51 This section provides the baseline for the Proposed Overhead Line. The baseline for the Proposed Substation Works at Birkhill Wood is presented in **Chapter 20 Substations and Associated Works**.

Noise sensitive receptors

16.5.52 The draft Order Limits pass in proximity to seven settlements: Sturton le Steeple, North Leverton with Habblesthorpe, South Leverton, Treswell, Woodbeck, East Drayton and Darlton. A large number of residential properties and farmhouses are within the study area. Several lower sensitivity NSRs, such as shops, are also within the study area. The NSRs within this study area are detailed in Table 16.19 and illustrated on **Figure 16.1 Baseline Conditions**.

Table 16.19 - Route Section 10 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	170
High	Places of worship and a hospital	2
Medium	Leisure	4
Low	Offices	15
Negligible	Industrial or retail premises.	171

16.5.53 There is one NIA located within the study area, as detailed in Table 16.20 and **Figure 16.1 Baseline Conditions**.

Table 16.20 - NIA within Section 10

NIA Identification number	Associated road/railway	Responsible Authority
11148	A57	Nottinghamshire

Noise climate

16.5.54 The main existing sources of noise are the A57, which crosses the southern part of the draft Order Limits, and a railway line (west to east) between Retford and Gainsborough crossing the northern part of this Route Section to the west of Sturton le Steeple. There are also relatively low levels of traffic on Gainsborough Road, Station Road, Retford Road, Forewood Lane, Darlton Road Lane, and Main Street.

16.5.55 DEFRA Road and Rail Noise mapping (Ref 16.26 and Ref 16.25) indicates that ambient noise levels are less than 50 dB $L_{Aeq,T}$ at the majority of the identified NSRs. For several NSRs close to A57 the existing ambient noise levels exceed 55 dB $L_{Aeq,T}$. The ambient noise level at the NIA (11148) may exceed 70 dB $L_{Aeq,T}$.

16.5.56 Away from road and rail traffic sources ambient sound levels are expected to be low.

Route Section 11: Fledborough to High Marnham

16.5.57 This section provides the baseline for the Proposed Overhead Line. The baseline for the Proposed Substation Works at Birkhill Wood is presented in **Chapter 20 Substations and Associated Works**.

Noise sensitive receptors

16.5.58 The settlements of Fledborough, High Marnham, and Normanton on Trent are located close to draft Order Limits associated. The High Marnham Substation works in this Route Section are discussed in **Chapter 20 Substations and Associated Works**. Several residential houses and farmhouses are within the study area. The NSRs within this study area are detailed in Table 16.21 and illustrated on **Figure 16.1 Baseline Conditions**.

16.5.59 No NIAs are within the 300 m study area in this Route Section.

Table 16.21 - Route Section 11 NSRs

Sensitivity of NSR	Receptor types	Number of NSRs within 300 m study area
Residential	Residential properties	3
High	None within the study area	0
Medium	None within the study area	0
Low	None within the study area	0
Negligible	Industrial or retail premises.	8

Noise climate

16.5.60 No main transport routes or railway lines are within the study area in this Route Section. The main existing source of noise is Fledborough Road crossing the draft Order Limits form north to south in this Route Section.

16.5.61 Away from road traffic sources ambient sound levels are expected to be low.

Future Baseline

16.5.62 Predicting future baseline requires projecting forward any trends in change and considering how they may affect the baseline conditions over time. The nature of future baseline is influenced by a combination of natural and human processes, including climate change.

