

The Great Grid Upgrade

Chesterfield to Willington

Preliminary Environmental Information Report

Volume 1: Chapter 14 Noise and Vibration

March 2026

nationalgrid

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14. Noise and Vibration

14.1 Overview

14.1.1 This chapter presents the preliminary assessment of likely significant noise and vibration effects that could result from the Chesterfield to Willington Project (the 'Project') during construction and operation, and describes:

- relevant legislation and planning policy context;
- consultation and engagement undertaken to date;
- the methodology for assessment;
- relevant baseline information;
- potential effects of the construction phase;
- potential effects of the operational phase;
- potential additional mitigation measures; and
- residual effects.

14.1.2 This chapter considers effects on human noise sensitive receptors (NSRs) and vibration sensitive receptors (VSRs), during construction and operation.

14.1.3 This chapter should be read in conjunction with:

- **Chapter 4 Description of the Project;**
- **Chapter 5 Approach to Preliminary Environmental Information Report;**
- **Chapter 7 Ecology and Biodiversity:** this chapter presents information relating to the potential for noise and vibration effects on ecological receptors;
- **Chapter 8 Historic Environment:** this chapter presents information relating to noise and vibration on the setting and character of heritage assets;
- **Chapter 12 Traffic and Transport:** this chapter presents information relating to the assessment of traffic on the local road network;
- **Chapter 15 Socio-economics, Recreation and Tourism:** considers the potential for noise and vibration associated with the Project to affect socio-economic, recreation and tourism receptors;
- **Chapter 16 Health and Wellbeing:** considers the potential for noise and vibration associated with the Project to affect health and wellbeing receptors; and
- **Chapter 17 Cumulative Effects:** this chapter outlines the intra-project interactions between technical topics.

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

- **Figure 14.1 Baseline Monitoring Locations and Study Area;**
- **Figure 14.2 Overhead Line Noise Tier 1 Buffers;**
- **Appendix 14A Baseline Noise Survey Data;**

- **Appendix 14B Construction Noise and Vibration Data;**
- **Appendix 14C Construction Traffic Noise Predictions;** and
- **Appendix 14D Overhead Line Operational Noise Assessment.**

14.1.5 A glossary of terms and abbreviations is provided in **Appendix 1B Abbreviations and Glossary.**

Scope

14.1.6 The scope of this assessment has been established through an ongoing scoping process and takes account of matters which have been agreed through the Scoping Report (Ref 14.1) and Scoping Opinion (Ref 14.2). The matters set out in **Table 14.1** have been scoped into the noise and vibration assessment.

14.1.7 **Table 14.2** identifies the matters that, as agreed with the Planning Inspectorate, are not expected to result in significant noise or vibration effects from the Project and have therefore been scoped out from this assessment. The table also provides justification for further matters proposed to be scoped out.

Table 14.1: Scope of the noise and vibration assessment

Matters Scoped into the Noise and Vibration Assessment
Noise and vibration from construction activities associated with the overhead line.
Noise from construction traffic.
Noise and vibration from the construction of the substation at Chesterfield.
Noise from the operation of the substation at Chesterfield. Adequate information was not available to allow an assessment of likely noise effects for this aspect of the Project for the Preliminary Environmental Information Report (PEIR). The Study Area has been set out in this chapter, and a full assessment will be included at the Environmental Statement (ES) stage. The substation is proposed to be designed to avoid significant effects.
Noise from the overhead line during operation.
Noise from maintenance activities during operation limited to repair or replacement of pylon steelwork, foundations and overhead lines.

Table 14.2: Matters scoped out of the assessment

Matter	Justification
Vibration effects from construction traffic	Vibration from construction traffic is caused by the road surface and if the road surfaces used by construction traffic are well maintained and remain free from irregularities, such as potholes, significant effects would not be expected, even at relatively short distances.
Noise effects from the operation and maintenance of underground cables	No significant noise generation is expected.

Matter	Justification
Vibration effects from the operation and maintenance of underground cables	No significant vibration generation is expected. Therefore, this matter is proposed to be scoped out.
Vibration from the operation (including maintenance) of new infrastructure	Plant with moving parts, including cooling equipment and transformers, will include vibration isolation measures within the design.
Noise from operational traffic	Traffic movements during the operational phase are expected to be minimal and infrequent. Therefore, this matter is proposed to be scoped out.
Noise from the operation and maintenance of the upgraded Willington Substation	This existing substation would not be replaced. Upgrades are covered by another scheme, outside of this Project.
Vibration from the operation and maintenance of the upgraded Willington Substation	This existing substation would not be replaced. Upgrades are covered by another scheme, outside of this Project. Therefore, this matter is proposed to be scoped out.
<p>During the operational phase, the following minor repair work and inspections of infrastructure, which are unlikely to result in significant effects have been scoped out of further assessment:</p> <p>Inspection of the overhead line would be carried out annually from the ground by engineers on foot, in small vans, or by air using drone/helicopter.</p> <p>Independent companies may require infrequent access to maintain mobile telephone antennae and optical fibres using pickup trucks and vans. Infrequent access would also be required for vegetation management.</p> <p>Routine inspection of the substation would be required.</p> <p>Minor repairs or modifications to the overhead line and Cable Sealing End (CSE) Compounds may be required occasionally. Minor repairs or modifications may be required from time to time for local earthwire damage, addition of jumper weights, local conductor damage, broken insulator units, damaged or broken spacers, broken or damaged vibration dampers, damaged or broken anti climbing guards.</p>	<p>Typically, these activities would occur during the daytime only and would be close to any individual NSR only briefly (a few days). Therefore, noise effects from these activities would not be considered significant.</p> <p>Where maintenance is required, noise from the maintenance work would typically be quieter than during construction and unlikely to be significant.</p> <p>They are likely to be infrequent, take place during daytime hours and generate lower noise levels than during construction. Access for the maintenance team using pickup trucks/vans would normally use interlocking trackway panels, which would require little construction and therefore generate considerably lower levels of noise than temporary access track installation. Given the infrequent occurrence and lower noise emissions from minor repair/modification works, noise and vibration effects are unlikely to be significant.</p>

14.2 Legislation, Planning Policy and Guidance Context

Legislation

14.2.1 A summary of the key legislation considered in the scope of effects on noise and vibration is outlined below:

- Environmental Protection Act 1990 (EPA 1990) (Ref 14.3) specifies powers available to local authorities in respect of any noise that either constitutes or is likely to cause a statutory nuisance. Local authorities have a duty to carry out inspections to identify statutory nuisances, and, where identified, to serve an abatement notice.
- Control of Pollution Act 1974 (CoPA) (Ref 14.4) provides local authorities with powers to control noise and vibration from construction sites:
 - Section 60 of CoPA enables a local authority to serve a notice setting out noise control requirements such as the level of noise or vibration that may be emitted, the hours during which construction work may be carried out and specific plant which may not be used.
 - Section 61 of CoPA allows for those carrying out construction work to apply in advance for consent. Where consent is granted, it provides a defence against action by the local authority under section 60 of CoPA. It does not however provide a defence against statutory nuisance action.

National Policy Statements

14.2.2 **Chapter 2 Legislative, Regulatory and Planning Policy Context** sets out the overarching policies relevant to the Project including the overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 14.5) and the NPS for Electricity Networks Infrastructure (EN-5) (Ref 14.6). **Table 14.3** sets out the requirements of both NPSs relevant to noise and vibration and how these have been considered within this chapter.¹

¹ The updated NPSs came into force on 6 January 2026; however, this post-dated the drafting and assessment work within this chapter and so are not reflected within the relevant policy descriptions in this chapter, which are instead based on the 2023 versions of the NPSs that were in force at the time of preparing the Chapter. These sections will be updated in the ES as part of the Application; however, after initial review and consideration, it is not anticipated that the updates to the NPS will result in any material changes to the assessment methodology or the conclusions in this chapter.

Table 14.3: National Policy Statements relevant to noise and vibration

Policy Reference	Policy Context	How It Will Be Considered
Overarching National Policy Statement for Energy (EN-1)		
Paragraph 5.12.6	<p><i>‘Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:</i></p> <ul style="list-style-type: none"> • <i>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</i> • <i>identification of noise sensitive receptors and noise sensitive areas that may be affected</i> • <i>the characteristics of the existing noise environment</i> • <i>a prediction of how the noise environment will change with the proposed development</i> <ul style="list-style-type: none"> – <i>in the shorter term, such as during the construction period</i> – <i>in the longer term, during the operating life of the infrastructure</i> – <i>at particular times of the day, evening and night (and weekends) as appropriate, and at different times of year</i> • <i>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</i> • <i>if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise</i> • <i>all reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life’</i> 	<p>Section 14.4 sets out the assessment methodology and as part of this, identifies the key noise generating aspects of the Project with the potential to result in noise and vibration impacts, including anticipated acoustic features.</p> <p>Section 14.5 provides a description of the baseline within the Study Areas and identifies NSRs and likely characteristics of the existing noise environment.</p> <p>Section 14.7 presents the results of a preliminary assessment of effects. This includes predicted noise and vibration levels and an assessment of potential noise and vibration effects as a result of the Project over both the construction and operational phases. The assessment follows relevant policy and guidance.</p> <p>An assessment of likely impacts on health and quality of life has been carried out with reference to significant observed adverse effect levels (SOAELs), as defined in the Noise Policy Statement for England (NPSE) (Ref 14.9). SOAELs for construction noise and vibration are set out in section 14.4. The SOAEL for noise from the operation of the overhead line is presented in Appendix 14D Overhead Line Operational Noise Assessment. SOAELs for operational noise</p>

