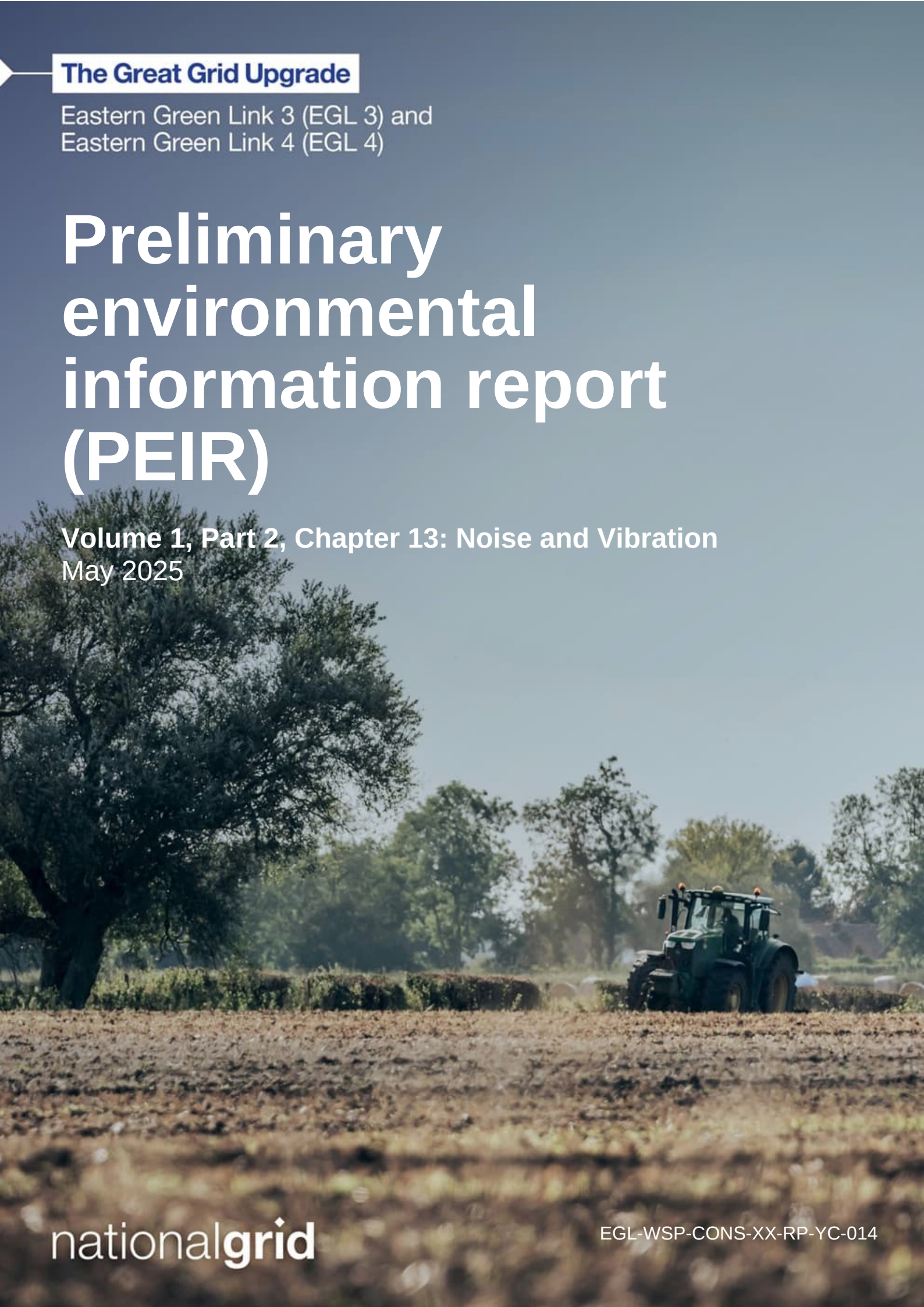
The Great Grid Upgrade

Eastern Green Link 3 (EGL 3) and
Eastern Green Link 4 (EGL 4)

Preliminary environmental information report (PEIR)

Volume 1, Part 2, Chapter 13: Noise and Vibration

May 2025



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EGL-WSP-CONS-XX-RP-YC-014

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13.1 Introduction

13.1.1 This chapter presents the preliminary findings of the Environmental Impact Assessment (EIA) undertaken to date for the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) English Onshore Scheme, with respect to Noise and Vibration. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the description of the Projects provided in **Volume 1, Part 1, Chapter 4: Description of the Projects.**

13.1.2 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, environmental measures, and the preliminary Noise and Vibration effects that could result from the English Onshore Scheme during the construction and operation (and maintenance) phases. Specifically, it relates to the English Onshore elements of EGL 3 and EGL 4 (the English Onshore Scheme) landward of Mean Low Water Springs (MLWS).

13.1.3 This chapter should be read in conjunction and considered alongside the following chapters found in Volume 1:

- **Volume 1, Part 2, Chapter 6: Biodiversity**: There is a potential for noise and vibration to adversely affect ecological receptors, resulting in a need for additional embedded environmental measures;
- **Volume 1, Part 2, Chapter 7: Cultural Heritage**: There is a potential for noise and vibration to adversely affect receptors with a heritage value, resulting in a need for additional embedded environmental measures;
- **Volume 1, Part 2, Chapter 8: Landscape and Visual Amenity**: There is a potential for noise and vibration to adversely affect amenity receptors, resulting in a need for additional embedded environmental measures;
- **Volume 1, Part, Chapter 12: Traffic and Transport**: There are potential impacts and effects of road traffic associated with the English Onshore Scheme to noise and vibration receptors;
- **Volume 1, Part 2, Chapter 15: Socioeconomics, Recreation and Tourism**: There is a potential for noise and vibration effects associated with the English Onshore Scheme to adversely affect some Socio-economic, Recreation and Tourism receptors
- **Volume 1, Part 2, Chapter 16: Health and Wellbeing**: There is a potential for noise and vibration to adversely affect health and quality of life, resulting in a need for additional embedded environmental measures; and
- **Volume 1, Part 4, Chapter 26: Cumulative Effects**: Consideration has been given to the potential for combined noise and vibration effects from other planned developments in the vicinity, where proximity and/or timing dictate.

13.1.4 This chapter is supported by the following figures:

- **Volume 3, Part 2, Figure 13-1: Construction Noise and Vibration Study Area;**
- **Volume 3, Part 2, Figure 13-2: Construction Traffic Noise Study Area;** and
- **Volume 3, Part 2, Figure 13-3: Operational Noise Study Area**.

13.1.5 This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.2.B: Regulatory and Planning Context;**
- **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**;
- **Volume 2, Part 1, Appendix 1.5.B: Outline Code of Construction Practice (CoCP);** and
- **Volume 2, Part 2, Appendix 2.13.A: Construction Plant Assumptions**

Limitations

13.1.6 The information provided in this Preliminary Environmental Information Report (PEIR) is preliminary; the final assessment of potential significant effects will be reported in the Environmental Statement (ES). The PEIR has been produced to fulfil National Grid Energy Transmission plc (NGET)'s consultation duties in accordance with Section 42 of the PA2008 and enable consultees to develop an informed view of the preliminary potential significant effects of the English Onshore Scheme.

13.1.7 The following limitations have been identified that will form the basis of the PEIR. The key parameters and assumptions related to the noise and vibration assessment are set out in **Section 13.8**:

- At the time of drafting, the design evolution of the Walpole converter stations and Walpole B Substation is not sufficiently advanced to allow for the full detailed modelling and assessment of the static plant aspects of the English Onshore Scheme to form part of the PEIR. However, this will form part of the Environmental Statement (ES) for the English Onshore Scheme, referencing the appropriate design specifics supplied by NGET.
- The construction noise that is assessed within the scope of this PEIR is based on the evolution of the construction information at the time of drafting. The construction requirements will continue to develop until the Development Consent Order (DCO) submission, and the ES will take account of and accord with this emerging information; specifically, this relates to the construction methods and programme. Additionally, this is the case with vehicle movements along the English Onshore Scheme constructed haul roads, which are yet to be fully defined. Furthermore, at this stage there is insufficient information regarding the layout and equipment proposed for River Nene Temporary Quay option (as described in **Volume 1, Part 1, Chapter 4: Description of the Projects**). If this option remains part of the English Onshore Scheme design the findings of the assessment of construction noise will be provided in the ES.
- Baseline noise surveys are necessary to determine baseline noise levels at sensitive receptors near the Walpole converter stations and the Walpole B Substation fixed plant installations. Monitoring methods will be adapted based on external factors such as land access and equipment safety and would be subject to consultation with the relevant local planning authority during the Projects advancement. The baseline noise levels will be reported and considered within the scope of the ES.

Preliminary significance conclusions

13.1.8 For ease of reference, a summary of the potential significant effects from the preliminary Noise and Vibration assessment is provided in **Table 13-1**. All other effects in relation to Noise and Vibration have been concluded as not significant. Further details of the methodology behind the assessment and a detailed narrative of the assessment itself are provided within the sections below.