16.5.63 The review evaluated the committed development summarised in **Chapter 21 Cumulative Effects**. This involved:

- The identification of any permitted (i.e. consented) development projects within the assessment study area that have yet to be implemented.
- Analysis of the likely environmental effects and planned timescales for each identified development project.
- An assessment of the potential for each identified development project to change the baseline in the construction year (2028) and opening year (2031), in the manner described above

16.5.64 A number of proposed development projects are expected to form part of, and influence, the future baseline conditions of the study area (These are identified in **Chapter 21 Cumulative Effects**, at section 21.6), including:

- One Earth Solar Farm, Newton on Trent;
- Oaks Lane Solar Farm, Beckingham, Doncaster;
- Steeples Solar Farm, West Burton;
- Peartree Solar, land to the east of Beverley, on land either side of the A1035;
- 49.5 MW Battery Storage Scheme, Cottingham;
- Creyke Beck Solar Farm, Creyke Beck;
- Albanwise BESS Battery Storage Facility, Cottingham;
- 400 kV Gas Insulated Substation, Cottingham; and
- High Marnham solar farm, High Marnham.

16.5.65 By reviewing the above committed projects, it is concluded that there would be no significant changes to existing noise and vibration baseline conditions over the period when the Project would be constructed. Accordingly, the preliminary assessment of construction noise does not consider future baseline conditions further.

16.5.66 These projects may have the potential to change the future baseline noise condition during the operational phase of the Project. The impacts will be assessed and reported within the ES.

16.6 Mitigation

16.6.1 As set out in **Chapter 5 Approach to Preparing the PEIR** mitigation measures fall into one of three categories: embedded measures; control and management measures; and additional mitigation measures. Those measures relevant to the assessment of noise and vibration effects are set out below.

Embedded Mitigation Measures

16.6.2 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.

16.6.3 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.

16.6.4 Embedded measures are those that are intrinsic to and built into the design of the Project, which have been presented in Table 4.2 in **Chapter 4 Description of the Project**. Measures of relevance to the noise and vibration chapter include:

- Sensitive Routeing and Siting to develop the preferred alignment, siting of substations and draft Order Limits. Avoids and reduces, as far as practicable, impacts on identified receptors, in line with the NPS EN-1 (Ref 16.4) and EN-5 (Ref 16.5) as well as the Holford Rules (Ref 16.27) and the Horlock Rules (Ref 16.27).
- Pylon fittings, such as insulators, dampers, spacers and clamps, are designed and procured in accordance with a series of National Grid Technical Specifications and must be type registered (rigorously tested) to ensure the fitting conforms to the specification. These processes reduce the potential for audible noise and tones to occur from all types of fittings, including insulators. Where noise does occur, it is likely to be localised and of short duration. If this is due to a fault, action can be taken to rectify it. Where noise from fittings does occur which results in a complaint, appropriate action can be taken to seek to remedy the cause of the noise, usually through cleaning or replacing the relevant fitting.
- The design includes strategically located and optimised temporary haul roads along the Project alignment to support construction of the Project. This will reduce the effects of construction traffic movements on the local public highway network during construction.

Control and Management Measures

16.6.5 Control and management measures, comprising management activities and techniques, will be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.

16.6.6 A Draft Outline Code of Construction Practice (CoCP) is provided in **Appendix 4.1 Draft Outline Code of Construction Practice CoCP** in Volume 3. Measures contained in the Draft Outline CoCP that are relevant to the control and management of impacts that could affect the noise and vibration assessment are:

- GG03: The following environmental management plans will be produced prior to construction;

  - Code of Construction Practice (CoCP)
  - Register of Environmental Actions and Commitments (REAC)
  - Construction Traffic Management Plan (CTMP)
  - Soil Management Plan (SMP)
  - Public Rights of Way Management Plan
  - Materials and Waste Management Plan (MWMP)
  - Noise and Vibration Management Plan
  - Landscape and Ecology Management Plan (LEMP) including an Outline Landscape Maintenance and Management Plan
  - Archaeological Written Scheme of Investigation (WSI)
- GG04: The CoCP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake site inspections to check conformance to the Management Plans.
- GG05: A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced EnvCoW will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CoCP. The EnvCoW will monitor that the works proceed in accordance with relevant environmental DCO requirements and adhere to the required good practice and mitigation measures. The EnvCoW will be supported as necessary by appropriate technical specialist advisors, including archaeologists, ecologists, soil scientists, and arboriculturists.
- GG06: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
  - Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the Project. Topics will include but not be limited to:
  - Working hours;
  - Ecology: working in or adjacent to protected sites and priority habitats, protected species, management, mitigation and controls;
  - Water management: legislation, buffer zones, control mechanisms, flood risks and emergency response procedures;
  - Waste management: legislation, segregation, contamination, best practice;
  - Agreed traffic routes and access points;
  - Nuisance: dust, behaviour, noise, vibration, management and controls;
  - Working around trees: tree and root protection;
  - Contaminated land: recognising and dealing with contaminated material;
  - Pollution prevision and incident response; and
  - Spill and emergency response.

