The Great Grid Upgrade

Sea Link

Preliminary Environmental Information Report

Volume: 1

Part 3 Kent Onshore Scheme

Chapter 10 Noise and Vibration

Version A

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3.10 Noise and Vibration

3.10.1 Introduction

3.10.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents information about the preliminary environmental assessment of the likely significant noise and vibration effects at noise and vibration sensitive receptors (NSR) identified to date, that could result from Sea Link (hereafter referred to as the Proposed Project) (as described in **Volume 1**, **Part 1, Chapter 4, Description of the Proposed Project**).

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

3.10.1.3 The draft Order Limits, which illustrate the boundary of the Proposed Project, are illustrated on **Figure 1.1.1 Draft Order Limits** and the Kent Onshore Scheme Boundary is illustrated on **Figure 1.1.3 Kent Onshore Scheme Boundary**.

3.10.1.4 This chapter should be read in conjunction with:

- **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**;
- **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**;
- **Volume 1, Part 1, Chapter 6, Scoping Opinion and EIA Consultation**; and
- **Volume 1, Part 3, Chapter 1, Evolution of the Kent Onshore Scheme**.

3.10.1.5 This chapter is supported by the following figures:

- **Figure 3.10.1 Kent Noise and Vibration Baseline Information**; and
- **Figure 3.10.2 Kent Initial Construction Noise and Vibration Assessment**.

3.10.1.6 This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.4.A, Outline Code of Construction Practice**;
- **Volume 2, Part 1, Appendix 1.4.E, Construction Plant Schedule**;
- **Volume 2, Part 1, Appendix 1.4.F, Outline Schedule of Environmental Commitments and Mitigation Measures**;
- **Volume 2, Part 3, Appendix 3.10.A, Kent Noise Survey Data**;
- **Volume 2, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration**; and
- **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**.

3.10.2 Regulatory and Planning Context

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

3.10.2.2 Policy generally seeks to minimise noise and vibration effects from development and to avoid significant adverse effects. This applies particularly to construction and operational noise and vibration.

Legislation

The Control of Pollution Act 1974

3.10.2.3 The Control of Pollution Act 1974 (CoPA) (Ref 3.10.1) sets out the framework for the legislative control of construction noise and vibration on any given site. It also sets out the principle of 'best practicable means' (as defined in Section 72 of the Act) and how that should be applied to construction activity noise. The Act refers to approved Codes of Practice, which include British Standards 5228 Part 1 (Ref 3.10.3) and Part 2 (Ref 3.10.4), as being relevant for the purposes of determining the 'best practicable means'.

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

Environmental Protection Act 1990

3.10.2.5 Under Part III of the Environmental Protection Act 1990 (Ref 3.10.2) as amended by the Noise and Statutory Nuisance Act 1993, local authorities have a duty to investigate noise complaints relating to a variety of sources such as construction noise but excluding road traffic noise. If the local authority is satisfied that the noise amounts to a statutory nuisance it shall serve an Abatement Notice which may require that the noise be stopped altogether or limited to certain times.

National Policy

National Policy Statements

3.10.2.6 National Policy Statements (NPSs) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Proposed Project would be considered. A review of the NPS was announced in the 2020 Energy white paper: Powering our net zero future. This review was to ensure the NPSs were brought up to date to reflect the policies set out in the white paper. The below information reflects these updates currently under consultation.

3.10.2.7 Table 3.10.1 and Table 3.10.2 below provides details of the elements of NPS for Energy (EN-1) (Ref 3.10.5) and NPS for Electricity Networks Infrastructure (EN-5) (Ref 3.10.6) that are relevant to this chapter, and how and where they are covered in the PEIR or will be covered within the Environmental Statement (ES).

Table 3.10.1: NPS EN-1 requirements relevant to noise and vibration

NPS EN-1 section	Where this is covered in the PEIR
5.11.1 Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality. The Government's policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references to "noise" below apply equally to assessment of impacts of vibration.	The potential effects of noise and vibration during both construction and operational are considered in this chapter of the PEIR.
5.11.4 Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment: *a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;* *identification of noise sensitive premises and noise sensitive areas that may be affected;* *the characteristics of the existing noise environment;* *a prediction of how the noise environment will change with the proposed development;* *in the shorter term such as during the construction period;* *in the longer term during the operating life of the infrastructure; at particular times of the day, evening and night as appropriate.*	A description of noise generating aspects of the Proposed Project and how the noise climate will change with the Proposed Project are provided in **Volume 2, Part 1, Appendix 1.4.E, Construction Plant Schedule**, **Volume 2, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration**, and **Figure 3.10.2 Kent Initial Construction Noise and Vibration Assessment** in relation to construction noise, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment** in relation to operational noise. Results are summarised in Section 3.10.9.
an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and *measures to be employed in mitigating noise.* *The nature and extent of the noise assessment should be proportionate to the likely noise impact.*	Noise sensitive receptors and characterisation of the existing noise environment are detailed in Section 3.10.7, **Volume 2, Part 3, Appendix 3.10.A, Kent Noise Survey Data**, and **Figure 3.10.1 Kent Noise and Vibration Baseline Information**.
5.11.5 The noise impact of ancillary activities associated with the development, such as	Construction traffic noise is assessed in Section 3.10.9 and

NPS EN-1 section	Where this is covered in the PEIR
increased road and rail traffic movements, or other forms of transportation, should also be considered.	**Volume 2, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration Data**.
5.11.6 (part) Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information on assessment of particular noise sources may be contained in the technology-specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies.	The assessment of operational noise from the proposed substation and converter station has been undertaken in accordance with relevant British Standards (BS), as described in Section 3.10.4, Section 3.10.9, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**. Details of noise and vibration mitigation are provided in Section 3.10.8, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**.
Draft EN-1: 5.12.16 *(part) A development must be undertaken in accordance with statutory requirements for noise. Due regard must be given to the relevant sections of the Noise Policy Statement for England, the NPPF, and the government's associated planning guidance on noise.*	The assessment of noise and vibration considers the relevant sections of the stated documents as described in Table 3.10.3 and subsequent sections.

Table 3.10.2: NPS EN-5 requirements relevant to noise and vibration

NPS EN-5 section	Where this is covered in the PEIR
2.12.2 All high voltage transmission lines have the potential to generate noise under certain conditions.	The proposed Kent Onshore Scheme includes a small section of new overhead lines. There is a relatively large distance between the new transmission line and the nearest NSRs (approximately 750 metres (m) to R_26628 to the northwest, and >1 kilometres (km) to all other NSR). Significant adverse effects from noise from new overhead lines is therefore unlikely and is scoped out of further assessment.