Table 13-1 – Preliminary summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor	Magnitude of change[1]	Significance[2]	Summary rationale
Construction				
Construction noise, including construction traffic noise	Not defined under Acoustic Scope, all sensitive receptors hold the same value.	With the implementation of Best Practicable Means (BPM) secured through mechanisms in the DCO including the Outline Code of Construction Practice (CoCP) (**Volume 2, Part 1, Appendix 1.5.B: Outline Code of Construction Practice (CoCP)** submitted in support of the DCO application, no significant construction noise effects are anticipated. Full details of the assessments are provided in **Section 13.10.**		
Construction vibration	Not defined under Acoustic Scope, all sensitive receptors hold the same value.	With the implementation of BPM secured through mechanisms in the DCO including the Outline CoCP (**Volume 2, Part 1, Appendix 1.5.B: Outline Code of Construction Practice (CoCP)** submitted in support of the DCO application, no significant construction vibration effects are anticipated. Full details of the assessments are provided in **Section 13.10**.		
Operation				
Noise associated with the static plant facilities, including the Walpole converter stations and the Walpole B Substation.	Not defined under Acoustic Scope, all sensitive receptors hold the same value.	At this design stage, limited information is available, and significant aspects of the Walpole converter stations design are still to be concluded, meaning that a detailed assessment of operational noise impacts as part of the PEIR is not possible. As the design and information relating to these features of the English Onshore Scheme evolves, the assessment of noise will be concluded and subsequently reported in the ES.		

1. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 13.9** and is defined as [negligible, minor, moderate and major.
2. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 13.9**.

13.2 Relevant technical guidance

13.2.1 The legislation and planning policy that informed the assessment of effects with respect to Noise and Vibration is provided within **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context**. Further information on policies relevant to the English Onshore Scheme is provided in **Volume 1, Part 1, Chapter 2: Regulatory and Policy Overview.** Relevant technical guidance, specific to Noise and Vibration, that has informed this PEIR and will inform the assessment within the ES is summarised below.

Technical guidance

13.2.2 A summary of the technical guidance for Noise and Vibration is given in **Table 13-2.**

Table 13-2 – Technical guidance relevant to the Noise and Vibration assessment

Technical guidance document	Context
British Standard (BS) 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound (herein referred to as BS 4142) (Ref 13.1)	The standard is used to rate and assess sound of an industrial nature, including, but not limited to, assessing sound from proposed, new, modified or additional sources of industrial sound, and sound at proposed new dwellings. The guidance contains direction on monitoring and assessment of industrial and commercial sound sources (including fixed installations comprising mechanical and electrical plant and equipment) and how these can affect sensitive receptors.
BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise' (herein referred to as BS 5228-1) (Ref 13.2)	Provides guidance on the prediction and assessment of noise from construction sites, along with ways to control noise. The guidance further presents suggestions for the derivation of threshold values for impact assessment.
BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Vibration' (herein referred to as BS 5228-2) (Ref 13.3)	Provides guidance on the prediction and assessment of vibration from construction sites, along with ways to control vibration. The guidance further presents suggestions for the derivation of guideline values for impact assessment.
BS 7385-2:1993, Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration' (herein referred to as BS 7385-2) (Ref 13.4)	Guidance on the levels of ground-borne vibration which could have the potential to lead to damage to building structures.
Calculation of Road Traffic Noise (CRTN) 1988 (Ref 13.5)	Describes the UK methodology for the calculation of road traffic noise and the propagation of such into the environment.
Design Manual for Roads and Bridges (DMRB) LA 111:	Guidance document which provides a methodology for the assessment of noise from road traffic, particularly from new and altered roads. Also provides modifications to CRTN and a

Technical guidance document	Context
Noise and Vibration (National Highways, 2020) (Ref 13.6)	methodology for the assessment of noise and vibration from construction traffic.
Institute of Environmental Management and Assessment (IEMA), Guidelines for Environmental Noise Impact Assessment (Ref 13.7)	Presents guidelines on how the assessment of noise effects should be presented within the Environmental Impact Assessment (EIA) process. The IEMA guidelines cover aspects such as: scoping, baseline, prediction and example definitions of significance criteria.
ISO 9613-2:2024 Acoustics Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors (Ref 13.8)	Defines a method for calculating the attenuation of sound during propagation outdoors in order to predict noise at distances from a source, accounting for pertinent factors.
National Planning Practice Guidance (Ref 13.9)	Guidance relating to the processes and tools that can be used through the planning system in England. It includes guidance relating to how planning can manage potential noise effects of new development.

13.3 Consultation and engagement

Overview

13.3.1 The assessment of noise and vibration will be informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 5.9** of **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**.

Scoping Opinion

13.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 5th September 2024. A summary of the relevant responses received in the Scoping Opinion in relation to Noise and Vibration and confirmation of how these have been addressed within the assessment to date is presented in **Table 13-3.**

13.3.3 Since issue of the Scoping Opinion changes to the Projects design has resulted in Fenland District Council and Cambridgeshire County Council falling within the draft Order Limits. Whilst the preliminary assessment has taken account of the relevant baseline information for these local planning authorities the scope of the assessment remains unchanged.

13.3.4 The information provided in the PEIR is preliminary, and not all of the Scoping Opinion comments have been addressed or fully considered at this stage, however, all comments will be addressed within the ES.

Table 13-3 – Summary of EIA Scoping Opinion responses for Noise and Vibration

Consultee	Consideration	How this is addressed in the PEIR
Planning Inspectorate	Matter to scope out: Vibration from construction activities other than piling and ground stabilisation – construction. The Scoping Report identifies that it is unlikely that sensitive receptors would be disturbed by vibration from general construction at distances of 20 m or more. Information on the plant to be used has not been provided, nor have details of construction methods been provided as a result. Based on the information provided, the Planning Inspectorate does not agree to scope this matter out. The ES should include an assessment of these matters, or the information referred to demonstrating agreement with the relevant consultation bodies and the absence of a likely potential significant effect.	Where construction information and methodologies are available, prediction and assessment of construction vibration effects have been undertaken as part of the PEIR and would be refined through the EIA process. As the information supporting the English Onshore Scheme is still evolving, where this assessment is not contained within the PEIR, it will be contained within the ES.
Planning Inspectorate	Matter to scope out: Vibration from traffic - construction The Scoping Report proposes to scope out an assessment of vibration from construction traffic on the basis that potential significant effects are not expected. The Planning Inspectorate agrees that vibration from traffic during construction is unlikely to result in potential significant effects and is content that this matter can be scoped out of the ES.	Noted, and as such assessment will not form part of this PEIR or the future ES.
Planning Inspectorate	Matter to scope out: Noise from underground cables - operation The Scoping Report proposes to scope out an assessment of noise from underground cables during operation. The Planning Inspectorate agrees that noise from the operation of the underground cable is unlikely to result in potential significant effects and is content that this matter can be scoped out.	Noted, and as such assessment will not form part of this PEIR or the future ES.
Planning Inspectorate	Matter to scope out: Vibration from static plant operation	Noted, and as such assessment will not form

Consultee	Consideration	How this is addressed in the PEIR
	The Scoping Report proposes to scope out an assessment of vibration from static plant (converter stations, direct current switching stations and substations) during operation on the basis that static plant would be mounted on suitable anti-vibration mounts to eliminate vibration. The Planning Inspectorate agrees that vibration from static plant during operation is unlikely to result in potential significant effects and is content that this matter can be scoped out of the ES.	part of this PEIR or the future ES.
Planning Inspectorate	Matter to scope out: Noise and vibration associated with maintenance of underground cables and substations - operation The Scoping Report proposes to scope this matter out on the basis that maintenance activities will likely be infrequent, localised, and short-term term and so potential significant effects are not expected. The Planning Inspectorate agrees that noise and vibration associated with maintenance of underground cables and substations during operation are unlikely to result in potential significant effects and is content that this matter can be scoped out.	Noted, and as such assessment will not form part of this PEIR or the future ES.
Planning Inspectorate	Matter to scope out: study area The Scoping Report states that the construction noise study area would comprise the closest noise-sensitive receptors within 300 m from the proposed construction works. The ES should include appropriate figures to illustrate the study area adopted for the construction noise assessment and noise-sensitive receptors within the study area. The study area should be based upon all receptors likely to experience a potential significant effect and not a nominal distance. Effort should also be made to agree on the study area and noise monitoring locations with the relevant consultation bodies.	The Planning Inspectorate requested greater detail on the construction noise study area and how it is to be defined, specifically requesting that this be undertaken in consultation with the LPAs along the Scheme. The study area informing the PEIR assessment has been defined in accordance with appropriate noise guidance as referenced herein. However, this has been augmented by professional judgement to extend the boundaries where specific

Consultee	Consideration	How this is addressed in the PEIR
		circumstances dictate. The definition of the study areas is detailed within **Section 13.4**. study areas will be agreed with the appropriate local planning authorities as part of the consultation process, informing the ES and the specifics of the English Onshore Scheme become more defined. Within the scope of the PEIR, figures are supplied to demonstrate graphically the extent of the study areas defined: • **Volume 3, Part 2, Figure 13-1: Construction Noise and Vibration Study Area**; • **Volume 3, Part 2, Figure 13-2: Construction Traffic Noise Study Area**; and • **Volume 3, Part 2, Figure 13-3: Operational Noise Study Area**. Within the production of the ES, the specifics of the study areas identified within the scope of the study will be consulted with the LPAs along the English Onshore Scheme.

