RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Preliminary Environmental Information Report

Chapter 25 – Noise

25/04/2023

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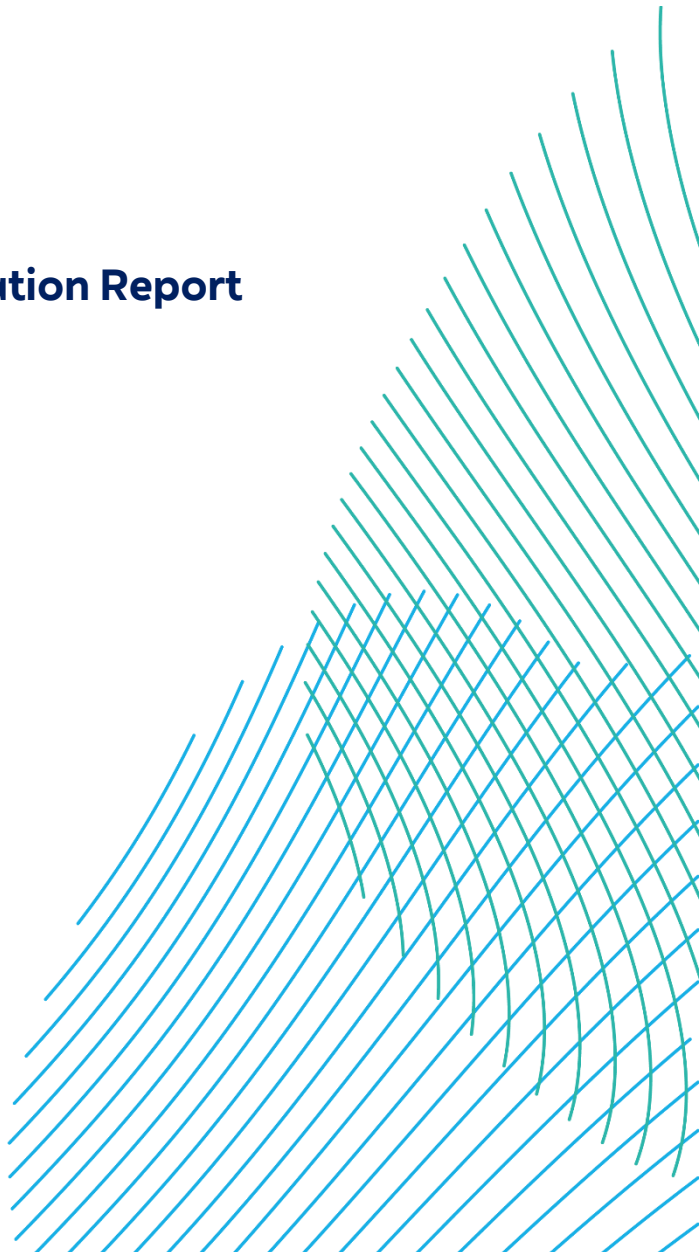

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Contents

Tables

Glossary

Term	Definition
Dogger Bank South (DBS) offshore wind farms	The collective name for the two Projects, DBS East and DBS West.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics.
Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Horizontal directional drilling (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.
Jointing Bays	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The point on the coastline at which the offshore export cables are brought onshore, connecting to the onshore export cables at the Transition Joint Bay.
Link Boxes	Below ground structures housing cable equipment, located along the onshore export cable corridor alongside the jointing bays.
Onshore Development Area	The Onshore Development Area for PEIR is the boundary within which all onshore infrastructure required for the Projects will be located including landfall, onshore export cable route, accesses, construction compounds and onshore substations. The Onshore Development Area is to be refined through the consultation and engineering review process.

Term	Definition
Onshore Export Cable Corridor	This is the area which includes cable trenches, haul roads, spoil storage areas, and limits of deviation for micro-siting. For assessment purposes, the cable corridor does not include the onshore substations, Transition Joint Bays or temporary access routes; but includes construction compounds (purely for the cable route).
Onshore Export Cables	Onshore export cables take the electricity from the Transition Joint Bay to the onshore substations.
Onshore Substations	A compound containing electrical equipment required to transform and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network. There will be one onshore substation for each Project.
Onshore Substation Zone	Parcels of land within the Onshore Development Area where the onshore substation infrastructure (including the haul roads, temporary construction compounds and associated cable routeing) may be located.
The Applicant	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited as the owners of DBS West and DBS East respectively are the named undertakers that will have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South offshore wind farms).
Trenching	Open cut method for cable or duct installation

Acronyms

Term	Definition
AAWT	Annual Average Weekday Traffic
BNL	Basic Noise Level
BPM	Best Practicable Means
BS	British Standard
BSI	British Standards Institution
CEA	Cumulative Effects Assessment
CoCP	Code of Construction Practice
CRTN	Construction of Road Traffic Noise
CTMP	Construction Traffic Management Plan
DBS	Dogger Bank South
DCO	Development Consent Order
DEFRA	Department for the Environment and Rural Affairs
EC	European Commission
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
HVAC	High-Voltage Alternating Current

Term	Definition
HVDC	High-Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
IPMP	In-principle Monitoring Plan
ISO	International Standards Organisation
km	Kilometre
LFR	Landfall Receptor
LOAEL	Lowest Observed Adverse Effect Level
MW	Megawatts
NAC	Noise Advisory Council
NE	Natural England
NNG	Night Noise Guideline
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptor
OAE	Observed Adverse Effect
OcoCP	Outline Code of Construction Practice
PEIR	Preliminary Environmental Information Report

Term	Definition
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
ProW	Public Right of Way
SOAEL	Significant Observed Adverse Effect Level
TCC	Temporary Construction Compound
TJB	Transition Joint Bay
UK	United Kingdom
WHO	World Health Organisation

25 Noise

25.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects of the Projects on onshore noise and vibration. The chapter provides an overview of the existing environment for the proposed Onshore Development Area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Projects.
2. The assessment should be read in conjunction with the following linked chapters:
   - **Chapter 24 Traffic and Transport;**
   - **Chapter 18 Terrestrial Ecology and Ornithology**; and
   - **Chapter 17 Human Health**.
3. Additional information to support the Noise and Vibration assessment include:
   - **Appendix 25.1 Baseline Noise Monitoring**;
   - **Appendix 25.2 Construction Noise Assessment**; and
   - **Appendix 25.3 Construction Road Traffic Noise Assessment**.

25.2 Consultation

4. Consultation with regard to noise and vibration has been undertaken in line with the general process described in **Chapter 6 EIA Methodology**. The key elements of consultation to date have included scoping and the ongoing Evidence Plan Process (EPP) via the Traffic and Access, Onshore Noise and Air Quality Expert Topic Group (ETG) as well as consultation with East Riding of Yorkshire Council regarding baseline noise monitoring locations. The feedback received has been considered in preparing the PEIR. **Table 25-1** provides a summary of how the consultation responses received to date have influenced the approach that has been taken.
5. This chapter will be updated following consultation on PEIR in order to produce the final assessment that will be submitted with the Development Consent Order (DCO) application. Full details of the consultation process will also be presented in the Consultation Report alongside the DCO application.

