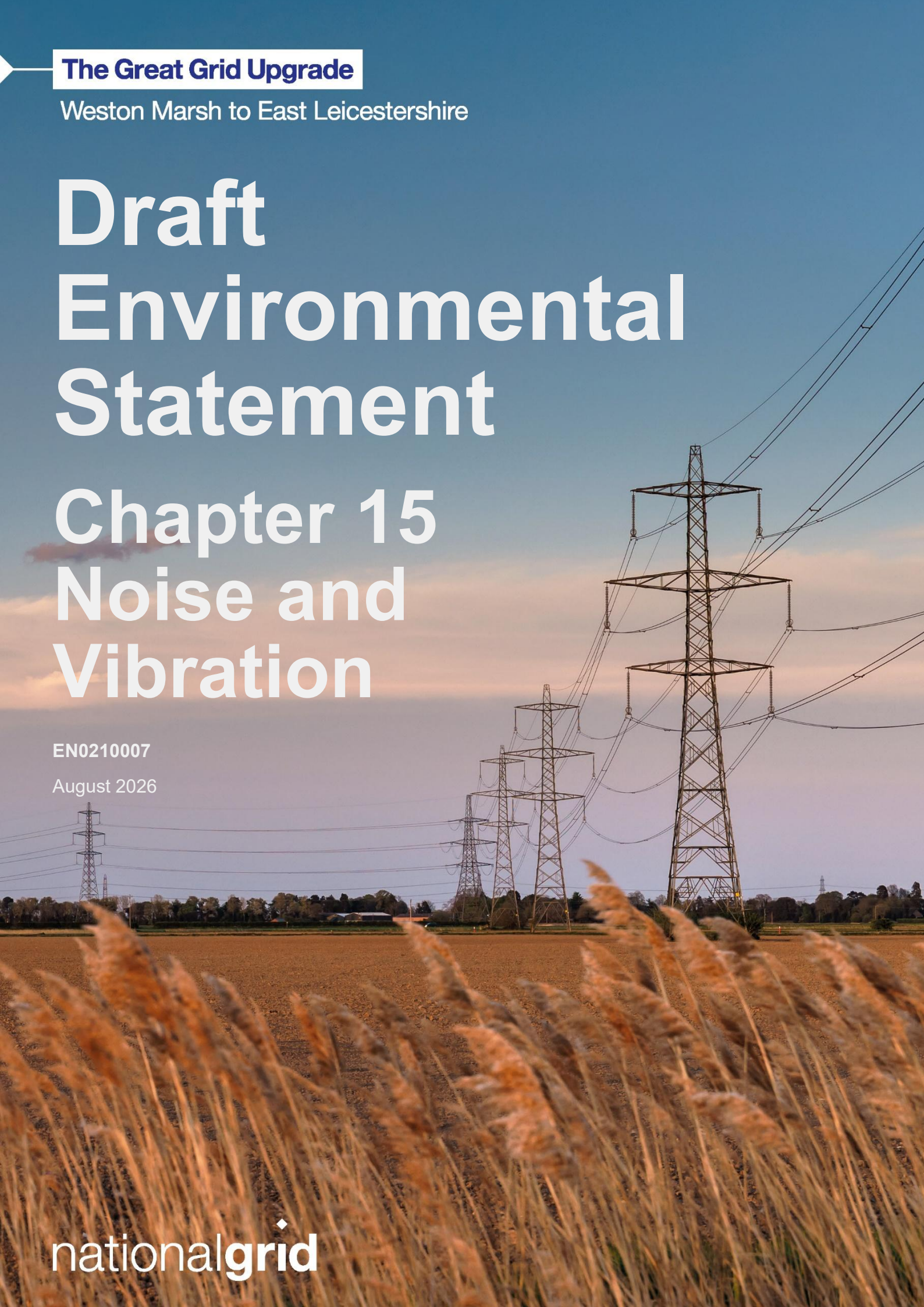




The Great Grid Upgrade

Weston Marsh to East Leicestershire

Draft Environmental Statement

Chapter 15 Noise and Vibration

EN0210007

August 2026

nationalgrid

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15. Noise and Vibration

15.1 Introduction

- 15.1.1 This chapter reports the preliminary assessment of the potential impacts/effects of the Weston Marsh to East Leicestershire Project (the Project) on noise and vibration sensitive receptors (NSRs). This chapter includes consideration of the following matters:
- construction noise;
 - construction vibration (on humans and structures);
 - construction traffic noise; and
 - operational noise from the proposed new substations.
- 15.1.2 The following matters are not included in this assessment, as agreed through the Scoping Opinion provided as **Appendix 5B Scoping Opinion** (adopted by the Planning Inspectorate on behalf of the Secretary of State on 17 December 2025):
- construction traffic vibration;
 - operational noise from overhead lines;
 - operational noise from substation switchgear and auxiliary plant;
 - operational vibration; and
 - maintenance noise or vibration.
- 15.1.3 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to EIA:
- **Chapter 2 Regulatory and Planning Policy Context;**
 - **Chapter 3 Main Alternatives Considered;**
 - **Chapter 4 Description of the Project;** and
 - **Chapter 5 EIA Approach and Methodology.**
- 15.1.4 There are interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:
- **Chapter 8 Ecology and Biodiversity** – includes details of the potential for noise impacts on ecology receptors.
 - **Chapter 9 Cultural Heritage** – includes details of the potential for noise and vibration impacts on heritage assets.
 - **Chapter 13 Traffic and Transport** – includes details of the potential change in construction traffic movements, which may result in noise impacts as a result of the Project.
 - **Chapter 16 Socio-economics, Recreation and Tourism** – includes details of noise impacts on communities.

- **Chapter 17 Health and Wellbeing** – includes details of the potential for noise and vibration impacts on health and wellbeing.
- **Chapter 19 Cumulative Effects** – includes consideration of the potential for in-combination and cumulative effects on noise and vibration.

15.1.5 Other chapters of this Draft Environmental Statement (DES) draw on information presented in this noise and vibration assessment. For example, disturbance to protected and notable species from noise and vibration are assessed separately within **Chapter 8 Ecology and Biodiversity**, and potential vibration on heritage assets is assessed in **Chapter 9 Cultural Heritage**.

15.1.6 This chapter is supported by the following figures and appendices:

- **Figure 15.1 Noise and Vibration Study Area with Initial Construction Noise Assessment Outputs;**
- **Figure 15.2 Noise and Vibration Baseline;**
- **Appendix 15A Baseline Sound Survey;** and
- **Appendix 15B Operational Noise Assessment.**

15.2 Legislation, Policy Framework and Guidance

Legislation and National Policy

15.2.1 Legislation and national policy relevant to the Project and this chapter are described in **Chapter 2 Regulatory and Planning Policy Context**, and supporting appendices **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Policy** and **Appendix 2C Local Policy**.

Regional and Local Policy

15.2.2 **Chapter 2 Key Legislation and Planning Policy Context** sets out relevant regional and local policy. Regional and local plans or policies relevant to this assessment are as follows:

- **Harborough Local Plan 2011-2031 (Adopted 2019) (Ref 15.1):** Policy GD8: Good design in development and Policy CC2: Renewable Energy Generation.
- **Melton Borough Local Plan 2011-2036 (Adopted October 2018) (Ref 15.2):** Policy EN10: Energy Generation from Renewable and Low Carbon Sources.
- **North Northamptonshire Joint Core Strategy 2011-2031 (Adopted 2016) (Ref 15.3):** Policy 26: Renewable and Low Carbon Energy Guidance.
- **South East Lincolnshire Local Plan 2011-2036 (Adopted March 2019) (Ref 15.4):** Policy 2: Development Management, Policy 30: Pollution and Policy 31: Climate Change and Renewable and Low Carbon Energy.
- **The South Kesteven District Council Local Plan 2011-2036 (Adopted 2020) (Ref 15.5):** Policy DE1: Promoting Good Quality Design.