Policy Reference	Policy Context	How It Will Be Considered
Paragraph 5.12.8	<i>‘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.’</i>	<p>from the new Chesterfield Substation will be established for the ES assessment.</p> <p>Mitigation measures to reduce noise as far as reasonably practicable during construction and operation are set out in section 14.6 and section 14.8. Further measures will be considered as the design of the Project progresses which will be reported in the ES.</p>
Paragraph 5.12.9	<i>‘Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information on assessment of particular noise sources may be contained in the technology specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards (for example BS 5228) and other guidance which also give examples of mitigation strategies.’</i>	<p>Increases in road traffic noise during construction are assessed in section 14.7.</p> <p>Increases in road traffic noise during operation are scoped out, as they are expected to be minimal and infrequent.</p> <p>The noise and vibration assessment has been carried out following relevant British Standards (BS) and guidance. Details are provided in section 14.4.</p>
Paragraph 5.12.12	<i>‘Applicants should submit a detailed impact assessment and mitigation plan as part of any development plan, including the use of noise mitigation and noise abatement technologies during construction and operation.’</i>	<p>An assessment of potential impacts is included in section 14.7.</p> <p>Environmental management plans will be produced to mitigate noise during construction and operation. This is discussed in section 14.6.</p>

Policy Reference	Policy Context	How It Will Be Considered
National Policy Statement for Electricity Networks (EN-5)		
Paragraph 2.9.26 to 2.9.43	<p><i>'All high voltage transmission lines have the potential to generate noise under certain conditions.</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>Transmission line audible noise is generally categorised as 'crackle' or 'hum', according to its tonal content.</i></p>	<p>Noise from the proposed substation is included within the scope of the noise and vibration assessment. Adequate information was not available to allow an assessment of likely noise effects for this aspect of the Project for the PEIR. A full assessment will be included at the ES stage. The substation is proposed to be designed to avoid significant effects.</p> <p>Section 14.7 presents a Tier 1 screening assessment of noise from the overhead line in accordance with National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines (Ref 14.10). The Tier 1 screening assessment assumes noise generated by overhead lines in wet weather conditions as a worst case. The noise assessment for the ES will build upon the preliminary assessment undertaken for the PEIR. It will incorporate a Tier 2 screening assessment, which is based on combined wet and dry noise effects. Where this indicates the potential for adverse impacts at noise-sensitive receptors, a more detailed Tier 3 assessment will be conducted, which considers noise generated by overhead lines in wet and dry weather conditions relative to existing background sound levels.</p>

Policy Reference	Policy Context	How It Will Be Considered
	<p><i>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.</i></p> <p><i>Noise may also arise from discharges on overhead line fittings such as spacers, insulators and clamps. Such noise should be mitigated through good design.</i></p> <p><i>Audible noise effects can also arise from substation equipment such as transformers, quadrature boosters and mechanically switched capacitors. Transformers are installed at many substations and generate low frequency hum. Whether the noise can be heard outside a substation depends on a number of factors, including transformer type and the level of noise attenuation present (either engineered intentionally or provided by other structures).</i></p> <p><i>For the assessment of noise from substations, standard methods of assessment and interpretation using the principles of the relevant British Standards (for example BS 4142) are satisfactory.</i></p> <p><i>For the assessment of noise from overhead lines, the applicant must use an appropriate method to determine the sound level produced by the line in both dry and wet weather conditions, in addition to assessing the impact on noise-sensitive receptors.</i></p> <p><i>For instance, the applicant may use an appropriate noise modelling tool or tools for the prediction of overhead line noise and its propagation over distance, such as an ISO 9613-2 or Technical Report TR(T)94.</i></p> <p><i>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.</i></p> <p><i>The Secretary of State is likely to regard it as acceptable for the applicant to use a methodology that demonstrably addresses these criteria.'</i></p>	

Other National Policy

14.2.3 Whilst the Project will be assessed in accordance with the national policy outlined above, a preliminary assessment has also been undertaken with reference to the following additional national policy documents.

National Planning Policy Framework (NPPF)

- 14.2.4 The NPPF sets out the government’s planning policies for England and how these are expected to be applied. It includes provisions relating to noise and emphasises the requirement to consider noise impacts within the planning process.
- 14.2.5 The original NPPF was published by central government in 2012 with the latest revision published in February 2025 (Ref 14.11) at the time of writing. Paragraph 198 of this document is relevant to noise and paragraph 200 provides additional policy information applicable where new noise sensitive development is proposed close to existing commercial noise sources.
- 14.2.6 This chapter reports the results of a preliminary assessment of likely noise and vibration impacts from the construction and operation of the Project. The assessment follows relevant standards and guidance (see section 14.4, subsection entitled ‘Technical Guidance’).
- 14.2.7 Mitigation measures are included, to mitigate and reduce potential adverse impacts to a minimum. Further assessment will be carried out and reported in the ES, to identify additional mitigation, where required, to avoid significant adverse effects on health and the quality of life where practicable.

Noise Policy Statement for England

- 14.2.8 This document provides more detail than the NPPF, setting out the long-term vision of government noise policy and applying to all forms of noise excluding occupational noise (Ref 14.9). The NPSE repeatedly refers to the management and control of noise within the context of government policy on sustainable development.
- 14.2.9 The NPSE also stresses that noise should not be considered in isolation from other related factors. At paragraph 2.7 for example it states:
- ‘...the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications.’
- 14.2.10 The NPSE introduces and describes three categories, or levels, describing the presence or absence of noise effects but does not quantify those categories, stating that the corresponding objective levels are likely to be different for different noise sources, receptors and times of the day or night. These categories are:
- NOEL – No Observed Effect Level – This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
 - LOAEL – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected.

- SOAEL – Significant Observed Adverse Effect Level – This is the level above which significant adverse effects on health and quality of life occur.

14.2.11 The NPSE recognised that, at the time of publication, further research was needed into how these categories might be quantified for different scenarios. There is still no robust, universally accepted method of deriving suitable values and a variety of approaches are adopted in different circumstances. Values used in this assessment are based on experience on projects of a similar nature.

14.2.12 An assessment of likely impacts on health and quality of life has been carried out with reference to SOAELs. SOAELs for construction noise and vibration of the overhead line are set out in section 14.4. The SOAEL for noise from the operation of the overhead line are presented in **Appendix 14D Overhead Line Operational Noise Assessment**. SOAELs for operational noise from the Chesterfield Substation will be established for the ES assessment.

Regional and Local Policy

14.2.13 **Chapter 2 Legislative, Regulatory and Planning Policy Context** lists relevant regional and local policy documents. The preliminary assessment has been guided by key policies relating to noise and vibration, which will also underpin the final assessment presented within the ES.

- Chesterfield Borough Council Local Plan 2008-2035, adopted 2020 (Ref 14.12);
- North East Derbyshire Local Plan (2014-2034), adopted 2021 (Ref 14.13);
- Bolsover District Council Local Plan adopted 2022 (Ref 14.14);
- Amber Valley Borough Council Local Plan adopted 2006 (Ref 14.15);
- Amber Valley Local Plan (2022-2040), currently at Local Plan Examination (Ref 14.16);
- Erewash Core Strategy, adopted March 2014 (Ref 14.17);
- City of Derby Local Plan – Core Strategy, adopted January 2017 (Ref 14.18);
- City of Derby Local Plan Review, 2006 (Ref 14.19);
- South Derbyshire Local Plan Part 1, adopted June 2016 (Ref 14.20); and
- South Derbyshire Local Plan Part 2 adopted November 2017 (Ref 14.21).

Guidance

14.2.14 The guidance listed below is relevant to the assessment of noise and vibration:

- Planning Practice Guidance for Noise (PPGN) (Ref 14.22);
- BS 7445-1:2003 – Description and Measurement of Environmental Noise – Part 1: Guide to quantities and procedures (BS 7445) (Ref 14.23);
- BS 4142. 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142) (Ref 14.24);
- BS 5228 (2009) + A1 (2014): Code of Practice for Noise and Vibration Control on Construction and Open Sites (BS 5228) (Ref 14.25, Ref 14.26);

- ISO 9613-2:2024 Acoustics. Attenuation of Sound During Propagation Outdoors - Engineering Method for the Prediction of Sound Pressure Levels Outdoors. (Ref 14.27);
- Department of Transport: Calculation of Road Traffic Noise (CRTN) (Ref 14.28);
- Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration (Ref 14.29);
- Noise Advisory Council: A Guide to Measurement and Prediction of Sound Level Leq (Ref 14.30);
- National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines (Ref 14.30);
- National Grid Technical Report TR(E)564: Development of Method for Assessing the Impact of Noise from Overhead Lines (New Build, Reconductoring, Diversion and Uprating) (Ref 14.31); and
- National Grid Technical Guidance Note TGN(E)322: Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating) (Ref 14.32).

14.3 Scoping Opinion and Consultation

Scoping Opinion and Stakeholder Engagement

- 14.3.1 A Scoping Report (Ref 14.1) was prepared and submitted by National Grid to the Planning Inspectorate in October 2024. The Planning Inspectorate provided a Scoping Opinion (Ref 14.2) on behalf of the Secretary of State for Energy Security and Net Zero in December 2024. Responses from the Planning Inspectorate in relation to noise and vibration and how these requirements will be addressed by the applicant are set out in **Table 14.4**.

Table 14.4: Summary of Planning Inspectorate’s Scoping Opinion comments in relation to noise and vibration

Scoping Opinion ID	Planning Inspectorate’s Comments	Response
3.9.1	Vibration effects from construction traffic. The Inspectorate agrees that significant are not likely and that this matter can be scoped out of the ES.	This matter has been scoped out of further assessment. See Table 14.2 .
3.9.2	Noise effects from Willington Substation – operation and maintenance. On the basis that the existing Willington Substation would not be replaced, the Inspectorate is content that no new noise effects would arise and as such this matter can be scoped out of the ES.	This matter has been scoped out of further assessment. See Table 14.2 .
3.9.3	Noise effects from the operation of underground cables.	This matter has been scoped out of further assessment.