Table 25-1 Consultation Responses

Comment	Project Response
Planning Inspectorate / Scoping Opinion Response 02/09/2022	
The Scoping Report states that there are no operational noise impacts from buried infrastructure at landfall or from the onshore export cable. The Inspectorate considers that given the nature of the infrastructure significant noise effects are unlikely, however, the ES should provide evidence of the anticipated noise emissions from above ground infrastructure to demonstrate that a detailed assessment is not necessary.	Noise from the operational substation will be assessed at ES stage. No other operational noise-generating plant are anticipated to be used across the Projects and therefore no other assessment of operational noise emissions will been undertaken.
The Inspectorate has considered the information in the Scoping Report regarding operational traffic, substation equipment, and other onshore infrastructure as sources of ground-borne vibration. The Inspectorate agrees that significant effects are unlikely and is content that operational vibration can be scoped out of the ES.	Operational ground-borne vibration impacts are scoped out of the assessment.
Table 3-27 lists criteria for determining the sensitivity of receptors. The ES should list the source of this data or indicate the use of professional judgement to inform the criteria, as no source is currently listed.	The sensitivity of receptors has been defined using professional judgement. Refer to 25.4.3.1 for the methodology for defining the sensitivity of receptors.
On the basis of the information presented in section 2.4.2 of the Scoping report concerning the offshore activities that would generate airborne noise, and the distance of these activities from the nearest onshore receptors (at approx. 100km), the Inspectorate agrees that	Impacts relating to offshore airborne noise have been scoped out. Nearshore impacts to onshore receptors have been considered as part of the assessment of on-site

Comment	Project Response
offshore airborne noise impacts are unlikely to result in significant effects during construction, operation, and decommissioning, and can be scoped out of the ES. Noise impacts that are generated nearer to onshore receptors, i.e., activity associated with the laying/removal of nearshore cable, should be scoped into the ES where there is potential to result in likely significant effects. The Inspectorate notes that this matter is proposed to be scoped into the ES as part of the assessment of onshore noise and vibration (Section 3.8 of the Scoping report). The Inspectorate is content that the main impacts from noise to ecological receptors occur from underwater noise, which is to be assessed in other relevant aspects chapters.	construction noise at landfall (section 25.6.1.1). Underwater noise and the impacts on ecological receptors are considered in **Chapter 11 Marine Mammals**.
As no pathway for effects has been identified the Proposed Development is not expected to contribute to cumulative effects with other offshore noise sources. The Inspectorate agrees that cumulative effects from offshore noise can be scoped out of the assessment.	Cumulative effects from offshore noise have been scoped out of the assessment.
Hull City Council / Scoping Opinion Response 02/09/2022	
Whilst the identified onshore study area is within the administrative area of East Riding of Yorkshire, construction traffic may be routed along the Strategic Road Network and local highway network within the Hull City Council administrative area. In such circumstances, assessment of potential noise and vibration impact on	The study area for construction road traffic noise impacts (defined in section 25.3.1) includes all links in the traffic and transport model. Refer to section 25.6.1.4 for discussion on construction road traffic noise effects.

Comment	Project Response
sensitive receptors and identification of appropriate mitigation measures should be undertaken. Hull City Council would wish to be consulted on such matters. It is noted that whilst the scoping report proposes to include the highway network within the City of Hull for assessment of air quality impacts, the noise and vibration chapter scoping information is in contrast with this comprehensive approach.	
UK Health Security Agency / Scoping Opinion Response 02/09/2022	
UKHSA has not assessed this issue [noise and vibration] and does not wish to submit any associated comments at this time. We note that the assessment is scoped in and reserve the right to comment at future stages of the consultation process.	N/A
Dogger Bank South Traffic and Access, Onshore Noise and Air Quality ETG/ Pre-Scoping Meeting 14/09/2021	
Presentation of the approach to collecting baseline data and the approach to assessing potential impacts. The ETG were in agreement that the proposed approach was acceptable.	N/A
Meeting with East Riding of Yorkshire Council on Noise Monitoring 05/10/2022	
East Riding of Yorkshire Council confirmed the proposed approach to baseline noise surveys was acceptable.	Refer to section 25.5.1 and **Appendix 25-1** for information on baseline noise surveys.

25.3 Scope

25.3.1 Study Area

6. The noise and vibration study area has been defined by identifying noise sensitive receptors (NSRs) within specified distance buffers to the Onshore Development Area. Different buffer zones have been applied for different impacts:

   - Construction noise – 300m from the Onshore Development Area;
   - Construction vibration – 100m from the Onshore Development Area; and
   - Operational noise – 500m from the Onshore Development Area.

7. **Figure 21-1** shows the sensitive receptors which are considered in the assessment.

8. In addition, the assessment considers road traffic links with the potential to be affected by the Projects during the construction phase, as defined in **Chapter 24 Traffic and Transport**.

25.3.2 Realistic Worst Case Scenario

25.3.2.1 General Approach

9. The realistic worst case design parameters for likely significant effects scoped into the EIA for the Noise and Vibration assessment are summarised **Table 25-2**. These are based on the project parameters described in **Chapter 5 Project Description**, which provides further details regarding specific activities and their durations.

10. In addition to the design parameters set out in **Table 25-2**, consideration is also given to the different development scenarios still under consideration and the possible phasing of the construction as set out in sections 25.3.2.2 to 25.3.2.5.

Table 25-2 Realistic Worst Case Scenarios

<table>
<tr><th rowspan="2"></th><th colspan="4">Parameter</th></tr>
<tr><th>DBS East or DBS West in isolation</th><th>DBS East and DBS West concurrently</th><th>DBS East and DBS West sequentially</th><th>Notes and rationale</th></tr>
<tr><td colspan="5">Construction</td></tr>
<tr><td>Impact 1: Construction Noise at Landfall Location</td><td colspan="3">Landfall construction activities (worst-case activity in bold):
Construction of access to the landfall compound and haul road;
Construction of the landfall compound - worst-case daytime activity;
Trenchless crossings/HDD works (likely to require 24 hour working) – worst-case night-time activity along cable corridor (see Impact 2);
Construction of transition joint bays (TJBs);
Laying of offshore export cables from vessels in the nearshore environment;
Pull-in of duct from barge (alternatively, they may be pushed from landfall side);
Pull-in of offshore export cables from vessel;
Transition jointing offshore / onshore export cables;
Backfilling of TJBs
Reinstatement works.
Working Hours:
07.00 to 19.00 Monday to Saturday
No work on Sundays or bank holidays.
Potential for 24 hour working at trenchless crossings (see Impact 2)
Location: Both possible landfall locations have been assessed.</td><td rowspan="2">Construction noise at noise sensitive receptors (NSRs) at sites has been calculated assuming all construction plant is operating simultaneously and spread across the work areas for each activity.
Noise levels associated with landfall plant are detailed in Appendix 23.2 Construction Noise Assessment.
The magnitude of a construction noise impact depends on the noise level and duration of exposure. The sequential scenario results in the longest duration construction noise impacts.
As a conservative worst-case assumption, the plant required at the landfall locations could be doubled, should the Projects be built concurrently.</td></tr>
<tr><td>Noise levels presented for each receptor:
Worst case of one landfall in each of the possible landfall locations.
Duration: 18 months</td><td>Noise levels presented for each receptor:
Worst-case of one landfall in each of the possible landfall locations, with potential for double the amount of work at one site (+3 dB correction).
Duration: 18 months</td><td>Noise levels presented for each receptor:
Worst case of one landfall in each of the possible landfall locations.
Duration: 42 months</td></tr>
</table>

	Parameter			
	DBS East or DBS West in isolation	**DBS East and DBS West concurrently**	**DBS East and DBS West sequentially**	**Notes and rationale**
Impact 2: Construction Noise along Onshore Export Cable Corridor (TCCs and HDD)	**Onshore export cable construction activities (worst-case activity in bold):** • Site survey and ecological clearance required in preparation for construction; • Construction of access to the onshore export cable corridor infrastructure; • Temporary strip and storage of topsoil for agricultural areas; • **Construction of Temporary Construction compounds (TCC) – worst-case daytime activity;** • Construction of temporary haul roads to facilitate the onshore export cable installation; • Design and construction of crossings or protective measure required due to close proximity or crossing of export cable to existing infrastructure and natural features. This includes roads, railways, rivers and streams. This may be achieved by construction of culverts/cable structures of trenchless methods including HDD or other appropriate methodologies; • Excavation of trenches and installation of cable ducts (where used); • Installation of ducts and cable/ in hard ground/ road carriageways where required including temporary traffic management and reinstatement of the surfacing surface. • Construction of Jointing Bays; • Installation of below ground chamber at the link box locations, required to provide maintenance and inspection access to the cable system; • Laying or pull-in of onshore export cables within duct or direct lay in trench; • Backfilling of joint bays and cable trenches with suitable material for electrical performance and protection of cables; • Reinstatement works. **Cable route length:** Approximately 39km **Working Hours:** 07.00 to 19.00 Monday to Saturday No work on Sundays or bank holidays.			Construction noise at noise sensitive receptors (NSRs) at sites has been calculated assuming all construction plant is operating simultaneously and spread across the work areas for each activity. Noise levels associated with onshore export cable corridor workfront plant (TCCs and HDD) are detailed in **Appendix 23.2 Construction Noise Assessment**. The magnitude of a construction noise impact depends on the noise level and duration of exposure. The sequential scenario results in the longest duration construction noise impacts. The worst-case scenario for assessment of onshore export cable corridor noise and vibration impacts at sensitive receptors is considered to be the Projects sequentially as this represents the longest duration (temporal impact) and requires the same number of workfronts and plant as the Projects constructed in isolation or the Projects constructed concurrently.