NPS EN-5 section	Where this is covered in the PEIR
2.12.9 For the assessment of noise from overhead lines, the Applicant must use an appropriate method to determine the sound level produced by the line in both dry and wet weather conditions, in addition to assessing the impact on noise-sensitive receptors. For instance, the Applicant may use an appropriate noise modelling tool or tools for the prediction of overhead line noise and its propagation over distance. When assessing the impact of noise generated by overhead lines in wet weather relative to existing background sound levels, the Applicant should consider the effect of varying background sound levels due to rainfall. The Secretary of State is likely to regard it as acceptable for the Applicant to use a methodology that demonstrably addresses these criteria.	As above.
2.12.10 Applicants must consider the following measures: • the positioning of lines to help mitigate noise • ensuring that the appropriately sized conductor arrangement is used to minimise potential noise • quality assurance through manufacturing and transportation to avoid damage to overhead line conductors which can increase potential noise effects • ensuring that conductors are kept clean and free of surface contaminants during stringing/installation • the selection of the quietest cost-effective plant available	As above.
2.12.11 In addition, the ES should include information on planned maintenance arrangements. Where detail is not included, the Secretary of State should consider stipulating appropriate maintenance arrangements by way of requirements attached to any grant of development consent.	Details of proposed maintenance activities are provided in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**.

3.10.2.8 There are no other new or materially different policy considerations for the noise and vibration assessment within the Draft EN-5 (Ref 3.10.7), when compared to the current EN-5 (Ref 3.10.6).

National Planning Policy Framework

3.10.2.9 The National Planning Policy Framework (NPPF) (Ref 3.10.8) has the potential to be considered important and relevant to the Secretary of State's (SoS) consideration of the Proposed Project. Table 3.10.3 below provides details of the elements of the NPPF that are relevant to this chapter, and how and where they are covered in the PEIR or will be covered within the ES.

Table 3.10.3: NPPF requirements relevant to noise and vibration

NPPF section	Where this is covered in the PEIR
174 …preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.	The potential effects of noise and vibration during both construction and operational are considered in this chapter of the PEIR.
185 mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; and identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.	The assessment of operational noise from the proposed substation and converter station has been undertaken in accordance with relevant British Standards, as described in Section 3.10.4, Section 3.10.9, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**. Details of noise and vibration mitigation are provided in Section 3.10.8, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**.

Noise Policy Statement for England

3.10.2.10 The long-term vision of Government noise policy is set out in the Noise Policy Statement for England (NPSE) (Ref 3.10.9) published in March 2010. Through

effective management and control of environmental noise within the context of Government policy on sustainable development, the NPSE aims to:

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

3.10.2.11 The Explanatory Note to the NPSE assists in the definition of significant adverse and adverse, as stated in the NPPF, with reference to No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) values:

- NOEL: the level of noise exposure below which no effect at all on health or quality of life can be detected;
- LOAEL: the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- SOAEL: the level of noise exposure above which significant adverse effects on health and quality of life occur.

3.10.2.12 The Government policy and guidance do not state values for the NOEL, LOAEL and SOAEL. Rather, it considers that they are different for different noise sources, for different receptors, and at different times, and they should be defined on a strategic or project basis considering the specific features of that area, source, or project.

National Planning Practice Guidance

3.10.2.13 Planning Practice Guidance for Noise (PPGN) (Ref 3.10.10) was published in March 2014 and updated in July 2019. It provides advice on how planning can manage potential noise impacts related to new development. It states that:

"*Noise needs to be considered when development may create additional noise or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced).*"

3.10.2.14 It also states that "*...it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern*."

3.10.2.15 The guidance also advises that Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

3.10.2.16 PPGN provides a noise exposure hierarchy explaining how effects of noise can be categorised, as reproduced in Table 3.10.4.

Table 3.10.4: PPGN noise exposure hierarchy

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

Local Planning Policy

3.10.2.17 The Kent Onshore Scheme lies within the jurisdiction of Kent County Council. County planning guidance which is relevant to a study of noise and vibration and has informed the assessment of preliminary effects in this chapter are as follows:

- Thanet Local Plan, Adopted July 2020 (Ref 3.10.11);
- Dover District Local Development Framework Core Strategy Adopted February 2010 (Ref 3.10.12); and
- Dover District Local Plan Regulation 19 Submission (Ref 3.10.13).

3.10.2.18 The Kent Onshore Scheme Boundary (refer to **Figure 1.1.3 Kent Onshore Scheme Boundary**) lies within the jurisdiction of Kent County Council.

3.10.2.19 The Kent Onshore Scheme Boundary lies within the boundary of Thanet Local Plan and Dover District Local Plan. Local Plan policies which are relevant to noise and vibration matters and will inform the noise and vibration assessment in the ES are detailed in Table 3.10.5 and Table 3.10.6.

Table 3.10.5: Local Planning Policies relevant to noise and vibration – Thanet Local Plan

Thanet Local Plan, Adopted July 2020 – Policy	Where this is covered in the PEIR
SE01 – Potentially Polluting Development The objective of policy SE01 is to ensure that potential development will not adversely affect existing sensitive locations due to various types of pollution, including noise and vibration.	The assessment of operational noise from the proposed substation and converter station has been undertaken in accordance with relevant British Standards, as described in Section 3.10.4, Section 3.10.9, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**. Details of noise and vibration mitigation are provided in Section 3.10.8, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**.
SE06 – Noise Pollution The objective of policy SE06 is to ensure proposed developments do not generate unacceptable levels of noise.	As above.

Table 3.10.6: Local Planning Policies relevant to noise and vibration – Dover District Local Plan

Dover District Local Plan – Policy	Where this is covered in the PEIR
There are no specific policies relating noise from proposed development. However, Section F.4 of the Local Plan Regulation 19 Submission states that noise and vibration assessment/survey, amongst other types of assessment, may be required to support applications in certain locations or certain types of applications.	The assessment of operational noise from the proposed substation and converter station has been undertaken in accordance with relevant British standards, as described in Section 3.10.4, Section 3.10.9, and **Volume 2, Part 3**, **Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**. Details of noise and vibration mitigation are provided in Section 3.10.8, and **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**.

3.10.3 Scoping Opinion and Consultation

Scoping

3.10.3.1 A Scoping Report (Ref 3.10.14) for the Proposed Project was issued to the Planning Inspectorate (PINS) on 24 October 2022 and a Scoping Opinion (Ref 3.10.15) was received from the SoS on 1 December 2022.

3.10.3.2 Table 3.10.7 sets out the comments raised in the Scoping Opinion and how these have been addressed in this PEIR or will be addressed within the ES. The Scoping Opinion takes account of responses from prescribed consultees as appropriate.