Guidance

- 15.2.3 Relevant guidance, specific to noise and vibration, that has informed this non-statutory Draft Environmental Statement (DES) (referred to in this document as “DES” and “non-statutory DES”) and will inform the assessment within the Environmental Statement (ES), comprises:
- BS 4142 (Ref 15.6) - British Standard providing methods for assessing the significance of effects of industrial and commercial sound.
 - BS 5228-1 (Ref 15.7) - British Standard providing a code of practice for controlling noise and vibration on construction sites. Also provides example methods for assessing the significance of construction noise impacts.
 - BS 5228-2 (Ref 15.8) - British Standard providing a code of practice for controlling vibration on construction sites. Also provides guidance on the significance of vibration impacts.
 - BS 6472-1 (Ref 15.9) - British Standard providing methods for evaluating human exposure to vibration in buildings.
 - BS 7385-2 (Ref 15.10) - British Standard providing methods for measuring and/or evaluating the risk of damage from groundborne vibration in buildings.
 - BS 7445-1 (Ref 15.11) - British Standard providing methods for describing and measuring environmental noise.
 - BS 8233 (Ref 15.12) - British Standard providing guidance on suitable internal sound levels within buildings including residential buildings.
 - Calculation of Road Traffic Noise (CRTN) (Ref 15.13) - provides a detailed method for predicting noise levels from road traffic.
 - Department for Education/Education Funding Agency: Acoustic design of schools: performance standards. Building bulletin 93 (Ref 15.14) - Provides minimum performance standards for the acoustics of school buildings and describes the normal means of demonstrating compliance with the Building Regulations.
 - Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government: Noise planning practice guidance (Ref 15.15) Advises on how planning can manage potential noise impacts in new developments.
 - Department of Health: Health Technical Memorandum 08-01: Acoustics (Ref 15.16) provides guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare.
 - Design Manual for Roads and Bridges (DMRB) LA 111: Noise and Vibration (Ref 15.17) - provides additional guidance to CRTN for predicting noise levels from road traffic and provides a framework for assessing the significance of road traffic noise changes. Primarily used by UK national road authorities for strategic road scheme assessments but suitable for other projects causing traffic changes.
 - The Institute of Environmental Management and Assessment (IEMA): Guidelines for Environmental Noise Impact Assessment (Ref 15.18)¹ - provides a framework

¹ IEMA has been rebranded as the Institute of Sustainability and Environmental Professionals, however the guidance stated remains the current version

for assessing the significance of noise effects in environmental impact assessments. It provides guidance on baseline noise surveys, impact prediction, evaluation of significance, and stakeholder engagement.

- ISO 9613-2 (Ref 15.19) - International Standard providing a detailed environmental noise prediction methodology.
- Noise Policy Statement for England (Ref 15.20) Outlines out the long term vision of government noise policy.
- World Health Organization Guidelines for Community Noise (Ref 15.21) - Provides health-based guideline values for communities in non-industrial settings. Offers recommendations to protect the population from adverse health effects such as sleep disturbance, annoyance, speech interference, and hearing impairment caused by noise from sources such as traffic, neighbourhoods, and public works.
- World Health Organization Night Noise Guidelines for the Europe (WHO NNG) (Ref 15.22) - The Night Noise Guidelines for Europe establishes health-based thresholds for night-time noise exposure, identifying levels above which adverse health effects may occur. The Guidelines are relevant to assessing potential sleep disturbance and long-term health impacts from night-time construction or operational noise.

15.3 Scope of Assessment

- 15.3.1 The scope of the assessment has been informed by the Environmental Impact Assessment Scoping Opinion provided as **Appendix 5B Scoping Opinion** (adopted by the Planning Inspectorate on behalf of the Secretary of State on 17 December 2025) and ongoing engagement with relevant technical consultees.
- 15.3.2 A full summary of all issues raised relevant to noise and vibration in the Scoping Opinion and National Grid's response is provided in **Appendix 5C Preliminary Scoping Opinion Response**. Further details of engagement undertaken to date is provided in Section 15.4.

15.4 Stakeholder Engagement

- 15.4.1 National Grid has held a meeting with relevant consultees including the environmental health professionals at local authorities within 1 km of the draft Order Limits. A summary of discussions and how these have influenced the Project, scope and/or the approach to the assessment is provided in **Table 15.1**.

Table 15.1 Key stakeholder engagement and National Grid response

Organisation and Date	Summary of Issue Discussed	Project Response
South Holland District Council and Harborough District Council 26 March 2026	Overview of noise and vibration assessment scope presented to council representatives.	Provided full survey methodology in the meeting which was agreed by the councils.

15.5 Assessment Methodology

- 15.5.1 This section describes the methodology used to establish the existing and future baseline, together with the methodology/approach used to undertake the preliminary assessment of noise and vibration. The methodology differs from the generic assessment methodology set out in **Chapter 5 EIA Approach and Methodology** and instead employs noise assessment methods accepted across the profession. This section also identifies further assessment needed to be undertaken as part of the ES.
- 15.5.2 The assessment is based on the guidance identified above.

Study Area

- 15.5.3 The Study Areas used for this assessment are presented on **Figure 15.1 Noise and Vibration Study Areas with Initial Construction Noise Assessment Outputs** and summarised in the following paragraphs.

Construction noise Study Area

- 15.5.4 Based on the assessment methodology and guidance in BS 5228-1 (Ref 15.7), a 300 m Study Area has been defined for the preliminary assessment of daytime construction airborne noise.
- 15.5.5 For the purposes of this DES, this is defined as 300 m from the overhead line, compounds, towers and haul roads, given that full details of locations of noisy construction activities (including handheld, mobile or static plant) are not known at this stage. This is based on guidance from BS 5228-1 (Ref 15.7).

Construction vibration Study Area

- 15.5.6 The Study Area for construction vibration effects is 100 m from the closest activity with the potential to generate appreciable levels of vibration associated with the Project. This is based on guidance from BS 5228-2 (Ref 15.8) and DMRB LA 111 (Ref 15.17).

Construction traffic noise Study Area

- 15.5.7 The Study Area for construction traffic noise effects is 50 m around proposed haulage routes, i.e. public roads with the potential for an increase in Basic Noise Level (BNL) of 1 dB(A), or more, as a result of the additional construction traffic to existing traffic levels. This is based on guidance from DMRB LA 111 (Ref 15.17).

Operational noise Study Area

- 15.5.8 The Study Area for operational noise effects is 500 m from substations which was determined by professional judgement and extensive experience of assessment of similar infrastructure projects. Noise levels are expected to be below those likely to cause a risk of a significant effect at or beyond these distances.

Data Collection

- 15.5.9 A combination of publicly available data sources and site surveys has been used to determine the existing baseline environment within the Study Area. This provides a reference state against which any potential noise and vibration effects can be assessed.

Desk study

- 15.5.10 The baseline information has drawn on the following key data sources:
- Ordnance Survey (OS) AddressBase® Plus data, as presented in **Figure 15.1 Noise and Vibration Study Areas with Initial Construction Noise Assessment Outputs**;
 - Other potentially sensitive receptors (e.g. ecological or heritage) informed by relevant topic specialists;
 - Department for Environment, Food and Rural Affairs (Defra) Noise Action Planning Important Areas Round 3 2025 England - Noise Important Areas (NIAs)² (Ref 15.23) which are unchanged from the Noise Important Area associated with the Round 3 mapping (Ref 15.24), presented as polygons within **Figure 15.2 Noise and Vibration Baseline**; and
 - Department for Environment, Food and Rural Affairs (Defra) Strategic Noise Mapping Round 4 2022 (Ref 15.25), presented as noise contours within **Figure 15.2 Noise and Vibration Baseline**, represents the daytime ambient sound levels from road and rail sources;
 - Baseline sound survey results, presented in **Appendix 15A Baseline Sound Survey**.