- GG11: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.

  GG13: Vehicles will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. The operators of plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. Electric, or other low carbon plant and equipment should be used where available and where practicable.

- GG14: Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including excavated materials, drop heights will be limited, where practicable.

- GG25: Working areas will be appropriately fenced. The type of fencing installed will depend on the area to be fenced and will take into consideration the level of security required in relation to the surrounding land and public access, rural or urban environment and arable or stock farming. For some locations the fence used may also serve to provide acoustic and visual screening of the work sites and reduce the potential for disturbance of users in the surrounding areas. Fencing will be regularly inspected and maintained and removed as part of demobilisation unless otherwise specified.

- NV01: Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise and limit effects on perceptual aspects of landscape, such as tranquillity, will be set out within the CoCP.

- NV02: Contractor(s) will be required to follow good construction practices (referred to as best practicable means (BPM)) as outlined in BS 5228-1 (Ref 16.17) and BS 5228-2 (Ref 16.18) to control noise and vibration respectively. BS 5228-1 and BS 5228-2 have Approved Code of Practice status (in England) under the powers conferred by Sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974 (Ref 16.1), as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 (Ref 16.31). Compliance with the good practice noise and vibration requirements stated therein are a statutory obligation under the Act.

- NV03: In certain instances where construction noise and/or vibration may cause a significant adverse effect at nearby NSRs, applications for prior consent under Section 61 of the Control of Pollution Act 1974 (Ref 16.1) may be submitted to the relevant local authority to ensure that BPM are applied to control noise and vibration.

Additional Mitigation Measures

16.6.7 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this PEIR has identified a requirement to further reduce significant environmental effects.

16.6.8 The preliminary assessment reported in this PEIR has not identified any requirements for additional mitigation at this stage, over and above the embedded or control and management measures identified. This will continue to be reviewed as the assessment progresses and the preliminary design develops further.

16.7 Preliminary Assessment

16.7.1 This section first identifies the potential effects that could occur because of the construction, and operation and maintenance of the Proposed Overhead Line. The preliminary assessment is then presented for Proposed Overhead Line as described in **Chapter 4 Description of the Project**. The preliminary assessment of the Proposed Substation Works is presented in **Chapter 20 Substations and Associated Works**.

16.7.2 The preliminary assessment takes account of the embedded and control and management measures as set out in section 16.6.

Potential Effects

16.7.3 The potential for the Proposed Overhead Line to result in likely significant effects on NSR was determined through the scoping process. This section lists the potential effects that have been scoped into the assessment within the EIA Scoping Report (Ref 16.15) taking into account the comments received within the Scoping Opinion (Ref 16.14). Where the scope has been amended since the EIA Scoping Report (Ref 16.15), explanatory text has been included to provide justification for this change.

16.7.4 The preliminary likely significant effects of the Proposed Overhead Line during construction have been considered based upon currently available data relating to the Project. The potential effects and potential mitigation measures to manage them are outlined below. It assumes that the relevant embedded (design measures) and good practice measures outlined within the Outline CoCP are in place before assessing the effects. This is in accordance with guidance from the Institute of Environmental Management and Assessment (Ref 16.20, Ref 16.21) as part of preparing a proportional assessment. Although contractor(s) would use BPM to reduce noise and vibration effects, for the purposes of this initial assessment it is assumed that no specific mitigation measures, such as screening, are included in the calculations. This is such that noise and vibration 'hot-spots' can be identified where specific mitigation measures may be required to avoid significant adverse effects.