Table 3.10.7: Comments raised in the Scoping Opinion

ID	Inspectorate's comments	Response
4.9.1	[*Operational vibration*] The Inspectorate does not agree to scope this matter out given the uncertainties regarding the chosen location of the converter station and the proximity to sensitive receptors. The Scoping Report provides limited information regarding anticipated operational vibration levels. The ES should provide an assessment of operational vibration or the information demonstrating agreement with relevant stakeholders and the absence of likely significant effects.	Information relating to the proposed location and indicative design of the substation and converter station is now available, as detailed in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**. There are no proposed plant items where vibration levels would be deemed significant even immediately next to the plant. There is significant distance between the substation/converter station, and nearby NSR. Adverse and significant adverse effects from operational vibration are therefore highly unlikely and are scoped out of further assessment. This will be kept under review for the ES.
4.9.2	[*Operational road traffic noise and vibration – all options*] The Inspectorate agrees to scope this matter out on the basis that operational traffic movements are likely to be infrequent and unlikely to give rise to significant effects.	Operational traffic is scoped out of further assessment.
4.9.3	[*Construction traffic vibration*] Construction vehicle routes are currently unknown and therefore so is the distance to sensitive receptors. In addition, the number and type of vehicles have not yet been confirmed. In the absence of this detail, the Inspectorate does not agree to scope out construction traffic vibration for the construction phase at this time.	Construction traffic vibration considered in **Volume 2, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration** and Section 3.10.9.
4.9.4	[*Switchgear operational noise*] This matter is proposed to be scoped out on the basis that switchgear noise emissions would be impulsive in character and operation would be infrequent. It is further stated that auxiliary plant comprising standby generators and air compressors would	Operational noise from auxiliary and backup items is scoped out of further assessment. Further details will be provided in the ES as appropriate.

ID	Inspectorate's comments	Response
	contribute to the broadband noise, however, these would not run continuously and would be housed and used as emergency back-up only. The Inspectorate agrees that this matter can be scoped out of further assessment. The ES should contain relevant engineering specifications to demonstrate that switchgear operation is unlikely to result in significant effects and should demonstrate that consultation has been undertaken with the relevant consultation bodies.	
4.9.5	[*Operational noise and vibration from underground cables (operation)*] The Inspectorate agrees that operational noise and vibration from underground cables is unlikely to result in significant effects and agrees that this matter can be scoped out of the ES.	Operational noise and vibration from underground cables is scoped out of further assessment.
4.9.6	[*Overhead line noise (operation)*] The Inspectorate agrees to scope out the operational effects of overheard line noise on the basis that the nearest noise sensitive receptor would be approximately 500 m away from the closest potential proposed overhead line. Based on the nature of the noise emissions and the predicted distance from receptors, the Inspectorate considers that this matter may be scoped out.	Operational noise from overhead lines is scoped out of further assessment.
4.9.7	[*Mitigation measur*es] The Scoping Report refers to noise mitigation measures which include screening and enclosures. The ES should address the potential adverse effects of mitigation measures in the relevant aspect chapters of the ES (e.g., Landscape and Visual) where significant effects are likely to occur.	Landscape and visual effects are considered in **Volume 1, Part 3, Chapter 2, Landscape and Visual**.

3.10.3.3 Based on the Inspectorates comments, construction traffic vibration has been added to the scope of the vibration assessment. Operational vibration is maintained as being scoped out of the assessment as there are no material sources of vibration proposed as part of the Kent Onshore Scheme.

Consultation and Project Engagement

3.10.3.4 National Grid Electricity Transmission plc (National Grid) have consulted with the environmental protection departments of Thanet District Council and Dover District Council regarding the assessment of noise and vibration from the Proposed Project and the noise survey methodology during a meeting held on 27 April 2023. The proposed assessment methodologies were discussed and the results of these discussions are considered in the assessments described in this chapter. Subsequent liaison has been held with regards to the baseline noise survey methodology and locations. Following the baseline noise survey, representative background noise levels for use within the operational noise assessment have been discussed and agreed with Thanet District Council.

3.10.4 Approach and Methodology

3.10.4.1 **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** sets out the overarching approach which has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the baseline conditions, sensitivity of the receptors and magnitude of effects and sets out the significance criteria that have been used for the preliminary noise and vibration assessment.

Guidance Specific to the Noise and Vibration Assessment

3.10.4.2 The preliminary noise and vibration assessment has been carried out in accordance with the following good practice guidance documents:

- British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BS 5228-1) (Ref 3.10.3);
- British Standard 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (BS 5228-2) (Ref 3.10.4);
- Design Manual for Roads and Bridges LA 111 – Noise and Vibration (DMRB LA 111) (Ref 3.10.16);
- Calculation of Road Traffic Noise, 1988 (CRTN) (Ref 3.10.17);
- ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613) (Ref 3.10.18);
- British Standard 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound (BS 4142) (Ref 3.10.19);
- Association of Noise Consultants (ANC) BS 4142:2014+A1:2019 Technical Note, 2020 (Ref 3.10.20);
- British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings (BS 8233) (Ref 3.10.21); and
- British Standard 7445-1:2003 – Description and measurement of environmental noise – Part 1: Guide to quantities and procedures (BS 7445-1) (Ref 3.10.22).

Baseline Data Gathering and Forecasting Methods

Data sources

3.10.4.3 A baseline assessment has been informed by a desk study which has drawn on the following information sources:

- Defra strategic noise mapping (2017) (Ref 3.10.23);
- Ordnance Survey (OS) mapping;
- OS AddressBase Plus data;
- traffic data as described in **Volume 1, Part 3, Chapter 8, Traffic and Transport**; and
- noise survey data.

Noise survey methodology

3.10.4.4 The operational noise assessment has been informed by noise survey data obtained from a location representative of nearby NSR, as shown in **Figure 3.10.1 Kent Noise and Vibration Baseline Information**. The noise survey was conducted in accordance with BS 7445-1 (Ref 3.10.22) and BS 4142 (Ref 3.10.19). The sound level meter measured 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;
- $L_{A90,T}$ – The A-weighted noise level that is exceeded for 90% of the measurement period, and is usually regarded as a descriptor of the background noise level; and
- $L_{AFmax,T}$ –the maximum A-weighted noise level during the sample period, measured using a fast time weighting.

3.10.4.5 Broadband and 1/3 octave band values were measured for the above parameters.

3.10.4.6 The measurement periods and durations were appropriate to the measurement required. Microphones were fitted with windshields and the microphone was mounted between 1.3 m – 1.5 m from ground level. The measurement locations were free-field, at least 3.5 m from any reflective surfaces, other than the ground. Weather conditions were monitored during the survey, with periods of rain and wind speeds greater than 5 metres per second (m/s) excluded from the assessment.

3.10.4.7 The sound level meter was calibrated at the start and end of the survey period with no significant drift observed.

