The Great Grid Upgrade

Sea Link

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Kent Operational Noise Assessment

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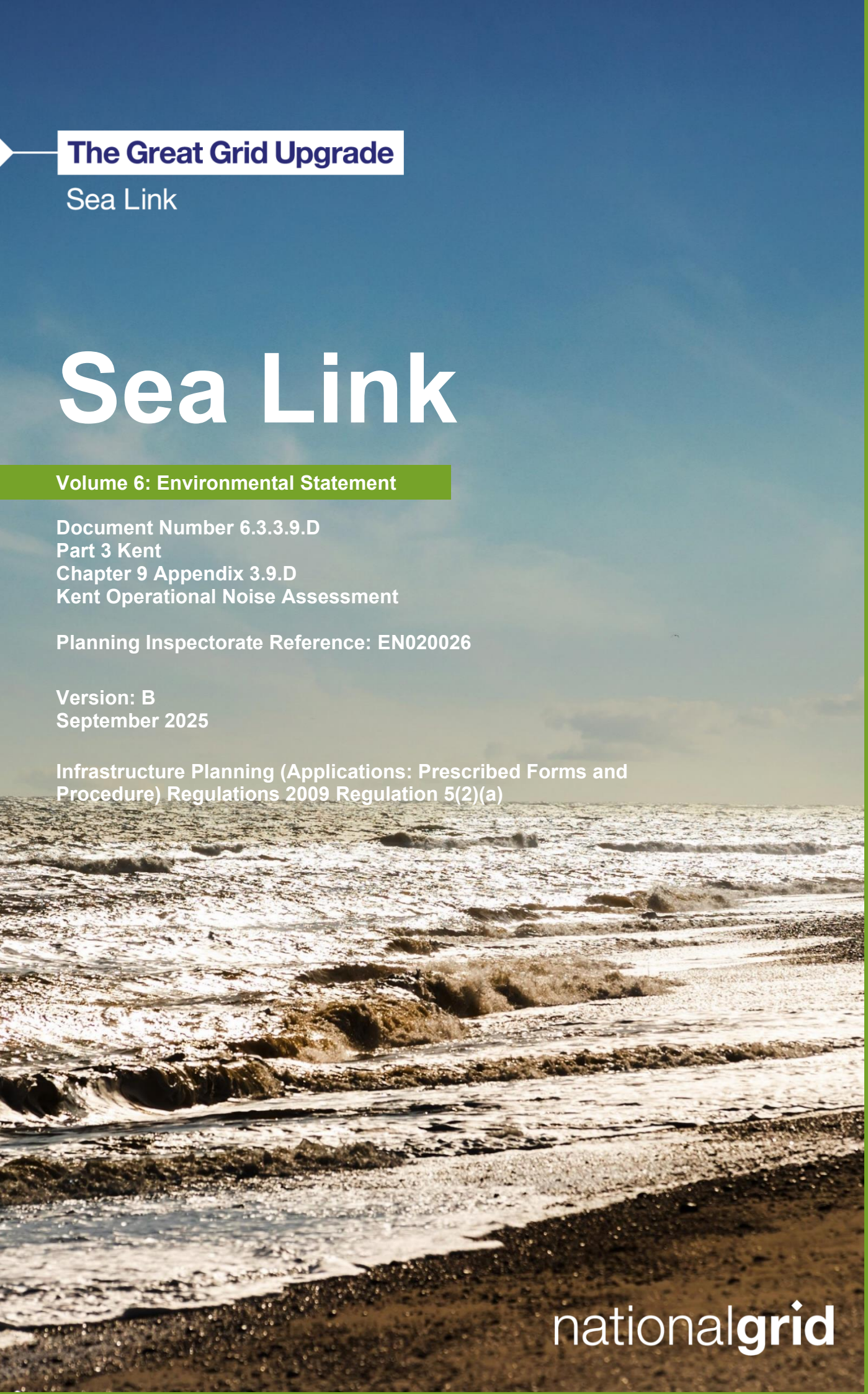

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Version History

Date	Issue	Status	Description / Changes
March 2025	A	Final	For DCO submission
September 2025	B	Final	Update to reflect S89(3) Procedural Decision from the Examining Authority