Scoping Opinion ID	Planning Inspectorate's Comments	Response
	The Inspectorate agrees that this can be scoped out of the assessment as significant effects are not likely.	See Table 14.2 .
3.9.4	<p>Vibration effects from the operation of new infrastructure.</p> <p>The Inspectorate agrees that this can be scoped out of the ES, subject to the mitigation measures described being implemented.</p>	<p>This matter has been scoped out of further assessment. See Table 14.2.</p> <p>Suitable mitigation measures are set out in section 14.6 and Appendix 4A Draft Outline Code of Construction Practice.</p>
3.9.5	<p>Noise and vibration effects from the maintenance of operational infrastructure.</p> <p>The Inspectorate requires significant maintenance activities that resemble construction to be included in the ES, even if short-term maintenance is scoped out.</p>	<p>Chapter 4 Description of the Project outlines the anticipated maintenance activities.</p> <p>This matter will be addressed within the ES.</p>
3.9.6	<p>Vibration effects from construction activities.</p> <p>The Inspectorate requires the assessment of vibration from construction activities to include consideration of effects on Environment Agency assets to include, but not limited to:</p> <ul style="list-style-type: none"> • Ambaston Ring Embankment defence; • Shardlow Ring Embankment defence; • Shardlow Coppice Embankment defence; and • Draycott Front Floodbank. 	<p>A preliminary assessment of potential impacts to flood defence assets from vibration through the construction phase has been carried out.</p> <p>The methodology is set out in section 14.4 and the results are presented in section 14.7.</p>
14.3.2	<p>Table 14.5 provides a summary of the consultation feedback from specific stakeholders provided as part of the Scoping Opinion (December 2024) to inform the noise and vibration assessment to date.</p>	

Table 14.5: Summary of stakeholder Scoping Opinion responses in relation to noise and vibration

Consultee	Summary of Key Topics Raised	Response
Alfreton Town Council	Noise effects during operation. There is concern relating to the proximity of Alfreton Park Community Special School to the Project and the susceptibility of the children to pure tones and the resulting effects.	Section 14.7 presents the results of a screening assessment of operational noise from the overhead line. Further details of this assessment are presented in Appendix 14D Overhead Line Operational Noise Assessment . Further assessment will be carried out within the ES. The assessment method considers several different receptor types, the most sensitive of which, 'vulnerable subgroup' would be used to assess effects on the users of the Alfreton Park Community Special School.
Ashfield District Council	Objection provided from a resident in the district on a number of grounds, including noise pollution.	Noise effects are assessed and reported in this chapter. Likely effects in relation to construction activities and operational noise are assessed in section 14.7 and they will be further assessed in the ES.
Little Eaton Parish Council	Objection provided by the Parish Council on a number of grounds, including operational noise at residential properties.	A screening assessment of operational noise from the overhead line has been carried out in accordance with relevant guidance. The results are presented in section 14.7. Further assessment will be carried out for the ES.
North West Leicestershire District Council	The Council considers that a noise and vibration assessment should demonstrate that no adverse impacts would arise at sensitive receptors within the District.	A preliminary assessment of noise and vibration has been carried out and is reported in section 14.7. The assessment has followed relevant policy and guidance. Further assessment will be included in the ES.
Stanley and Stanley Common Parish Council	Objection provided by the Parish Council on a number of grounds, including operational noise at residential properties.	A preliminary assessment of noise from the operation of the overhead line is included in section 14.7. Further assessment will be carried out in the ES.
Yorkshire Water	Request consideration of vibration impacts to their assets from construction works during the detailed design stage. Agree with the scope of the assessment.	

- 14.3.3 Non-statutory (Stage 1) consultation was held between May and September 2024. The principal feedback received from Stage 1 consultation of relevance to this chapter is included in **Table 14.6**, together with a response on how the comments were considered in the Scoping Report and this PEIR.

Table 14.6: Summary of Stage 1 consultation in relation to noise and vibration

Consultee	Summary of Key Topics Discussed and Key Outcomes	Response
National Highways	Vibration from construction equipment can undermine National Highways structural assets and cause damage. Detailed information on the positions and clearance height of both modified and new infrastructure is required in relation to assets to ensure they do not compromise the long-term integrity of other National Highways structural assets.	Vibration impacts on third party assets will be considered as the design progresses and will be taken into account by the engineering team during detailed design. An assessment is therefore not included here and will not be included in the ES. The Project will continue to engage with National Highways during the design process, as appropriate.
South Derbyshire District Council	The Council expects full consideration to be given to the environmental effects of the Project and that these are effectively mitigated as far as possible. A number of points were raised, including noise from construction and from the proximity of pylons to neighbours.	Noise effects are assessed and reported in this chapter. Likely effects in relation to construction activities and operational noise are assessed in section 14.7 and they will be further assessed in the ES.

14.4 Assessment Methodology

- 14.4.1 **Chapter 5 Approach to Preliminary Environmental Information Report** sets out the overarching approach which has been used in developing the PEIR. This section describes the technical methods used to determine the baseline conditions, receptor sensitivity and magnitude of change. This section also identifies further surveys and assessment that will be undertaken and reported in the ES.

Technical Guidance

- 14.4.2 The technical guidance presented in this section is relevant to the assessment of noise and vibration.

Planning Practice Guidance for Noise

- 14.4.3 The government published the PPGN (Ref 14.22) web-based resource in March 2014 and updated it in July 2019. The section on noise provides tabulated descriptions of example outcomes of the categories introduced in the NPSE based on the likely average response. It also adds a fourth category termed ‘Unacceptable Adverse Effect’. The tabulated descriptions are summarised in **Table 14.7**.
- 14.4.4 The PPGN recognises that there is not a simple relationship between measured or predicted noise levels and the resultant impact, and that this will depend on how various factors combine.

Table 14.7: Outcome descriptors for noise effect levels

Perception	Examples of Outcomes	Increasing Effect Levels	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite; significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

BS 7445-1:2003 – Description and Measurement of Environmental Noise – Part 1: Guide to Quantities and Procedures

- 14.4.5 The BS 7445 Part 1 standard (Ref 14.23) provides a comprehensive guide to the description and measurement of environmental noise. Part 1 includes a guide to quantities and procedures for determining noise levels.

BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142)

- 14.4.6 This standard (Ref 14.24) describes methods for rating and assessing sound in order to provide an indication of its likely effect upon nearby dwellings or premises used for residential purposes.
- 14.4.7 The ‘specific sound level’ from the Project (dB, L_s) at a NSR is used to derive a ‘rating level’ by applying appropriate corrections taking into account the perceptibility of distinguishing characteristics (i.e. tonal elements, impulsivity, intermittency) at the assessment location(s). This is then compared with the existing ‘background sound level’ (dB, L_{A90}) at that location in order to derive an initial impact estimation.
- 14.4.8 When considering the actual level of impact, BS 4142 emphasises the importance of all pertinent contextual factors prior to modifying the initial impact estimation.

BS 5228:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites

- 14.4.9 BS 5228 (Ref 14.25, Ref 14.26) is relevant to noise and vibration generated by the construction of the Project. The standard refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction and open sites. It provides guidance on assessing the significance of noise and vibration effects, guidance on estimating noise and vibration from construction sites and recommends procedures for noise and vibration control in respect of construction activities.

ISO 9613-2:2024 Acoustics. Attenuation of Sound During Propagation Outdoors - Engineering Method for the Prediction of Sound Pressure Levels Outdoors

- 14.4.10 This standard (Ref 14.27) specifies methods of calculating the attenuation of sound propagating outdoors in order to predict the level of environmental noise at distant locations from various sound sources.

Department of Transport: CRTN

- 14.4.11 The CRTN memorandum (Ref 14.28) describes a methodology to calculate the road traffic noise at a given distance from a highway. The methodology takes into account factors such as the traffic flow, speed, and percentage of Heavy Goods Vehicles (HGVs). Noise levels are presented in terms of the noise descriptor $LA_{10,18h}$ between 6am and midnight.

DMRB LA 111 Noise and Vibration

- 14.4.12 LA 111 (Ref 14.29) sets out the requirements for noise and vibration assessments of trunk road projects. The document presents criteria to assess likely significant effects from changes in road traffic on highways.

The Noise Advisory Council: A Guide to Measurement and Prediction of Sound Level L_{eq}

- 14.4.13 This document (Ref 14.30) includes a method for predicting road traffic noise in terms of an L_{Aeq} , rather than an $L_{A10,18h}$. This method is used when traffic flows are too low for CRTN to apply (i.e. less than 1,000 vehicles per day).
- 14.4.14 National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines.
- 14.4.15 This document (Ref 14.10) applies to environmental noise due to the operation of new overhead power lines, reconductoring, diversion, and uprating projects for overhead lines operated at 275 kV and 400 kV. The policy describes a three-tier assessment process and sets noise impact criteria taking into account worst-case wet noise (Tier 1), wet noise and dry noise in combination (Tier 2), and dry noise and wet noise separately following the principles of BS 4142 (Tier 3).

National Grid Technical Report TR(E)564: Development of Method for Assessing the Impact of Noise from Overhead Lines (New Build, Reconductoring, Diversion and Uprating)

- 14.4.16 This document (Ref 14.31) advises the need for a clear policy stance on acceptable noise levels from overhead lines and explains how the noise criteria presented in PS(T)134 (Operational Audible Noise Policy for Overhead Lines) were developed, taking into account the UK noise policy context and UK national and international guidance, including World Health Organization guidelines and evidence for health effects.

National Grid Technical Guidance Note TGN(E)322: Operational Audible Noise Assessment Process for Overhead Lines (New Build, Reconductoring, Diversion and Uprating)

- 14.4.17 This document (Ref 14.32) provides guidance on the practical implementation of PS(T)134: Operational Audible Noise Policy for Overhead Lines. The policy suite allows for noise impact (and hence significance of effect) to be reported according to the specific requirements of an Environmental Impact Assessment submitted as part of a development consent order (DCO) application.