<table>
<tr><th rowspan="2"></th><th colspan="4">Parameter</th></tr>
<tr><th>DBS East or DBS West in isolation</th><th>DBS East and DBS West concurrently</th><th>DBS East and DBS West sequentially</th><th>Notes and rationale</th></tr>
<tr><td></td><td colspan="3">HDD has been assumed at all identified obstacles (roads, waterways etc.) along the onshore export cable corridor as a worst case assumption. All locations have been assumed to have 24 hour operations as a worst case assumption.
TCC Locations:
Worst-case TCCs (multiple options for each onshore export cable corridor section) presented for each receptor</td><td rowspan="2"></td></tr>
<tr><td></td><td>Duration: 33 months</td><td>Duration: 33 months</td><td>Duration 57 months</td></tr>
<tr><td>Impact 3: Construction Noise at Onshore Substation</td><td colspan="3">Substation construction activities (worst-case activity in bold):
Construction of temporary haul roads;
Temporary strip and storage of topsoil for agricultural areas;
Construction of TCCs (assessed in Impact 2);
Establishment of a suitably level platform through cut, fill and import or suitable material - worst case daytime activity;
Construction of permanent access to the site;
Construction of Drainage, Foundations and Structures.
Working Hours:
07.00 to 19.00 Monday to Saturday
No work on Sundays or bank holidays.
Potential for 24 hour working at trenchless crossings (see Impact 2)</td><td rowspan="2">Construction noise at noise sensitive receptors (NSRs) at sites has been calculated assuming all construction plant is operating simultaneously and spread across the work areas for each activity.
Noise levels associated with onshore substation construction plant are detailed in Appendix 23.2 Construction Noise Assessment.
The magnitude of a construction noise impact depends on the noise level and duration of exposure. The sequential scenario results in the longest duration construction noise impacts.
As a conservative worst-case assumption, the plant required at the substation zones could be doubled, should the Projects be built concurrently. For the substation, this accounts for the worst-case scenario of two substations being built at Substation Zone 4.</td></tr>
<tr><td></td><td>Noise levels presented for each receptor:
Worst case of two substation zones.
Duration: 4 years</td><td>Noise levels presented for each receptor:
Worst case of two substation zones with a +3 dB correction applied to represent either:
Two substations built concurrently at one site (i.e. double the amount of work at one site); or</td><td>Noise levels presented for each receptor:
Worst case of two substation zones and assumed longer duration.
Duration: 6 years</td></tr>
</table>

	Parameter			
	DBS East or DBS West in isolation	**DBS East and DBS West concurrently**	**DBS East and DBS West sequentially**	**Notes and rationale**
		• Two substations being built concurrently at two nearby sites (zones 1 and 4). Duration: 4 years		
Impact 4: Construction Road Traffic Noise	Increase in traffic flows (18hr Annual Average Weekday Traffic [AAWT]) and % HGV across the Onshore Traffic Study Area for peak construction activity.			Increased number of vehicles during proposed working hours across the Onshore Traffic Study Area and associated traffic noise. The Projects constructed concurrently is the worst case scenario from a construction traffic relative change in noise level impact due to the higher total vehicles and percentage HGVs on any of the network links. Spatially all scenarios present the same potential effect as the same highways links are relevant for both Projects (in isolation, concurrent or sequential). Temporal impacts may be worse for the sequential scenario, compared to the in isolation and concurrent scenarios.
Impact 5: Construction Vibration	**Landfall/Onshore Cable Corridor/Onshore Substation:** Works include: • Enabling works • Civils works • Cable installation works • HDD/Trenchless Crossings • Reinstatement/Demobilisation • Main Compound			The sequential scheme is the worst scenario due to the longer duration. Spatially both Projects present the same potential effect due to the defined Onshore Development Area limiting proximity to sensitive receptors.

	Parameter			
	DBS East or DBS West in isolation	**DBS East and DBS West concurrently**	**DBS East and DBS West sequentially**	**Notes and rationale**
	• Secondary Compounds Piling/Trenchless Crossings: Piling works at the onshore substations were assessed based on a single Continuous Flight Auger (CFA) piling rig for daytime works only. Low vibration piling methods will be adopted where practicable. Durations are as per the construction noise impacts for each of the landfall/onshore export cable corridor/onshore substations.			
Operation				
Impact 6: Operation of Onshore Substation	Plant noise emission magnitude of impact criteria have been proposed, based on the baseline background sound level and WHO Night Noise Guidelines.			As assessment of operational noise will be undertaken in the ES. The assessment will be determined by magnitude of impact criteria based on the baseline background sound level and the WHO Night Noise Guidelines.
Decommissioning				
A final decision regarding the decommissioning policy for the onshore project infrastructure including landfall, onshore cable route and onshore substation has not yet been made. It is also recognised that legislation and industry best practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused or recycled wherever possible and the transition bays and cable ducts will be left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst case scenario, the impacts will be no greater than those identified for the construction phase.				

25.3.2.2 Development Scenarios

11. There are currently two possible electrical solutions being considered for DBS West, HVAC or HVDC. Due to the distance of the array area offshore DBS East will be an HVDC project. Therefore, there are two possible electrical solutions for the Projects:

- One HVDC project and one HVAC project; or
- Two HVDC projects.

12. There are different parameters required for the onshore substations depending on which electrical solution is selected. Therefore, there are four possible development scenarios within the onshore substation zones that could be taken forward:

- Two HVDC substations in Substation Zone 4;
- One HVDC substation in Substation Zone 1 and one HVAC substation in Substation Zone 4;
- One HVDC substation in Substation Zone 4 and one HVAC substation in Substation Zone 1; or
- One HVDC substation in Substation Zone 1 and one HVDC substation in Substation Zone 4.

13. In order to ensure that a robust assessment has been undertaken, all development scenarios and options have been considered to ensure the realistic worst-case scenario for each topic has been assessed. Further details are provided in **Chapter 5 Project Description**.

25.3.2.3 Construction Scenarios

14. The following principles set out the framework for how the Projects may be constructed (relating to both onshore and offshore works):

- DBS East and DBS West may be constructed at the same time, or at different times;
- If built concurrently, both Projects could be constructed in five years;
- If built non-concurrently, either Project could be built first;
- If built non-concurrently, each Project would require a five year period of construction;
- If built non-concurrently, it is anticipated that there would be up to a two year lag between the start of construction for the first project and the start of construction for the second project; and

- Assuming a maximum construction period per Project of five years, and taking the above into account, the maximum construction period over which the construction of both Projects could take place is seven years.

15. In order to determine which construction scenario presents the realistic worst case for each receptor and impact, the assessment considers both maximum duration effects and maximum peak effects, in addition to each Project being developed in isolation, drawing out any differences between each of the two Projects.

16. The three construction scenarios considered by the Noise and Vibration assessment are therefore:

- Build DBS East or build DBS West in isolation;
- Build DBS East and DBS West concurrently – reflecting the maximum peak effects; and
- Build the Projects sequentially with a lag of up to two years – reflecting the maximum duration of effects.

17. The individual, concurrent and sequential construction scenarios all allow for flexibility to build out the Projects using a phased approach. This will allow the Projects to adapt to National Grid Electricity Transmission Operator's development plans for the onshore grid connection points. Under a phased approach the maximum timescales for individual elements of the construction have been assessed.

18. Any differences between the Projects, or differences that could result from the manner in which the first and the second Projects are built (concurrent or sequential and the length of any gap) are identified and discussed where relevant in section 25.6. For each potential impact, only the worst case construction scenario for two Projects is presented, i.e. either concurrent or sequential. The justification for what constitutes the worst case is provided, where necessary, in section 25.6.