Assessment Criteria

Sensitivity

3.10.4.8 The sensitivity of NSR is determined partly on property type, for example residential properties are of a higher sensitivity than factories and offices.

3.10.4.9 Although all residential NSR are sensitive to noise and vibration, there are also cases where the sensitivity of an NSR may depend on the pre-existing noise climate. For example, NSR falling with existing high noise areas (such as Noise Important Areas (NIA)) may be more sensitive to increases in noise than those outside NIA. Consideration would be given to such instances as part of the assessment of construction impacts.

3.10.4.10 The sensitivity of residential NSR is factored into the assessment methodologies. However, additional consideration of sensitivity may be required in certain cases for non-residential NSR. The criteria used to determine the value and sensitivity of non-residential NSR specific to noise and vibration are set out in Table 3.10.8. These values are based on standard practice.

Table 3.10.8: Criteria for determining value/sensitivity – Non-residential NSR

Sensitivity/Value	Criteria
High	Schools and education premises, hospitals, clinics, care homes, places of worship, community centres, libraries, dwellings within NIA (in relation to road traffic noise)
Medium	Areas primarily used for leisure activities including Public Rights of Way (PRoW), sports facilities and sites of historic or cultural importance, camp sites, hotels, gardens, parks
Low	Offices, cafes/bars with external areas
Negligible	Industrial or retail premises

Magnitude

Construction noise assessment criteria

3.10.4.11 Initial construction noise impacts have been assessed in accordance with BS 5228-1 (Ref 3.10.3) and with the guidance of DMRB LA 111 (Ref 3.10.16).

3.10.4.12 Distances within which the various construction noise magnitude threshold values would be exceeded have been calculated for each construction activity in accordance with the methodology described in Annex F of BS 5228-1. The thresholds are set relative to the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the 'ABC' method). The Category A construction noise thresholds represent the lowest assessment criteria (typically used to assess impacts in rural areas) and are proposed to be used throughout the EIA as a worst-case.

3.10.4.13 The LOAEL and SOAEL are established in accordance with Table 3.10.9.

Table 3.10.9: Construction Noise LOAEL and SOAEL

Time period	LOAEL	SOAEL
Weekdays 7:00am to 7:00pm, and Saturdays 7:00am to 1:00pm	50 dB $L_{Aeq,T}$	65 dB $L_{Aeq,T}$
Weekdays 7:00pm to 11:00pm, Saturdays 1:00pm to 11:00pm, and Sundays 7:00am to 11:00pm	50 dB $L_{Aeq,T}$	55 dB $L_{Aeq,T}$
Night-time 11:00pm to 7:00am	40 dB $L_{Aeq,T}$	45 dB $L_{Aeq,T}$

3.10.4.14 The assessment highlights NSR potentially falling within the various threshold distances. In practice best practical means (BPM) would be employed to reduce construction noise levels. However, for the purposes of this assessment, specific mitigation measures, such as screening, are not included in the calculations (with the exception of certain plant items, such as generators, compressors, and jackhammers). This is so that construction noise 'hot-spots' can be high-lighted and specific noise mitigation measures can be identified to avoid significant adverse effects.

3.10.4.15 The magnitude of impact of construction noise would be determined against the criteria specified by DMRB LA 111, as detailed in Table 3.10.10.

Table 3.10.10: Magnitude of impact from construction noise

Magnitude	Construction noise level
Large	Above or equal to SOAEL +5 dB
Medium	Above or equal to SOAEL and below SOAEL +5 dB
Small	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Construction vibration assessment criteria

3.10.4.16 The distances within which construction vibration threshold levels would be exceeded have been calculated in accordance with the methodologies described in BS 5228-2 (Ref 3.10.4) for each applicable activity.

Construction vibration effect threshold levels, including applicable LOAEL and SOAEL, are presented in

3.10.4.17 Table 3.10.11.

Table 3.10.11: Construction vibration effect levels

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.

* millimetres per second peak particle velocity

3.10.4.18 The assessment highlights NSR potentially falling within the various threshold distances for each activity. Although in practice BPM would be employed to reduce construction vibration levels, for the purposes of this assessment specific mitigation measures are not included in the calculations. This is so that construction vibration 'hot-spots' can be high-lighted and specific noise mitigation measures can be identified to avoid significant adverse effects.

3.10.4.19 The magnitude of impact of construction vibration would be determined against the criteria specified by DMRB LA 111 (Ref 3.10.16), as detailed in Table 3.10.12.

Table 3.10.12: Magnitude of impact of construction vibration

Magnitude	Construction vibration level
Large	Above or equal to 10 mm/s PPV
Medium	Above or equal to SOAEL and below 10 mm/s PPV
Small	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Construction traffic noise assessment criteria

3.10.4.20 Noise from construction traffic on the public highway would be calculated in accordance with CRTN (Ref 3.10.17) and assessed against the criteria detailed in DMRB LA 111 (Ref 3.10.16). The basic noise level (BNL) from roads within the construction traffic study area would be calculated in accordance with CRTN for the 'do-nothing' and 'do-something' scenarios in the construction year.

3.10.4.21 The calculated BNL values for the ‘do-minimum’ and ‘do-something’ scenarios in the construction year would be compared to determine the magnitude of the impact in accordance with criteria specified by DMRB LA 111 as detailed in Table 3.10.13.

Table 3.10.13: Magnitude of impact from construction traffic

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

Operational noise assessment criteria

3.10.4.22 The noise rating level will be compared to the background sound level to determine the magnitude of impact with reference to the criteria described by BS 4142 (Ref 3.10.19). The magnitude of impact of operational noise is determined against the criteria detailed in Table 3.10.14.

Table 3.10.14: Magnitude of impact of operational noise

Magnitude	Comparison of sound rating level and background sound level
Large	Rating level > 10 dB above the background sound level (SOAEL)
Medium	Rating level between 5 and 9 dB above background sound level (LOAEL)
Small	Rating level between 0 and 4 dB above background sound level
Negligible	Rating level below background sound level

3.10.4.23 It is anticipated that further detailed assessment of operational noise from the proposed Minster Substation and Minster Converter Station, once the design has been finalised, detailing specific mitigation measures would be secured via a requirement attached to the DCO, if granted. The assessment will therefore focus on setting of noise limits such that adverse impacts are avoided.

3.10.4.24 Although the above criteria will be used to assess the magnitude of impact, it is standard practice to aim for a sound rating level not to exceed the background sound level, such that the impact is ‘low’ (as defined in BS 4142), or negligible in terms of the impact magnitude definition defined in Table 3.10.14 above. Additionally, the local authority aim is for the rating level to be at least 5 dB below the background sound level, where feasible.