Assessment Methods and Criteria

- 14.4.18 **Chapter 5 Approach to Preliminary Environmental Information Report**, sets out the overarching approach used in developing the preliminary environmental information. The process involves considering both the sensitivity of the receptor and the magnitude of the impact.
- 14.4.19 This section provides information relevant to the noise and vibration technical topic and describes the technical methods used to determine receptor sensitivity, and magnitude of change.
- 14.4.20 In general, for noise and vibration, the sensitivity of the receptor is taken into account through the use of criteria which are specific to different types of receptors. For example, the construction criteria in **Table 14.8** are specific to residential receptors and separate criteria are included which take into account their higher sensitivity to noise during the evening and night compared with the daytime period. The following subsections describe the assessment criteria in more detail.

Construction noise

Basis of assessment

- 14.4.21 At this stage, due to the preliminary stage of the design, a preliminary assessment has been carried out to provide an indication of the potential for significant noise and vibration effects, using worst-case assumptions.
- 14.4.22 The worst-case assumptions that have informed the assessment are set out in the assumptions and limitations section below.
- 14.4.23 The number, type and percentage on-time (percentage of time that the equipment is operating over the relevant time period) of construction equipment for the key phases of construction have been based on information provided by the Project design team. Noise source data have been based on information from the Project design team and the database of noise source levels for construction equipment in BS 5228. The highest noise producing activity has been predicted for enabling works, which is assumed to be rotary bored piling. It therefore follows that the noise effects from other activities are likely to be no greater than those for piling. Details are provided in **Appendix 14B Construction Noise and Vibration Data**.
- 14.4.24 As set out in **Chapter 4 Description of the Project**, the proposed core construction working hours for overhead line elements of the Project are:
- 7am to 7pm on Monday to Friday; and
 - 8am to 5pm on Saturday, Sunday and Bank Holidays.
- 14.4.25 For the proposed substation at Chesterfield the proposed core construction working hours are:
- 7am to 7pm on Monday to Friday; and
 - 8am to 1pm on Saturday, with no works on Sunday and Bank Holidays.
- 14.4.26 The typical operations proposed which may take place outside of the proposed core working hours are outlined in **Chapter 4 Description of the Project**.

Prediction method

- 14.4.27 Noise levels have been predicted using the method set out in BS 5228-1 (Ref 14.25).

Criteria for determining effect significance

- 14.4.28 The 'ABC' method in BS 5228-1 (Ref 14.25) has been used to assess construction noise effects at residential NSRs. This method uses three categories of criteria, depending on the existing ambient sound level. Category 'A' criteria are used where existing noise levels are low with categories 'B' and 'C' used in higher noise areas. **Table 14.8** summarises the 'ABC' criteria.

Table 14.8: Thresholds of potential significant effects at dwellings

Assessment Category and Threshold Value Period	Threshold Value (Façade), in Decibels, dB $L_{Aeq,T}$		
	Category A ^(A)	Category B ^(B)	Category C ^(C)
Night-time (11pm – 7am)	45	50	55
Evenings and weekends ^(D)	55	60	65
Daytime (7am – 7pm) and Saturdays (7am – 1pm)	65	70	75

Notes:

^[1] A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the Site exceeds the threshold level for the category appropriate to the ambient noise level.

^[2] If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to Site noise.

^[3] Applied to residential receptors only.

^(A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

^(B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

^(C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

^(D) 7pm – 11pm weekdays, 1pm – 11pm Saturdays and 7am – 11pm Sundays.

14.4.29 **Table 14.9** presents criteria used to assess the magnitude of potential effects on non-residential receptors.

Table 14.9: Criteria for construction noise affecting non-residential receptors

Receptor Type	Period	Reference	External Criteria for a Potentially Significant Effect, dB $L_{Aeq,T}$ ¹
Hotels and Guest Houses	Day ²	BS 5228, ‘ABC’ method (Ref 14.25)	65 ^{3,4}
	Evening and weekends ²		55 ^{3,4}
	Night ²		45 ^{3,4}
Schools and education premises, classroom	Day ⁵	BB 93 (Ref 14.33)	55 ^{6,7,8}
Teaching space intended	Day ⁵	BB 93 (Ref 14.33)	50 ^{6,7}

Receptor Type	Period	Reference	External Criteria for a Potentially Significant Effect, dB L _{Aeq,T} ¹
specifically for students with special hearing and communication needs			
Hospitals and healthcare facilities, including care homes	Day ⁵	Health Technical Memorandum 08-01: Acoustics, Table 1 (Ref 14.34)	55 ^{6,7}
	Night ⁴		50 ^{6,7}
Places of worship	Day ⁴	BS 8233 Table 6 (Ref 14.35)	50 ^{6,7}
Community facilities including libraries	Day ⁴	BS 8233, Table 6 (Ref 14.35)	65 ^{6,7}

1. Based on design guidance for internal ambient noise levels, except for hotels and guest houses (see note 3). Where the existing ambient noise level is above the threshold levels presented here, the threshold level for a potentially significant effect is set equal to the ambient noise level.
2. Daytime, evening and weekends and night-time periods as per **Table 14.8**.
3. BS 5228, 'ABC' method, category 'A' criteria, assuming existing ambient levels are low. Where existing ambient levels are higher, category 'B' or 'C' criteria may be appropriate (as per **Table 14.8**). These criteria are intended to be used for permanent dwellings and therefore using them here to assess premises used for short term accommodation is conservative.
4. Façade criterion (takes account of reflections from the building façade).
5. Daytime 7am to 11pm. Night-time 11pm to 7am.
6. In defining the external assessment criteria, +15 dB has been applied to the indoor design criteria to take account of the reduction in external noise with a
7. Free-field criterion (assumes no façade reflections).
8. Although not presented in Building Bulletin (BB) 93, the level of 55 dB, L_{Aeq,T} is also adopted to assess external spaces used for outdoor teaching. This criterion aligns with the level set out in BS 8233 for external amenity space.

14.4.30 The magnitude and significance of construction noise effects are set out in **Table 14.10**.

Table 14.10: Magnitude and significance of predicted construction noise effects

Magnitude	Exceedance of 'ABC' Construction Noise Thresholds	Consider Context	Likely Significance of Effect
Large	> 5 dB above the criteria	Example of context factors: <ul style="list-style-type: none"> • the duration of the impact; • whether windows can remain closed temporarily; and 	Major (Potentially Significant, depending on context)
Medium	Up to 5 dB above the criteria	<ul style="list-style-type: none"> • whether construction noise will be present during the 	Moderate (Potentially Significant, depending on context)

Magnitude	Exceedance of 'ABC' Construction Noise Thresholds	Consider Context	Likely Significance of Effect
Small	< 5 dB below, up to the threshold	times when the building is used for the purpose intended by the criteria (e.g. places of worship are being used for services).	Minor (Not Significant)
Negligible	5 dB or more below the threshold		Not Significant

14.4.31 For a potentially significant effect to be identified, the magnitude of impact must be Medium or Large and occur for the following minimum durations:

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

14.4.32 For dwellings, the existing pre-construction ambient noise level for the relevant period is adopted as the LOAEL for construction noise. In accordance with the NPSE, construction noise above this level will be mitigated and minimised, as far as practically possible.

14.4.33 The SOAEL values for dwellings are set in line with the Category 'C' (façade) values in **Table 14.8**: defined as 75 dB $L_{Aeq,12h}$ during the day, 65 dB $L_{Aeq,4h}$ during the evening and 55 dB $L_{Aeq,8h}$ at night. In addition, in line with the eligibility for noise insulation criteria set out in Table E.2 of BS 5228-1, for an exceedance of the SOAEL to occur, construction noise must also be 5 dB or more above the existing pre-construction ambient sound level.

Construction traffic noise

14.4.34 Road traffic noise levels have been predicted for the Primary Access Routes expected to be used by construction traffic. The proposed routes are shown in **Figure 12.1 Traffic and Transport Study Area**.

14.4.35 The preliminary assessment of likely significant effects considers the following:

- the magnitude of the predicted change in noise as a result of construction traffic; and
- contextual factors.

Basis of assessment

14.4.36 The assessment has made use of preliminary traffic information in terms of traffic flow data, average speeds and the percentage of HGVs for each road link, as set out in **Appendix 12C Baseline Transport Context Information** and **Appendix 12A Transport Statement**.

14.4.37 Noise predictions have been undertaken for the following scenarios:

- future baseline traffic flow without Project construction traffic; and
- future baseline traffic flow with Project construction traffic.

- 14.4.38 The construction traffic flow values represent the construction period anticipated to experience the highest average daily traffic flows. Forecasts indicate this peak will occur in 2029/2030. Accordingly, traffic data for this period has been adopted.
- 14.4.39 It is assumed that there is no change in average speed on each road between the scenarios with and without Project construction traffic.
- 14.4.40 The traffic data adopted for the assessment is presented in **Appendix 14C Construction Traffic Noise Predictions**.

Prediction method

- 14.4.41 Road traffic noise has been predicted in terms of a Basic Noise Level (BNL), in accordance with CRTN (Ref 14.28). CRTN uses Annual Average Weekday Traffic flows (AAWT) over the 18-hour period between 6am and midnight, to predict road traffic noise in terms of an LA10,18h.
- 14.4.42 The BNL is the predicted road traffic noise level at a distance of 10 m from the road.
- 14.4.43 As required by CRTN, a low flow correction has been applied to all road links with an AAWT flow of between 1,000 and 4,000 vehicles.
- 14.4.44 Flows of less than 1,000 vehicles per day fall outside of the scope of CRTN. In these situations, noise levels have been calculated using guidance in The Noise Advisory Council (Ref 14.30), which is a method predicting road traffic noise in terms of an LAeq.