25.3.2.4 Operation Scenarios

19. Operation scenarios are described in detail in **Chapter 5 Project Description**. The assessment considers the following scenarios:

- Only DBS East in operation;
- Only DBS West in operation; and
- The two Projects operating concurrently, with or without a lag of up to two years between each Project commencing operation.

20. If the Projects are built out using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phase for the Projects has been assessed. See section 5.1.1 of Chapter 5 Project Description for further information.

21. The operations lifetime of each Project is expected to be 30 years.

25.3.2.5 Decommissioning Scenarios

22. Decommissioning scenarios are described in **Chapter 5 Project Description**. Decommissioning arrangements will be agreed through the submission of a Decommissioning Programme prior to construction, however for the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

25.3.3 Mitigation Embedded in the Design

23. This section outlines the embedded mitigation relevant to the Noise and Vibration assessment, which has been incorporated into the design for the Projects (**Table 25-3**). Where other mitigation measures are proposed, these are detailed in the impact assessment (section 25.6).

Table 25-3 Embedded Mitigation Measures

Parameter	Mitigation Measures Embedded into the Project Design
HDD at trenchless crossings	Localised screening will be employed where required via acoustic enclosures for stationary plant and noise barriers around works area for mobile plant.
Construction noise	Prior to the commencement of construction, noise management measures will be detailed in a Code of Construction Practice (CoCP) detailing site-specific best practicable means (BPM) noise control measures to be adopted throughout construction. An Outline CoCP is provided as part of the statutory consultation. Mitigation measures will be identified and adhered to, including, but not limited to: • Ensuring plant and machinery is turned off when not in use; • Using modern, quiet equipment and ensuring such equipment is properly maintained and regularly inspected;

Parameter	Mitigation Measures Embedded into the Project Design
	• Locate noise generating plant at a low level and as distant as possible from NSRs; • Plant to operate at low speeds, where possible, and incorporate automatic low-speed idling; • Locate site entrances and exits to prevent the need for vehicles to reverse and also minimise impacts upon sensitive receptors; • Consideration to be given to temporary screening or enclosures for static noisy plant to reduce noise emissions and plant should be certified to meet any relevant EC Directive standards; • Informing local receptors about the construction works, including the timing and duration of any particularly noisy elements; and • Implement a grievance mechanism (e.g. complaint procedure) for local receptors to report nuisance and other issues, including contact details for a site representative during construction hours. It should be noted that certain site-specific construction noise mitigation measures will be established at a later stage when sites and methodologies are finalised. They are therefore not included in the worst-case noise modelling. However, potential additional mitigation has been qualitatively assessed using professional judgment and is discussed in the mitigation and residual effects sections of the construction noise assessments (impacts 1-3).
Construction road traffic noise	An Outline Construction Traffic Management Plan (CTMP) will be presented as part of the statutory consultation. The plan will outline methods to manage peak construction traffic flows and minimise significant traffic and transport impacts. The CTMP will also serve to reduce the associated construction traffic noise and the relative noise change. Traffic management measures are provided in **Chapter 24 Traffic and Transport**.

25.4 Assessment Methodology

25.4.1 Policy, Legislation and Guidance

25.4.1.1 National Policy Statements

24. The assessment of potential impacts upon noise and vibration has been made with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for noise and vibration, as detailed in the NPS, are summarised in **Table 25-4** together with an indication of the section of this chapter where each is addressed.

25. It is noted that the NPS for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5) are in the process of being revised. Draft versions were published for consultation in September 2021 by the Department for Business Energy and Industrial Strategy (BEIS) (2021a, 2021b and 2021c, respectively). A review of these draft versions has been undertaken in the context of this PEIR chapter.

26. Following the consultation in 2021 on the draft energy NPS, a new consultation opened on the 30th March 2023 on revised drafts of the energy NPSs, including EN1, EN3 and EN5. Due to the timing of this consultation, and finalisation of this PEIR we have been unable to review and take these revised draft NPS into account within these documents. However, these will be reviewed and incorporated into the final ES where relevant.

Table 25-4 NPS Assessment Requirements

NPS Requirement	NPS Reference	PEIR Section Reference
EN-1 NPS for Energy		
Where noise impacts are likely to arise, the applicant should include: • 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; • 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.	EN-1, paragraph 5.11.4	The assessment methodology is presented in section 25.4.3., Section 25.5 presents the existing noise environment and identifies NSRs Section 25.6 details the anticipated changes in noise levels as a result of the Projects , includes the assessment of potential impacts and identifies mitigation measures.

NPS Requirement	NPS Reference	PEIR Section Reference
The noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation, should also be considered.	EN-1, paragraph 5.11.5	Impacts from ancillary works, for example vehicle movements, are assessed in section 25.6.1.4.
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 are 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.	EN-1, paragraph 5.11.6	An outline assessment of the changes in noise levels as a result of the operational Projects are assessed in section 25.6.2. A full assessment will be undertaken at ES stage. The current relevant British Standards (BS) have been used within this assessment and are detailed within section 25.4.1.3.
The applicant should consult EA and NE, or the Countryside Council for Wales (CCW), as necessary and in particular with regard to assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.	EN-1, paragraph 5.11.7	Noise impacts on terrestrial protected species are considered within **Chapter 18 Terrestrial Ecology and Ornithology**. Noise impacts on marine protected species are considered in **Chapter 11 Marine Mammals**.
The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant	EN-1, paragraph 5.11.8	The principals of good design have been taken into consideration throughout the site selection process,

NPS Requirement	NPS Reference	PEIR Section Reference
layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission.		where possible. See **Chapter 4 Site Selection and Assessment of Alternatives** and **Chapter 5 Project Description** for further details.
When preparing the development consent order, the IPC (Infrastructure Planning Commission) [now the Planning Inspectorate and the Secretary of State] should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent.	EN-1, paragraph 5.11.10	Where relevant, requirements and mitigation measures to ensure that limits are not exceeded are proposed in section 25.6.
Draft EN-1 NPS for Energy		
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.	Draft EN-1, Paragraph 5.12.9	Due regard is given to statutory requirements and the quoted policy, as described in section 25.4.1.
The Secretary of State should not grant development consent unless it is satisfied that the proposals will meet the following aims: • avoid significant adverse impacts on health and quality of life from noise • mitigate and minimise other adverse impacts on health and quality of life from noise	Draft EN-1, paragraph 5.12.10	These aims are met by the adoption of the proposed mitigation as outlined in section 25.6 and **Chapter 27 Human Health.**

NPS Requirement	NPS Reference	PEIR Section Reference
• where possible, contribute to improvements to health and quality of life through the effective management and control of noise		
These requirements or mitigation measures may apply to the construction, operation, and decommissioning of the energy infrastructure development.	Draft EN-1, paragraph 5.12.11	All phases of the development are considered within this assessment presented in section 25.6.
EN-5 NPS for Electricity Networks Infrastructure		
While standard methods of assessment and interpretation using the principles of the relevant British Standards are satisfactory for dry weather conditions, they are not appropriate for assessing noise during rain. This is when overhead line noise mostly occurs, and when the background noise itself will vary according to the intensity of the rain. Therefore, an alternative noise assessment method to deal with rain-induced noise is needed, such as the one developed by National Grid as described in report TR (T) 94,199319. This follows recommendations broadly outlined in ISO 1996 (BS 7445:1991) and in that respect, is consistent with BS 4142:1997. The IPC is likely to be able to regard it as acceptable for the applicant to use this or another methodology that appropriately addresses these particular issues.	EN-5, paragraph 2.9.8 and paragraph 2.9.9	The Projects do not include any requirement for additional overhead lines. As such, further operational assessment of rain-induced noise is not considered necessary.

25.4.1.2 Other

27. The NPS (see section 25.4.1.1) are the key policy documents for Nationally Significant Infrastructure Projects (NSIPs). In addition to the NPS, there a number of pieces of legislation, policy and guidance applicable to the assessment of noise and vibration.