Site visit and surveys

- 15.5.11 A baseline sound survey was conducted in the locality of each of the proposed substations (WMEL-A) in June 2026 as part of this DES. Sound level surveys have been conducted in accordance with the requirements of BS 4142 (Ref 15.6) and in general accordance with the methodology detailed in BS 7445 (Ref 15.11). The methodology and measurement locations of the baseline sound survey are presented in **Appendix 15A Baseline Sound Survey**.

Further data to be collected to inform the ES

- 15.5.12 In addition to the data sources used for this DES, the ES will be informed by baseline data in the locality of each of the proposed substations and any additional baseline

² Noise Important Areas are areas identified by DEFRA, based on strategic noise mapping, as being subject to the highest levels of road and, rail traffic noise exposure, and are designated to inform the prioritisation of mitigation measures.

data if there are changes to the Study Area, for example, because of updated draft Order Limits or changes in construction vehicle movements.

Impact Assessment Methodology

- 15.5.13 This preliminary noise and vibration assessment determines the potential effects resulting from the construction of the Project based upon a qualitative approach. A detailed quantitative construction noise and vibration assessment cannot be undertaken at this stage as the construction programme, phasing, methodology, plant requirements, working areas, working hours and construction traffic movements are still being developed and have not yet been confirmed. A full construction noise and vibration assessment will be undertaken in the ES once the relevant detailed construction information has been identified. Potential construction noise and vibration effects have been identified at the NSRs defined below, having regard to the Study Areas defined in the 'Study Area' section - paragraphs 15.5.3 to 15.5.8, and the potential screening provided by existing buildings and local features.
- 15.5.14 An initial assessment of the operational noise associated with the WMEL-A Substation has been undertaken and in this chapter. An operational noise assessment for the WMEL-B Substation has not been completed due to site access constraints, which meant baseline sound surveys could not be undertaken in the vicinity. A detailed operational noise assessment for both the WMEL-A and WMEL-B substations will be undertaken and reported in the ES once the required baseline sound surveys have been completed.
- 15.5.15 The following sections set out the methodology used for the operational assessment for the DES and the construction and operational assessment to be used for the ES. This is primarily based on guidance set out in BS 5228-1 (Ref 15.7), BS 5228-2 (Ref 15.8), BS 4142 (Ref 15.6), BS 7385-2 (Ref 15.10), DMRB LA 111 (Ref 15.17), BS 8233 (Ref 15.12), Building Bulletin 93 (BB93) (Ref 15.14), and Health Technical Memorandum 08-01 (HTM08-01) (Ref 15.16).

Sensitive receptors

- 15.5.16 The following are considered NSRs and are therefore included in this assessment:
- residential receptors (including buildings used for residential purposes e.g. care homes);
 - education facilities;
 - medical facilities;
 - community facilities;
 - places of worship;
 - landscapes/parks and gardens prized for their tranquillity;
 - hotels; and
 - offices.
- 15.5.17 Public Rights of Way (PRoWs) are by their nature transitory in their use, with users not staying in any one location for any length of time. Levels of noise from the construction and operation of the Project will vary as users of PRoWs move closer to, and further from, the Project. Noise effects would generally be reduced by the control

measures defined in **Appendix 4A Draft Outline Code of Construction Practice (CoCP)** during construction and the design mitigation during operation. Significant noise effects are therefore considered unlikely on PRow users during either construction or operation.

- 15.5.18 Outdoor sports/recreation community facilities (e.g. football pitches, golf courses) are by their nature, used intermittently. Outdoor sport activities are unlikely to be significantly affected by noise at the levels associated with construction or operation of the Project, outside the draft Order Limits.
- 15.5.19 On the basis that users of PRow and outdoor sports/recreation community facilities are unlikely to be exposed to increased noise for prolonged periods, the adverse noise effects on users are not considered significant. Therefore, PRow and outdoor sports/recreation community facilities are not considered further within this assessment.

Impact assessment and significance criteria

- 15.5.20 This section describes the impact thresholds and significance criteria for the various noise and vibration impact pathways associated with the Project. Reference is made to the Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) when describing the thresholds of impact for various sources. LOAELs and SOAELs are defined in the Noise Policy Statement for England (NPSE) (see **Appendix 2B National and Regional Policy**) and Noise Planning Practice Guidance (NPPG) (see **Appendix 2B National and Regional Policy**) and their definitions are below:
- The LOAEL is defined as ‘*the level of noise exposure above which adverse effects on health and quality of life can be detected*’.
 - The SOAEL is defined as ‘*the level of noise exposure above which significant adverse effects on health and quality of life occur*’.
- 15.5.21 At ES stage, a significant effect will be determined based on the predicted levels of noise and vibration at sensitive receptors in relation to the impact thresholds and the context of the impact (see further detail in the following sections for each impact pathway).

Construction noise methodology

- 15.5.22 The effect levels for construction noise at residential receptors have been defined in Government policy terms (see NPSE in **Appendix 2B National and Regional Policy**) as presented in **Table 15.2**.

Table 15.2 Construction noise LOAEL and SOAEL

Time Period	LOAEL	SOAEL
Day (07:00-19:00 weekday and 07:00-13:00 Saturdays)	65 dB L _{Aeq,T}	75 dB L _{Aeq,T}
Night (23:00-07:00)	45 dB L _{Aeq,T}	55 dB L _{Aeq,T}
Evening and weekends (19:00-23:00 weekdays, 13:00-23:00 Saturdays and 07:00-23:00 Sundays)	55 dB L _{Aeq,T}	65 dB L _{Aeq,T}

- 15.5.23 At the ES stage, where the construction noise level is predicted to be greater than the LOAEL, the construction noise impacts at residential receptors shall be assessed in accordance with BS 5228-1 (Ref 15.7). Annex E of BS 5228-1 describes the ‘ABC’ method for determining potential significant construction noise effects. This method involves defining a threshold of potential significant effect (Categories A, B and C are defined in **Table 15.3**) for each dwelling, or group of dwellings, based on the pre-existing ambient noise levels. For each time period, the ambient noise level is determined and rounded to the nearest 5 dB, then compared with the Category A values in **Table 15.2**.

Table 15.3 BS 5228 Part 1 – ABC method for determining the threshold of potential significant construction effects at dwellings

Assessment Category and Threshold Value Period	Threshold Value, in Decibels dB $L_{Aeq,T}$ (Measured or Predicted 1 m in Front of Most Exposed Façade)		
	Category A ⁽¹⁾	Category B ⁽²⁾	Category C ⁽³⁾
Daytime (07:00 – 19:00)	65	70	75
Saturdays (07:00 – 13:00)			
Weekday evenings (19:00 – 23:00)	55	60	65
Saturdays (13:00 – 23:00)			
Sundays (07:00 – 23:00)			
Night time (23:00 – 07:00)	45	50	55

⁽¹⁾ Category A: threshold value to use when ambient noise levels (rounded to the nearest 5 dB) are less than these values.

⁽²⁾ Category B: threshold value to use when ambient noise levels (rounded to the nearest 5 dB) are the same as Category A values.

⁽³⁾ Category C: threshold value to use when ambient noise levels (rounded to the nearest 5 dB) are higher than Category A values.

- 15.5.24 A potential significant effect is indicated where the construction site noise level ($L_{Aeq,T}$) exceeds the threshold level for the category appropriate to the ambient noise level. If the ambient sound level exceeds the Category C threshold values given in **Table 15.3**, i.e. the ambient sound level is higher than the Category C values, then a potential significant effect is identified if the total $L_{Aeq,T}$ level for the period increases by more than 3 dB due to site noise.
- 15.5.25 Having established whether there is a potential significant effect using the ‘ABC’ method, the final assessment of significance is made by considering the following:
- exceedance over the established thresholds of potential significant effect;
 - the levels of noise exposure and character of existing sound environment;
 - combined exposure to construction noise and vibration;
 - effectiveness of mitigation measures that may be provided;
 - the duration of the construction impact; and
 - professional judgement.