Criteria and significance

- 14.4.45 **Table 14.11** presents the criteria used to assess the magnitude of the predicted change in noise as a result of the construction phase of the Project, based on the guidance in DMRB LA 111 (Ref 14.29), which sets out the requirements for noise and vibration assessments of trunk road projects. DMRB LA 111 provides guidance for the assessment of noise from road projects; however, the guidance is widely used in the assessment of construction road traffic noise impacts from other infrastructure projects, as the principles to assess potentially significant adverse effects are applicable.

Table 14.11: Magnitude of impact from construction traffic noise

Magnitude	Increase in BNL of Closest Public Road Used for Construction Traffic (dB)
Large	Greater than or equal to 5.0
Medium	Greater than or equal to 3.0 and less than 5.0
Small	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

- 14.4.46 When considering the significance of road traffic noise effects, contextual factors are considered, such as the existing ambient noise level, the absolute noise level and the duration over which impacts are expected to occur.

- 14.4.47 In accordance with DMRB LA 111, for a potentially significant effect to be identified, impacts must be Medium or above and occur for the following minimum durations:
- 10 or more days or nights in any 15 consecutive days or nights; or
 - a total number of days exceeding 40 in any six consecutive months.
- 14.4.48 The LOAEL and the SOAEL values for construction traffic noise for the daytime, are as follows:
- LOAEL threshold of 55 dB, $L_{A10,18h}$ (façade); and
 - SOAEL threshold of 68 dB, $L_{A10,18h}$ (façade).
- 14.4.49 The LOAEL and SOAEL threshold values are considered where impacts (as per **Table 14.11**) are predicted to be Medium magnitude or above.
- 14.4.50 **Table 14.12** summarises the process of assessing likely significant effects.

Table 14.12: Assessment of likely significant effects from construction traffic noise

Magnitude	Consider Context	Significance
Large	Context factors include: <ul style="list-style-type: none"> • existing ambient noise level; 	Major (Potentially Significant, depending on context)
Medium	<ul style="list-style-type: none"> • the absolute road traffic noise level; and 	Moderate (Potentially Significant, depending on context)
Small	<ul style="list-style-type: none"> • the duration of the impact 	Minor (Not Significant)
Negligible		Negligible (Not Significant)

- 14.4.51 For NSRs situated within 50 m of a road, a significant effect is identified, following consideration of context and where the impact magnitude is Medium or Large.

Construction vibration affecting human receptors

- 14.4.52 A preliminary assessment has been carried out at this stage, using conservative assumptions, to provide an indication of the potential for significant vibration effects.
- 14.4.53 The highest levels of vibration during construction are expected to arise from driven piling should this activity be required. Although rotary bored piling is the preferred piling technique for the construction of the Project and it is likely that this technique will normally be used, driven piling has been assumed in the assessment of construction vibration, in case it is required in localised areas. Levels of vibration from other construction plant are generally lower, so assuming driven piling results in a worst-case assessment. Vibration from the use of driven piling has been predicted using conservative assumptions, following the method set out in BS 5228-2 (Ref 14.26). Details of the prediction method and assumptions are set out in **Appendix 14B Construction Noise and Vibration Data**.
- 14.4.54 BS 5228-2 sets out criteria which have been used to assess the potential for significant effects on humans within residential and non-residential buildings. **Table 14.13** sets out the criteria from BS 5228-2.

Table 14.13: Construction vibration criteria

Vibration Level, Peak Particle Velocity (PPV), mm/s	Effect
<0.3	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 to <1.0	Vibration might be perceptible in residential environments.
≥1.0 to <10	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
≥10	Vibration is likely to be intolerable for any more than a brief exposure to this level in most building environments.

14.4.55 The magnitude and significance of construction vibration effects are set out in **Table 14.14**.

Table 14.14: Magnitude and significance of predicted construction vibration effects

Magnitude	Construction Vibration Level, PPV, mm/s	Consider Context	Likely Significance of Effect
Large	≥10	Example of context factors: <ul style="list-style-type: none"> the duration of the impact. 	Major (Potentially Significant, depending on context)
Medium	≥1.0 to <10		Moderate (Potentially Significant, depending on context)
Small	≥0.3 to <1.0		Minor (Not Significant)
Negligible	<0.3		Not Significant

14.4.56 For a potentially significant effect to be identified, the impact must be Medium or above and occur for the following minimum durations:

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

14.4.57 A vibration level (PPV) of 1 mm/s is adopted as the LOAEL. Adopted from the NPSE (Ref 14.9), construction vibration will be mitigated and minimised above this level, as far as practically possible. The SOAEL is set at a level of 10 mm/s.

Construction vibration affecting flood defence assets

14.4.58 In addition, an assessment of vibration effects on Environment Agency flood defence assets has been carried out.

- 14.4.59 BS 5228-2 (Ref 14.26) provides threshold limits for cosmetic damage to buildings from transient vibration, with lower (more stringent) criteria applicable where the vibration source gives rise to lower frequencies (of between 4 Hz and 15 Hz) and where the type of building is an unreinforced or light framed structure or a residential or light commercial building.
- 14.4.60 The most stringent of the criteria provided have been adopted: a level of 15 mm/s, PPV, applicable to an unreinforced or light framed building structure or a residential or light commercial building, assuming construction vibration dominates at frequencies between 4 Hz and 15 Hz. This criterion is expected to be conservative in relation to effects on flood defences. The location of the Environment Agency flood defence assets are shown in **Figure 14.1 Baseline Monitoring Locations and Study Area**.

Noise and vibration effects from the maintenance of operational infrastructure

- 14.4.61 In addition to noise and vibration during the construction phase, significant maintenance activities during the operational phase have been assessed.
- 14.4.62 Maintenance of the Project infrastructure is described in **Chapter 4 Description of the Project**, in **Volume 1**.
- 14.4.63 As these maintenance works would be required only infrequently, the criteria for assessing temporary construction noise and vibration impacts presented above is considered appropriate.
- 14.4.64 Minor repair work and inspections of infrastructure, which are unlikely to result in significant effects have been scoped out of further assessment and are listed in **Table 14.2**.

Operation of the overhead line

- 14.4.65 A Tier 1 screening assessment of noise from the overhead line has been carried out in accordance with National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines (**Table 14.10**).
- 14.4.66 The assessment process, input data and assessment method are detailed in **Appendix 14D Overhead Line Operational Noise Assessment**.

Preliminary Assessment Assumptions and Limitations

- 14.4.67 The assumptions and limitations that have been adopted in this preliminary assessment are outlined below.

Noise and vibration from construction activities associated with the overhead line and the Chesterfield Substation

- 14.4.68 The design is at an early stage. Therefore, the location of aspects of the Project such as the pylons and construction compounds may change.
- 14.4.69 A preliminary assessment has been carried out to provide an indication of the potential for significant noise and vibration effects, which will be refined for the ES assessment.

- 14.4.70 The following worst-case and conservative assumptions have been adopted:
- construction plant, including piling, is assumed to be operating at the closest part of the draft Order Limits to NSRs and VSRs;
 - no noise control mitigation measures;
 - the intervening ground is assumed to be acoustically hard and reflective;
 - existing ambient noise levels are low, so that the most stringent noise thresholds are used; and
 - screening of noise that may occur from land topography, site hoardings or buildings has not been taken into account.

Noise from construction traffic

- 14.4.71 Assumptions and limitations in relation to the traffic data used in this assessment are set out in **Chapter 12 Traffic and Transport**.

Noise from the overhead line during operation

- 14.4.72 The assessment of operational noise from the overhead line is limited to a screening assessment at this stage, to identify the extent beyond which significant effects would not be expected.

Noise from the operation of the Chesterfield Substation

- 14.4.73 The Project would connect into the existing Willington Substation² located to the south west of Derby and a proposed new substation at Chesterfield. It is currently anticipated that the new Chesterfield Substation will be consented and delivered as part of a separate National Grid project, Chesterfield to High Marnham, distinct from this Project. However, it is possible that it will be decided to also include the new Chesterfield Substation works as part of the DCO application for this Project to provide an alternative consenting mechanism to remove reliance on that separate planning application/consent and so mitigate against the risk of delay to the delivery of the Project.
- 14.4.74 Adequate information was not available to allow an assessment of likely noise effects for this aspect of the Project for the PEIR. An assessment is proposed to be included at the ES stage. The substation is proposed to be designed to avoid significant effects.

Further Assessment Within the ES

Baseline

- 14.4.75 **Section 14.5** provides a description of the noise surveys undertaken to date, the baseline within the Study Area, and identifies NSRs and likely characteristics of the existing noise environment.

² Separate from the Project, National Grid (Customer and Network Development) is developing plans for an extension to the existing substation to facilitate new customer connections. It is anticipated that these extension works would be delivered via permitted development rights and are expected to be completed by 2029. If confirmed, this potential development will be considered as part of the Project's cumulative assessment within the ES.

14.4.76 At ES stage, additional work will be carried out to quantify the baseline environment at NSRs along the proposed route alignment of the overhead line and close to the proposed substation at Chesterfield. This will include additional noise monitoring surveys as well as review of the results of the Round 4 strategic noise mapping published by the Department for Environment, Food and Rural Affairs (Defra noise mapping) (Ref 14.36). The locations for further noise monitoring will be chosen in consultation with the relevant local authorities.

Construction noise

14.4.77 At this stage, due to the preliminary stage of the design, a preliminary assessment has been carried out to provide an indication of the potential for significant noise and vibration effects, using worst-case assumptions. A detailed assessment will be carried out at the ES stage.

14.4.78 Some works may take place outside of core hours. However, for the PEIR, the assessment has considered the proposed core hours only. Out of hours works will be assessed in the ES proportionate to the information available before submission.

14.4.79 It may be necessary to use helicopters and/or drones for the following activities:

- the installation and removal of conductors; and
- the installation and removal of protective netting across highways, railway lines, watercourses and other assets.

14.4.80 Details of these activities such as the time of operation, duration and extent of use are not known at this stage. As such, noise from the use of drones/helicopter operations has not been assessed for the PEIR but will be reviewed as part of the ES assessment.