28. Further detail is provided in **Chapter 3 Policy and Legislative Context**.

25.4.1.2.1 National Planning Policy Framework

29. The National Planning Policy Framework (NPPF) (as revised in 2021) forms the basis of the Government's planning policies for England and how these should be applied. Section 15, Paragraph 174 of the NPPF states planning policies and decisions should contribute to and enhance the natural and local environment by:

"*e).....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…*"

30. Furthermore, Section 15, Paragraph 185 states:

"*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) 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;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"

31. The Noise Policy Statement for England (NPSE) document was published by Defra in 2010 and paragraph 1.7 states three policy aims:

"*Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.*"

32. The Explanatory Note contained within the NPSE introduces the following concepts to aid in the establishment of significant effects:

- No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established.
- Lowest Observable Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

33. The aims of the NPSE can therefore be interpreted as follows (within the context of Government policy on sustainable development):

- The first aim is to avoid noise levels above the SOAEL.
- To consider situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur.

34. Furthermore, paragraph 2.22 of the NPSE acknowledges that:

- "*Further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise*".

25.4.1.2.2 National Planning Practice Guidance (NPPG) 2019

35. The National Planning Practice Guidance (NPPG), states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or making decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

25.4.1.2.3 East Riding Local Plan (adopted April 2016)

36. Policy EC5 states:

"*Proposals for the development of the energy sector, will be supported where any significant adverse impacts are addressed satisfactorily and the residual harm is outweighed by the wider benefits of the proposal. Developments and their associated infrastructure should be acceptable in terms of effects of development local amenity, including noise, air and water quality, traffic, vibration, dust and visual impact.*"

37. The local plan also states the following with regard to noise assessment:

"*Proposals should also ensure they are located at an appropriate distance from noise sensitive uses, such as housing and quiet leisure based uses, to ensure that increases in ambient noise levels are acceptable. The prevailing noise standards (e.g. BS4142 or ETSU-R-97), and any current best practice/ guidance (e.g. from the Institute of Acoustics), should be used, giving consideration to the level of existing background noise in the area. Where impacts cannot be mitigated, on-site proposals.*"

25.4.1.2.4 Hull Local Plan 2016 to 2032 (Adopted 2017)

38. Policy 18 (Renewable and low carbon energy) states:

39. *"Development that generates, transmits and/or stores renewable and/or low carbon energy will be supported where the impact is or can be made acceptable. Potential impacts that are particularly relevant to this type of development are: a. local amenity, including noise, air quality, water quality, traffic, vibration, dust, visual impact, shadow flicker and odour"*

40. Policy 49 (Noise Pollution) states:

41. *"1. Development which would site noise sensitive receptors in proximity to noisy uses or areas should demonstrate that there would be an acceptable level of amenity for end users. Where this has not been demonstrated, development will not be allowed.*

2. Development of noisy uses should demonstrate that adverse impacts of noise can be mitigated and that there would be an acceptable impact on the amenity of surrounding land uses, including the Humber Estuary International Site."

25.4.1.3 Guidance and Best Practice

25.4.1.3.1 BS 4142:2014+A1:2019 – Method for Rating and Assessing Industrial and Commercial Sound

42. This standard describes a method for rating and assessing sound of an industrial and/or commercial nature. This method uses a Rating Level to assess the likely effects from sound of an industrial or commercial nature on people using amenity space outside a dwelling or premises used for residential purposes upon which the sound is incident.

25.4.1.3.2 BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise

43. Part 1 of BS 5228 provides recommendations for methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels. It also provides guidance on methods of predicting and measuring noise and assessing its impact on those exposed to it.

25.4.1.3.3 BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration

44. Part 2 of BS 5228 gives recommendations for methods of vibration control on construction and open sites, where work activities generate significant vibration levels. It also provides guidance on predicting and assessing vibration levels from construction and a database of measured vibration levels during piling activities.

25.4.1.3.4 BS 7385:1993 – 'Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration'

45. This standard provides guidance regarding the potential for vibration to result in building damage, including basic principles for carrying out vibration measurements and processing the data. It includes guide values for transient and continuous vibration, above which there is a likelihood of cosmetic damage.

25.4.1.3.5 BS 7445:2003 Part 1 and BS 7445:1991 Part 2 – Description and Measurement of Environmental Noise

46. Provides details of the instrumentation and measurement techniques to be used when assessing environmental noise and defines the basic noise quantity as the continuous A-weighted sound pressure level (L_{Aeq}). Part 2 of BS 7445 replicates International Standards Organisation (ISO) 1996-2.

25.4.1.3.6 BS 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings

47. Provides a methodology to calculate the noise levels entering a building through facades and facade elements and provides details of appropriate measures for sound insulation between dwellings. It includes recommended internal noise levels which are provided for a variety of situations and are based on World Health Organisation (WHO) recommendations.

25.4.1.3.7 Calculation of Road Traffic Noise (CRTN) 1988

48. Provides a method for calculating noise levels from the Annual Average Weekday Traffic (AAWT) flows and from measured noise levels. Since publication in 1988 this document has been the accepted standard for predicting noise levels from road traffic in the UK. The calculation methods take account of variables including percentage of heavy goods vehicles (HGVs), road surfacing, gradient, screening by barriers and relative height of source and receiver.

25.4.1.3.8 Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration, Revision 2

49. LA111 Noise and Vibration provides detailed methodologies for the assessment of construction and operational noise and vibration impacts from road schemes. It provides guideline significance criteria in terms of both absolute noise and vibration levels and the change in noise levels due to a scheme.

25.4.1.3.9 ISO 9613-2:1996 Acoustics - Attenuation of Sound during Propagation Out-oors - Part 2: General Method of Calculation

50. Specifies an engineering method for calculating the attenuation of sound due to propagation outdoors, enabling prediction of sound levels at a specified distance from a source.

25.4.1.3.10 WHO (1999) Guidelines for Community Noise

51. These guidelines present health-based noise limits intended to protect the population from exposure to excess noise. They present guideline limit values at which the likelihood of particular effects, such as sleep disturbance or annoyance, may increase. The guideline values are 50 or 55dB L_{Aeq} during the day, related to annoyance, and 45dB L_{Aeq} or 60dB L_{Amax} at night, related to sleep disturbance.

52. The Guidance states:

"*The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events. Lower noise levels may be disturbing depending on the nature of the source.*"

25.4.1.3.11 WHO (2009) Night Noise Guidelines for Europe

53. These guidelines an extension to the WHO Guidelines for Community Noise (1999). Based on evidential review, they conclude that:

"*Below the level of 30 dB $L_{night,outside}$, no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise. There is no sufficient evidence that the biological effects observed at the level below 40dB $L_{night,outside}$ are harmful to health. However, adverse health effects are observed at the level above 40dB $L_{night,outside}$.*

Therefore, 40dB $L_{night,outside}$ is equivalent to the LOAEL for night noise."

54. In addition to the above, the following is also stated,

"*Considering the scientific evidence on the thresholds of night noise exposure indicated by $L_{night,outside}$ as defined in the Environmental Noise Directive (2002148/EC), an $L_{night,outside}$ of 40dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. $L_{night,outside}$ value of 55dB is recommended as an interim target for those countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach.*"

55. These guidelines present health-based noise limits intended to protect the population from exposure to excess noise. They present guideline limit values at which the likelihood of particular effects, such as sleep disturbance or annoyance, may increase. The guideline values are 50 or 55dB L_{Aeq} during the day, related to annoyance, and 45dB L_{Aeq} or 60dB L_{Amax} at night, related to sleep disturbance.

25.4.2 Data and Information Sources

25.4.2.1 Site Specific Surveys

56. In order to provide site specific and up to date information on which to base the impact assessment, a baseline sound survey within the vicinity of the possible landfall and onshore substation zones was conducted at six locations during October and November 2022, as described in section 25.5.1. The scope and extent of the baseline survey was agreed with East Riding of Yorkshire Council. Not all locations were able to be surveyed by the time of this assessment, however, additional data is in the process of being collected and the remaining locations will be surveyed by the time of the ES.

25.4.2.2 Other Available Sources

57. Other sources that have been used to inform the assessment are listed in **Table 25-5**.

Table 25-5 Other Available Data and Information Sources

Data Set	Spatial Coverage	Year	Notes
Google Maps Aerial Photography	Onshore Study Area	2022	The data was used to determine sensitive receptors in the noise and vibration study area
Topographical data: Environmental Agency LiDAR Data (Open Licence)	Onshore Study Area	2020	The data was used in the construction noise assessment model to incorporate topography of the noise and vibration study area
OS Mapping	Onshore Study Area	2022	The data was used to import buildings into the construction noise assessment model and to determine sensitive receptors
Road traffic AAWT data	Onshore Traffic Study Area	2022	Used to assess construction road traffic noise impacts

25.4.3 Impact Assessment Methodology

58. **Chapter 6 EIA Methodology** provides a summary of the general impact assessment methodology applied. The following sections describe the methods used to assess the likely significant effects on noise and vibration.