1. Kent Operational Noise Assessment

1.1 Introduction

1.1.1 This appendix presents the results of the operational noise assessment conducted as part of the Kent Onshore Scheme. The assessment considers the potential effects of operational noise from the proposed Minster Converter Station and Substation at nearby noise sensitive receptors (NSR). The assessment is indicative and based on outline design information and is does not therefore provide a definitive indication of noise impacts from the proposed Minster Converter Station and Substation. The assessment does, however, present an assessment of noise from a 'generic' converter station with standard noise mitigation measures applied. Further detailed design would be undertaken by the developer, if consent is granted, and noise would be considered as a design parameter, with specific mitigation measures applied. The assessment of operational noise from the proposed Minster Converter Station and Substation presented in this appendix therefore represents a likely worst-case scenario.

1.1.2 The assessment draws on the findings of noise survey data detailed in **Application Document 6.3.3.9.A ES Appendix 3.9.A Kent Noise Survey Data**.

1.2 Assessment Methodology

1.2.1 The assessment of operational noise has been conducted in accordance with British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS 4142) (BSI, 2019). The assessment methodology was discussed and has been agreed with the environmental health department of Thanet District Council.

1.2.2 BS 4142 is used to assess the potential significance of effects by comparing the 'rating sound level' of an industrial source to the typically representative 'background sound level' at the location of nearby NSR. Certain acoustic features can increase the potential for a sound to attract attention, and therefore increase its relative significance than that expected from a simple comparison between the specific sound level and the background sound level. In particular, BS 4142 identifies noise that contains audible tonality, impulsivity and/or intermittency and recommends that a correction be added to the specific sound level. The specific sound level along with any applicable correction is referred to as the 'rating level'. It should be noted that the penalties can be additive (i.e., if they have a combination of tonal (e.g. whistling or humming), impulsive (e.g. hammering or banging), and intermittent (e.g. regularly turning on and off) acoustic characters.

1.2.3 Where tonality is audible at a receptor a penalty of between 0 and 6 dB may be applied. Subjectively, a 2 dB penalty may be applied where a tone is just perceptible, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

1.2.4 The greater the difference between the rating level and the background sound level; the greater the likelihood of complaints. The assessment criteria given by BS 4142 are as follows:

- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- a difference of around +5 dB could be an indication of an adverse impact, depending on the context.

1.2.5 The lower the rating level is, relative to the measured background sound level, the less likely it is that there will be an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a 'low' impact (in BS 4142 terminology), depending on the context.

1.2.6 The assessment should also consider the context of the sound. Where the initial estimate of the impact needs to be modified due to the context, all pertinent factors should be considered, including:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor, including whether dwellings already incorporate design measures that secure good internal and/or outdoor conditions, such as: façade insulation treatment, ventilation and/or cooling that will reduce the need to have windows open to provide rapid or purge ventilation, and acoustic screening.

1.2.7 With regards to the absolute level of the sound, BS 4142 states that where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background, particularly at night. Guidance on this matter is provided by:

- BS 4142;
- World Health Organization (WHO) Guidelines for Community Noise (GfCN) (WHO, 1999);
- WHO Night Noise Guidelines (NNG) (WHO, 2009);
- The Association of Noise Consultants (ANC) BS 4142:2014+A1:2019 Technical Note Version 1.0 (ANC, 2020);
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BS 8233) (BSI, 2014); and
- Planning Practice Guidance for Noise, 2019 (PPGN) (HM Government, 2019).

1.2.8 The noise rating level will be compared to the background sound level to magnitude of impact. The magnitude of impact of operational noise is determined against the criteria detailed in Table 1.1.

Table 1.1 Magnitude of impact of operational noise

Magnitude	Comparison of sound rating level and background sound level
Large	Rating level ≥ 10dB above the background sound level (significant observed adverse effect level (SOAEL))

Magnitude	Comparison of sound rating level and background sound level
Medium	Rating level between 5 and 9 dB above background sound level (lowest observed adverse effect level (LOAEL))
Small	Rating level between 0 and 4 dB above background sound level
Negligible	Rating level below background sound level

1.2.9 Although the above criteria are 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 1.1 above. Additionally, the local authority aim is for the rating level to be at least 5 dB below the background sound level, where feasible.