Technical engagement

13.3.5 Technical engagement with consultees in relation to noise and vibration is ongoing. Engagement has commenced in relation to the agreement of baseline noise survey locations to support the operational assessment. Information, including the proposed scope and location of baseline noise monitoring surveys, was shared for comment and agreement with the Borough Council of King's Lynn and West Norfolk and Fenland District Council on 28 February 2025.

13.3.6 In advance of the ES, engagement will continue with the following key stakeholders relevant to noise and vibration, to discuss the proposed assessment methodology:

- Lincolnshire County Council;
- Norfolk County Council;
- Cambridgeshire County Council;
- East Lindsey District Council;
- Boston Borough Council;
- South Holland District Council;
- Borough Council of King's Lynn and West Norfolk; and
- Fenland District Council.

13.4 Data gathering methodology

Study area

13.4.1 A number of specific study areas for the assessment of noise and vibration have been defined as part of the PEIR; these would potentially be redefined as part of the ES when more specific information emerges. These study areas have been defined in accordance with appropriate guidance as set out below, and using the available information informing the PEIR. Through the ES process, the scope of the study areas will be further defined, and relevant stakeholders will be consulted, as noted in **Section 13.3.**

13.4.2 This section sets out the methodology and approach to selecting the study areas for the construction and operational assessments for the purposes of the production of the PEIR.

13.4.3 The study areas defining the scope of the noise and vibration assessments presented within the PEIR are presented within the following figures:

- **Volume 3, Part 2, Figure 13-1: Construction Noise and Vibration Study Area;**
- **Volume 3, Part 2, Figure 13-2: Construction Traffic Noise Study Area;** and
- **Volume 3, Part 2, Figure 13-3: Operational Noise Study Area**.

Construction Noise

13.4.4 For the assessment of construction noise, the study area has been defined based on guidance contained within BS 5228-1 to comprise the closest Noise Sensitive Receptors (NSRs) within 300 m from the indicative zone for underground cable assets, construction compound, converter stations and indicative zone for Walpole B Substation associated with the English Onshore Scheme.

13.4.5 However, because of the nature of the area being predominantly open and flat, and sparsely populated, where there are no receptors within 300 m of the works, this has been augmented by professional judgement to extend the boundaries to cover the closest NSRs.

Construction Vibration

13.4.6 The proposed study area for construction vibration has been defined within the PEIR based on the guidance of BS 5228-2 and comprises vibration sensitive receptors (VSRs) within 100 m from the closest construction activity with potential to generate vibration impacts.

Construction Traffic Noise

13.4.7 Road traffic noise from construction vehicles on the existing road network has been assessed for each applicable construction traffic road link affected, based on the peak activity year traffic data supporting the PEIR. For the construction traffic noise assessment, a peak year of 2031 has been assumed, as informed by the preliminary traffic information. Traffic data assumptions, including in relation to the peak construction year, are detailed in **Volume 1, Part 2, Chapter 12, Traffic and Transport**.

Operation

13.4.8 The proposed study area for operational noise is limited to the static above-ground infrastructure associated with the English Onshore Scheme, namely the Walpole converter stations and Walpole B Substation at the southern end of the English Onshore Scheme.

13.4.9 To identify the closest sensitive receptors to the static above-ground infrastructure, the operational study area is 1 km from the indicative zone for converter stations and Walpole B Substation.

Desk study

13.4.10 A summary of the organisations that have supplied data, together with the nature of that data, is outlined in **Table 13-4**.

Table 13-4 – Data sources used to inform the Noise and Vibration assessment

Organisation	Data source	Data provided
Ordnance Survey (OS)	Address Base Core	Address point data for the identification of noise-sensitive receptors
Ordnance Survey (OS)	OS Open Mapping	Mapping data for noise and vibration assessment
British Standards Institute	BS 5228-1: 2009+A1:2014	Noise data for construction noise and vibration predictions
Department for Environment, Food & Rural Affairs (Defra)	Strategic noise map data	Road traffic noise levels from existing highways

Survey work

13.4.11 To date, no site surveys have been undertaken in support of the noise assessment, however, noise surveys are planned to be undertaken to inform the ES in the vicinity of the Walpole converter stations, defined within the operational noise study area. The

proposed scope, including the location of baseline noise monitoring surveys was consulted with the Borough Council of King's Lynn and West Norfolk and Fenland District Council on 28 February 2025.

13.4.12 Baseline noise surveys for the English Onshore Scheme would be conducted in accordance with the methodology described in BS 7445-1:2003 (Ref 13.10).

13.4.13 The sound level meters would measure a range of parameters, including the following:

- $L_{Aeq, T}$ – The A-weighted equivalent continuous sound pressure level over the measurement period T, representative of the 'average' sound pressure level over a given period, in this case 15 minutes.
- $L_{A10, T}$ – The noise level that is exceeded for 10% of the measurement period and is usually regarded as a descriptor of road traffic noise.
- $L_{A90, T}$ – The noise level that is exceeded for 90% of the measurement period and is usually regarded as a descriptor of the background noise level.
- $L_{A, max}$ – The maximum A-weighted noise level during the sample period, measured using a fast time weighting.

13.4.14 The measurement periods and durations would be consulted on with the LPAs and would be undertaken by methods including:

- Unattended long-term surveys for up to seven days; and
- Attended short-duration surveys for key weekday and weekend time periods.

13.4.15 Unattended surveys would be subject to the safety of equipment and land access provisions. The noise surveys would be consulted with the local planning authorities along the English Onshore Scheme relating to durations and specifics of the surveys in advance.

13.4.16 Baseline surveys to support the assessment and consideration of the Walpole B Substation will be supported and delivered by the Grimsby to Walpole Project team and will be reported as part of the ES.

13.5 Overall baseline

Current baseline

13.5.1 To inform the PEIR and based upon the information contained on the Department for Environment, Food & Rural Affairs Noise Mapping of the UK and the review of commercial aerial photography of the English Onshore Scheme route, a description of the baseline noise climate of the area is provided below.

13.5.2 It is noted that vibration is assessed on the basis of absolute thresholds, so baseline vibration is not a consideration.

13.5.3 The draft Order Limits predominantly encompasses a rural setting, with aspects coming close to urban areas, but avoiding them where possible through design. The general description of the area concludes minimal large infrastructure, with no motorways or mainline railways present within the draft Order Limits. There are local transportation routes identified within the draft Order Limits which will affect the noise climate, namely:

- A-Roads (main trunk roads): A1028, A1101, A1121, A151, A158, A16, A17, A47, A1031, A1104, A1111, A157 and the A52;

- B-Roads (lower traffic densities than the main trunk roads): B1168, B1183, B1184, B1192, B1195, B1196, B1357, B1359, B1373, B1390, B1391, B1397, B1449, B1515 and the B198; and
- Grantham to Skegness rail line which is referred to as the 'Poacher line'

13.5.4 The general conclusion for the baseline definition of the English Onshore Scheme, drawn from the subjective consideration of the above referenced information, is a noise climate typical of a rural setting. The Department for Environment, Food & Rural Affairs noise maps for the area demonstrate elevated noise levels around transportation links (road and rail), with noise generally reducing to below 40 dB away from these sources.

13.5.5 It is appreciated that the Department for Environment, Food & Rural Affairs noise maps do not contain all noise sources along the English Onshore Scheme and are limited to the highway and rail infrastructure identified above. However, the Department for Environment, Food & Rural Affairs noise maps provide a good indication of what the current noise climate could be for the purposes of this PEIR. Further consideration of the baseline noise climate will form part of the ES, concluded in consultation with the local planning authorities along the English Onshore Scheme.

Future baseline

13.5.6 Notwithstanding the area contained within the draft Order Limits generally being characterised as a quiet rural setting, road traffic noise will steadily increase due to the natural year-on-year traffic growth, thus increasing the baseline noise climate over time.

13.5.7 Traffic growth will be reflected within the construction traffic noise assessment, with future traffic conditions being modelled taking into account this traffic growth, and traffic associated with new development. Ongoing engagement with local planning authorities will also identify any potential developments which could also contribute to increases in the future baseline, and these would be accounted for in the assessments where appropriate.

13.5.8 It is recognised that there are both proposed and committed developments within the surrounding area that could alter the future baseline in the absence of the English Onshore Scheme. The potential for cumulative effects will be considered as part of the future EIA documents in accordance with the approach and guidance outlined within **Volume 1, Part 4, Chapter 28: Cumulative Effects**.

13.6 Environmental measures

13.6.1 As set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, the environmental measures are characterised as design measures or control and management measures. A range of environmental measures would be implemented as part of the English Onshore Scheme and will be secured in the DCO as relevant.