25.4.3.1 Definitions

59. For each potential impact, the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts (i.e. magnitude) on given receptors. The definitions of sensitivity and magnitude for the purpose of the Noise and Vibration assessment are provided in **Table 25-6** and **Table 25-7**.

Table 25-6 Definition of Sensitivity for a Noise and Vibration Receptor

Sensitivity	Definition
High	Noise and vibration receptors are categorised as high sensitivity where noise and vibration may be detrimental to vulnerable receptors. Such receptors include certain hospital wards (e.g. operating theatres or high dependency units) or care homes at night.
Medium	Noise receptors are categorised as medium sensitivity where noise may cause disturbance and a level of protection is required but a level of tolerance is expected. Such subgroups include: • Residential accommodation; • Private gardens; • Hospital wards; • Care homes (during the day); • Schools; • Universities; • Research facilities; • National parks (during the day); • Temporary holiday accommodation (including holiday lets); and • Places of worship.

Sensitivity	Definition
Low	Noise receptors are categorised as low sensitivity where noise may cause short duration effects in a recreational setting although particularly high noise levels may cause a moderate effect. Such subgroups include: • Offices; • Shops (including cafes); • Outdoor amenity areas during the day (including recreation, public amenity space/play areas and Public Right of Ways (PRoWs); • Doctor's surgeries; and • Sports facilities.
Negligible	Noise receptors are categorised as negligible sensitivity where noise is not expected to be detrimental. Such subgroups include: • Warehouses; • Light industry; • Car parks; and • Agricultural land.

Table 25-7 Definition of Magnitude of Impacts

Magnitude	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the receptor's character or distinctiveness. The impact gives rise to serious concern; it should be considered as unacceptable.
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the receptor's character or distinctiveness. The impact gives rise to some concern, but it is likely to be tolerable (depending on its scale and/or duration).
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the receptor's character or distinctiveness. The impact is undesirable, but of limited concern.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the receptor's character or distinctiveness. The impact is at a threshold of predictive quantification and is not of concern.

25.4.3.2 Significance of Effect

60. The assessment of significance of an effect is informed by the sensitivity of the receptor and the magnitude of the impact. The determination of significance is guided by the use of an impact significance matrix presented in **Chapter 6 EIA Methodology**. Definitions of each level of significance are provided in **Table 25-8**. For the purposes of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that has a significance of minor or negligible is not significant.

Table 25-8 Noise and Vibration Significance of Effect Matrix

		Adverse Magnitude				Beneficial Magnitude			
		High	**Medium**	**Low**	**Negligible**	**Negligible**	**Low**	**Medium**	**High**
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Table 25-9 Definition of Effect Significance

Significance	Definition
Major	Very large or large change in receptor condition, which is likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which is likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.

25.4.3.3 Construction Phase Noise Assessment Methodology

61. This section outlines the proposed approach for the construction phase assessment.

62. BS 5228-1 makes reference to durations when outlining methods of assessing construction noise effects, referring to assessing construction "works "*likely to continue for a significant period of time (either continuously or sporadically)*", and *"a duration of a month or more"*. Therefore, the activities scoped into this quantitative assessment of construction noise are the worst case activities that are likely to take one month or more in a given location.

63. Construction noise impacts are assessed using the criteria presented in **Table 25-10** for the daytime, evening and weekend, and night-time. The significance of construction noise effects is defined, at each receptor within the study area, by combining the magnitude of impact and receptor sensitivity, as presented in the significance of effect matrix (**Table 25-8**).

Table 25-10 Construction Noise Magnitude of Impact Criteria

Magnitude of impact	**Construction noise level (dB $L_{Aeq,T}$)**			**NPSE/PPG category**
	Daytime	**Evenings and weekends**	**Night-time**	
High	≥80	≥70	≥60	-
Medium	≥75 to <80	≥65 to <70	≥55 to <60	Lower end of range is equivalent to SOAEL
Low	≥65 to <75	≥55 to <65	≥45 to <55	Lower end of range is equivalent to LOAEL
Negligible	<65	<55	<45	-

64. In accordance with BS 5228-1, there are other project-specific factors which can be considered, any or all of which may be relevant depending on the specific situation. The following demonstrates how these other factors can be considered to determine the magnitude of effect, receptor sensitivity and impact significance:

- the duration of the effect;
- the timing of the effect, night-time impacts being more likely to be considered significant than daytime impacts, due to potential sleep impacts;
- the location of the effect at the NSR, for example, a receptor may contain areas which are more or less sensitive than others, for example in a school, office spaces or kitchens would be considered less sensitive than classrooms;
- the nature, times of use and design of the receptor, for example a NSR which is not used at night would not be considered sensitive to night-time construction works; and
- NSRs exposed to combined noise and vibration effects are more likely to experience significant impacts than those which are only exposed to one effect.

65. Noise levels for the construction phase have been predicted using CadnaA 3D modelling software and using the methods and guidance in BS 5228. The standard provides methods for predicting receptor noise levels from construction works based on the number and type of construction plant and activities operating on site, with corrections to account for:

- The 'on-time' of the plant, as a percentage of the assessment period;
- Distance from source to receptor;
- Acoustic screening by barriers, buildings or topography; and
- Ground type.

25.4.3.4 Construction Phase Road Traffic Noise Assessment Methodology

66. The road links required for construction traffic are detailed with **Chapter 24 Traffic and Transport**, specifically **Figure 24-1**.

67. Construction road traffic noise impacts have been determined by assessing the change in Basic Noise Level (BNL) in accordance with the methodology provided in CRTN. As per the guidance in CRTN a 'low-flow correction' can be applied to AAWT total vehicular 18hr flows between ≥1000 to ≤4000 vehicles. Where links in the traffic dataset had more than one speed limit, calculations were undertaken for the highest speed, to provide a worst case assessment.

68. The CRTN methodology was used for all road links within the traffic study area for the following scenarios:

- 2026 Future Base (AAWT);
- 2026 Future Base (AAWT) + Construction traffic for the Projects in isolation (Peak 18hr Weekday); and
- 2026 Future Base (AAWT) + Construction traffic for the Projects concurrently (Peak 18hr Weekday).

69. Construction road traffic noise impacts were determined by assessing the change in BNL, compared to the 2026 Future Base, for the Projects in isolation and the Projects built concurrently.

70. For road links that were not in compliance with the CRTN range for traffic flow data (below 1000 18hr vehicles) commentary has been provided, with reference to BNLs of nearby links and/or percentage increases in traffic.

71. Magnitude of impact criteria for construction traffic noise are displayed in **Table 25-11**, taken from DMRB. The significance of road traffic noise effects is defined, for each road link, by combining the magnitude of impact and receptor sensitivity, as presented in the significance of effect matrix (**Table 25-8**).

Table 25-11 Magnitude of Impact Criteria for Relative Change Due to Construction Road Traffic

Magnitude of impact	Increase in BNL of closest public road used for construction traffic (dB)
High	≥5.0
Medium	≥3.0 to <5.0
Low	≥1.0 to <3.0
Negligible	<1.0
No Impact	= 0.0

25.4.3.5 Construction Phase Vibration Assessment Methodology

72. Ground-borne vibration can result from construction works and may lead to perceptible levels of vibration at nearby receptors, which at higher levels can cause annoyance to occupants. In extreme cases, cosmetic or structural building damage can occur, but only at extremely high vibration levels and such cases are rare.

73. Typically, perceptible ground-borne vibration is only emitted by 'heavy' construction works such as piling, deep excavation, or dynamic ground compaction.

74. The response of a building to ground-borne vibration is affected by the type of foundation, ground conditions, the building construction and the condition of the building. BS 7385-2 provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228-2. Guide values for transient vibration in terms of peak particle velocity (PPV), above which cosmetic damage could occur, are given in **Table 25-12**.