3.10.4.25 Consideration will also be taken of the context as defined in BS 4142 (Ref 3.10.19) for the final determination of significance; in particular, absolute noise levels. Taking account of the guidance provided by BS 4142, the ANC Technical Note (Ref 3.10.20), BS 8233 (Ref 3.10.21), and PPGN (Ref 3.10.10), where background sound levels are 'low' (less than about 30 dB L_{A90}), the SOAEL is defined as follows:

- SOAEL: rating level >34 dB $L_{Ar,Tr}$ or ≥10 dB above the background sound level, whichever is higher.

Significance of effects

3.10.4.26 As set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** the general approach taken to determining the significance of effect in this preliminary assessment is only to state whether effects are likely or unlikely to be significant, rather than assigning significance levels.

3.10.4.27 At residential NSR, large and medium magnitude effects are typically considered to be significant, whilst minor and negligible effects are considered to be not significant.

3.10.4.28 At non-residential NSR the significance of effect is based on the significance matrix provided in Table 3.10.15.

Table 3.10.15: Significance matrix at non-residential NSR

		NSR sensitivity:			
		High	**Medium**	**Low**	**Negligible**
Impact magnitude	**Large**	Major	Major	Moderate	Minor
	Medium	Moderate	Moderate	Minor	Negligible
	Small	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

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

3.10.4.30 With regards to construction noise and vibration, significant effects are deemed to occur where the impact occurs for a period of at least ten days in any 15 consecutive days or 40 days in any consecutive six-month period, based on guidance from BS 5228-1 (Ref 3.10.3) and DMRB LA 111 (Ref 3.10.16).

Assumptions and Limitations

3.10.4.31 The assessment is based on currently available information for the Proposed Project. It is assumed that third party data is accurate.

3.10.5 Basis of Assessment

3.10.5.1 This section sets out the assumptions that have been made in respect of design flexibility maintained within the Proposed Project and the consideration that has been given to alternative scenarios and the sensitivity of the preliminary assessment to changes in the construction commencement year.

3.10.5.2 Details of the available flexibility and assessment scenarios are presented in **Volume 1, Part 1, Chapter 4, Proposed Project Description** and **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**.

Flexibility Assumptions

3.10.5.3 The main preliminary assessments have been undertaken based on the description of the Proposed Project provided in **Volume 1, Part 1 Chapter 4, Description of the Proposed Project**. To take account of the flexibility allowed in the Proposed Project, consideration has been given to the potential for preliminary effects to be of greater or different significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LoD) or draft Order Limits.

3.10.5.4 The assumptions made regarding the use of flexibility for the main assessment, and any alternatives assumptions are set out in Table 3.10.16 below.

Table 3.10.16: Flexibility assumptions and Minister substation

Element of flexibility	Proposed Project assumption for initial preliminary assessment	Flexibility assumption considered
Lateral LoD high voltage direct current (HVDC) cables	The preliminary assessment of construction noise and vibration effects considers works occurring at the extent of the LoD boundary as a worst-case.	The preliminary assessment of construction noise and vibration impacts has already considered a worst-case and therefore no flexibility in assumptions has been considered.
Lateral LoD Minster Converter Station and Substation	The preliminary assessment of construction noise and vibration effects considers works occurring at the extent of the LoD boundary as a worst-case.	The preliminary assessment of construction noise and vibration impacts has already considered a worst-case and therefore no flexibility in assumptions has been considered.
	The preliminary assessment of operational noise effects from the proposed Minster Converter Station and Substation is based on the proposed location shown in **Figure 1.4.12 Minster 400kV Substation and Minster Converter Station Indicative Location**.	The potential implications on operational noise impacts due to movement of the proposed Minster Converter Station and Substation anywhere within the LoD are considered qualitatively within Section 3.10.9.

Element of flexibility	Proposed Project assumption for initial preliminary assessment	Flexibility assumption considered
Vertical LoD Minster Converter Station and Substation	The vertical LoD for the Minster Converter Station and Substation would not have a material effect on the assessment of construction noise and vibration or operational noise impacts	No likely change in outcome due to flexibility.
Lateral LoD overhead line	The preliminary assessment of construction noise and vibration effects considers works occurring at the extent of the LoD boundary as a worst-case.	The preliminary assessment of construction noise and vibration impacts has already considered a worst-case and therefore no flexibility in assumptions has been considered.
Vertical LoD overhead line	The vertical LoD for overhead lines would not have a material effect on the assessment of construction noise and vibration impacts	No likely change in outcome due to flexibility.

Consideration of Scenarios and Options

3.10.5.5 Two alternative scenarios have been considered within each of the technical assessment chapters in Part 3. These are:

- the use of either low height or standard height pylons for the high voltage alternating current (HVAC) connection. Within this scenario there are three options as explained in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**; and
- permanent access to proposed Minster Converter Station and substation is either taken off A256 (through bellmouth BM02) or off Jutes Lane through bellmouth BM03 but with bellmouth BM02 being retained for any abnormal indivisible load (AIL) movements during maintenance and operation as explained in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**.

3.10.5.6

3.10.5.7 Table 3.10.17 details where these scenarios are relevant to the preliminary landscape and visual assessment and how they have been assessed and reported in Section 3.10.9, preliminary assessment of effects.

Table 3.10.17: Consideration of scenarios

Assessment scenario	How it has been considered within the preliminary assessment
Pylon types	There is no material difference in construction noise and vibration impacts from the various pylon types and the preliminary assessment of construction noise and vibration effects from pylon construction considers the worst-case pylon locations being at the LoD boundary.
Permanent access to Minster Converter station and Substation	The preliminary assessment of construction noise and vibration effects considers both potential permanent accesses are constructed, as a worst-case.

Sensitivity Test

3.10.5.8 It is likely that under the terms of the draft DCO, construction could commence in any year up to five years from the granting of the DCO which is assumed to be 2026. Consideration has been given to whether the preliminary effects reported would be any different if the works were to commence in any year up to year five. Where there is a difference this is reported in Section 3.10.9, preliminary assessment of effects.

3.10.6 Study Area

3.10.6.1 This section describes the study areas for the various noise and vibration assessment. The study areas are shown graphically in **Figure 3.10.1 Kent Noise and Vibration Baseline Information.**

Construction Noise Study Area

3.10.6.2 The proposed study area for construction noise effects would include NSR within 300 m from the draft Order Limits/construction works associated with the Proposed Project, excluding traffic on the public highway which is considered separately below. This is based on guidance in BS 5228-1 (Ref 3.10.3) and DMRB LA 111 (Ref 3.10.16).

Construction Vibration Study Area

3.10.6.3 The proposed study area for construction vibration effects, based on guidance from BS 5228-2 (Ref 3.10.4) and DMRB LA 111 (Ref 3.10.16), comprises 100 m from the closest construction activity with the potential to generate vibration impacts at NSR.