16.7.5 It should be noted that this assessment is ongoing and evolves through ongoing development of the Project proposals. The mitigation currently proposed is based on available validated data and professional judgement.

16.7.6 Further assessments will be undertaken before the submission of the DCO application. The results of these further assessments and the mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

Construction

16.7.7 The potential effects that could result from the construction of the Proposed Overhead Line are:

- Noise impact from construction activities on NSRs within the study area;
- Vibration impact from construction activities on human NSRs in the study area;
- Vibration impact from construction activities on buildings and structures in the study area;
- Noise impact from construction traffic on NSRs within the study area; and
- Vibration impact from construction traffic on NSR within the study area.

Operation

16.7.8 It was understood during the Scoping stage that triple araucaria conductor would be used. Triple araucaria is considered a 'low noise' conductor system, reducing the effects of line crackle (corona discharge), and would reduce the generation of noise from the Proposed Overhead Line during operation. Therefore, potential noise and vibration effects from the operation of the Proposed Overhead Line was scoped out during the Scoping stage.

16.7.9 Following further design work undertaken, it is now considered that twin conductors are a potential conductor technology option which could be used for the Proposed Overhead Line as described in **Chapter 4 Description of the Project**. As the twin bundle conductors emits more noise than the triple Araucaria, the assessment of operational noise from the Proposed Overhead Line has been scoped into the PEIR and will be considered in the ES.

Maintenance

16.7.10 Potential noise and vibration effects from the maintenance of the Proposed Overhead Line have been scoped out, as agreed by the Planning Inspectorate in the Scoping Opinion (Ref 16.14).

Potential Effects Assessment

Construction noise

16.7.11 Construction plant data and associated noise data is provided in **Appendix 16.1 Construction Noise and Vibration Data**, and an initial assessment of construction vibration is presented in **Figure 16.2 Construction Noise and Vibration Buffer Zone**.

16.7.12 As noted above, the preliminary assessment assumes that no specific BPM mitigation measures are used. The above locations, also shown in **Figure 16.2 Construction Noise and Vibration Buffer Zone**, can be considered as construction noise 'hot-spots' where specific BPM mitigation measures may be required when detailed construction proposals are available.

16.7.13 Ten NSRs have been identified as experiencing potentially significant effects without mitigation, as shown in Table 16.22.

Table 16.22 - NSRs which have the potential to be significantly affected by construction noise– without mitigation

Route Section	NSR description	Sensitivity of the NSR	Affected by
Route Section 1	A farmhouse	Residential	Noise from pylon and overhead line construction
Route Section 2	A residential property on Ellerker Wold Lane	Residential	Noise from pylon and overhead line construction

Route Section	NSR description	Sensitivity of the NSR	Affected by
Route Section 3	A residential property near Sands Lane	Residential	Noise from pylon and overhead line construction
	A farmhouse near Province Farm	Residential	Noise from pylon and overhead line construction
	A residential property on Staddlethorpe Broad Lane	Residential	Noise from pylon and overhead line construction
Route Section 4	A farmhouse on Pennyhill Cottages Road	Residential	Noise from pylon and overhead line construction
Route Section 5	No NSR are identified	N/A	N/A
Route Section 6	A residential property on Outgate	Residential	Noise from modification of the overhead line
Route Section 7	Two residential properties on Melwood Hill	Residential	Noise from pylon and overhead line construction
Route Section 8	No NSR identified	N/A	N/A
Route Section 9	No NSR identified	N/A	N/A
Route Section 10	No NSR identified	N/A	N/A
Route Section 11	No NSR identified	N/A	N/A

16.7.14 As detailed above, no mitigation measures such as BPM were included in the construction noise assessment such that construction noise 'hot-spots' can be identified. With the use of BPM it is anticipated that the noise effect would reduce. BPM may take the form of alternative plant or methods, plant silencers, and screening, as appropriate to the task. In all instances, with the use of BPM it is anticipated that noise effects would reduce such that construction noise effects are **not significant**. The assessment is based on worst-case scenarios and the confidence for this prediction is High.