Table 25-12 Transient Vibration Guide Values for Cosmetic Damage

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm.s^{-1} at 4 Hz and above	
2	Un-reinforced or light framed structures Residential or light commercial type buildings	15 mm.s^{-1} at 4 Hz increasing to 20 mm.s^{-1} at 15 Hz	20 mm.s^{-1} at 15 Hz increasing to 50 mm.s^{-1} at 40 Hz and above

75. BS 7385-2 states that the probability of building damage tends to zero for transient vibration levels less than 12.5 mm.s^{-1} PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value.

76. BS 7385-2 states that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration twice that of minor damage. The values presented in **Table 25-12** refer to the likelihood of cosmetic damage. ISO 4866:2010 defines three different categories of building damage:

- Cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions;
- Minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block; and
- Major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.

77. The vibration level and effects presented in **Table 25-13** are taken from Table B-1 of BS 5228-2. These levels and effects are based on human perception of vibration in residential environments. The significance of construction vibration effects is defined, for each receptor within the study area, by combining the magnitude of impact and receptor sensitivity, as presented in the significance of effect matrix (**Table 25-8**).

Table 25-13 Construction Vibration – Example of Human Perception in Buildings

Vibration limit PPV (mms^{-1})	Interpreted significance to humans	Magnitude of impact	NPSE/PPG Category
<0.14	Vibration unlikely to be perceptible	Negligible	NOEL
0.14 to 0.3	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction		LOAEL
0.3 to 1.0	Vibration might just be perceptible in residential environments	Low	
1.0 to <10.0	It is likely that vibration at this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents	Medium	SOAEL
>10.0	Vibration is likely to be intolerable for any more than a brief exposure to this level	High	

78. Predicted construction vibration levels at receptors which exceed a value of 1 mm.s^{-1} have the potential to result in a significant effect. However, the same additional project-specific factors which can influence the construction noise effect significance (as discussed in section 25.4.3.3) are considered relevant to vibration impacts. Hence, the same process for considering these other factors should be used to determine the vibration effect significance.

79. Comparison of the criteria in **Table 25-12** and **Table 25-13** shows that the levels at which building damage may occur are significantly above those which are considered tolerable by the occupants. The assessment therefore applies the criteria for human annoyance. Assuming that the vibration impacts will be controlled to avoid significant annoyance effects, then building damage is not anticipated.

25.4.3.6 Operational Substation Noise Assessment Methodology

80. Details of the fixed plant associated with the substations has not been fully developed, therefore predictions to determine the significance of the likely noise effect would not be meaningful at this stage. Consequently, proposed operational noise magnitude of impact criteria have been presented.

81. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature and is referred to in NPS EN-1 and East Riding of Yorkshire Council Local Plan. The standard applies to industrial/commercial and background noise levels outside residential buildings and for assessing whether existing and new industrial/commercial noise sources are likely to give rise to significant adverse impacts on the occupants living in the vicinity.

82. The basis of BS 4142 is a comparison between the background sound level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background sound level – $L_{A90,T}$ – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F (Fast) and quoted to the nearest whole number of decibels;
- Specific sound level – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a reference time interval, Tr (1 hour during the daytime hours (07:00 to 23:00 hours) and 15 minutes during night-time hours (23:00 to 07:00 hours));

- Residual Sound Level - $L_{Aeq,T}$ - the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- Rating level – $L_{Ar,Tr}$ – the specific sound level plus a "character correction" if required for the acoustic features of the noise such as tonality, impulsivity and intermittency.

83. When comparing the background and the rating sound levels, the standard states that:

"*a) Typically, the greater the difference, the greater the magnitude of impact.*

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context

c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and

d) The lower the rating level relative to the measured background sound level the less likely it is that the specific sound source will have an adverse impact or a significant 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, depending on the context".

84. When assessing the noise from a source, it is necessary to have regard to the acoustic features that may be present. Section 9.1 of BS 4142 states:

"*Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level.*"

85. For clarity, an explanation of each character correction type (taken from BS 4142:2014+A1:2019, page 13 and 14) is provided here:

- Tonality - For sound ranging from not tonal to prominently tonal a correction of between 0 dB and +6 dB for tonality can be applied. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.
- Impulsivity - A correction of up to +9 dB can be applied for sound that is impulsive. Subjectively, this can be converted to a penalty of 3 dB for

impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

- Intermittency - When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

86. Other sound characteristics - Where the specific sound feature characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

87. In accordance with BS 4142, a suitable operational noise LOAEL is equal to background noise levels, as this is the threshold at which adverse impacts are anticipated. However, it is also necessary to consider the context; of particular relevance to this assessment are the absolute sound levels. Regarding absolute sound levels, 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. This is especially true at night."* The standard offers no guidance about what background and rating levels are considered low; however, the 1997 version of BS4142 stated that background sound levels below around 30dB L_{A90}, and rating levels below around 35dB L_{ArTr}, were considered very low and therefore outside the scope of the assessment method. The Association of Noise Consultants produced guidance on the application of BS 4142 (BS 4142:2014+A1:2019 Technical Note, Association of Noise Consultants, March 2020) which states that *"similar values* [i.e. background sound levels below around 30dB L_{A90}, and rating levels below around 35dB L_{ArTr}] *would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate."*

88. The WHO NNG for Europe was published to complement the WHO Guidelines for Community Noise and introduced additional research on the effects of night-time noise exposure.

89. The WHO Night Noise Guidance for Europe (NNG) found that below the level of 30dB $L_{night,outside}$ there are no observed effects on sleep. Furthermore, there is no evidence that biological effects observed at levels below 40dB $L_{night,outside}$ are harmful to health. At levels above 55dB $L_{night,outside}$, the NNG detailed that adverse health effects occur frequently and there is limited evidence that the cardio-vascular system is coming under stress.

90. Therefore, based on the NNG, the following effect levels for absolute noise levels are also relevant, with reference to the NPSE categories:

- 30dB $L_{night,outside}$ - NOEL;
- 40dB $L_{night,outside}$ - LOAEL; and
- 55dB $L_{night,outside}$ - SOAEL.

91. The magnitude of impact based on a predicted level of operational noise sources above the prevailing background sound environment, in accordance with BS 4142, are summarised in **Table 25-14**. Where background noise levels or rating levels are low, NNG guidance will be considered, the criteria for which are summarised alongside the BS4142 criteria.

Table 25-14 Operational Noise Magnitude of Impact Criteria for Industrial/Commercial Noise Sources

Magnitude of impact	**Excess of rating level over background sound level (dB)**	**NPSE/PPG category using BS 4142 criteria**	**WHO NNG threshold**	**NPSE / PPG category using WHO NNG threshold**
High	≥ 10	Lower end of range is equivalent to SOAEL	>55 dB $L_{night,outside}$	Lower end of range is equivalent to SOAEL
Medium	≥ 5 and <10			
Low	> 0 to < 5dB	LOAEL to SOAEL	40 to ≤55dB $L_{night,outside}$	LOAEL to SOAEL
Negligible	> -10 to ≤ 0	NOEL to LOAEL	30 to ≤40dB $L_{night,outside}$	NOEL to LOAEL
No Impact	≤ -10	Below NOEL	≤30dB $L_{night,outside}$	Below NOEL

25.4.4 Cumulative Effect Assessment Methodology

92. The cumulative effect assessment (CEA) considers other plans and projects that may result in a cumulation of effects with the Projects. **Chapter 6 EIA Methodology** provides details of the general framework and approach to the CEA that will be undertaken for the Projects.

93. The final assessment of cumulative effects will be undertaken during the later stages of the EIA, once further information is available on a number of projects such as the Outer Dowsing Offshore Wind Farm, Hornsea Project Four decision and the Sheringham Shoal and Dudgeon Extension Projects examination. However, for the purposes of the PEIR, it is possible to identify a number of projects and plans which are likely to feature in that assessment and consider the extent to which cumulative effects might arise. Section 25.7 presents the following preliminary information regarding cumulative effects:

- Screening for cumulative effects; and
- A preliminary short list of plans and projects considered for CEA, including a brief description as to how projects have been screened in and the initial tier level they have been assigned.