13.6.2 **Table 13-5** outlines how these design and control measures will influence the noise and vibration assessment. In addition to the measures listed in **Table 13-5** standard mitigation measures, comprising management activities and techniques, would be implemented during the construction of the Projects to limit effects through adherence to good site practices and achieving legal compliance. These are listed in **Volume 2, Part 1, Appendix 1.5.B: Outline Code of Construction Practice (CoCP)** and are not repeated below.

13.6.3 Measures listed in **Table 13-5** have been assigned references, for example (GG01). These align with the references provided in **Volume 2, Part 1, Appendix 1.5.B: Outline CoCP** for ease of cross-reference.

13.6.4 As part of the design process, embedded environmental measures have been adopted to reduce the potential for adverse noise and vibration effects. These embedded environmental measures will evolve through the EIA progresses and in response to consultation. These measures have been considered iteratively through the assessment process. Design measures included that a relevant to noise and vibration receptors are included in **Table 13-5** below under Design and Operation and are also included in **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures.**

Table 13-5 – Summary of the environmental measures

Receptor	Potential changes and effects	Embedded measures	ID reference
Construction			
All NSRs within the construction noise and vibration study area.	Potential adverse effects from construction noise from mobile and static plant along the construction route and within compound areas.	BPM as defined under Section 72 of the Control of Pollution Act (CoPA), 1974 (e.g. screening, alternative plant, working methods etc) would be employed during the construction phase to reduce noise and vibration nuisance respectively from potentially significant construction activities. Implementation of BPM measures as defined in Section 72 of the Control of Pollution Act and Section 79 (9) of the Environmental Protection Act 1990 would include measures such as, but not limited to: • Use of temporary noise screens to disrupt the line of sight between activities and receptors. • Plant is to consist of modern, well-maintained machinery fitted with efficient silencers, where possible, designed to minimise noise levels that are generated during operations. • All compressors and generators to be 'sound reduced' models. • Ancillary pneumatic percussive tools to be fitted with mufflers or suppressors. • Machines in intermittent use shall be shut down between work or, where this is impracticable, throttled down to a minimum. • Where practicable, plant with directional noise characteristics to be positioned to minimise noise at nearby properties.	MT12

Receptor	Potential changes and effects	Embedded measures	ID reference
		• Static equipment and machinery to be sited as far as is practicable from inhabited buildings. Use of temporary noise screens to disrupt the line of sight between activities and receptors.	
Design and Operation			
NSRs close to the indicative zone for underground cable assets.	Potential adverse effects from the operation of the underground cables.	The cables are located underground, thus fully controlling noise emissions into the environment through burial as a means of noise mitigation. All High Voltage Alternating Current (HVAC) and High Voltage Direct Current (HVDC) cables associated with the English Onshore Scheme shall be located underground, buried in accordance with an appropriate design strategy and method statement prepared as part of the DCO for undergrounding to ensure compliance with relevant permitting requirements.	NV01
NSRs close to the indicative zone for converter stations and Walpole B Substation.	Potential adverse effects from the operation of new converter stations and Walpole B Substation.	Proposed above ground infrastructure and underground infrastructure will be designed such that noise and vibration from their normal operation is mitigated to a minimum in line with the aims of the Noise Policy Statement for England (NPSE), NPS EN-1 and in the context of sustainable development. Sourcing equipment and defining mitigation requirements (such as noise enclosures, etc.) within the converter stations to NGET technical specifications, which include requirements regarding audible noise, including confirmation by type testing and sample testing. Equipment specifications and mitigation necessary for the Walpole B Substation will be defined and designed by the Grimsby to Walpole Project team, in consultation with the English Onshore Scheme Team.	NV02
VSRs close to the indicative zone for converter stations and Walpole B Substation.	Potential adverse effects from the operation of new converter stations and Walpole B Substation.	The converter stations designs would be subject to the requirements of the Noise and Vibration Management plan relating to the specification and control of vibration generation and transmission control/abatement. All operational plant within the above ground installations with the potential to generate vibration would be designed and specified such that the vibration from plant and apparatus within these facilities would not transmit into the environment. This could include the use of vibration isolation	NV03

Receptor	Potential changes and effects	Embedded measures	ID reference
		solutions or the specification of low vibration plant and equipment options where necessary.	

13.7 Scope of the assessment

Spatial scope and study area

13.7.1 The spatial scope of the assessment of Noise and Vibration covers the areas identified as study areas, defined relative to the draft Order Limits, the indicative zone for construction compounds, the indicative zone of the converter stations and the Walpole B Substation. The study areas for noise and vibration are shown on.

- **Volume 3, Part 2, Figure 13-1: Construction Noise and Vibration Study Area;**
- **Volume 3, Part 2, Figure 13-2: Construction Traffic Noise Study Area;** and
- **Volume 3, Part 2, Figure 13-3: Operational Noise Study Area.**

Temporal scope

13.7.2 The temporal scope of the assessment of Noise and Vibration is consistent with the period over which the English Onshore Scheme would be carried out. It covers the periods set out below:

- The construction assessments are consistent with the period over which the Projects would be in construction, i.e., between 2028 and 2033.
- Site-based construction noise and vibration is assessed at each key point of the programme and when the maximum plant for that phase is in use.
- Noise from road traffic associated with construction has been assessed during the peak year of construction, noted as 2031, considering a change in road traffic noise in this peak year.
- The operational assessments align with the English Onshore Scheme becoming operational in 2033 and remaining operational for a minimum period of 40 years thereafter.

13.7.3 The English Onshore Scheme is expected to have a life span of 40 years. If decommissioning is required at that point in time, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration of two years. Acknowledging the complexities of completing a detailed assessment for decommissioning works up to 40 years in the future, it is considered that the significance of effects relating to the decommissioning phase would be no greater than those from the construction phase and decommissioning effects are therefore not discussed in detail in this chapter; however, **Table 4.21** in **Volume 1, Part 1, Chapter 4: Description of the Projects** provides a high level summary assessment of the likely potential significant effects associated with decommissioning. Furthermore, should decommissioning take place, it is expected that assessment under the legislation and guidance at the time of decommissioning would be undertaken.

Identification of receptors

13.7.4 The principal noise and vibration receptors that have been identified as being potentially subject to significant effects are summarised in **Table 13-6** and are shown in **Volume 3, Part 2, Figure 13-1: Construction Noise and Vibration Study Area; Volume 3, Part 2, Figure 13-2: Construction Traffic Noise Study Area** and **Volume 3, Part 2, Figure 13-3: Operational Noise Study Area**.

Table 13-6 – Noise and Vibration receptors subject to potential effects

Receptor	Reason for consideration
Residential – residences, including private gardens where appropriate	These receptors occur within the study area of the English Onshore Scheme, and have the potential to experience a change in noise and/or vibration as a result of the English Onshore Scheme and may present the potential for adverse effects.
Community services – e.g. schools (during daytime periods), places of worship	
Commercial – e.g. offices, retail, entertainment venues and eateries, leisure facilities	
Leisure areas – e.g. local nature reserves	These sites have the potential to experience adverse effects as a result of the English Onshore Scheme. These potential effects will be further defined and considered in the ES as part of the relevant assessments.
Onshore ecology – e.g. designated sites include Special Protection Areas and Sites of Special Scientific Interest	These sites have the potential to experience adverse effects as a result of the English Onshore Scheme. These potential effects will be further defined and considered in the ES as part of the biodiversity assessment.
Historic environment – e.g. scheduled monuments, listed buildings	These sites have the potential to experience adverse effects as a result of the English Onshore Scheme. These potential effects will be further defined and considered in the ES as part of cultural heritage assessment.

Potential effects considered within this assessment

13.7.5 The effects on Noise and Vibration receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 13-7.**

Table 13-7 – Noise and Vibration receptors scoped in for further assessment

Receptor	Likely significant effects
Sensitive receptors identified in **Table 13-6** located within the construction noise and vibration study area.	Potential for adverse effects relating to construction noise as predicted and assessed in accordance with BS 5228-1.
Sensitive receptors identified in **Table 13-6** located adjacent to construction traffic routes/links.	Potential for adverse effects relating to changes in road traffic noise along affected links during construction, as assessed in accordance with DMRB LA 111.
Sensitive receptors identified in **Table 13-6** located within 100 m of the construction haul routes and the indicative zone of the converter stations.	Potential for adverse effects relating to construction vibration as predicted and assessed in accordance with BS 5228-2.
Sensitive receptors identified in **Table 13-6** located within 1 km of the indicative zone of the converter station and the Walpole B Substation.	Potential for adverse effects relating to operational noise associated with the combined noise from the converter stations and Walpole B Substation, as assessed in accordance with BS 4142.

13.7.6 The effects detailed in **Table 13-8** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant. These have been agreed with the Planning Inspectorate in the scoping response received.