- 15.5.26 In terms of duration, a significant effect has been considered for the Project where the identified threshold levels are anticipated to be exceeded for the following minimum periods, derived from Annex E of BS 5228-1 (Ref 15.7):
- 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.
- 15.5.27 The contextual and duration factors have been considered proportionately to the information available in this DES. Further consideration of these factors will be included in the ES assessment.
- 15.5.28 Best practicable means (BPM³) will be applied at all times to minimise construction noise levels. If, despite the adoption of the Project-wide BPM measures described in **Appendix 4A Draft Outline CoCP**, potential significant adverse effects are identified, then further site-specific noise mitigation measures shall be identified and secured, to reduce or avoid potential significant adverse effects.

Construction traffic noise methodology

- 15.5.29 At this stage the baseline traffic modelling has not been completed, therefore a qualitative assessment has been undertaken to identify where there could be potential noise impacts based on construction traffic routes and traffic flows. This has included consideration of the baseline noise levels obtained from the Defra strategic noise mapping (Ref 15.25) and the criteria for assessing impacts in DMRB LA 111 (Ref 15.17). A full assessment will be undertaken in the ES when baseline traffic flows are available.
- 15.5.30 For the ES the following approach shall be undertaken to determine impacts associated with construction traffic. The approach defined in DMRB LA 111 requires a comparison between the BNL, which is the noise level at 10 m from the nearside carriageway, for the with and without construction traffic scenarios. The difference in noise level is used to determine the magnitude of the impact in accordance with the DMRB criteria as set out in **Table 15.4**.

Table 15.4 Magnitude of impact from construction traffic noise at residential receptors

Magnitude	Increase in BNL of Closest Public Road used for Construction Traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0

³ Best Practicable means is defined in Section 72 of the Control of Pollution Act 1974 as:

In that expression “practicable” means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications. The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures. The test of best practicable means is to apply only so far as compatible with any duty imposed by law, and in particular is to apply to statutory undertakers only so far as compatible with the duties imposed on them in their capacity of statutory undertakers.

(5) The said test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.

(6) Subject to the preceding provisions of this section, regard shall be had, in construing references to “best practicable means”, to any relevant provision of a code of practice approved under the preceding section.

Magnitude	Increase in BNL of Closest Public Road used for Construction Traffic (dB)
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

15.5.31 Receptors within 50 m of roads experiencing major or moderate magnitude of impact for the following minimum durations are determined to experience a significant effect:

- 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.

15.5.32 For this preliminary assessment, road links have been identified where there is the potential for moderate or greater impacts and there are NSRs within 50 m of the road link.

Construction vibration methodology

15.5.33 BPM will be demonstrated at all times to minimise construction vibration levels. If potential significant adverse effects are identified despite the adoption of the Project-wide BPM measures described in **Appendix 4A Draft Outline CoCP**, then further site-specific vibration mitigation measures shall be identified and secured to reduce or avoid potential significant adverse effects.

Construction vibration on human receptors

15.5.34 Since the vibration impact depends on the absolute vibration level instead of comparing against baseline vibration level, no vibration baseline study has been undertaken within the assessment. The assessment therefore considers potential construction vibration effects assuming no significant existing vibration sources.

15.5.35 The relevant construction vibration threshold levels, including applicable LOAEL and SOAEL, are presented in **Table 15.5**.

Table 15.5 Construction vibration effect levels at residential receptors

Vibration Level mm/s PPV(*)	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments (LOAEL).
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents (SOAEL).
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.
(*) Peak Particle Velocity	

- 15.5.36 At the ES stage, a likely significant effect is assessed using professional judgement by considering not only the criteria above but also other factors, such as the duration of exposure and the particular characteristics⁴ of the source and the receptor use.

Construction vibration on buildings and structures

- 15.5.37 The criteria for risk of damage to buildings from ground-borne vibration are derived from BS 7385-2 (Ref 15.10) and shown in **Table 15.6**. These criteria ensure there is no risk of the lowest damage category (cosmetic⁵) being exceeded. However, minimising disturbance to people will generally control damage risk since the impacts in terms of even cosmetic damage to buildings would occur only for vibration exposures much higher than perceptible levels.
- 15.5.38 The relevant construction vibration threshold levels for construction vibration on buildings are presented in **Table 15.6**.

Table 15.6 Vibration impact criteria for buildings (conservative criteria below which there is no risk of cosmetic damage)

Category of Building	Peak Particle Velocity ⁽¹⁾ (mm/s)	
	Transient Vibration ⁽²⁾	Continuous Vibration ⁽³⁾
Potentially vulnerable building	6	3
Structurally sound buildings	12	6

Notes:

(1) At the building foundation.

(2) Transient relative to building response, e.g. from impulsive plant.

(3) Continuous relative to building response, e.g. from vibration rollers.

- 15.5.39 Other structures and facilities which are particularly sensitive to vibration (e.g. vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment and operations, universities with vibration-sensitive research, equipment and operations) shall be considered on a case-by-case basis. At this stage, none have been identified.

Operational noise from proposed new substations methodology

- 15.5.40 The assessment of operational noise has followed the methodology stated in BS 4142 (Ref 15.6).

⁴ The characteristics of vibration, e.g. whether it is continuous, intermittent or impulsive, can influence its acceptability.

⁵ Cosmetic damage is defined in ISO 4866: 2010 as:

The formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick/concrete block construction.

- 15.5.41 Noise limits have been determined based on background sound level surveys at locations representative of nearby NSRs. Sound level surveys have been conducted in accordance with the requirements of BS 4142 and in general accordance with the methodology detailed in BS 7445 (Ref 15.11).
- 15.5.42 BS 4142 assesses the potential significance of effects by comparing the 'rating sound level' of an industrial source to the typically representative 'background sound level' at the location of nearby receptors. The sound rating is a combination of the specific sound level at the NSR and any applicable penalties that may be required for acoustic character, such as tonality or impulsivity.
- 15.5.43 The specific sound level at nearby NSRs has been predicted by incorporating the available design information in a computer noise model, based on the methodology detailed in ISO 9613 (Ref 15.19).
- 15.5.44 The predicted sound rating levels have been compared against the relevant noise limits determined from the baseline sound level survey data. The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact, depending on context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context. The guidance from BS 4142 (Ref 15.6) for operational noise is detailed in **Table 15.7**.
- 15.5.45 The final assessment of significance is made by considering the following additional context:
- Exceedance over the established thresholds of potential significant effect.
 - The absolute level of sound. E.g., for a given difference in rating level relative to the background sound level, the magnitude of overall impact might be greater for an acoustic environment where the existing ambient sound level is high compared with one where the existing ambient noise level is low.
 - Whether the background sound level is low, e.g. absolute levels might be as, or more relevant than the margin by which the rating level exceeds the background. BS 4142 references BS 8233 (Ref 15.12) as providing context where background and rating noise levels are low.
 - Whether the existing ambient sound level is already very high, e.g. already resulting in adverse impacts (unrelated to the Project) that could be made worse by industrial plant noise.
 - The character of the existing sound environment and the industrial plant noise in this context, e.g. if existing sound sources are dominant or a significantly higher level than that from the industrial plant.
 - Whether the industrial plant noise is masked by the existing ambient environment, e.g. regular events of a significantly higher level than that from the industrial plant noise.
 - The time period the industrial plant is operating at and the sensitivity of the receptor during these time periods, e.g. daytime, night-time, weekday, weekend.
 - The industrial plant noise level inside (in addition to outside) the dwelling and whether the dwelling will already incorporate acoustic design measures, e.g. façade insulation, ventilation reducing the need to have windows open, acoustic screening.
 - Professional judgement.