14.4.81 Non-residential NSRs have not been assessed at this stage. An assessment of the following non-residential NSRs will be included in the ES assessment:

- hotels and Guest Houses;
- schools and education premises, including teaching spaces intended specifically for students with special hearing and communication needs;
- hospitals and healthcare facilities;
- care homes;
- places of worship; and
- community facilities including libraries.

14.4.82 Criteria which will be used to assess the magnitude and significance of noise and vibration effects on non-residential receptors are presented in **Table 14.9** and **Table 14.10**. Industrial and commercial receptors will not be considered as noise and vibration sensitive receptors within the assessment unless agreed otherwise during consultation with the local planning authorities.

Construction traffic noise

14.4.83 It is likely that the data used to inform the construction traffic noise assessment will be updated for the ES assessment. Should this be the case, then the assessment of construction traffic noise will be updated accordingly.

Construction vibration

- 14.4.84 A preliminary assessment of construction vibration has been carried out at this stage, using conservative assumptions, to provide an indication of the potential for significant vibration effects. The assessment will be refined at the ES stage and will identify VSRs where likely significant effects are predicted.
- 14.4.85 The screening assessment of construction vibration affecting flood defence assets will be updated to reflect any changes to the design.

Noise and vibration effects from the maintenance of operational infrastructure

- 14.4.86 Typically, pylon steelwork and foundations have a life expectancy of approximately 80 years, the conductors have a life expectancy of approximately 40 to 60 years, and the insulators and fittings have a life expectancy of approximately 25 to 40 years.
- 14.4.87 As the lifespan of the overhead line may be more than 80 years, repairs or refurbishment of these items may be required. The works required to maintain or replace these items are expected to be similar in nature to the work required to construct them but in some cases would be more limited.
- 14.4.88 When the CSE Compounds require refurbishment and/or replacement works, vans and possibly HGVs and small mobile cranes would be used to bring new materials and equipment to site and remove old equipment. Temporary scaffolding may also be required. The works would be expected to generate lower noise levels than those anticipated during the construction of the compounds. The assessment will be refined at the ES stage and will identify NSRs where likely significant effects are predicted.
- 14.4.89 In the unlikely event of a fault along the underground cable, the faulty section of cable would be replaced. It is expected that these maintenance works would be required only very infrequently. The activities involved in cable repair would be similar to those outlined for construction albeit over a much smaller area and scale.
- 14.4.90 Noise and vibration effects are expected to be no higher than those relating to the construction of the overhead line, as presented above. The assessment will be refined at the ES stage and will identify the potential for significant effects at NSRs and VSRs.

Noise from the operation of the substation at Chesterfield

- 14.4.91 Adequate information was not available to allow an assessment of likely noise effects for this aspect of the Project for the PEIR. The Study Area has been set out in this chapter, and a full assessment will be included at the ES stage. The substation is proposed to be designed to avoid significant effects.

Noise from the operation of the overhead line

- 14.4.92 A Tier 1 primary screening assessment has been carried out in accordance with National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines (**Table 14.10**).
- 14.4.93 The results of the screening assessment have been used to define a Study Area of 200 m from the Limits of Deviation (LoD) of the overhead line. NSRs within this distance and any changes in the design influencing the assessment will be considered in further detail within the ES. This will include a Tier 2 screening assessment and, where this more refined assessment identifies the potential for significant effects, a Tier 3 assessment will also be carried out.

14.5 Baseline Conditions

Study Area

- 14.5.1 Preliminary Study Areas have been defined to identify NSRs and VSRs which may have the potential to be significantly affected by noise and vibration from the construction and operation of the Project.
- 14.5.2 The Study Area, shown as an envelope, is illustrated in **Figure 14.1 Baseline Monitoring Locations and Study Area**.
- 14.5.3 For construction noise, a Study Area of 300 m from construction activities has been adopted. For construction vibration a Study Area of 100 m from construction activities has been adopted. These distances are typically sufficient to encompass significant effects based on previous experience of similar projects.
- 14.5.4 The Study Area for the construction traffic noise assessment is based on a distance of 50 m from the Primary Access Routes, as shown in **Figure 12.1 Traffic and Transport Study Area**. This is based on the guidance in DMRB LA 111 (Ref 14.29).
- 14.5.5 To inform the Study Area for operational noise from the overhead line, a Tier 1 primary screening assessment has been carried out in accordance with National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines (Ref 14.10). Details of this assessment are presented in **Appendix 14D Overhead Line Operational Noise Assessment**.
- 14.5.6 The screening assessment demonstrates that, for the most stringent criteria (which relate to ‘vulnerable subgroups’, such as hospitals, pre-schools, care homes and hospices), adverse effects would not be expected beyond a distance of 73 m from the overhead line. Therefore, the Study Area encompasses a distance of 100 m from the LoD of the overhead line.
- 14.5.7 For operational noise from the Chesterfield Substation, a Study Area of 1 km has been adopted. This distance is typically sufficient to encompass significant effects based on previous experience of similar projects.
- 14.5.8 The assessments of noise and vibration carried out for the PEIR will be used to inform the extent of the Study Areas considered in the ES. NSRs that fall within these Study Areas will be assessed in further detail within the ES.

Data Collection

- 14.5.9 A number of data sources have been used to understand the existing baseline situation. They are summarised below:
- A desktop study has been carried out to understand the location of NSRs and of existing sources of noise such as roads and railways. This study has made use of Ordnance Survey mapping data and satellite imagery (e.g. Google Earth).
 - Baseline noise surveys have been carried out to quantify the existing sound levels at locations representative of NSRs close to the Project, provided in **Appendix 14A Baseline Noise Survey Data**.
 - Traffic data from the Project’s Traffic and Transport team for existing roads for the baseline situation have been used to inform an assessment of likely significant effects from construction traffic noise.

Existing Baseline Conditions

- 14.5.10 The Project passes through a mix of rural and built-up areas. NSRs close to the proposed route alignment of the overhead line include:
- isolated dwellings;
 - NSRs in villages, including Tibshelf, Pentrich, Lower Hartshay, Upper Hartshay, Rawson Green, Holbrook, Kilburn, Brackley Gate, Ockbrook, Borrowash and Willington;
 - NSRs in towns, including Chesterfield, Holmewood, Alfreton, Ripley, Belper; and
 - NSRs in the city of Derby.
- 14.5.11 Whilst the majority of NSRs are residential, some non-residential NSRs such as schools, hospitals and churches are also situated within the Study Area. The ES will identify and assess non-residential NSRs within the 1 km Study Area, including the Alfreton Park Community Special School which lies within the Study Area, to the west of Alfreton.
- 14.5.12 Existing sound levels at NSRs close to the proposed route alignment of the overhead line will vary and are likely to be influenced by their proximity to major transport sources such as roads and railways. To the south of Chesterfield, the route runs close to the A617. Between Derby and Ripley, the route runs close to the A38, whilst to the south of Derby, the route runs close to the A50 (Derby bypass).
- 14.5.13 Existing sound levels are likely to be lower further from major transport sources and may be influenced by natural sounds such as birds and the wind blowing vegetation as well as anthropogenic sources such as agricultural activity.
- 14.5.14 In relation to the proposed Chesterfield Substation, a Study Area of 1 km is proposed. NSRs in this area include the closest NSRs within the areas of Calow, Spital and Hasland, on the outskirts of Chesterfield as well as smaller residential clusters and isolated properties. Existing sound levels in this area are likely to include contributions from roads, including the A617, natural and anthropogenic sounds and, at NSRs nearby, noise from the existing Chesterfield Substation.
- 14.5.15 Existing sound levels have been measured at several locations. Long term, unattended noise monitoring was carried out in August 2024 at two locations, representative of NSRs close to the proposed substation at Chesterfield. Short term attended noise monitoring was carried out during the daytime in June 2025 at a further nine locations along the proposed route alignment of the overhead line. Details are provided in **Appendix 14A Baseline Noise Survey Data**. The monitoring locations are shown in **Figure 14.1 Baseline Monitoring Locations and Study Area**.
- 14.5.16 The results of the monitoring suggest that, for the locations they represent, existing sound levels generally indicate the lowest/most stringent (Category A) construction noise criteria are appropriate during the daytime. Further noise monitoring will be carried out to inform both the construction and operational assessments, as appropriate, and with engagement with the relevant local authorities, for the ES assessment.

Future Baseline

- 14.5.17 The future baseline relates to known or foreseeable changes to the current baseline in the future, against which the effects of the Project during construction and operation can be assessed. Specifically, it accounts for anticipated changes including those caused by changing climatic conditions, policy, legislation and by other confirmed development projects which would be complete prior to construction of the Project.
- 14.5.18 Should the Project gain development consent, construction is planned to commence in 2029, with operation due to begin in 2031.
- 14.5.19 Road traffic noise levels tend to increase over time and therefore, where the existing acoustic environment at NSRs is significantly influenced by this noise source, future baseline noise levels may be higher during the construction and operational phases than at present.
- 14.5.20 The assessment of construction traffic noise makes use of the future baseline in the form of estimated future traffic flow data. Therefore, the future baseline is taken into account when assessing this aspect of the Project.
- 14.5.21 The assessment of noise from construction of the Project is based on the conservative assumption that baseline levels are relatively low so that the most stringent construction criteria apply. Should baseline noise levels increase during the period before construction begins, the use of these lower criteria would result in a conservative assessment. Further noise monitoring will be carried out to inform the construction and operational noise assessment for the ES; however, no adjustments will be made to account for increases in baseline noise levels that may occur between the ES and the start of construction/operation. Therefore, in this respect, the baseline used in the assessment will be conservative.