Construction Traffic Noise Study Area

3.10.6.4 Noise from construction traffic on the existing road network would be assessed for each applicable road. The assessment would consider the change in BNL, calculated in line with the methodology described in CRTN (Ref 3.10.17), with a subsequent assessment of the impacts on NSR within 50 m of routes where potential significant effects are identified.

Operational Noise Study Area

3.10.6.5 The proposed study area for operational noise effects from the proposed Minster Converter Station and Minster Substation, based on guidance from ISO 9613 (Ref 3.10.18), would include NSR within 1 km of the converter station and substation, with a particular focus on the nearest NSR.

3.10.7 Baseline Conditions

3.10.7.1 This section describes the baseline noise and vibration conditions in the study area for the Kent Onshore Scheme. Baseline information is shown graphically in **Figure 3.10.1 Kent Noise and Vibration Baseline Information**.

Noise Sensitive Receptors

3.10.7.2 There are built-up residential areas at:

- Ebbsfleet to the northeast; and
- Minster to the northwest.

3.10.7.3 There are also isolated NSR and small settlements within the noise and vibration study area located between the main built-up residential areas identified above.

3.10.7.4 In relation to the operational noise study area, the nearest NSR are located approximately 650 m to the east of the proposed Minster Converter Station and Substation. These include one residential receptor (R_16000) and one educational establishment (E_35). Additionally there are four further residential NSR (R_11056, R_8335, R_12489, and R_6709) approximately 800 m to the east.

Noise Climate

Desk study

3.10.7.5 The study area includes a mix of residential, rural, industrial, and commercial environments. The noise climate is therefore expected to vary throughout the study area.

3.10.7.6 The main sources of noise include road traffic from the A256 which runs between Ramsgate to the north and Dover to the south. There are potential railway noise sources from train services on the Ashford to Ramsgate Line and the Kent Coast Line. There are also potential industrial sources of noise, particularly in the vicinity of the A256. Away from these sources of noise into more rural areas, ambient sound levels are lower.

3.10.7.7 Defra strategic noise mapping (Ref 3.10.23) indicates that ambient noise levels are moderate to high in the vicinity of the A256 but reduce to relatively low levels beyond approximately 300 m from the road.

3.10.7.8 There are a number of NIA on the existing public highway along routes which may be used for construction traffic associated with the Kent Onshore Scheme. NIA are determined via strategic noise maps and highlight the residential areas experiencing the highest 1% of noise levels from road and rail sources in England. These are generally away from the construction noise study area but may be applicable when identifying potential construction traffic noise impacts on the wider road network as receptors within NIA have greater sensitivity to increases in road traffic noise. The NIA within the construction noise study area are as follows:

- NI_12135 – Ebbsfleet Lane, adjacent to Ramsgate Road; and
- NI_4487 – Sandwich Road at Foads Lane.

3.10.7.9 There are additional NIA in the wider area on main transport routes (e.g. Island Road, and the A299) which are not likely to be significantly affected by the Kent Onshore Scheme as the comparative change in traffic would be negligible.

Noise surveys

3.10.7.10 A baseline noise survey has been conducted at one location (K_L1), as shown in **Figure 3.10.1 Kent Noise and Vibration Baseline Information,** to inform the assessment of operational noise. The survey location is approximately 500 m to the east of the proposed Minster Converter Station site at a location representative of the nearest NSR. Details of the survey are provided in **Volume 2, Part 3, Appendix 3.10.A, Kent Noise Survey Data**. A summary of the measured noise levels is provided in Table 3.10.18.

Table 3.10.18: Summary of measured noise levels

Survey location	Time period	Average noise level, dB $L_{Aeq,15min}$	Maximum noise level, dB $L_{AFmax,15min}$	Background sound level, dB $L_{A90,15min}$
K_L1	Day	Range: 34 – 73 Average: 50	Range: 41 – 97 Typical: 60	Range: 31 – 49 Average: 37 Mode: 38
	Night	Range: 29 – 63 Average: 48	Range: 34 – 84 Typical: 47	Range: 27 – 42 Average: 32 Mode: 29

3.10.7.11 Table 3.10.19 presents a summary of representative background sound levels during daytime and night-time periods at the survey location for use in the operational noise assessment.

Table 3.10.19: Summary of representative background sound levels

Monitoring location	Representative background noise level, dB $L_{A90,15min}$	
	Daytime	Night-time
K_L1	35	29

3.10.7.12 The representative background sound levels to be used within the assessment of operational noise were discussed and agreed with Thanet District Council.

Vibration Baseline

3.10.7.13 Vibration impacts are assessed against fixed thresholds. It is assumed that existing vibration levels are negligible in the study area.

Future Baseline

3.10.7.14 No significant changes to the future noise and vibration baseline are anticipated. Should there be any changes, these would be assessed within the ES.

3.10.8 Mitigation

3.10.8.1 As set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**, mitigation measures typically fall into one of the three categories: embedded measures; control and management measures; and mitigation measures.

Embedded Measures

3.10.8.2 Embedded measures have been integral in reducing the noise and vibration effects of the Proposed Project. Measures that that have been incorporated are:

- Sensitive routeing and siting of infrastructure and temporary works;
- Commitments made within **Volume 2, Part 1, Appendix 1.4.F, Outline Schedule of Environmental Commitment and Mitigation Measures**.

Control and Management Measures

3.10.8.3 The following measures have been included within **Volume 2, Part 1, Appendix 1.4.A, Outline Code of Construction Practice** relevant to the control and management of impacts that could affect noise and vibration receptors:

- GG01: The Proposed Project will be run in compliance with all relevant legislation, consents and permits.
- GG03: A Construction Environmental Management Plan (CEMP), a Landscape and Ecological Management Plan (LEMP) and a Construction Traffic Management Plan (CTMP) will be produced prior to construction.
- GG04: The CEMP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans. The name and contact details of person(s) accountable for issues relating to dust, waste, water, noise, vibration and soil will be displayed at site boundary.
- GG05: A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced Environmental Clerk of Works (ECoW) will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CEMP. The ECoW will monitor that the works proceed in accordance with relevant environmental management plans secured through DCO requirements and adhere to the required good practice and mitigation measures. The ECoW will be supported as necessary by appropriate specialists, including ecologists and arboriculturists.