- 15.5.46 BS 8233 (Ref 15.12) provides recommended noise levels for a variety of situations and locations, including in habitable spaces such as living rooms and bedrooms, and external amenity areas. Guidance may also be sought from BS 4142 guidance (Ref 15.6).
- 15.5.47 It is anticipated that specific mitigation measures for operational noise from substations, if required, would be secured via an appropriate Requirement of the Development Consent Order, if granted. For example, the assessment may include noise limits such that adverse impacts are avoided.
- 15.5.48 In UK Government policy terms, depending on the absolute sound levels under consideration, the SOAEL is defined for this assessment as a rating level of 10 dB above the representative background sound level. The LOAEL is defined as 5 dB above the representative background sound level.

Table 15.7 Magnitude of impact from operational substation noise at residential receptors along with LOAEL and SOAEL thresholds

Comparison of Sound Rating Level and Background Sound Level	BS 4142 Impact Guidance
Rating level $\geq$ 10 dB above the background sound level SOAEL	Likely to be an indication of a significant adverse impact, depending on context.
Rating level of 5 dB above the background sound level LOAEL	Likely to be an indication of an adverse impact, depending on context.
Rating level below background sound level	Likely to be an indication of a low impact, depending on context. The lower the rating level is, relative to the measured background sound level, the less likely it is to be an adverse or significant adverse impact.

Non-residential receptors (construction and operational noise)

- 15.5.49 Impacts of noise from construction or operation at non-residential receptors have been compared with the screening criteria set out in **Table 15.8**.

Table 15.8 Noise impact screening criteria at non-residential receptors (construction and operation)

Description	Impact (Screening) Criteria		Outcome	Reference
	Day (07:00-23:00)	Night (23:00-07:00)		
Places of worship, places for performance, museums and outdoor space receptors	50 dB $L_{pAeq,T}$ and a change >3 dB	-	Disturbance	BS 8233 (Ref 15.4) BB93 (Ref 15.13), HTM08-01

Description	Impact (Screening) Criteria		Outcome	Reference
	Day (07:00-23:00)	Night (23:00-07:00)		
Education facilities, medical facilities, hotels and community facilities	50 dB $L_{pAeq,T}$ and a change >3 dB	45 dB $L_{pAeq,T}$ ⁽²⁾ and a change >3 dB	Disturbance and sleep disturbance ⁽²⁾	(Ref 15.14), WHO guidelines (Ref 15.15, Ref 15.16, Ref 15.17)
Offices	ABC ⁽¹⁾ or 55 dB $L_{pAeq,T}$ and a change >3 dB	-	Disturbance	BS 8233 (Ref 15.4)

Notes:

⁽¹⁾ For construction, assess using A and B categories from ABC Method

⁽²⁾ The night-time criteria of 45 dB $L_{pAeq,T}$ for sleep disturbance applies to student residential accommodation, hospitals and hotels.

15.5.50 Where the predicted noise levels exceed the criteria, an assessment of the potential for significant effects has been undertaken for each impacted receptor, taking into account other factors such as:

- use and sensitivity of the receptor or land use;
- design of the receptor or land use;
- existing sound environment at and within the receptor, or land use;
- magnitude of the predicted impact (noise change);
- potential combined impacts of noise and vibration;
- frequency and duration over which temporary impacts may occur; and
- effectiveness of mitigation through design or other means.

15.5.51 These additional contextual factors have been considered proportionately to the information available in this DES. Further consideration of these factors will be included in the ES assessment.

Data sources

15.5.52 In addition to the baseline data sources listed in paragraph 15.5.10, the following data sources have been used to inform this assessment for the DES as described in **Chapter 4 Description of the Project**:

- Project design information;
- locations of construction activities; and
- proposed plant information for the proposed substation plant (operational noise and specification data).

Assessment Assumptions and Limitations

- 15.5.53 The assessment has been undertaken based on preliminary Project design information. This information is iterative and will be updated for the ES as the design evolves and relevant changes are accounted for in the assessment.
- 15.5.54 All conclusions and assessments are by their nature preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario has been assessed.
- 15.5.55 BPM will be applied at all times to minimise construction noise and vibration levels.
- 15.5.56 Where potential significant adverse effects remain despite the Project-wide BPM measures (as described in **Appendix 4A: Draft Outline CoCP**), additional site-specific mitigation shall be implemented to reduce or avoid those effects.
- 15.5.57 Although the majority of works would be expected to occur during normal daytime hours, there may be activities that require night-time working. It is assumed this may include trenchless crossings, as once the works have started, it may not be feasible to stop such works until completed. As such, it is assumed that there is potential for night-time works at all trenchless crossing locations. Additionally, in practice, drilling would occur in one direction, with the plant (and therefore the main noise source) located on one side of the crossing only. However, it is assumed that drilling may occur in either direction as a worst-case.
- 15.5.58 The key parameters and assumptions will be reviewed based on the final design and where required, updated or refined. The ES will present the final key parameters and assumptions used within that assessment.

15.6 Baseline Conditions

Existing Baseline

- 15.6.1 The Project has been divided into five Sections as described in **Chapter 4 Description of the Project** and shown in **Figure 1.2 Draft Order Limits**. The Sections are defined by the geographical alignment of the draft Order Limits and the administrative boundaries of the local authorities.
- 15.6.2 The following section outlines the noise and vibration baseline. The baseline section should be read in conjunction with the following supporting figures and appendices:
- **Figure 15.1 Noise and Vibration Study Areas with Initial Construction Noise Assessment Outputs;**
 - **Figure 15.2 Noise and Vibration Baseline;** and
 - **Appendix 15A Baseline Sound Survey.**
- 15.6.3 The baseline conditions are presented with reference to the Section of the Project where they are located.

Route-wide baseline noise and vibration conditions

- 15.6.4 The draft Order Limits pass predominantly through rural areas, with the majority of NSRs being isolated dwellings or part of small settlements. **Figure 15.1 Noise**

and Vibration Study Areas with Initial Construction Noise Assessment Outputs shows NSR locations, including residential and noise-sensitive non-residential receptors.

- 15.6.5 Defra Noise Action Planning Noise Important Areas (NIAs) Round 3 2019 (Ref 15.23) highlight the residential areas experiencing the highest 1% of noise levels from road and rail sources in England. These are shown in **Figure 15.2 Noise and Vibration Baseline** and are described in the baseline description in each Section of the route below. NIAs were determined via the previous round of the strategic noise maps (Defra Strategic Noise Mapping Round 3 2017 (Ref 15.23)). NIAs are not yet available for the Defra Strategic Noise Mapping Round 4 2022. NIAs are primarily relevant to transportation projects but are considered in this project for completeness, as the future baseline could change in these areas if the NIAs are mitigated.
- 15.6.6 The noise climate is expected to vary within the Study Area depending on the nature of the area. For example, close to noise sources such as roads and railways and in built up areas, ambient noise levels are expected to be higher. Further away from road and rail sources and in rural areas, ambient and background noise levels would be expected to be lower. Daytime noise level contours from existing road and railway sources (from the strategic noise maps) are presented in **Figure 15.2 Noise and Vibration Baseline**. The contours give a high-level indication of how existing noise levels vary within the Study Area. Areas outside the contours are generally considered to have low ambient and background sound levels. Areas where the road and rail contours overlap are considered to experience noise effects from both sources.
- 15.6.7 At this stage it is assumed that no existing appreciable level of vibration exists at any sensitive receptors within the Study Area.
- 15.6.8 The main sources of industrial noise across all of the Sections of the Project are likely to be due to agricultural activity such as the operation of farm machinery and vehicles.