14.6 Design Embedded and Good Practice Mitigation Measures

- 14.6.1 As set out in **Chapter 5 Approach to Preliminary Environmental Information Report**, mitigation measures fall into one of three categories: embedded measures; good practice measures; and additional mitigation measures. This section sets out the embedded and good practice measures relevant to the noise and vibration assessment. Potential additional mitigation measures are described in section 14.8.

Embedded Mitigation Measures

- 14.6.2 **Chapter 4 Description of the Project** sets out the principle embedded measures included to date. The following measures are relevant to noise and vibration.
- 14.6.3 An environmental appraisal of route options for the overhead line has been carried out, to avoid environmentally sensitive features, including NSRs and VSRs, as far as reasonably practicable. This will reduce noise and vibration effects during both the construction and operational phases of the Project.
- 14.6.4 Pylon fittings, such as insulators, dampers, spacers and clamps, will be specified in accordance with National Grid Technical Specifications to reduce the potential for audible noises to occur. Where noise from pylon fittings does occur, e.g. due to a fault, appropriate action can normally be taken to remedy the cause of the noise, usually through cleaning or replacement.

- 14.6.5 At this stage, a preliminary assessment of overhead line noise has been undertaken assuming a triple Araucaria conductor.
- 14.6.6 Plant with moving parts, such as cooling equipment and transformers, substations and CSE Compounds equipment will be mounted on suitable anti-vibration mounts where necessary, to protect the plant from potential vibration impacts and to attenuate vibration generated by the plant.
- 14.6.7 Further embedded design measures will be considered as the Project design evolves.

Good Practice Mitigation Measures

Construction

- 14.6.8 Construction noise and vibration impacts will be managed through the use of a Code of Construction Practice (CoCP). A Draft Outline CoCP is provided in **Appendix 4A Draft Outline Code of Construction Practice**. The CoCP includes a number of mitigation and management measures, including those listed below.
- NV01: Construction works would be carried out during core working hours (as set out in **Appendix 4A Draft Outline Code of Construction Practice**) where practicable;
 - NV02: BS 5228-1 and BS 5228-2 set out good construction practices to control noise and vibration respectively, which would be adopted, where practicable;
 - NV03: Best Practicable Means (BPM) (as defined in section 72 of the CoPA), would be used to control construction noise and vibration and would consider the following general principles:
 - control at source, including measures such as the use of modern, low noise equipment; equipment noise control measures such as the use of mufflers/silencers and regular maintenance to ensure integrated noise control measures are in good working order; construction methods which use quieter equipment; considerate use of equipment (e.g. powering down when not in use); and
 - control of the spread of noise across the site, including the use of acoustic screens/enclosures, siting noisy equipment further from Noise Sensitive Receptors (NSRs), the use of site cabins to screen noise.
 - NV04: During commissioning of the Project, noise monitoring will be carried out at a selection of locations. The monitoring will be used to identify whether noise levels are higher than predicted and, should this be the case, to identify mitigation to reduce noise levels as far as reasonably practicable;
 - NV05: The Main Works Contractor will develop a Construction Noise and Vibration Management Plan (CNVMP) which shall be submitted to the local authority for approval before works start. The CNVMP would include modelling and assessment of construction noise and vibration. The results of the modelling would be used to identify where significant effects are predicted to occur;
 - NV06: The CNVMP will identify site-specific details of the mitigation and management measures that will be implemented to mitigate and minimise (using BPM) effects above the Lowest Observed Adverse Effect Level (LOAEL) and to

avoid significant adverse effects on health and quality of life (i.e. effects above the Significant Observed Adverse Effect Level or SOAEL), as defined in the ES; and

- NV07: During the construction of the Project, temporary access routes would be required, to deliver and remove materials and to enable access to the proposed route alignment. A Construction Traffic Management Plan would be produced which would require that, as far as practicable, these access routes be located away from NSRs and VSRs, thereby minimising potential noise and vibration effects during both the construction and during the use of these routes during the construction phase.

Operation (and maintenance)

- 14.6.9 Measures to mitigate and manage noise during the operational phase (and maintenance) will be developed as the design progresses. Such measures may include, where necessary and practicable, the use of low noise equipment, siting noisy equipment away from NSRs and the use of acoustic screens or enclosing equipment. These mitigation measures will be secured in the DCO by an appropriate strategy / management plan, if required.

14.7 Preliminary Assessment of Effects

- 14.7.1 This section presents a preliminary assessment of likely significant noise and vibration effects arising from the construction and operation of the Project. A description of each of these stages is set out in **Chapter 4 Description of the Project**.
- 14.7.2 The assessment assumes that the embedded mitigation measures are in place. Good practice or additional mitigation measures have not been included in the assessment at this stage.
- 14.7.3 The assessment is ongoing and is subject to change in response to the ongoing development of the Project. A full detailed assessment will be presented within the ES submitted with the DCO application.
- 14.7.4 Results are presented for aspects of the Project for which likely significant effects are identified.

Construction phase

- 14.7.5 The potential effects that could result from the construction of the Project are:
- noise and vibration from construction activities associated with the overhead line;
 - noise and vibration from construction activities associated with the Chesterfield Substation; and
 - noise increases from construction traffic.

Operational phase

- 14.7.6 The potential effects that could result from the operation of the Project are:
- noise from the operation of the overhead line; and
 - noise from the operation of Chesterfield Substation.

- 14.7.7 It should be noted, however, that adequate information was not available to allow an assessment of likely noise effects from the operation of Chesterfield Substation for the PEIR. An assessment will be included at the ES stage.

Likely Significant Effects

Noise and vibration from construction activities associated with the overhead line and Chesterfield Substation

- 14.7.8 Construction noise has been assessed according to the method set out in section 14.4.
- 14.7.9 As described in that section, a high-level assessment based on worst-case assumptions has been carried out, e.g. construction plant is located at the closest part of the draft Order Limits to NSRs, no good practice or additional noise mitigation and the use of the most stringent noise criteria.
- 14.7.10 As set out in **Chapter 4 Description of the Project**, the proposed core construction working hours for the overhead line works are:
- 7am to 7pm on Monday to Friday; and
 - 8am to 5pm on Saturday, Sunday and Bank Holidays.
- 14.7.11 In accordance with BS 5228-1, the core hours cover two assessment periods (see **Table 14.8**), as follows:
- Daytime assessment period:
 - 7am to 7pm on Monday to Friday; and
 - 8am to 1pm on Saturday
 - Weekend assessment period:
 - 1pm to 5pm on Saturday; and
 - 8am to 5pm on Sundays and Bank Holidays.
- 14.7.12 The proposed core construction working hours for the Chesterfield Substation (listed below) fall within the daytime assessment period only.
- 7am to 7pm on Monday to Friday; and
 - 8am to 1pm on Saturday, with no works on Sunday and Bank Holidays.
- 14.7.13 Details regarding the construction noise and vibration predictions are provided in **Appendix 14B Construction Noise and Vibration Data**.
- 14.7.14 The highest noise generating activity associated with the construction of the overhead line is assumed to be rotary bored piling (during enabling works). For construction of the underground cable, the highest noise generating activity is assumed to be excavation and trenching. Both activities have an assumed sound power level of around 116 dB, L_{WA}.
- 14.7.15 The potential for **significant** effects is predicted at residential NSRs within approximately 200 m during the daytime period and within approximately 630 m for works carried out during the weekend period. It should be noted that although the overall construction programme is approximately three years, construction works close to individual NSRs will last for shorter periods of time.

- 14.7.16 The highest noise generating activity associated with the construction of the Chesterfield Substation is assumed to be earthworks and piling with an assumed sound power level of around 112 dB, L_{WA} . The potential for significant effects is predicted at residential NSRs within approximately 130 m during the daytime period.
- 14.7.17 The worst-case assumptions adopted for this preliminary assessment are likely to result in a cautious assessment of likely significant effects and the assessment will be refined for the ES. The ES assessment will identify NSRs (including non-residential receptors) where likely significant effects are identified.
- 14.7.18 A preliminary construction vibration assessment has also been carried out at this stage to provide an indication of the potential for **significant** vibration effects, using conservative assumptions. Although rotary bored piling is the preferred piling technique for the construction of the Project and will normally be used, driven piling has been assumed as a worst-case for the vibration assessment. Vibration levels from other construction plant are generally lower.
- 14.7.19 The results show that, for driven piling, depending on the duration of this activity at a specific location, **significant** effects are predicted at residential VSRs within approximately 90 m of works. The assessment will be refined at the ES stage and will identify VSRs where likely **significant** effects are predicted.

Noise from the operation of the overhead line

- 14.7.20 A Tier 1 primary screening assessment has been carried out in accordance with National Grid Policy Statement PS(T)134: Operational Audible Noise Policy for Overhead Lines (Ref 14.10). Details of this assessment are presented in **Appendix 14D Overhead Line Operational Noise Assessment**.
- 14.7.21 **Figure 14.2 Overhead Line Noise Tier 1 Buffers**, indicates the distance from the overhead line centreline at which an additional investigation is required. This will be revisited for the ES.
- 14.7.22 The screening assessment demonstrates that, for the most stringent criteria (which relate to 'vulnerable subgroups'), **significant** effects would not be expected beyond a distance of 73 m from the overhead line.
- 14.7.23 NSRs within this distance of the LoD of the overhead line and any changes in the design influencing the assessment will be considered in further detail within the ES.

Likely Non-Significant Effects

Construction traffic noise

- 14.7.24 Construction traffic noise has been assessed according to the method set out in section 14.4. Predicted increases in road traffic noise from construction are presented for each assessed road link, in **Appendix 14C Construction Traffic Noise Predictions**.
- 14.7.25 The results indicate that the magnitude of impact from construction traffic noise on the public highway is negligible or small and **not significant** for all the proposed Primary Access Routes except for Main Road between Bridle Lane and Cromford Canal. A noise level of 54.8 dB $L_{Aeq,18hr}$ is predicted during the peak construction year. This road experiences low existing traffic flows and a 5.9 dB increase in noise level is predicted, which is a large magnitude of impact. Peak construction traffic flows would be expected for approximately three to four months with lower flows expected at other times.