Table 13-8 – Summary of effects scoped out of the Noise and Vibration assessment

Receptors/potential effects	Justification
General construction vibration resulting from construction activities other than piling and ground stabilisation.	Transport and Road Research Laboratory Supplementary Report 328 ‘Ground vibrations caused by road construction activities’ (Ref 13.11), concluded that, ‘at distances greater than 20 m, the vibration levels measured were below the level of human perception because of attenuation in the ground and that it is unlikely that people would be disturbed by vibration from general construction activities at distances of 20 m or more.’
Vibration associated with construction traffic.	Vibration from road traffic on existing highways is caused by the interaction of the vehicle tyres and the road surface thus resulting from significant surface irregularities. Assuming the road surfaces used by construction traffic are free from irregularities, potential significant effects would not be expected. This would be controlled through the implementation of a traffic management plan.
Vibration associated with the static plant facilities, including converter stations and Walpole B Substation	All plants with moving parts would be mounted on suitable anti-vibration mounts and vibration eliminated at source for the protection of the operational plant and equipment, and the superstructure of the facilities.

Receptors/potential effects	Justification
Noise and vibration associated with future maintenance of the underground HVAC and HVDC cables, converter stations and Walpole B Substation.	Maintenance activities are likely to be infrequent, localised, and short-term. Activities would follow standard measures to reduce noise and vibration, and therefore, potentially significant effects are not expected.

13.8 Key parameters for assessment

Realistic worst-case design scenario

13.8.1 The assessment has followed the Rochdale Envelope approach as outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects** and **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**. The assessment of effects has been based on the description of the Projects and parameters outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects**. However, where there is uncertainty regarding a particular design parameter, the realistic worst-case design parameters are provided below with regard to noise and vibration, along with the reasons why these parameters are considered worst-case. The preliminary assessment for noise and vibration has been undertaken on this basis. Effects of greater adverse significance are not likely to arise should any other development scenario, based on details within the Rochdale Envelope (e.g., different infrastructure layout within the draft Order Limits), to that assessed here be taken forward in the final design of the English Onshore Scheme.

13.8.2 In relation to noise and vibration, the following assumptions are made regarding the Project's design parameters in order to ensure a realistic worst-case assessment has been undertaken.

- As accepted by the Planning Inspectorate in the EIA Scoping Opinion, the operational noise from underground HVAC and HVDC cables do not present the potential for any likely potential significant effects, as all noise sources will be underground and, as such, propagation and emission of noise into the environment will not occur. This was accepted by the Planning Inspectorate through the EIA Scoping Opinion and therefore operational noise from the cables is not considered further.
- Through the Scoping Opinion, the Planning Inspectorate have agreed that the issue of construction traffic vibration can be scoped out of the EIA, with clauses necessary in the Outline CoCP to ensure this is suitably managed and maintained.
- Through the EIA Scoping Opinion for the Grimsby to Walpole Project, the Planning Inspectorate has confirmed acceptance of the following relative to the overhead lines. Through the implementation of a 'triple Araucaria' conductor bundle and pylon fittings designed to National Grid Technical Specifications, operational noise generated from overhead lines and pylons is unlikely to give rise to potential significant effects. Therefore, this matter is not considered further.
- Due to the rural setting of the English Onshore Scheme, baseline noise monitoring will not be conducted for the undergrounding sections of the indicative cable route. With this regard, the lowest threshold criteria from BS 5228-1 has been applied for construction noise along the route, unless emerging local factors suggest otherwise,

and these will be considered within the ES. This ensures a robust evaluation as limits at the lowest BS 5228-1 thresholds have been set, presenting a worst-case assessment regarding the potential for potential significant effects.

- As set out in **Section 4.4** of **Volume 1, Part 1, Chapter 4: Description of the Projects**, at this stage in the design process, four options have been identified with regards to the proposed siting of the Walpole converter stations. As detailed in the limitations (**Section 13.1**), the design of the Walpole converter stations are not sufficiently advanced to allow for the full detailed modelling and assessment of these above ground installations. Therefore, in the production of the PEIR, the locations of the converter stations are based upon the four indicative zones for converter stations being considered (converter station options A, B, C and D). Thus, the potential for impacts is considered over the areas covered by these indicative zones which would be a larger area within the PEIR than would be the case in the ES, where the converter station siting and preferred option will be defined. Where an option or options affects the findings of the noise and vibration assessment reference to the specific option(s) is made in **Section 13.10**.
- The construction phase traffic data analysed and discussed is provisional at this stage, and is limited to the peak construction year of 2031. The year 2031 generates the greatest volume of trips at bellmouths across the Projects as a whole and therefore is considered to be the peak year. The traffic data provided is built on information derived from 47 traffic count sites and has been factored to include growth and traffic generated by the English Onshore Scheme. Traffic data assumptions are detailed in **Volume 1, Part 2, Chapter 12:Traffic and Transport.** The air quality study area for vehicle emissions has been predicated on the Project's traffic flow information.
- During the operational (and maintenance) phase, the converter stations would be operated by a small team (six-eight staff), and maintenance would be limited to routine activities. Occasional Heavy Goods Vehicle (HGV) and Abnormal Indivisible Loads (AIL) access would be required. Assuming all converter station staff drive, this equates to 16 two-way Light Goods Vehicle (LGV) trips per day (eight arrivals, eight departures) per site which equates to 32 trips per day (16 arrivals, 16 departures) in total, plus occasional maintenance vehicles and visitors.
- The Walpole B Substation is not expected to be manned, therefore the operational traffic flows would comprise vehicles associated with routine visits and fault maintenance only. It is anticipated that there would be two visits per month by two people. Assuming the Walpole B Substation visitors drive, this equates to four two-way trips (two arrivals, two departures).
- In total, the converter stations, and Walpole B Substation are forecast to attract 36 two-way trips (18 arrivals, 18 departures). In relation to the inspection and maintenance of the indicative cable route, vehicle movements would be limited to maintenance and staff vehicles. On the basis of this information, no likely potential significant effects are expected; therefore, as set out in the ES Scoping Report the operational (and maintenance) phase is scoped out.
- The assessment supporting the noise and vibration chapter assumes that all plant and equipment identified in a specific construction phase is operational at the closest approach to the receptor, thus meaning that the attenuation of sound over distance is minimised.

Consideration of construction scenarios

13.8.3 As detailed in **Volume 1, Part 1, Chapter 4: Description of the Projects**, the timing of construction activities set out within this PEIR is indicative. It has been identified that elements of the Projects could be constructed sequentially or concurrently. To allow for any unexpected circumstances and a realistic worst-case assessment, the impact assessment for the English Onshore Scheme considers the following construction scenario to ensure the worst-case scenario for noise and vibration can be identified and assessed:

- The assumption has been made that both the EGL 3 Project and EGL 4 Project construction activities would occur concurrently, relating to the installation of the indicative cable route, and the construction of the converter stations. This would mean higher levels of construction activity at any given time than if these elements of the Projects were constructed sequentially in isolation.
- Where various routeing options exist for the indicative cable route, the assessment is based upon the consideration of the closest routeing option to the receptor under consideration. This again minimises the separation distances from the sources to the receptors and thus minimises the opportunity for sound to dissipate over distance.

13.9 Assessment methodology

Overview

13.9.1 The generic project-wide approach to the assessment methodology is set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, and specifically in **Sections 5.4** to **5.6**. However, whilst this has informed the approach that has been used in this noise and vibration assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this noise and vibration assessment. Details are provided below.

Receptor sensitivity/value

13.9.2 In terms of noise and vibration, there is no published methodology available to assign a value to a receptor; as such, all receptors considered within the noise and vibration assessment are assigned the same level of sensitivity:

- NSRs are defined as dwellings, hospitals, healthcare facilities, education facilities, community facilities, Environmental Noise Directive quiet areas or potential Environment Noise Directive quiet areas, international and national or statutorily designated sites, Public Rights of Way and cultural heritage assets.
- VSRs are classified as dwellings, hospitals, healthcare facilities, education facilities, community facilities, buildings containing vibration-sensitive equipment and cultural heritage assets.

Magnitude of impact

Construction Noise

13.9.3 Construction noise impacts have been assessed in accordance with BS 5228-1. Construction activities generate noise which can be experienced by nearby sensitive receptors. The noise levels experienced depend upon a number of variables, the most significant of which are:

- the noise generated by plant or equipment used on site, generally expressed as a sound power level (Lw);
- the amount/number of construction plant items operational at the same time;
- the periods of operation of the plant on the site, known as its 'on-time';
- the distance between the noise source and the receptor; and
- operational times.

13.9.4 Predictions of the construction noise impacts from the English Onshore Scheme have been undertaken in accordance with BS 5228-1 within the construction noise study area, utilising the calculation methods and formulae contained within Annex F of BS 5228-1.

13.9.5 Construction noise would be considered within the study area in accordance with the methodology described in Annex E of BS 5228-1, relating to the setting of appropriate threshold Categories, which are linked to baseline noise climates. As a result of the length of the English Onshore Scheme and the nature of the areas that the indicative zone of underground cable assets passes through, the assumption is made that the noise climate would be low and generally result in a limit in line with the lower noise threshold of Category "A".