- GG06: Construction workers will undergo training to increase their awareness of environmental issues as applicable to their role on the project. Topics will include but not be limited to:
  - pollution prevention and pollution incident response;
  - dust management and control measures;
  - location and protection of sensitive environmental sites and features;
  - adherence to protected environmental areas around sensitive features;
  - working hours and noise and vibration reduction measures;
  - working with potentially contaminated materials;
  - waste management and storage;
  - flood risk response actions; and
  - agreed traffic routes, access points, etc.
- GG11: Any activity carried out or equipment located within a construction compound that may produce a noticeable nuisance, including but not limited to dust, noise, vibration and lighting, will be located away from sensitive receptors such as residential properties or ecological sites where practicable.
- GG14: Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including cable drums and excavated materials, drop heights will be limited.
- GG27: Working areas will be appropriately fenced. The type of fencing installed will depend on the area to be fenced and will take into consideration the level of security required in relation to the surrounding land and public access, rural or urban environment and arable or stock farming. For some locations the fence used may also serve to provide acoustic and visual screening of the work sites and reduce the potential for disturbance of users in the surrounding areas. Fencing will be regularly inspected and maintained and removed as part of the demobilisation unless otherwise specified.
- GG28: Members of the community and local businesses will be kept informed regularly of the works through active community liaison. This will include notification of noisy activities, heavy traffic periods and start and end dates of key phasing. A contact number will be provided which members of the public can use to raise any concerns or complaints about the project. All construction-related complaints will be logged by the contractor(s) in a complaints register, together with a record of the responses given and actions taken.
- NV01: Construction working will be undertaken within the agreed working hours set out within the DCO. Best practicable means to reduce construction noise will be set out within the CEMP.
- NV02: Construction traffic routes, access tracks, and construction haul routes will be surveyed for damage and irregularities (e.g. potholes) that may lead to vibration from construction traffic. Access tracks and construction haul routes will be well maintained.

- NV03: Proposed substations and converter stations will be designed such that noise from their normal operation does not cause a significant adverse effect at nearby noise sensitive receptors. Additionally, where feasible the substation and converter station designs will seek to achieve noise levels at nearby noise sensitive receptors in line with the aims the local authorities, or otherwise as low as reasonably possible.
- TT01: The CTMP will set out measures to reduce route and journey mileage to and from and around site, and prevent nuisance to the residents, businesses and the wider community caused by parking, vehicle movements and access restrictions. It will also provide suitable control for the means of access and egress to the public highway and set out measures for the maintenance and upkeep of the public highway. The plan will also identify access for emergency vehicles. It will also set out measures to reduce safety risks through construction vehicle and driver quality standards and measures to manage abnormal loads.
- TT02: The contractor(s) will implement a monitoring and reporting system to check compliance with the measures set out within the CTMP. This will include the need for a GPS tracking system to be fitted to Heavy Goods Vehicles (HGV) to check for compliance with authorised construction routes. The contractor(s) will also be expected to monitor the number of construction vehicles between the site and the strategic road network. Deviations from the authorised routes or changes to traffic levels that are higher than the CTMP assumptions will require discussion of the need for additional mitigation measures with relevant highways authorities.

Mitigation Measures

3.10.8.4 Mitigation measures are additional topic and site-specific measures that have been applied to mitigate or offset any likely significant effects. Mitigation measures included that are relevant to noise and vibration receptors are:

- Application of BPM (e.g. screening) to reduce levels of noise and vibration from potentially significant construction activities; and
- Minster Converter Station and Minster Substation will include appropriate noise mitigation measures in the design (e.g. plant selection, and transformer noise enclosures).

3.10.9 Preliminary Assessment of Effects

3.10.9.1 The preliminary assessment of the effects of the Kent Onshore Scheme described in this section considers the embedded, control and management and mitigation measures described in Section 3.10.8.

3.10.9.2 The preliminary noise and vibration assessment of the effects of the Kent Onshore Scheme is presented in the following tables.

Preliminary Assessment of Construction Noise Effects

3.10.9.3 Table 3.10.20 presents the preliminary assessment of construction noise. The assessment is based on the information contained in **Volume 2, Part 1, Appendix 1.4.A, Construction Plant Schedule** and **Volume 2, Part 3**, **Appendix 3.10.B, Kent Construction Noise and Vibration Data**. Results are also shown graphically in **Figure 3.10.2 Kent Initial Construction Noise and Vibration Assessment**.

Table 3.10.20: Preliminary assessment of construction noise

	Preliminary assessment
Receptors	Noise sensitive receptors within the construction noise study area as shown in **Figure 3.10.1 Kent Noise and Vibration Baseline Information**.
Potential Impact	Potential noise impacts from construction activities.
Proposed Project phase	Construction.
Duration	Temporary short to medium term.
Mitigation	GG01, GG03, GG04, GG05, GG06, GG11, GG14, GG25, GG26, NV01.
Preliminary sensitivity	Residential – Sensitivity factored into assessment. Educational - High sensitivity.
Preliminary magnitude	Without mitigation, there is medium to large magnitude impacts from construction activities within approximately 126 m of residential NSR and within approximately 300 m of the high sensitivity NSR. The assessment assumes that no specific mitigation measures are in place in order to highlight noise 'hot-spots'. Potential medium or large magnitude impacts are likely at four residential NSR (R_8335, R_11056, R_16000, and C_3378)) and a small magnitude impact is likely at one educational NSR (E_35) without mitigation, as shown in **Figure 3.10.2 Kent Initial Construction Noise and Vibration Assessment**. The effects at R_8335 and R_11056 would be due to haul road construction and drainage works to the north and northeast. The effects at R_16000, C_3378, and E_35 would be due to permanent access road construction to the east.

	Preliminary assessment
	Impacts from all other construction activities, including cable construction, compounds, substation and converter station construction, pylons, overhead lines, and landfall would be, at worst, small magnitude. Where BPM, such as localised screening, are in place, construction noise impacts would be negligible to small magnitude at all NSR. <u>Consideration of LoD</u> The assessment considers works could occur at the extent of the LoD boundary as a worst-case.
Preliminary likely significance of effect	With mitigation, effects are likely **Not Significant** at all NSR.
Sensitivity Test	The assessment outcome would not be expected to be affected by altering the start dates of the works.
Confidence in prediction	Medium to high.

Preliminary Assessment of Construction Vibration Effects

3.10.9.4 Table 3.10.21 provides the preliminary assessment of construction vibration. The assessment is based on the information contained in **Volume 2, Part 1, Appendix 1.4.A, Construction Plant Schedule** and **Volume 2, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration Data**. Results are also shown graphically in **Figure 3.10.2 Kent Initial Construction Noise and Vibration Assessment**.