Construction vibration on people within buildings

16.7.15 Construction plant data and associated noise data is provided in **Appendix 16.1 Construction Noise and Vibration Data**, and an initial assessment of construction vibration is presented in **Figure 16.2 Construction Noise and Vibration Buffer Zone**.

16.7.16 Without mitigation, three NSRs have been identified to have the potential to be significantly affected by vibration from the construction of pylon foundations as shown in Table 16.23. No NSRs were identified within the range which may be damaged by the construction vibration.

Table 16.23 - NSRs which have the potential to be significantly affected by construction vibration – without mitigation

Route Section	NSR description	Sensitivity of the NSR	Affected by
Route Section 3	A residential property on Staddlethorpe Broad Lane	Residential	Vibration from pylon construction
Route Section 7	Two residential properties on Melwood Hill	Residential	Vibration from pylon construction

16.7.17 As noted above, the assessment assumed that no specific BPM mitigation measures were used and as such the above locations, shown in **Figure 16.2 Construction Noise and Vibration Buffer Zone**, can be considered as construction vibration 'hot-spots' requiring specific BPM mitigation measures.

16.7.18 In the construction vibration impact assessment, no mitigation measures such as BPM were included. With the use of BPM it is anticipated that the vibration effect would reduce. BPM may take the form of alternative plant or methods as appropriate to the task. For example, with regards to pylon construction, it is assumed that percussive piling may be required for the construction of pylon foundations, as a worst-case. However, typically, non-percussive methods would be used where feasible. Where a percussive method was required, measures may be employed to reduce the energy per blow which would reduce the level of vibration generated, although this may extend the time required to conduct the works. The construction method and associated BPM would be determined by the contractor(s) following an assessment of ground conditions.

16.7.19 In all instances, with the use of BPM it is anticipated that vibration effects would reduce so construction vibration effects are **not significant**. The assessment is based on worst-case scenarios and the confidence for this prediction is High.

Construction vibration on buildings and structures

16.7.20 Construction plant data and associated noise data is provided in **Appendix 16.1 Construction Noise and Vibration Data**. The data and associated vibration calculations indicate that the vibration level threshold for potential building damage may be exceeded within approximately:

- 2 m of vibratory compaction activities; and
- 10 m percussive piling activities.

16.7.21 No buildings or structures have been identified within these distances for the applicable activities and therefore construction vibration effects are anticipated to be **not significant**. The assessment is based on worst-case scenarios and the confidence for this prediction is High.

Construction traffic noise on the public highway

16.7.22 The assessment of construction traffic noise on the public highway in provided in **Appendix 16.2: Construction Traffic Noise and Vibration Assessment**.

16.7.23 Provisional construction traffic data has been reviewed and the noise impact has been assessed in accordance with BS 5228-1 and DMRB LA 111 (Ref 16.16). Based on the current construction traffic flow, the construction traffic noise from all primary access routes have been calculated to have negligible or minor impacts. Based on the calculations, the effect of the construction traffic noise is considered to be **not significant** and the confidence for this prediction is High.

Construction traffic vibration

16.7.24 Indicative construction traffic vibration calculations are provided in **Appendix 16.2: Construction Traffic Noise and Vibration Assessment**.

16.7.25 The literature indicates that where the road surface is well maintained and free from irregularities (e.g., pot-holes), vibration levels from construction traffic would be a negligible magnitude, even directly adjacent to the road. The effect of the construction traffic vibration is considered to be **not significant** and the confidence for this prediction is High.