1.2.10 Consideration, will also be taken of context, as defined in BS 4142, for the final determination of significance; this is particularly the case for absolute noise levels.

1.3 Baseline Data

Introduction

1.3.1 This section details the baseline information used within the preliminary operation noise assessment.

1.3.2 The proposed Minster Converter Station and Substation location, study area, NSR locations, and noise survey location, are shown in Plate 1.1.

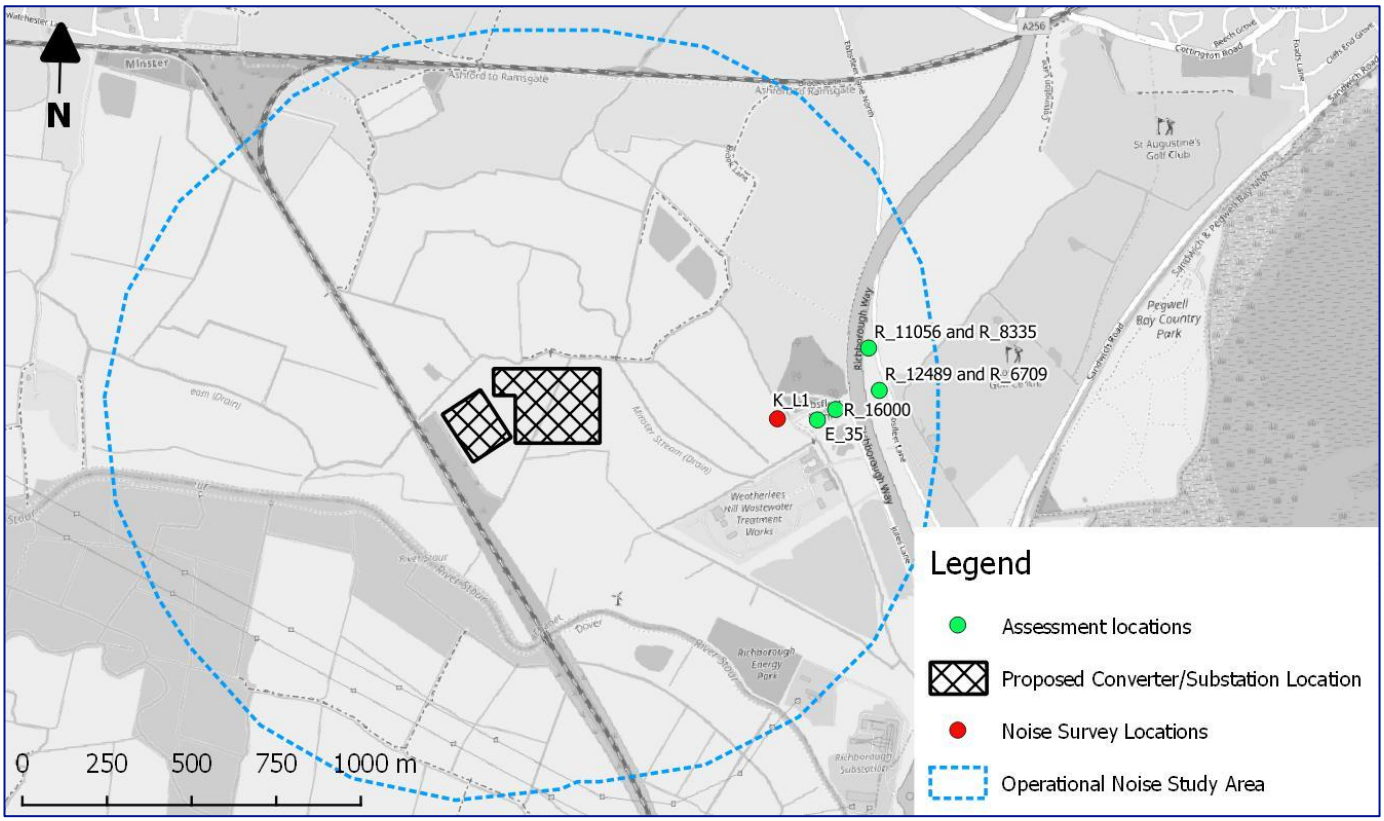

Plate 1.1 Kent Onshore Scheme operational noise baseline information

Study Area

1.3.3 The proposed study area for operational noise effects from substations, based on guidance from ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors (ISO 9613) (ISO, 2024), is an area within 1 km of the Minster Converter Station and Substation, with a particular focus on the nearest NSR within that area.