13.9.6 The Category "A" construction noise thresholds represent the lowest assessment threshold from BS 5228-1 and as such the use of this criteria would be considered a worst-case scenario, as the only variance would be to increase threshold Categories to "B" or "C" at specific locations where higher baseline/ambient noise levels prevail and are proven.

13.9.7 The Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL) (as defined in **Table 13-9**) for construction noise remains in line with those presented in the EIA Scoping Report, and has been defined for the English Onshore Scheme as presented within **Table 13-9**. Within the Scoping Opinion, the Planning Inspectorate presented no objections or variations to these values.

Table 13-9 – Construction noise LOAELs and SOAELs at residential receptors

Time Period	LOAEL	SOAEL (1) (2)
Weekdays 7:00am to 7:00pm, Saturdays 7:00am to 1:00pm	Baseline noise levels LAeq, T	75dB LAeq, T
Weekdays 7:00pm to 11:00pm Saturdays 1:00pm to 11:00pm, Sundays 7:00am to 11:00pm	Baseline noise levels LAeq, T	65dB LAeq, T
All days Night-time 11:00pm to 7:00am	Baseline noise levels LAeq, T	55dB LAeq, T

Notes:

*(1) Based upon the lowest eligibility for noise insulation as defined in Table E.2 of BS 5228-1:2009 (+A1 2014). Additional note to noise insulation; in noisy environments an offer of insulation is made where a noise level 5 dB or more above the existing pre-construction

Time Period	LOAEL	SOAEL [1] [2]
ambient noise level for the corresponding times of day is measured; hence the threshold for SOAEL is set relative to the higher of these values and as such could increase in noisy environments with justification. *[2] If the ambient noise level exceeds the SOAEL 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 LAeq, T noise level for the period increases by more than 3 dB due to site noise.		

13.9.8 Based on the criteria presented in **Table 13-6,** a semantic magnitude of impact scale has been defined relative to both the environment and health and quality of life impacts. As such, the following impact magnitudes are applicable:

- **Negligible**: Below LOAEL.
- **Minor**: Above or equal to LOAEL but below appropriate BS 5228-1 Category.
- **Moderate**: Above or equal to appropriate BS 5228-1 Category but below an SOAEL.
- **Major**: Above or equal to an SOAEL.

Construction Traffic

13.9.9 Noise from construction traffic on the public highway would be calculated in accordance with CRTN and assessed against the criteria detailed in DMRB LA 111. The road traffic noise levels from road links used within the construction phase would be calculated for the 'do-nothing' and 'do something' scenarios in the peak activity year of 2031 to allow direct comparison, and the conclusion of potential changes in road traffic noise.

13.9.10 The LOAEL and the SOAEL for the construction traffic noise assessment would be established in accordance with **Table 13-10**. Within the Scoping Opinion, the Planning Inspectorate presented no objections or variations to these values.

Table 13-10 – Construction traffic noise LOAELs and SOAELs

Time Period	Adverse effect level	$L_{night, outside}$ noise level (dB)	L_{A10} noise level (dB)
Daytime	LOAEL	n/a	55dB $L_{A10, 18hr}$ façade
	SOAEL	n/a	68dB $L_{A10, 18hr}$ façade
Night-time	LOAEL	40dB $L_{night, outside}$ (free field)	n/a
	SOAEL	55dB $L_{night, outside}$ (free field)	n/a

13.9.11 The calculated Basic Noise Level values are compared for the "with" and "without" construction traffic flow scenarios within the peak year, to determine the magnitude of the impact in line with the semantic description scale below.

- **Negligible:** Less than 1.0dB change in road traffic noise.
- **Minor:** Greater than or equal to a 1.0dB, but less than a 3.0dB, change in road traffic noise.

- **Moderate:** Greater than or equal to a 3.0dB, but less than a 5.0dB, change in road traffic noise.
- **Major:** Greater than or equal to a 5.0dB change in road traffic noise.

Construction Vibration

13.9.12 Construction vibration levels have been calculated and assessed in accordance with the methodologies described in BS 5228-2 relating to piling and ground stabilisation. No vibration baseline study is proposed within either the PEIR or the ES, as construction vibration levels are considered relative to fixed, absolute level assessment criteria as detailed in BS 5228-2.

13.9.13 Threshold vibration levels from piling and ground stabilisation, including applicable LOAEL and SOAEL values, are presented in **Table 13-11**. Within the Scoping Opinion, the Planning Inspectorate presented no objections or variations to these values.

Table 13-11 – Construction vibration effect magnitudes at residential receptors

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

13.9.14 Based on the above, a semantic magnitude of impact scale has been defined relative to environment, and health and quality of life impacts. As such, the following impact magnitudes are applicable with regard to piling and ground stabilisation ground-borne vibration impacts:

- **Negligible**: <0.3mm/s;
- **Minor**: ≥0.3mm/s and <1.0mm/s;
- **Moderate**: ≥1.0mm/s and <10.0mm/s; and
- **Major**: ≥10.0mm/s.

Operational Noise

13.9.15 BS 4142 provides a methodology and criteria for assessing new or existing industrial sound sources by comparing the operational sound (rating level) at a sensitive receptor to the background sound levels currently experienced without the new sound source under consideration.

13.9.16 The rating level is defined as the specific sound level with the addition of character corrections to consider certain acoustic features that could potentially increase the significance of the impact. A penalty will be applied to the specific sound level if a tone, impulsive or other characteristic occurs or is expected to be present for new or modified sound sources.

13.9.17 The assessment methodology outlined in BS 4142 indicates that the greater the difference of the rating level in comparison with the background sound level (L_{A90}), the greater the significance of the impact, as set out in **Table 13-12**.

13.9.18 Appropriate LOAEL and SOAEL values for the consideration of operational effects are presented in **Table 13-11**. Within the Scoping Opinion, the Planning Inspectorate presented no objections or variations to these values.

Table 13-12 – Summary of effects scoped out of the Noise and Vibration assessment

Effect	Observed Adverse Effect Level
≤ LA90 -0dB: 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.	N/A
> LA90 -0dB and ≤ LA90 +5dB: The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact.	LOAEL
> LA90 +5dB and ≤ LA90 +10dB: A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.	
> LA90 +10dB: A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.	SOAEL

13.9.19 Based on **Table 13-12**, a semantic magnitude of impact scale has been defined relative to the environment, and health and quality of life impacts. As such, the following impact magnitudes are applicable with regard to operational static plant noise:

- **Negligible:** < LA90 -0dB (as defined in **Table 13-12**).
- **Minor:** > LA90 -0dB and ≤ LA90 +5dB (**Table 13-12**).
- **Moderate:** > LA90 +5dB and ≤ LA90 +10dB (**Table 13-12**).
- **Major:** > LA90 +10dB (**Table 13-12**).

Significance of Effect

Construction Noise and Construction Traffic

13.9.20 Likely potential significant effects for construction noise and construction traffic noise are further defined above the metrics stated above in accordance with DMRB LA 111 on the following grounds.

"*Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:*

- *10 or more days or nights in any 15 consecutive days or nights; or,*
- *a total number of days exceeding 40 in any 6 consecutive months*."

Construction Vibration

13.9.21 Likely potential significant effects for construction vibration are further defined above the metrics stated above in accordance with DMRB LA 111 on the following grounds.

'Construction vibration shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

a) 10 or more days or nights in any 15 consecutive days or nights;

b) a total number of days exceeding 40 in any 6 consecutive months.'

Operational Noise

13.9.22 Likely potential significant effects for operational noise are further defined above the metrics stated above in accordance with BS 4142 on the following grounds.

'*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.'*

- '*Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:*
- *The absolute level of sound*
- *The character and level of the residual sound compared to the character and level of the specific sound.*
- *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions*.'

13.9.23 Based upon the guidance contained within BS 4142, a potential significant effect has been deemed to have occurred for impacts of a moderate or greater magnitude, considering the context of the sound generated by the English Onshore Scheme.

Preliminary assessment of cumulative effects

13.9.24 At the current stage of the Projects (PEIR stage), design information for the Projects is insufficient to allow for a robust cumulative assessment to be undertaken. Furthermore, given the current position in relation to baseline data collection, with much of the environmental surveys still to be undertaken during 2025, the baseline identified at this PEIR stage cannot be taken as a complete picture of the potential presence and significance of sensitive receptors. Therefore, a cumulative assessment has not been undertaken at this stage; however, **Volume 1, Part 4, Chapter 28: Cumulative Effects,** presents the long and short lists of 'other developments' which will be considered at the ES stage, and the methodology which allowed for the identification of these other developments, to allow consultation bodies to form a view and provide comment on the other developments included. The long-list will be reviewed and, if necessary, updated, in the lead up to the ES, as the Project's design further evolves and in response to any comments raised at statutory consultation.