Section 1: South Holland District Council

- 15.6.9 At the eastern end of this Section, the route passes between the communities of Pinchbeck and Surfleet, which are subject to marginally higher ambient sound levels compared to rest of this area. Across this Section, more substantial road traffic noise is anticipated from vehicles on the A16, and B1356, and rail traffic on the Peterborough to Lincoln railway line. There are no NIAs in this part of the Study Area. The remainder of this Section is primarily rural in character, with typical sounds including birdsong, farming activities and road traffic from local roads.

Section 2: South Kesteven District Council

- 15.6.10 Across this Section the route passes relatively close to the residential communities at Haconby, Corby Glen, Swayfield, and South Witham, although the route is predominantly rural in character, with typical sounds including birdsong, farming activities and road traffic from local roads. However, across this Section, more substantial road traffic noise is anticipated from vehicles on the A1, A15, A151, B1176, and B1177 and rail traffic on the East Coast Main Line railway line. Noise levels of >55 dBL_{Aeq} are predicted at up to 500 m from the A1 road. There is one NIA in this part of the Study Area (NIA 7888, on the A1 road, at the junction with Woolley's Lane).

- 15.6.11 Baseline sound surveys have been undertaken the vicinity of WMEL-A Substation. Site observations confirm that the existing acoustic environment is influenced by a combination of road traffic, rail traffic and agricultural activities. Natural sounds such as bird song also contribute to the ambient sound environment at noise-sensitive receptors.

Section 3: Melton Borough Council

- 15.6.12 Across this Section the route passes relatively close to the larger residential community at Melton Mowbray, and smaller residential communities at Twyford, Kirby Bellars, Ashby Folville, Asfordby, Saxelby, Waltham on the Wolds and Thorpe Arnold. The route is predominantly rural in character, with typical sounds including birdsong, farming activities and road traffic from local roads. However, across this Section, more substantial road traffic noise is anticipated from vehicles on the A607, A606, A6006, A1, B676, B674, B6047, and local roads, and rail traffic on the Melton Mowbray to Nottingham railway line and the Melton Mowbray to Leicester railway line. There is one NIA in this part of the Study Area (NIA 11677, on the A607 road close to the junction with Gaddesby Lane).

Section 4: Harborough District Council

- 15.6.13 Across this Section the route passes relatively close to the larger residential community at Market Harborough, and the small residential communities at Tilton on the Hill, Skeffington, and Stonton Wyville. The route is predominantly rural in character, with typical sounds including birdsong, farming activities and road traffic from local roads. However, across this Section, more substantial road traffic noise is anticipated from vehicles on the A47, A6, A4304, A508, B6047 and local roads, and rail traffic on the Leicester to Melton Mowbray to Kettering railway line. Noise levels of >55 dBL_{Aeq} are predicted at up to 500 m from the A43 road, and 200 m from the A6 road. There are several NIAs in this part of the Study Area, including NIA 11689, NIA 11691 and NIA 11692 on the A47 road.

Section 5: Northamptonshire (including both North Northamptonshire Council and West Northamptonshire Council)

- 15.6.14 Across this Section the route passes relatively close to the larger residential community at Broughton, and Wellingborough, and smaller residential communities at Braybrook, Thorpe Underwood, Mawsley Village and Earls Barton. The majority of the route remains mainly rural in character with typical sounds including birdsong, farming activities and road traffic from local roads. However, across this section, more substantial road traffic noise is anticipated from vehicles on the A427, A6, A14, A43, A508, A509, A4500, A45 and B664, B574, B573 and local roads, and rail traffic on the Market Harborough to Kettering railway line. Noise levels of >55 dBL_{Aeq} are predicted at up to 400 m from the A43 road. There is one NIA in this part of the Study Area (NIA 11716 on the A509 road).

Future Baseline

- 15.6.15 The future baseline relates to known or anticipated changes to the current baseline, in the future, in the absence of the Project. Relevant factors in defining the future baseline and considered in this DES are described here or will be considered in the ES.

- 15.6.16 The introduction of new infrastructure, development consented under permitted development, or changes to existing road or rail sources as a result of mitigating noise associated with NIAs have been considered in the context of any changes to the future baseline noise levels.
- 15.6.17 Other developments identified as having potential to affect the future baseline include Bente Klein Solar Farm, Davidson House Meridian, Millington Estates Ltd and Grimsby to Walpole. With the exception of the Grimsby to Walpole scheme, these are likely to be completed before commencement of construction of the Project. Developments which would be delivered during the same period as the Project have been considered in the cumulative effects, rather than the future baseline, as described in **Chapter 19 Cumulative Effects**.
- 15.6.18 Committed developments that would introduce NSRs within the Study Areas have been considered in the assessment.

15.7 Design, Standard, and Additional Mitigation Measures

- 15.7.1 Mitigation measures to avoid, reduce, manage, or control potential impacts and resulting effects of the Project are typically described and considered in assessment in three groups or types as defined in **Chapter 5 EIA Approach and Methodology**. Each measure considered in this preliminary assessment is described in the relevant section below.

Design Measures

- 15.7.2 The Project and draft Order Limits have been designed to avoid sensitive receptors as far as practicable. This is in accordance with the 'Holford Rules' (Ref 15.2) applicable to routeing of new overhead lines and the 'Horlock Rules' (Ref 15.5) which apply to the design and siting of substations. Refer to Section 2.6 of **Chapter 2 Regulatory and Planning Policy Context** for more details of the Holford and Horlock Rules.
- 15.7.3 National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation of the Project. For noise and vibration these include the following:
- The route alignment and siting have been designed as far as practicable to avoid sensitive noise and vibration features as set out in the **Corridor and Preliminary Routeing and Siting Study** (Ref 15.1). This included avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of nearby NSRs being isolated dwellings and small settlements.
 - The Project will include 'Triple Araucaria' conductor bundles. Noise from high voltage overhead lines is primarily due to a phenomenon called corona discharge. Overhead line noise is generated when the conductor surface voltage gradient (electric stress, or Emax expressed in kilovolts per centimetre (kV/cm)) exceeds the inception level for corona discharge activity which is released as acoustic energy and radiates into the air as sound. For the conditions experienced in the UK, the corona inception level is regarded as occurring when electric stress is in the range 17 to 20 kV/cm. Whilst most high voltage overhead lines are designed to operate below this level, those that operate close to this may produce audible noise when enhancement of conductor surface electric stress occurs due to rainfall (wet noise) or the presence of conductor surface contamination (dry

noise). Overhead lines that operate significantly below the corona inception level are much less likely to produce audible noise. 'Triple Araucaria' is regarded as practically quiet during both dry and wet weather conditions as it typically operates with an electrical stress below the inception level for corona discharge. Operational noise from the proposed overhead line would therefore not lead to significant adverse effects at nearby NSRs, even if directly underneath the line, and this matter is scoped out as agreed through the **Appendix 5B Scoping Opinion**.

- In addition, tower fittings, such as insulators, dampers, spacers and clamps, are designed and procured in accordance with a series of National Grid Technical Specifications and must be type registered (rigorously tested) to ensure the fitting conforms to National Grid standards. These design, testing and procurement processes reduce the potential for audible noise and tones to occur from all types of fittings, including insulators. Where noise does occur, it is likely to be localised and of short duration. If this is due to a fault, action can be taken to rectify it. Where noise from fittings does occur which results in a complaint, appropriate action can be taken to seek to remedy the cause of the noise where practicable, usually through cleaning or replacing the relevant fitting.
- Substations – noise control measures: The proposed new substations would include any required noise mitigation measures by design. This may include plant selection, siting, screening, and enclosures, as appropriate through design and assessment.
- Substations – vibration control measures: Plant with moving parts, such as cooling equipment and transformers, would be mounted on suitable anti-vibration mounts. This is principally to protect the plant from potential external sources of vibration but also serves to attenuate vibration from the plant such that vibration levels would be well below defined the LOAEL values, even immediately adjacent to the plant.