Noise Sensitive Receptors

1.3.4 The nearest NSR are located approximately 650 m to the east of the proposed converter station site. 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.

Measured Noise Levels

1.3.5 The operational noise assessment has been informed by noise survey data obtained from a location representative of nearby NSR as detailed in Plate 1.1. The survey was undertaken over an eight day period in June 2023. Details of the baseline survey are presented in **Application Document 6.3.3.9.A ES Appendix 3.9.A Kent Noise Survey Data**.

1.3.6 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;
- $L_{AFmax,T}$ –the maximum A-weighted noise level during the sample period, measured using a fast time weighting; and
- $L_{A90,T}$ – 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.

1.3.7 A summary of the measured sound levels is provided in Table 1.2.

Table 1.2 Summary of measured sound levels – K_L1

Time period	Average sound level, dB LAeq,15min	Maximum sound level, dB LAFmax,15min	Background sound level, dB LA90,15min
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

Representative Background Sound Levels

1.3.8 Table 1.3 Summary of representative background sound levels 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 1.3 Summary of representative background sound levels

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

1.3.9 The representative background sound levels were agreed with the environmental health department of Thanet District Council.

1.4 Operational Noise Assessment

Operational Plant Sound Level Data

1.4.1 An indicative 3D view of the proposed Minster Converter Station and Minster Substation is shown in Plate 1.2 The location of the transformers is identified as these are the main sources of noise from the Minster Converter Station.