Operational noise

16.7.26 Flexibility on conductor choice is required in order to maintain flexibility for the provision of new conductors that may be available prior to the construction of the Proposed Overhead Line, and which may have capability and sustainability benefits over the indicative design. The noise from potential conductors has been predicted and the screening distance beyond which operational noise from the Proposed Overhead Line is unlikely to be significant has been determined.

16.7.27 Based on National Grid noise predictions from the worst-case potential conductor type, the screening distance is:

- 130 m for vulnerable subgroups; and
- 60 m for residential NSR.

16.7.28 There vulnerable subgroups located within the 130 m screening distance of the Limits of Deviation of the preferred alignment of the Proposed Overhead Line.

16.7.29 Nineteen residential NSRs have been identified within the 60 m screening distance from the Limits of Deviation of the preferred alignment of the Proposed Overhead Line, as shown in Table 16.24.

16.7.30 This is not a direct indication of adverse or significant adverse effect, but rather an indication that such effects have not been ruled out. There is potential for adverse effects at some or all of the identified NSR, but the confidence for this prediction is Low at this stage. Further Tier 2 and Tire 3 assessments will be conducted as part of the ES to determine the magnitude and significance of effect at NSR not screened out by the Tier 1 assessment.

Table 16.24 - Number of residential NSRs within 60 m screening distance from the Proposed Overhead Line

Route Section	Number of NSRs within 60 m from the Proposed Overhead Line
Route Section 1	1
Route Section 2	1
Route Section 3	3
Route Section 4	2
Route Section 5	0
Route Section 6	7
Route Section 7	5
Route Section 8	0
Route Section 9	0
Route Section 10	0
Route Section 11	0
Total	**19**

Summary of likely effects

16.7.31 A summary of the likely noise and vibration effects associated with the Proposed Overhead Line is shown in Table 16.25. The number of NSRs shown in this table include residential, high sensitivity and medium sensitivity receptors.

16.7.32 The information provided in this assessment is preliminary. The noise and vibration assessment will be updated as the design evolves. An updated assessment will then be undertaken and reported in the ES.

Table 16.25 - Summary of likely significant effects from noise and vibration – without mitigation

Route Section	Number of NSRs with potential for significant effects from:					
	Construction noise	Construction vibration (people)	Construction vibration (buildings and structures)	Construction traffic noise	Construction traffic vibration	Operational noise from the Proposed Overhead Line*
Route Section 1	1	0	0	0	0	1
Route Section 2	1	0	0	0	0	1
Route Section 3	3	1	0	0	0	3
Route Section 4	1	0	0	0	0	2
Route Section 5	0	0	0	0	0	0
Route Section 6	1	0	0	0	0	7
Route Section 7	2	2	0	0	0	5
Route Section 8	0	0	0	0	0	0
Route Section 9	0	0	0	0	0	0
Route Section 10	0	0	0	0	0	0
Route Section 11	0	0	0	0	0	0
Total	**9**	**3**	**0**	0	0	19

* Column indicates potential for adverse effects.

Summary of the Preliminary Assessment of the Proposed Overhead Line with the Proposed Substation Works

16.7.33 The preliminary assessment of the Proposed Substation Works is presented in **Chapter 20 Substations and Associated Works.**

16.7.34 Shared receptors between the Proposed Overhead Line and Proposed Substation Works at Birkhill Wood include:

- 2 residential properties.

16.7.35 Shared receptors between the Proposed Overhead Line and Proposed Substation Works at High Marnham include:

- 3 residential properties.

16.7.36 Taking account of the embedded measures set out in **Chapter 4 Description of the Project** and the control and management measures as set out in **Appendix 4.1 Draft Outline Code of Construction Practice CoCP** any potential effects from the Proposed Substation Works are not likely to be significant, and, when considered together are unlikely to change the preliminary significance that is presented in this Chapter.

16.8 References

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