Standard Measures

- 15.7.4 Standard measures are those that would be implemented on a project of this scale and nature regardless of being subject to statutory assessment. As such, it can be assumed these measures will be applied in the assessment.
- 15.7.5 A range of standard measures for the Project will be adopted throughout the duration of the construction phase. A Draft Outline Code of Construction Practice (CoCP) is provided in **Appendix 4A Draft Outline CoCP**. Measures relevant to the control and management of impacts that could affect noise and vibration are (refer to **Appendix 4A** for the full description of each measure):
- NV01 - on the use of BPM to minimise noise and vibration at neighbouring residential properties and other NSRs.
 - NV02 - on the construction working hours.
- 15.7.6 The mechanisms by which mitigation measures will be secured and delivered will be set out in the ES.

Additional Mitigation Measures

- 15.7.7 Additional mitigation measures are those identified through assessment to reduce likely significant adverse environmental effects which may still occur despite the inclusion of the embedded design and standard measures described above.
- 15.7.8 Additional mitigation measures are not anticipated to be required in relation to noise and vibration effects. However, this will remain under review during the completion of further assessment and development of the ES.

15.8 Preliminary Assessment of Effects

- 15.8.1 A summary of potential impacts and mitigation measures identified in this preliminary assessment, and likely significance of the resulting effects with that mitigation in place, is provided in **Table 15.9**. Where appropriate for likely significant or notable effects, further explanation is provided in the following sections on construction and operation effects.
- 15.8.2 Note that for the purposes of the noise and vibration assessment, the assessment of impacts takes into account the sensitivity of the receptor based on differing thresholds of effect included in the relevant standards and guidance. Other contextual factors are considered in determining the final likely significance of effect.

Construction

Construction noise

- 15.8.3 In the absence of a quantitative assessment, the Study Area and screening from existing buildings and features has been used to identify potential significant adverse construction noise effects. Across all five Sections, approximately 300 NSRs may be subject to adverse construction noise effects as a result of overhead line, towers, compounds activities, and construction vehicles using the haul roads. The initial construction noise assessment outputs are presented in **Figure 15.1 Noise and Vibration Study Areas with Initial Construction Noise Assessment Outputs**. These are broken down as follows:
- **Section 1: South Holland District:** residential receptors at towns, villages, and dispersed dwellings. Approximately 60 residential receptors are located within the Study Area, including the villages of West Pinchbeck and Surfleet.
 - **Section 2: South Kesteven District:** residential receptors at villages. Approximately 40 residential properties are located within the Study Area including the villages of Corby Glen, Stainfield, Haconby, and isolated properties.
 - **Section 3: Melton Borough:** residential receptors at dispersed dwellings and villages. Approximately 90 residential properties are located within the Study Area including the villages of Twyford, Kirby Bellars, Ashby Folville, Asfordby, Saxelby, Waltham on the Wolds, Thorpe Arnold, and isolated properties.
 - **Section 4: Harborough District:** residential receptors at dispersed dwellings and villages. Approximately 20 residential properties are located within the Study Area including Tilton on the Hill, Lowesby, and isolated properties.
 - **Section 5: Northamptonshire:** residential receptors at isolated dwellings and villages. Approximately 90 residential properties are located within the Study Area

including the villages of Mawsley, Loddington, Earls Barton and isolated properties.

- 15.8.4 It is anticipated that the number of affected NSRs will be materially lower in the ES when a quantitative assessment can be undertaken and appropriate mitigation defined, based upon more detailed construction information.
- 15.8.5 The majority of works would be expected to be conducted during daytime periods. However, there are certain activities that may be required to be conducted during night-time periods. For example, this may include trenchless crossings, as once the works have started, it may not be feasible to stop such works until completed. As such, it is assumed that there is potential for night-time works at all trenchless crossing locations. In practice, drilling would occur in one direction, with the plant (and therefore the main noise source) located on one side of the crossing only. However, it is assumed that drilling may occur in either direction as a worst case. On this basis, there are approximately 10 NSRs potentially significantly affected by trenchless crossing construction noise during night-time periods.
- 15.8.6 Further assessment of potential construction noise effects will be undertaken in the ES.

Construction vibration

- 15.8.7 At this stage, a qualitative assessment has been undertaken, using the Study Area to identify potential significant adverse construction vibration effects. Based upon the Study Area, the assessment has identified approximately 63 NSRs potentially significantly affected by the overhead line construction (if percussive piling is required) and due to the construction of temporary access routes (ground compaction). The potential adverse effects are located as follows:
- **Section 1: South Holland District:** approximately five residential receptors on Cuckoo Lane and White Cross Lane in Surfleet.
 - **Section 2: South Kesteven District:** one residential receptor located just south of the A151 in Corby Glen.
 - **Section 3: Melton Borough:** approximately 50 residential receptors in Asfordby.
 - **Section 4: Harborough District:** two residential receptors (The Old Station and Springfield Farm) located on Melton Road in Tilton on the Hill.
 - **Section 5: Northamptonshire:** approximately five isolated residential receptors located within the Study Area in Kettering.
- 15.8.8 It is unlikely that any exceedances of the construction vibration impact thresholds for buildings would occur. Furthermore, it is anticipated that the number of affected NSRs will be materially lower in the ES, when a quantitative assessment can be undertaken and appropriate mitigation defined, based upon more detailed construction information.

Construction traffic on the public highway

- 15.8.9 At this stage, a qualitative assessment has been undertaken, using the Study Area to identify potential significant adverse construction traffic noise effects. A full assessment of construction traffic noise will be undertaken in the ES. The following road links have NSRs within 50 m of construction traffic routes, where the addition of the construction traffic may potentially result in a moderate or major impact:

- **Section 1: South Holland District:** approximately 10 residential receptors are located within the Study Area on Beach Lane in Surfleet.
- **Section 2: South Kesteven District:** approximately 100 residential receptors are located within the Study Area. The majority of these receptors are situated along Bourne Road in Corby Glen, which provides the main access route to WMEL-A Substation.
- **Section 3: Melton Borough:** approximately 240 residential receptors are located within the Study Area. Of these:
 - Approximately 130 residential receptors are located on Wellfield Lane, Water Lane, Valley View, St Thomas Way, Robert Street, Paulson Close, Oak Way, Mill Lane, Main Street, Main Road, Hall Orchard Lane, and Great Lane in Melton Mowbray;
 - Approximately 40 residential properties are located on Main Street in Wartnaby; and
 - Approximately 70 residential receptors are located along roads between the draft Order Limits and the wider road network.
- **Section 4: Harborough District:** approximately 360 NSRs, including one non-residential receptor (All Saints Church in Lowesby), are located within the Study Area. Of these:
 - Approximately 70 residential receptors are located on Bluebell Lane, Bowden Road, Church Hill Road, Church Lane, Cranoe Road, Fernie Chase, Goadby Road, Thorpe Langton, Main Street, and Welham Road in Market Harborough;
 - Approximately 140 residential receptors are located on Wellfield Close, Uppingham Road, Manor Farm Close, Main Street, Hunters Avenue, Hallaton Road, and Chapel Lane in Tugby;
 - Approximately 100 residential receptors are located on Melton Road, Marefield Lane, Main Street, Lowesby Road, Leicester Road, Halstead Rise, and Digby Close in Tilton on The Hill; and
 - Approximately 50 residential receptors are located along roads between the draft Order Limits and the wider road network.
- **Section 5: Northamptonshire:** approximately 870 noise sensitive receptors, including five non-residential properties (Broughton Baptist Chapel in Kettering; St Peter & St Paul's Church in Harrington; St Mary's Church in Kettering; All Saints' Church in Market Harborough; and All Saints Church in Wellingborough), are located within the Study Area. Of these:
 - Approximately 470 residential receptors are located on the A509 Niort Way in Wellingborough.
 - Approximately 260 residential receptors are located on Pytchely Road, Norlinton Close, Kettering Road, High Street, Cransley Hill, Broughton Hill, Church Lane, Loddington Road, and Bridle Way in Kettering.
 - Approximately 60 residential receptors are located on Desborough Road, Newland Street, and Harborough Road in Market Harborough.
 - Approximately 80 residential receptors are located along roads between the draft Order Limits and the wider road network.