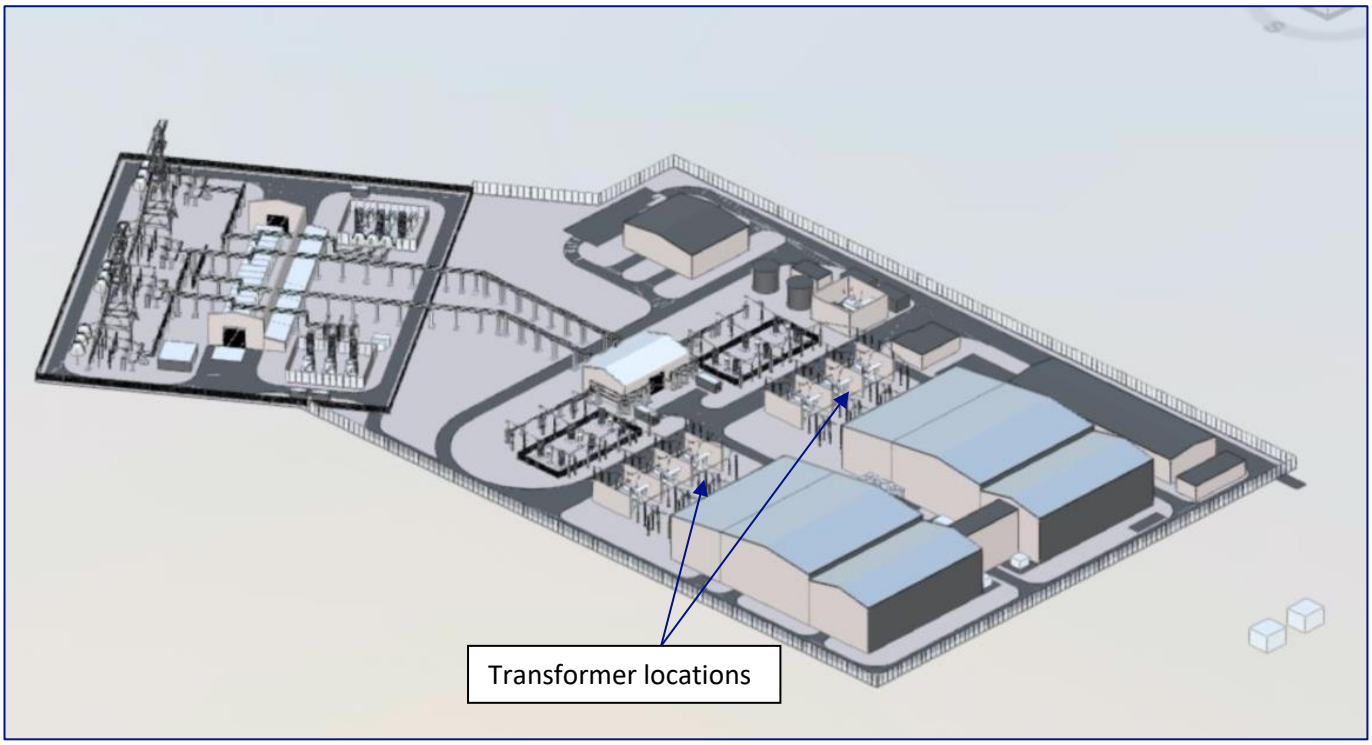

Plate 1.2 Indicative 3D view of Proposed Minster Converter Station and Substation

1.4.2 Table 1.4 presents indicative operational sound levels from proposed Minster Converter Station and Substation plant.

Table 1.4 Indicative Minster Converter Station and Substation Plant sound data

Plant item	Number of	Source of information	Sound power level dBA	Sound power, dB, at octave band centre frequency, Hz							
				63	125	250	500	1k	2k	4k	8k
Substation:											
400kV Harmonic Filter	6	East Anglia One North and East Anglia Two	82	82	43	79	44	76	74	17	13
Converter Station:											
Reactor Hall	2	Building envelope would be designed to sufficiently control noise egress.									
Valve Hall	2										
DC Hall	2										
Valve Cooler Fans	Two sets	Celtic Interconnector Project / New England Clean Power Link	89	96	91	88	88	84	81	72	62
Transformer (355MVA 1-PH)	6	Interconnexion France-Angleterre (IFA)	106	Assumed 100 Hz is dominant							
Transformer cooling	6	Celtic Interconnector Project/ New England Clean Power Link	90	96	92	89	89	84	82	72	62
400kV PLC Filter (AC Filter) (Reactor)	6	Celtic Interconnector Project/ New England Clean Power Link	80	68	85	82	81	63	58	62	54
Air Handling Unit (AHU)	4 sets	Interconnexion France-Angleterre (IFA)	85	-	-	-	-	-	-	-	-

Embedded mitigation

1.4.3 National Grid has committed to reducing operational noise levels through the design process of the proposed Minster Converter Station and Substation. This is secured through commitment NV09 within **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**. The assessment therefore assumes that standard noise mitigation would be included in the design if these are required to achieve suitable noise levels at nearby NSR.

1.4.4 The initial consideration would be mitigation of source through plant selection and siting, followed by consideration of plant specific attenuation, such as enclosures. Standard transformer enclosures used by National Grid are capable of reducing noise levels by 20 dB.

1.4.5 For the purposes of this assessment it is therefore assumed that transformers are installed within enclosures.

1.4.6 Although this is likely to be the case in the final design, other mitigation measures may be considered by the developer that result in the same outcome. However, this assumption would consider typical operational noise levels with the use of a standard mitigation option. The resultant noise levels therefore represent a readily achievable outcome and a proportionate assessment for this stage of the design process.

Operational Sound Propagation Modelling (with Standard Mitigation)

1.4.7 Specific sound levels at nearby NSR due to the proposed Minster Converter Station and Minster Substation plant have been predicted via computer noise modelling using SoundPlan software (version 9.0). The model calculates noise levels in accordance with the methodology described in ISO 9613-2 (ISO, 2024). The resultant noise levels at nearby NSR are presented in Table 1.5.

Table 1.5 Resultant specific noise levels at NSR (with Standard Mitigation)

NSR location	Resultant specific sound level, dB L_{Aeq}
R_12489 and R_6709	16
R_11056 and R_8335	17
R_16000	16
E_35	17

1.4.8 The results indicate that the worst-case affected NSR is R_11056, R_8335, and E_35, as these have the greatest predicted specific noise level (17 dB L_{Aeq}). This value is therefore considered in subsequent analysis as a worst-case.