- 14.7.26 Main Road is situated close to the A610 and the A38 and consequently existing ambient noise levels are expected to be relatively high. A review of the Defra noise mapping (Ref 14.36) shows that existing noise levels along this road are between 55 dB and 60 dB $L_{Aeq,16hr}$.
- 14.7.27 The road traffic noise level predicted at Main Road represents an 18-hour average noise level and therefore needs to be converted in order to compare it with the Defra noise mapping, which presents 16-hour average noise levels.
- 14.7.28 Conservatively assuming the full 18-hour traffic flow occurs within a 16-hour period results in a correction of +0.5 dB, giving a predicted noise level of 55 dB $L_{Aeq,16hr}$ at 10 m. As some NSRs are located closer to the road than 10 m (approximately 5 m – 6 m), noise levels may be up to 3 dB higher at the nearest NSRs, i.e. 58 dB, $L_{Aeq,16hr}$.
- 14.7.29 Predicted construction traffic noise levels of 58 dB, $L_{Aeq,16hr}$ are similar to existing ambient noise levels from the Defra noise maps of between 55 dB and 60 dB $L_{Aeq,16hr}$. Therefore, the significance of construction traffic noise along Main Road is expected to be lower than the large magnitude of impact would suggest. The significance of the effect is therefore considered to be minor (**not significant**).

Construction vibration affecting flood defence assets

- 14.7.30 For driven piling, exceedances of the screening criteria set out in section 14.4 are predicted at distances of less than 15 m. Further details regarding the vibration predictions are provided in **Appendix 14B Construction Noise and Vibration Data**.
- 14.7.31 As the nearest flood defence scheme (Ambaston Ring) is situated approximately 120 m from the LoD for the overhead line, effects are predicted to be not significant. This assessment will be updated in the ES to reflect any changes to the design.

14.8 Potential Additional Mitigation Measures

- 14.8.1 Additional mitigation comprises measures over and above any embedded and good practice mitigation measures. At this stage, no additional mitigation measures have been developed for noise and vibration.
- 14.8.2 The preliminary assessment indicates the potential for significant effects that may require additional mitigation, which will be developed as the Project design progresses. However, the application of good practice mitigation measures, including BPM (as set out in section 14.6), are likely to reduce these predicted noise levels, reducing the need for additional mitigation measures.
- 14.8.3 The ES will present an assessment considering the likely noise reduction provided by the proposed mitigation measures, as required.
- 14.8.4 In terms of construction noise, such measures could include acoustic screening around worksite boundaries, enclosure of fixed plant items, the use of different, quieter construction methods or restrictions on the timing of certain activities.
- 14.8.5 In terms of operational noise, measures could include the use of low noise versions of equipment, acoustic screens or enclosure within buildings.

14.9 Monitoring

- 14.9.1 The CNVMP will include measures to mitigate and manage noise and vibration during the construction phase.
- 14.9.2 Due to the large spatial extent of the Project, it will not be practicable to carry out construction noise monitoring at all construction worksites. Construction noise monitoring will be undertaken at selected locations identified through noise modelling as areas where significant effects are predicted, to capture noise levels during the various construction phases and activities.
- 14.9.3 Measures to mitigate and manage noise and vibration during the operational phase will be developed as the design progresses.
- 14.9.4 As outlined in **Appendix 4A Draft Outline Code of Construction Practice** measure NV06, during commissioning of the Project, noise monitoring will be carried out at a selection of locations. The monitoring will be used to identify whether noise levels are higher than predicted and, should this be the case, to identify mitigation to reduce noise levels as far as reasonably practicable.
- 14.9.5 Once the overhead line and substation are operational, noise will be monitored during regular maintenance inspections and as a result of complaints.

14.10 Residual Effects

- 14.10.1 Design embedded mitigation measures are described in section 14.6. The effect of the design embedded mitigation measures is included in the assessment presented above in section 14.7.
- 14.10.2 Section 14.6 also sets out good practice mitigation measures which will be implemented during the construction phase. At this stage, a high-level, conservative assessment has been carried out which does not take specific account of the effect of good practice mitigation measures or any additional measures that may be required.
- 14.10.3 Therefore, for this preliminary assessment, the residual effects are the same as the effects reported above, in section 14.7. This indicates the potential for significant effects at the nearest NSRs during the noisiest phases of construction and during operation.
- 14.10.4 The assessment will be refined and updated for the ES, as the design progresses. Good practice mitigation measures, including BPM (as set out in section 14.6), are likely to be effective at reducing predicted noise levels and will be assessed and reported in the ES.
- 14.10.5 The assessment will consider BPM to mitigate and minimise effects above the LOAEL as far as practicable. Where necessary, the assessment will consider additional mitigation to avoid significant adverse effects on health and quality of life (i.e. above the SOAEL).
- 14.10.6 The implementation of the good practice and potential additional mitigation measures outlined above will be considered further and the outcome of this assessment will be presented in the ES.

14.11 Summary

- 14.11.1 **Table 14.15** summarises the preliminary assessment of effects, potential additional mitigation measures and residual effects.

Table 14.15: Summary of residual effects for noise and vibration

Description of the Effect	Sensitive Receptor	Significance of Effect with Design Embedded and Good Practice Mitigation	Additional Mitigation Measure	Residual Effect
Noise from construction activities associated with the overhead line, including infrequent refurbishment/replacement works or a fault along the underground cable (confined to land owned by National Grid around the existing Chesterfield Substation)	Nearby residential receptors ¹	The potential for significant effects is predicted at residential NSRs within approximately 200 m during the daytime period and within approximately 630 m for works carried out during the weekend period.	Additional noise mitigation measures may be required and will be considered at the ES stage.	The potential for significant effects is predicted at residential NSRs within approximately 200 m during the daytime period and within approximately 630 m for works carried out during the weekend period. This preliminary assessment is based on conservative assumptions and will be refined for the ES. Good practice mitigation measures, including BPM are likely to be effective at reducing predicted noise levels and will be assessed and reported in the ES.
Noise from construction activities associated with the Chesterfield Substation	Nearby residential receptors ¹	The potential for significant effects is predicted at residential NSRs within approximately 130 m of works.	Additional noise mitigation measures may be required and will be considered at the ES stage.	The potential for significant effects is predicted at residential NSRs within approximately 130 m of works. Good practice mitigation measures, including BPM are likely to be effective at reducing predicted noise levels and will be assessed and reported in the ES.
Noise from construction traffic	Nearby NSRs	Effects are assessed to be Negligible or Minor and therefore Not Significant.	No additional mitigation measures are expected to be required.	Effects are assessed to be Negligible or Minor and therefore not significant.

Description of the Effect	Sensitive Receptor	Significance of Effect with Design Embedded and Good Practice Mitigation	Additional Mitigation Measure	Residual Effect
Vibration from construction activities associated with the overhead line, including infrequent refurbishment/replacement works or a fault along the underground cable (confined to land owned by National Grid around the existing Chesterfield Substation)	Nearby residential receptors ¹	The potential for significant effects is predicted at residential NSRs within approximately 90 m of works.	Additional mitigation measures may be required depending on the location of works and proximity to NSRs. This will be considered at the ES stage.	The potential for significant effects is predicted at residential NSRs within approximately 90 m of works. This preliminary assessment is based on conservative assumptions and will be refined for the ES. Good practice mitigation measures, including BPM are likely to be effective at reducing predicted noise levels and will be assessed and reported in the ES.
Vibration from construction activities associated with the overhead line, including infrequent refurbishment/replacement works or a fault along the underground cable (confined to land owned by National Grid around the existing Chesterfield Substation)	Nearby flood defence schemes	Effects are assessed to be Not Significant.	No additional mitigation measures are expected to be required.	Effects are assessed to be not significant.
Noise from construction activities associated with the overhead line, including infrequent refurbishment/replacement works or a fault along the underground cable (confined to land owned by National Grid around the existing Chesterfield Substation)	Nearby residential receptors ¹	The potential for significant effects is predicted at residential NSRs within approximately 200 m during the daytime period and within approximately 630 m for works carried out during the weekend period.	Additional noise mitigation measures may be required and will be considered at the ES stage.	The potential for significant effects is predicted at residential NSRs within approximately 200 m during the daytime period and within approximately 630 m for works carried out during the weekend period. This preliminary assessment is based on conservative assumptions and will be refined for the ES. Good practice mitigation measures, including BPM are likely to be effective at reducing predicted noise levels and will be assessed and reported in the ES.

Description of the Effect	Sensitive Receptor	Significance of Effect with Design Embedded and Good Practice Mitigation	Additional Mitigation Measure	Residual Effect
Noise from construction activities associated with the Chesterfield Substation	Nearby residential receptors ¹	The potential for significant effects is predicted at residential NSRs within approximately 130 m of works.	Additional noise mitigation measures may be required and will be considered at the ES stage.	The potential for significant effects is predicted at residential NSRs within approximately 130 m of works. Good practice mitigation measures, including BPM are likely to be effective at reducing predicted noise levels and will be assessed and reported in the ES.
Noise from the operation of the overhead line	Nearby NSRs	For the most stringent criteria (which relate to 'vulnerable subgroups'), there is the potential for adverse effects up to a distance of 73 m from the overhead line. Whilst for residential receptors, there is the potential for adverse effects up to a distance of 27 m from the overhead line.	Tier 1 screening assessment identifies the requirement of further assessment to determine significance. If required, mitigation will be considered at the ES stage.	For the most stringent criteria (which relate to 'vulnerable subgroups'), adverse effects would not be expected beyond a distance of 73 m from the overhead line. For residential receptors, adverse effects would not be expected beyond a distance of 27 m from the overhead line.

1. Non-residential receptors have not been assessed in detail at this stage. An assessment in detail will be included in the ES.

References

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