Table 3.10.21: Preliminary assessment of construction vibration

	Preliminary assessment
Receptors	Noise sensitive receptors within the construction vibration study area as shown in **Figure 3.10.1 Kent Noise and Vibration Baseline Information**.
Potential Impact	Potential vibration impacts from construction activities.
Proposed Project phase	Construction.
Duration	Short duration. Expected to be less than one day.
Mitigation	GG01, GG03, GG04, GG05, GG06, GG11, GG26, NV01.
Preliminary sensitivity	Residential – Sensitivity factored into assessment criteria.
Preliminary magnitude	There is potential medium to large magnitude impact during ground compaction activities if conducted within approximately 18 m of the NSR. This would include one residential NSR (C_3378), as shown in Volume 3 Part 3 **Figure 3.10.2 Kent Initial Construction Noise and Vibration Assessment**.. This is due to potential compaction activities associated with the proposed permanent access immediately to the east. However, the duration of such activities is likely to be relative short (likely less than a day) and below the temporal threshold significance. Impacts from all other activities, including any piling, and compaction activities associated with cable construction, compounds, substation and converter station construction, pylons, and landfall would be, at worst, small magnitude. <u>Consideration of LoD</u> The assessment considers works could occur at the extent of the LoD boundary as a worst-case.
Preliminary likely significance of effect	Likely **Not Significant** at all NSR.
Sensitivity Test	The assessment outcome would not be expected to be affected by altering the start dates of the works.

	Preliminary assessment
Confidence in prediction	Medium to high.

Preliminary Assessment of Construction Traffic Noise Effects

3.10.9.5 Table 3.10.22 provides the preliminary assessment of construction traffic noise. The assessment is detailed in **Volume 3, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration Data**.

Table 3.10.22: Preliminary assessment of construction traffic noise

	Preliminary assessment
Receptor	NSR close to proposed transport routes on the public highway.
Potential Impact	Potential impact due to increased road traffic noise due to the additional contribution from construction traffic on the public highway.
Proposed Project phase	Construction.
Duration	Temporary short to medium term.
Mitigation	GG01, GG03, GG04, GG05, GG06, GG26, NV01, NV02, TT01, TT02.
Preliminary sensitivity	Within 50 m of affected routes there are residential NSR and low to medium sensitivity non-residential receptors.
Preliminary magnitude	The results indicate that there is a small magnitude impact on one route; namely Ebbsfleet Lane. The impact of all other routes is negligible magnitude.
Preliminary likely significance of effect	Likely **Not Significant** at all NSR.
Sensitivity Test	The assessment outcome would not be expected to be affected by altering the start dates of the works.
Confidence in prediction	Medium.

Preliminary Assessment of Construction Traffic Vibration Effects

3.10.9.6 Table 3.10.23 provides the preliminary assessment of construction traffic vibration. The assessment is detailed in **Volume 3, Part 3, Appendix 3.10.B, Kent Construction Noise and Vibration Data**.

Table 3.10.23: Preliminary assessment of construction traffic vibration

	Preliminary assessment
Receptors	Vibration sensitive receptors close to proposed transport routes (public highway, access tracks, and haul roads).

	Preliminary assessment
Potential Impact	Potential vibration impact from construction traffic on the public highway, access tracks, and haul roads.
Proposed Project phase	Construction.
Duration	Short to medium term.
Mitigation	GG03, GG04, GG05, GG06, GG11, GG14, GG26, NV01, NV02, TT01, TT02
Preliminary sensitivity	Residential – Sensitivity factored into assessment criteria; and Medium to high sensitivity non-residential NSR.
Preliminary magnitude	Where the public highway, access tracks, and haul roads are well maintained, the magnitude of impact will be negligible to small.
Preliminary likely significance of effect	Likely **Not Significant** at all NSR.
Sensitivity Test	The assessment outcome would not be expected to be affected by altering the start dates of the works.
Confidence in prediction	High.

Preliminary Assessment of Operational Noise Effects

3.10.9.7 Table 3.10.24 provides the preliminary assessment of operational noise. The assessment is detailed in **Volume 2, Part 3, Appendix 3.10.C, Kent Preliminary Operational Noise Assessment**.

Table 3.10.24: Preliminary assessment of operational noise

	Preliminary assessment
Receptor	Noise sensitive receptors within the operational noise study area as shown **in Figure 3.10.1 Kent Noise and Vibration Baseline Information**.
Potential Impact	Potential impact of operational noise from the proposed substation and converter station.
Proposed Project phase	Operation.
Duration	Permanent long term.
Mitigation	NV03. Minster Converter Station and Minster Substation will include appropriate noise mitigation measures in the design (e.g. plant selection, and transformer noise enclosures)
Preliminary sensitivity	Residential – Sensitivity factored into assessment. Educational – High sensitivity.

	Preliminary assessment
Preliminary magnitude	The assessment is based on the proposed Minster Converter Station and Minster Substation being located at the indicative location shown in **Figure 1.4.12 Minster 400kV Substation and Minster Converter Station Indicative Location**. The main sources of noise from the proposed Minster Converter Station and Minster Substation are transformers. Noise from all other sources would be negligible. Where standard noise mitigation measures are incorporated in the design, such as plant selection and transformer enclosures, the impact of operational noise from the proposed substation and converter station would be negligible magnitude at all nearby NSR. <u>Consideration of LoD</u> All else being equal, noise levels would be higher if the converter station and substation were built closer to NSR and lower if built further from NSR. Noise levels would typically increase or reduce by approximately 6 dB for every halving or doubling of distance, respectively. Changing the location of the converter station and substation within in LoD therefore has the potential to affect the outcome of the assessment. However, the design of the proposed converter station and substation would also alter, in terms of the proposed noise mitigation measures, to reflect those changes. Additionally, potential noise impacts would act as a constraint within the LoD such that movement to within distances which would lead to adverse or significant adverse effect would be avoided, where practicable. The overall outcome therefore would not be expected to change due to movement within the LoD provided appropriate noise mitigation measures are considered in the design. It is anticipated that further detailed assessment of operational noise from the proposed Minster Substation and Minster Converter Station, once the design has been finalised, detailing specific mitigation measures would be secured via a requirement attached to the DCO, if granted.
Preliminary likely significance of effect	Likely **Not Significant** at all NSR.
Sensitivity Test	The assessment outcome would not be expected to be affected by altering the start dates of the works.
Confidence in prediction	Medium to high.

3.10.10 Summary

3.10.10.1 Table 3.10.25 provides the preliminary assessment of noise and vibration.

Table 3.10.25: Summary of preliminary effects of noise and vibration

Source	Receptor	Sensitivity	Magnitude	Significance of effect
Construction noise	NSR	Residential, and medium to high non-residential NSR	Negligible to small	**Not Significant**
Construction vibration	NSR	Residential, and medium to high non-residential NSR	Negligible to small	**Not Significant**
Construction traffic noise	NSR	Residential, and low to medium non-residential NSR	Negligible to small	**Not Significant**
Construction traffic vibration	NSR	Residential, and medium to high non-residential NSR	Negligible to small	**Not Significant**
Operational noise	NSR	Residential, and medium to high non-residential NSR	Negligible	**Not Significant**

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