BS 4142 Assessment (with Standard Mitigation)

1.4.9 The results of the BS 4142 assessment at the worst affected receptor are presented in Table 1.6.

Table 1.6 Resultant specific noise levels at NSR (with Standard Mitigation)

Parameter	Value		BS 4142 clause	Commentary
	Daytime	Night-time		
Background sound level, dB L_{A90}	35	29	8.1	Representative background sound level at nearby receptors based on measured noise data.
Specific sound level, dB $L_{Aeq,T}$	17	17	7.3	Calculated via noise model based on indicative plant data.
Acoustic feature correction, dB	6	6	9.2	Assumed potential tonal audibility at receptor as worst-case. In practice likely to be less.
Sound rating level, dB $L_{Ar,T}$	23	23	9	Sum of specific sound level and acoustic corrections.
Difference in rating noise level relative to background sound level, dB	-12	-6	11	
Assessment Outcome	Negligible magnitude impact, depending on context. Below LOAEL and local authority aim.	Negligible magnitude impact, depending on context. Below LOAEL and local authority aim.	11	Context The context is a low specific noise level in a mixed rural and industrial area, below existing average levels of ambient noise during both daytime and night-time periods. Additionally, the specific noise level achieves the local authority aim of being at least 5dB below the background sound level during daytime or night-time periods. Outcome – **Not Significant**
Uncertainty			10	Uncertainty has been minimised through the use of noise survey data over a suitable representative period. Main uncertainty from the use of indicative plant noise data, although this is based on plant at similar sites.

Parameter	Value		BS 4142 clause	Commentary
	Daytime	Night-time		
				Likely worst-case acoustic character correction applied for tonality. In practice likely to be lower. Uncertainty is unlikely to affect the outcome of the assessment. However, this assessment is indicative based on available plant noise data and further studies would be conducted as the design progresses.

Notes:

BS 4142 Clause refers to the corresponding clause in BS 4142 relating to that aspect of the assessment.

1.4.10 The assessment indicates that with suitable mitigation, the impact of operational noise from the proposed Minster Converter Station and Substation would be of negligible magnitude at nearby NSR during both daytime and night-time periods. Operational noise from the proposed Minster Converter Station and Substation would therefore likely be not significant. Additionally, the desired local authority aim of a noise rating level 5 dB below the background sound level at nearby NSR is achievable, subject to further design.

1.4.11 This appendix presents results of the noise survey conducted as part of the Kent Onshore Scheme. A noise survey has been conducted at a location representative of noise sensitive receptors (NSR) for use within the operational noise assessment for the proposed Minster Converter Station and Minster Substation.

1.5 Conclusions

1.5.1 This appendix presents results of the operational noise assessment conducted as part of the Kent Onshore Scheme. The assessment considers the potential effects of operational noise from the proposed Minster Converter Station and Minster Substation at nearby NSR.

1.5.2 The assessment has been conducted in accordance with current guidance and good practice. The assessment draws on noise survey data, and indicative operational plant noise data.

1.5.3 The assessment indicates that with standard mitigation measures mitigation and based on the indicative plant data, the impact of operational noise from the proposed Minster Converter Station and Substation would be **negligible** magnitude at nearby NSR. The effect of operational noise would therefore **not significant**. Additionally, the desired local authority aim of a noise rating level 5 dB below the background sound level at nearby NSR is achievable during both daytime and night-time periods, subject to further design.

1.5.4 The assessment is based on indicate plant noise data and it is anticipated that further assessment would be conducted as the design progresses.

References

ANC. (2020). *BS 4142:2014+A1:2019 Technical Note Version 1.0.* London: ANC.

BSI. (2014). *BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.* London: BSI.

BSI. (2019). *BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.* London: BSI.

HM Government. (2019). *Planning Practice Guidance for Noise*. Retrieved from gov.uk: https://www.gov.uk/guidance/noise--2

ISO. (2024). *ISO 9613-2:2024 Acoustics - Attenuation of sound during propatation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors.* Geneva: ISO.

WHO. (1999). *Guidelines for Community Noise.* Geneva: WHO.

WHO. (2009). *Night noise guidelines for Europe.* Geneva: WHO.

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