- 15.8.10 Based on the indicative Primary Access Route shown **Figure 13.2 Primary Access Route**, approximately 1,580 NSRs have been identified within the Study Area. These receptors comprise all identified residential and non-residential NSRs located within the Study Area along the proposed primary construction access routes. The assessment at this stage is based on preliminary design information and indicative routeing only.
- 15.8.11 A detailed construction traffic noise assessment will be undertaken as part of the ES once further Project design and construction information becomes available. This will include, but will not be limited to, confirmed construction traffic flows, vehicle types and numbers (including Heavy Goods Vehicles), routeing strategies, and construction programme details.
- 15.8.12 The purpose of the detailed assessment will be to quantify potential noise and vibration effects at identified NSRs, determine the significance of effects, and identify any necessary mitigation measures to reduce adverse impacts in line with BPM.
- 15.8.13 It is anticipated that the number of affected NSRs will be materially lower in the ES when a quantitative assessment can be undertaken and appropriate mitigation defined, based upon more detailed construction information.

Operation and Maintenance

- 15.8.14 Operational plant data and assessment for WMEL-A are provided in **Appendix 15B Operational Noise Assessment**. A summary of the assessment is presented in **Table 15.9**.
- 15.8.15 The assessment indicates that noise from the operation of the proposed WMEL-A Substation would lead to:
- approximately 20 NSRs in Burton Coggles and approximately 5 NSRS in Corby Glen experiencing noise impact 5 dB or more above background sound levels (above LOAEL and below SOAEL); and
 - 15 Birkholme (Corby Glen) experiencing noise impact less than 5 dB above background sound levels (below LOAEL).
- 15.8.16 Taking the contextual factors into account, noise from the operation of the proposed WMEL-A Substation is assessed as being potentially significant adverse at residential properties in Burton Coggles during the night time.
- 15.8.17 This assessment does not take account of ground absorption, topographical factors, acoustic screening, reflections from buildings or structures, meteorological conditions, or detailed source and receptor heights.
- 15.8.18 With the implementation of standard good practice and additional mitigation, it is anticipated that adverse significant effects would be minimised or removed. The details of these will be confirmed at the ES stage.

Table 15.9 Preliminary summary of noise and vibration effects

Receptor(s)	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change	Sensitivity/Value	Likely Significance of Effect
Construction					
300 NSRs potentially significantly affected by construction noise.	See section 15.7	Temporary adverse construction noise impacts between LOAEL and SOAEL thresholds	n/a	n/a	Potentially significant
63 NSRs potentially significantly affected by construction vibration	See section 15.7	Temporary vibration below LOAEL and SOAEL thresholds	n/a	n/a	Potentially significant
Approximately 1,580 NSRs potentially significantly affected by construction traffic	See section 15.7	Temporary adverse moderate/major construction traffic noise impacts	Moderate/Major	n/a	Potentially significant
Operation (WMEL-A)					
Approximately 20 NSRs in Burton Coggles and 5 NSRs in Corby Glen potentially significantly affected by operational noise	See section 15.8	Long-term operational adverse noise impacts between LOAEL and SOAEL due to the operation of WMEL-A Substation.	n/a	n/a	Potentially significant

Alternative Scenarios

- 15.8.19 As described in Section 4.4 of **Chapter 4 Description of the Project**, there are elements of the Project which have not been fixed at this stage. Therefore, flexibility needs to be considered in this DES. Two potential alternative scenarios are outlined in **Table 4.3** and are assessed in **Table 15.10** below.
- 15.8.20 This assessment considers each scenario, together with the assumptions and mitigation measures described in this chapter. It provides a qualitative appraisal of the potential changes to the preliminary conclusions reported in this section, should these scenarios occur.
- 15.8.21 **Table 15.10** presents the conclusions of this appraisal, supported by appropriate qualitative justification, to ensure that any potentially significant effects are identified in this DES. If these alternative scenarios remain under consideration in the application for development consent, they will be appropriately assessed in the ES.

Table 15.10 Preliminary assessment of alternative scenarios

Scenario	Potential Change in Impacts	Potential Change in Effects
1. No or reduced haul roads	This alternative scenario has the potential to alter the spatial distribution of construction traffic, resulting in increased traffic flows on existing highways along the corridor. Consequently, there is potential for a reduction in on-site construction noise levels due to a decrease in traffic movements associated with on-site haul roads.	At this stage, construction traffic data to inform the DES are not available; therefore, a detailed assessment of this alternative scenario has not been undertaken. The scenario has the potential to result in localised increases in construction traffic flows on sections of the existing highway network along the corridor. However, taking into account the temporary nature of construction traffic movements and the application of standard mitigation measures, it is not anticipated to give rise to new or materially different significant noise and vibration effects.
2. Off-site construction compound near Melton Mowbray	This alternative scenario has the potential to introduce a new temporary source of noise associated with the operation of the off-site compound, depending on its intended operation. No residential receptors are located within the 300 m Study Area of the proposed compound. However, one non-residential receptor, St Bartholomew's Church, is located within the Study Area and may be subject to potential impacts arising from the introduction of the compound. This represents a potential change in construction noise impacts at a single non-residential receptor.	At this stage, details regarding the proposed use of the off-site construction compound are not available; therefore, only a high-level consideration has been undertaken. This scenario has the potential to result in localised increases in construction traffic flows, as well as increases in construction noise associated with activities at the compound. However, taking into account the implementation of standard mitigation measures, it is not anticipated that this would give rise to new or materially different likely significant noise and vibration effects.

15.9 Monitoring

- 15.9.1 The following processes and monitoring would be undertaken in the management of noise and vibration:
- 1) Should development consent be granted, further detailed construction noise and vibration assessments will be conducted by the contractor prior to construction, based on their specific proposed construction methodologies.
 - 2) Based on the findings of the contractor's detailed construction noise and vibration assessments, specific BPM mitigation will be determined to avoid significant adverse effects and reduce and minimise adverse effects.
 - 3) Where appropriate, construction noise and/or vibration monitoring would be undertaken to demonstrate compliance with the relevant Project requirements, agreed thresholds and/or commitments set out in the CoCP or other relevant management plans.
- 15.9.2 If appropriate, through consultation with the local authority, the contractor may apply for prior approval under section 61 of the Control of Pollution Act 1974 for certain construction activities.
- 15.9.3 Further detailed operational substation noise assessments will be undertaken as the design progresses, with appropriate mitigation specified where required to avoid significant adverse effects and reduce and minimise adverse effects. Further baseline noise monitoring may be undertaken to confirm representative background sound levels, and post-construction operational noise monitoring may be undertaken, where appropriate, to verify compliance with the relevant noise limits, planning requirements and/or mitigation commitments.

15.10 Further Assessment

- 15.10.1 Further assessment of construction noise and vibration will be undertaken in the ES, when more detailed information is available about the construction programme, construction plant items, and their locations.
- 15.10.2 A full quantitative construction traffic noise assessment will be undertaken and reported in the ES once the baseline traffic modelling has been completed.
- 15.10.3 Further baseline sound survey will be undertaken at locations representative of NSRs in the vicinity of the WMEL-A and WMEL-B substations. The results of these surveys will be used to establish representative baseline and background sound levels to inform the operational substation noise assessment.
- 15.10.4 Further assessment of operational substation noise will be undertaken in the ES as the design progresses. Alternatively, further assessment will be conducted as standard practice by National Grid, including any mitigation measures. This may be secured as a Requirement in the DCO, if granted.

References

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