13.9.25 Combined effects (sometimes called intra-project effects) result principally from different types of impacts from one development acting in combination on a specific receptor. For noise and vibration, interrelationships are identified with cultural heritage, landscape and visual, onshore biodiversity and population and human health and are summarised below:

- Cultural heritage – effects on heritage assets as a result of increased audibility of the Projects during construction and operational phases, and impacts resulting from ground-borne vibration during construction activity.
- Landscape and visual – effects on landscape and visual receptors as a result of increased audibility of the Projects during construction and operational phases, resulting in effects on perceived tranquillity within the study area.
- Onshore biodiversity – disturbance to species, including some that form qualifying features of designated sites
- Health and Wellbeing – effects arising from changes in noise levels are also a consideration within the assessment of human health undertaken within the Health and Wellbeing Assessment.

13.9.26 The above interrelationships have been considered as part of the assessments reported in the respective topic chapters.

13.10 Preliminary assessment of noise and vibration effects

13.10.1 This section outlines the preliminary assessment of impacts for the English Onshore Scheme during the construction and operational phases based upon the maturity of the information at the time of the PEIR.

Construction Noise

13.10.2 Preliminary construction plant data and associated noise data for the English Onshore Scheme are presented in **Volume 2, Part 2, Appendix 2.13.A: Construction Plant Assumptions**. Although BPM to reduce construction noise impacts would be employed by the Contractor for all work areas, for the purpose of this preliminary assessment, it is assumed that no noise mitigation, such as screening, is included. This is so that potential noise 'hot-spots' can be identified, which would require specific mitigation measures to avoid significant adverse effects. However, BPM, such as those presented

in **Table 13-5,** would likely be employed by the Contractor for all work areas to reduce construction noise impacts.

13.10.3 The construction noise assessment undertaken within the scope of this PEIR has calculated construction noise levels at a total of 1,149 sensitive receptors located within the construction noise study area as identified on **Volume 3, Part 2, Figure 13-1: Construction Noise and Vibration Study Area**.

13.10.4 The number of potential significant adverse effects presented in **Table 13-13,** is concluded at this point in the absence of any mitigation measures specified under BPM and secured within the DCO.

13.10.5 The assessments accord with the core hours for construction underpinning the PEIR as follows:

- Monday to Friday between 07:00 and 19:00; and
- Saturdays, Sundays, Bank Holidays and other Public Holidays between 08:00 and 17:00.

13.10.6 The results presented in **Table 13-13** have aligned the Projects' core working hours to the time periods set out in BS 5228-1 and **Table 13-9**.

13.10.7 However, there remains the potential for activities associated with Health and Safety, and directional drilling/trenchless installation to operate outside of these core hours, and this will be considered further within the developing information supporting the ES.

Table 13-13 – Preliminary Likely Significant Effects from Construction Noise, aligned to the time periods set out in BS 5228-1

Activity	Weekday daytime number of potential significant effects	Saturday daytime number of potential significant effects		Sunday daytime number of potential significant effects	Night-time number of potential significant effects
	0700 - 1900	0700 -1300	1300 - 2300	0700 - 2300	2300 - 0700
Converter Stations, Walpole B Substation, Cable Sealing End Compound(s) (CSEC) and Overhead Line (OHL) Construction Works					
Enabling Works and Earthworks	1	1	10	10	N/A
Utilities and Drainage	1	1	10	10	N/A
Foundation Works	1	1	8	8	N/A
Structural Construction - Piling	1	1	8	8	N/A
Structural Construction – Buildings	0	0	1	1	N/A

Activity	Weekday daytime number of potential significant effects	Saturday daytime number of potential significant effects		Sunday daytime number of potential significant effects	Night-time number of potential significant effects
	0700 - 1900	0700 -1300	1300 - 2300	0700 - 2300	2300 - 0700
Overhead Line Construction	0	0	0	0	N/A
Overhead Line Demolition	0	0	1	1	N/A
Underground HVAC and HVDC Cable Installation, Haulage routes and Compounds					
Initial Enabling Works	1	1	176	176	N/A
Establishment of construction compounds, including site facilities	1	1	86	86	N/A
Haulage road installation	45	45	182	182	N/A
Ducted and trenchless crossings	0	0	0	0	134
Cable trench installation and joint bays	0	0	1	1	N/A
Cable pulling	0	0	53	53	N/A
Cable jointing and termination	0	0	0	0	N/A
Testing and commissioning	0	0	0	0	N/A
Removal of all site works and restoration to original condition	1	1	176	176	N/A

13.10.8 The result presented in **Table 13-13** indicate that the preliminary unmitigated calculations supporting this PEIR conclude a potential for significant noise effects during the weekday and weekend periods, and where identified, during overnight periods associated with limited activities considered to be trenchless crossing activities.

13.10.9 It is reiterated that the results presented in **Table 13-13** are unmitigated, and do not include any reduction in noise associated with the inclusion of BPM.

13.10.10 During the weekday and Saturday morning core construction hours:

- The unmitigated calculations demonstrate a low potential for significant adverse effects during the core construction hours, predominantly linked to the haulage road installation works, specifically relating to the construction of the underground cables.

- Consideration of BPM mitigation as outlined in BS 5228-1 for construction activities (**Table 13-5**) could provide up to 20 dB of attenuation to specific activities. However, practical implementation of BPM relating to general construction works would give a more realistic 10 dB of attenuation. Implementation of BPM into the calculations reduces the number of these potential significant effects considerably, with the potential for significant effects only remaining during haulage road installation and specifically where works have the potential to be located in close proximity to receptors and separation distances are small. However, these activities are highly transient and are unlikely to remain in the same place for a prolonged period.
- Construction activities associated with converter station Options A to D, Walpole B Substation, OHL modifications, CSEC and installation of the underground cables during the core construction hours are unlikely to result in significant adverse effects following the implementation of BPM. A detailed review of the programme of construction activities would be undertaken for the ES and will provide details on the duration that any receptor would likely experience construction noise. Impacts are likely to be of short duration and would support the avoidance of likely potential significant effects.

13.10.11 During the more sensitive weekend periods (including Sunday), defined as the core hours, the assessment of potential significant adverse noise effects from construction activities concludes:

- The unmitigated calculations demonstrate a greater prominence for potential significant adverse effects during these more sensitive periods than during the weekday daytime construction hours, as a result of the lowering of the acceptable threshold.
- Implementation of BPM relating to general construction works would reduce the number of potential significant adverse effects drastically, as would a detailed review of the programme of construction activities, taking into consideration the transient nature and short duration of construction activities associated with the Projects.
- The remaining potential significant effects would be associated with:
  - **Converter Station Construction:** activities associated with enabling works and earthworks, utilities and drainage, foundation works and structural construction - Piling phases maintain the potential for a significant adverse effect with the reasonable inclusion of BPM. However, these impacts all occur at the same residential dwelling, which is located within approximately 40 m to the east of the indicative zone for converter stations for Option A, Option B and Option C. As the converter station locations are refined, separation distances between the NSR and the converter station may increase. This would have the potential to reduce the magnitude of the impact, or remove the significant adverse effect entirely; however, this would become evident as the design of the English Onshore Scheme develops in the lead-up to the ES.
  - **Underground HVAC and HVDC cable installation, haulage routes and construction compounds**: due to the proximity to NSR, activities associated with haulage road installation maintain the potential for significant adverse effects with the reasonable inclusion of BPM. However, these activities are highly transient and are unlikely to remain in the same place for a prolonged period, thus not resulting in a significant adverse effect.

- The potential for significant adverse effects during the more sensitive weekend periods therefore remains higher than during the core weekday hours as a result of lower thresholds, with additional, more specific and onerous mitigation measures above standard BPM potentially being required. This would be considered in more detail within the ES, as the design and details of construction activities evolve. In the lead-up to the ES more specific mitigation will be identified and investigated where necessary and appropriate, including the potential for restrictions of certain activities at certain times.

13.10.12 The only activity currently considered in the information supporting the PEIR to retain a potential for 24-hour working, outside of emergency works for health and safety reasons, is that of directional drilling associated with trenchless crossings for the onshore cable installation. During the night-time, assessment of the potential for significant adverse effects from this activity concludes:

- The unmitigated calculations demonstrate a potential for significant adverse effects where NSRs are located in close proximity to these works during the night.
- Practical implementation of BPM relating to trenchless crossing installation works would reduce the number of potential significant adverse effects drastically, as could the consideration of duration of works as the programme emerges. However, the trenchless works relate to static plant and equipment, meaning that enclosure becomes a viable option under BPM, where necessary to mitigate night-time operations. Measures such as the enclosure or shrouding of noisy plant and equipment could result in up to 20 dB of attenuation, which could reduce the likelihood for the potential for significant effects at receptors during the night-time reported in the ES.
- The potential for significant adverse effects during the night-time remains higher than during the core daytime hours, as would be expected due to the higher sensitivity of the period. The preliminary study concludes that additional measures above standard BPM potential could be required, including complete enclosure of the trenchless crossing plant and equipment. This would be considered in more detail as the specifics of the construction works evolve through the EIA process, with more detail on necessary mitigation identified at the appropriate time, including the potential for restrictions to activities by time, and enclosure of plant and equipment.

13.10.13 The issue of the potential for significant construction noise effects and the necessary mitigation under BPM will be developed through the EIA process in collaboration with the evolving engineering design of the English Onshore Scheme and in consultation with the local planning authorities. This will allow potential significant effects to be concluded relative to the programme and other considerations, and mitigation specified and implemented through BPM, secured within the Outline CoCP, to be submitted in support of the DCO application.

Construction Traffic

13.10.14 To assess construction traffic noise impacts on the existing highway, forecast peak year construction traffic figures representing the “with” and “without” construction traffic flows for the English Onshore Scheme have been considered. The peak year of construction is noted to be 2031, and both the “with” and “without” construction traffic flows used in the assessment occur in this year.

13.10.15 A total of 47 links that have the potential to be used for construction routes as a result of the English Onshore Scheme have been considered within the PEIR.

13.10.16 **Table 13-14** presents the number of links predicted to experience an increase in road traffic noise levels during the peak construction year of 2031, as a result of the addition of English Onshore Scheme construction traffic to the existing traffic levels.

Table 13-14 – Construction traffic noise impacts 2031 – On the existing road network

Increase in Peak Year Road Traffic noise levels (dB LA10, 18hr)	Semantic "short term" Description of Change in Road Traffic Noise (DMRB LA 111)	Number of Links demonstrating a change in road traffic noise within this band
<1.0	No Change/Negligible	42
1.0–2.9	Minor	4
3.0–4.9	Moderate	0
>5	Major	1

13.10.17 During the peak year of 2031, the construction traffic assessment for the English Onshore Scheme concludes:

- 42 links are predicted to experience no change or a negligible change in road traffic noise level; and,
- Four (4) links are predicted to experience a minor change in road traffic noise level.

13.10.18 As such, these links would not be considered to represent significant adverse effects when considered in accordance with the significance criteria set out in **Section 13.9**.

- No (zero) links are predicted to experience a moderate change in road traffic noise level.
- One (1) link is predicted to experience a major change in road traffic noise level.

13.10.19 The link that presents the potential for a significant adverse effect during the English Onshore Schemes' 2031 peak construction vehicle activity is noted as Scarborough Bank. This road is in East Lindsey and forms part of the link between the construction area near Midville to the A16 at Stickney/Stickford. The change in road traffic noise on Scarborough Bank as a result of peak construction year traffic flows occurs at a noise level below a LOAEL as defined in **Section 13.9**.

13.10.20 In conclusion, consideration of changes in road traffic noise along all 47 road links identified in the construction traffic assessment for the English Onshore Scheme would not represent a likely potential significant effect when considered under National Policy relating to health and quality of life. Furthermore, as part of the DCO application, a Construction Traffic Management Plan will be produced covering all issues and control measures for construction traffic associated with the English Onshore Scheme.

Construction Vibration

13.10.21 Construction plant data and associated vibration data are provided in **Appendix 2.13.A: Construction Noise and Vibration Data**. Based upon this information, an initial, high-level assessment of construction vibration has been undertaken.

13.10.22 The construction vibration assessment undertaken within the scope of this PEIR has calculated where there is any potential for significant adverse effects. This is concluded at this point in the absence of specific BPM mitigation measures, so it represents a worst-case in this regard, considering impacts during daytime periods to be as follows:

- Ground compaction activities during haul road construction – 21 sensitive receptors are predicted to experience potential vibration impacts of moderate or greater, without the inclusion of any BPM mitigation measures. As such, these could present the potential for significant adverse effects due to the proximity of the works to the receptors. However, haul road construction is highly transient in nature and as such would not be expected to occur for a significant duration of time; less than ten days in any 15 consecutive days at any one location, and as such, due to temporal scope, would not present a significant adverse effect. Additionally, BPM will be implemented as part of standard construction operations, secured through its inclusion within the Outline CoCP, submitted in support of the DCO application. These would further reduce vibration levels generated.
- Percussive and vibratory piling activities during foundation works on the converter stations – No (zero) sensitive receptors are predicted to experience any vibration impacts of greater than Minor, concluded in the absence of any influence of BPM mitigation. As such, piling would not present any potential for significant adverse effects.

13.10.23 As can be seen from the conclusions presented above, the preliminary calculations supporting this PEIR conclude no potential for significant adverse vibration effects during the construction of the English Onshore Scheme. This will be considered further in the lead-up to the ES, including, where necessary, the need and nature of BPM mitigation measures, as more specifics of the construction phases of the English Onshore Scheme become available.

Operation

Static plant facilities

13.10.24 At the time of the production of the PEIR, detailed locations of the converter stations and layouts of any noise emitting plant have not been finalised. As such, it has not been possible to quantify the potential combined noise impacts of the converter stations and Walpole B Substation, to consider the requirement for any mitigation on either installation, or conclude any combined significant adverse effects.

13.10.25 Mitigation options and design considerations would be considered and implemented where necessary as part of the ES covering both the converter stations and the Walpole B Substation, as further information emerges as part of the design of the facilities.

13.10.26 Potential NSR in relation to the operation of static plant at the above ground infrastructure is presented on **Volume 3, Part 2, Figure 13-3: Operational Noise Study Area.**

13.10.27 Therefore, the assessment of noise associated with the static elements of the English Onshore Scheme, namely the converter stations and Walpole B Substation, will be developed and considered as part of the DCO process and presented within the ES.

Overhead lines

13.10.28 Operational noise from the overhead lines is not likely to be significant at nearby NSRs under any weather conditions, owing to the standard approach to incorporating a 'triple Araucaria' conductor bundle and is therefore proposed to be scoped out of further noise assessment. Should the iterative design process result in alternative conductor types being used, consideration for this would be assessed within the noise and vibration assessment.

13.10.29 Technical information would be submitted as part of the application for development consent to support scoping out noise associated with overhead lines from the noise and vibration assessment.

13.11 Further work to be undertaken

13.11.1 The information provided in this PEIR is preliminary; the final assessment of potential significant effects will be concluded and reported in the ES. This section describes the further work to be undertaken to support the Noise and Vibration assessment presented in the ES.

Consultation

13.11.2 In the lead-up to the ES, the consultation process initiated with the local planning authorities will be developed and continued.

13.11.3 Consultation will be undertaken with the Environmental Health Departments at each of the councils as detailed in **Section 13.3** to continue, develop and agree on the scope of the noise assessments supporting the English Onshore Scheme, including elements such as assessment and prediction methodologies and the approach to baseline surveys.

Baseline

13.11.4 Baseline noise surveys are necessary as part of the assessments supporting the ES to determine existing noise climates at NSRs in the vicinity of the converter stations and Walpole B Substation, at the southern end of the English Onshore Scheme.

13.11.5 The survey data, along with subjective observations, will form the basis of the operational noise assessments for the static/fixed plant facilities associated with the English Onshore Scheme. The proposed survey scope and locations of baseline noise survey monitoring were shared with the Borough Council of King's Lynn and West Norfolk and Fenland District Council on 28 February 2025. Actual monitoring locations will also be defined through factors such as land access permissions, representativeness and equipment safety.

13.11.6 Baseline noise surveys would be conducted in accordance with the methodology described in BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures (BS 7445). The measurement periods and durations would be agreed where possible, but would be delivered relative to a combination of the following methods:

- Unattended long-term surveys for up to seven (7) days; and
- Attended surveys at key times across the full 24hr daytime period, covering both weekday and weekend periods. These would be used where equipment safety concerns arise, preventing unattended surveys from being undertaken.

13.11.7 Weather conditions would be monitored concurrently with the unattended noise surveys through the use of long-term meteorological stations linked to the sound level meters. Where attended surveys are undertaken, subjective weather observations would be made using handheld equipment such as anemometers, combined with subjective observation of cloud cover, precipitation, and wind speed and direction.

Assessment

13.11.8 The assessments undertaken for the PEIR will be reviewed following stakeholder consultation feedback and further design refinement. The following assessments will then either be updated or undertaken where they have not been undertaken for this PEIR:

- Updated construction traffic noise assessment for the peak year;
- Updated construction noise assessments for the converter stations taking into account the selected preferred option and layout, Walpole B Substation, OHL modifications and underground HVAC/HVDC cable installation works, including works at the proposed landfall site and the River Nene Temporary Quay, if this option remains part of the Projects design;
- Updated construction vibration assessments;
- Production of a detailed operational noise assessment for the converter stations and Walpole B Substations; and
- Undertake a Cumulative Effects Assessment.

Further environmental measures

13.11.9 As the details of the construction programme and works mature, further consideration of BPM and specific mitigation/alternative construction methods will be required and will be undertaken as part of the production of the ES.

13.11.10 To date, no additional measures beyond the application of BPM have been identified as being necessary, however, this is a preliminary assessment which has not included prediction of operational noise from the converter stations or Walpole B Substation. Through the scope of the noise assessments that will support the ES, further design refinement and assessment will be undertaken to identify and conclude any additional environmental measures necessary to ensure noise does not present a significant adverse effect; these environmental measures will be fully considered and detailed as part of the production of the ES.

13.11.11 As the operational HVAC and HVDC cables are to be located underground for the length of the English Onshore Scheme, no additional environmental measures would be deemed to be necessary.

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