25.4.5 Assumptions and Limitations

94. This preliminary assessment is considered to be an interim stage in the EIA process. The results presented in the following sections are based on early design assumptions and initial assessments which will be refined and presented in the final Environmental Statement (ES) to be submitted as part of the DCO application.

95. Details of the fixed plant associated with the substations have not been fully developed, therefore noise predictions of the operational substations have not been undertaken at this stage. These will be undertaken when the design has been sufficiently progressed and the results will be presented in the final ES. At this stage, magnitude of impact criteria have been proposed for operational fixed plant.

96. Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort is made to ensure that measurements are undertaken in such a way to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions. However, a small degree of uncertainty will always remain in the values taken from such a measurement survey. The baseline sound levels presented in the PEIR were monitored over a two-week period, which included October half term (24 to 28 October 2022). Further noise monitoring was carried out in January 2023 and will be presented in the ES. Monitoring during this time period was agreed with East Riding of Yorkshire Council Environmental Health Department. Measured noise levels during holidays and non-holiday periods were found to be similar.

97. 3D construction noise predictions are based on a preliminary understanding of construction works, including the likely construction schedule and activities as well as the types of plant and equipment which are likely to be used. These assumptions have been provided by the Projects' construction consultants. The assumptions are considered representative of a reasonably foreseeable worst case. The plant and equipment for the worst case activities are detailed in **Appendix 25-2**. The design process is ongoing and this information may change once a construction contractor is appointed. It is likely that there will be more construction information available for the final ES.

98. Most of the construction noise impacts along the onshore export cable corridor will be of short-duration (less than one month) in a given location however the following key activities may take longer than one month and therefore worst-case noise predictions have been carried out:

- Establishing temporary work areas; and
- Trenchless crossing works along the onshore cable corridor using horizontal directional drilling (HDD).

99. The onshore export cable corridor is split into 16 sections. At this stage there are different options for TCC locations in each section. It should be noted that all options for the TCCs have been scoped into this assessment but not all will be required in reality.

100. There are also obstacles (roads, waterways etc.) that have been identified in each section of the onshore export cable corridor that may require 24 hour working using horizonal directional drilling (HDD) .HDD would be the worst case of the trenchless techniques and is therefore taken forward as a worst-case activity for the purposes of this assessment. Not all obstacles will require 24 hours a day working for HDD, however, all obstacle locations were scoped in as a worst case.

101. It is understood that all construction works are proposed to be undertaken during the daytime, with the exception of potential HDD trenchless crossing works. HDD works are continuous activities and require flexibility to potentially continue 24 hours a day for brief periods. It should be noted that noise predictions of HDD works include embedded noise mitigation of screening of stationary plant. This is detailed in **Appendix 25.2**.

25.5 Existing Environment

25.5.1 Baseline Noise Environment

102. An understanding of the baseline noise environment is required to determine the significance of potential impacts during both construction and operational phases.

103. A total of 49 NSR locations have been identified for the construction assessments (Impact 1-3, 5) and are presented in **Table 25-15**. NSR location were chosen to represent the worst case for each NSR across the Onshore Development Area, within the buffer zones defined in section 25.3.1 . It should be noted some NSR locations represent the worst-case location of multiple residential dwellings. **Appendix 25.2** presents a detailed breakdown of NSRs and **Figure 21-1** shows the locations of NSRs which are considered in the assessment.

104. The NSRs for the construction road traffic impacts are defined by the road links, and individual properties will be referred to if relevant to provide additional context to road traffic noise predictions.

105. The operational receptor locations for Impact 6 will be confirmed at ES stage when an operational assessment will be carried out. Initial baseline noise levels for five operational receptors are presented in the baseline noise results (**Table 25-16**), which overlap with receptors identified for construction impacts (R39, R43, R45, R46 and R47).

Table 25-15 Onshore Noise Sensitive Receptors Included in Construction Noise and Vibration Assessments

NSR Identifier	Coordinates		Classification	Sensitivity	Impacts
	X	Y			
R1	517766.2	455941.0	Residential	Medium	1, 2
R2	517307.2	457619.3	Residential	Medium	1, 2 (TCC only)
R3	517414.9	455124.1	Residential	Medium	1, 2
R4	517616.4	455099.4	Residential	Medium	1, 2
R5	517283.8	455048.5	Education	Medium	1, 2
R6	518141.1	455106.7	Residential	Medium	1, 2
R7	517581.2	454558.1	Residential	Medium	1, 2
R8	517666.6	454063.2	Residential	Medium	1, 2
R9	517723.3	453897.8	Residential	Medium	1, 2
R12	514397.7	449174.4	Residential	Medium	2
R13	514432.8	449032.7	Residential	Medium	2
R14	514880.8	446075.2	Residential	Medium	2
R15	514749.3	446425.7	Residential	Medium	2
R16	511381.5	443545.1	Residential	Medium	2
R17	508843.6	442650.9	Residential	Medium	2
R18	509011.3	442595.0	Residential	Medium	2
R19	509121.5	442112.2	Residential	Medium	2
R20	509097.4	442507.3	Place of Worship	Medium	2

NSR Identifier	Coordinates		Classification	Sensitivity	Impacts
	X	Y			
R21	509150.9	442421.1	Residential	Medium	2
R22	508611.7	442463.6	Residential	Medium	2
R23	508326.9	442246.1	Residential	Medium	2
R24	508213.4	442063.7	Residential	Medium	2
R25	506507.5	443164.6	Residential	Medium	2
R26	503605.1	441859.6	Residential	Medium	2
R27	503145.8	441379.5	Residential	Medium	2
R28	503061.4	441376.8	Pub	Low	2
R29	502966.2	441370.6	Education	Medium	2
R30	502867.2	441356.4	Residential	Medium	2
R31	502392.9	441213.3	Residential	Medium	2
R32	501930.3	441057.3	Residential	Medium	2
R33	502080.1	441179.7	Healthcare	Medium	2
R34	501913.4	441764.1	Residential	Medium	2
R35	501183.1	441040.6	Residential	Medium	2
R36	500618.4	440072.9	Residential	Medium	2
R37	501933.3	438191.6	Residential	Medium	2, 3
R38	501855.6	437933.1	Residential	Medium	2, 3
R39	502021.4	437000.2	Residential	Medium	2, 3
R40	502447.8	437128.6	Residential	Medium	2, 3

NSR Identifier	Coordinates		Classification	Sensitivity	Impacts
	X	Y			
R41	503492.5	437550.3	Residential	Medium	2, 3
R42	502508.8	436990.1	Residential	Medium	2, 3
R43	502491.5	436477.5	Residential	Medium	2, 3
R44	503806.0	437218.2	Residential	Medium	2, 3
R45	502806.7	437339.2	Residential	Medium	2, 3
R46	502817.2	436280.7	Residential	Medium	2, 3
R47	503343.8	435888.5	Residential	Medium	2, 3
R48	503719.0	435663.9	Residential	Medium	2, 3
R49	508812.3	442632.1	Place of Worship	Medium	2
R50	509338.8	442366.2	Residential	Medium	2
R51	501294.6	438889.4	Residential	Medium	2

106. Measurement locations (representative of individual or groups of NSRs) were identified and agreed with East Riding of Yorkshire Council's Environmental Health Department for the assessment of noise from the substation and landfall zones. Six measurements locations representative of substation receptors were surveyed between October and November 2022, one of which has been scoped out of the operational assessment (location E) as it is no longer within the Noise and Vibration study area. Further noise monitoring was carried out in January 2023 and will be presented in the ES.

107. The baseline sound survey comprised of unattended measurements at five NSRs with the potential to be impacted by operational noise from the onshore substation. Measurements were conducted in accordance with current guidance, including BS 4142 and BS 7445.

108. A preliminary analysis of baseline data has been undertaken, which will be developed further for the ES. A summary of the unattended baseline sound survey results, representative of the NSRs around the proposed onshore substation site, is provided in **Table 25-16**. Further details can be found in **Appendix 25-1**.

109. The single figure L_{A90} values for each receptor location have been ascertained by calculating the mean value of all day and night values at a given location over the monitoring period. The representative value for each day and night has been ascertained by calculating the lowest of the mean and mode of $L_{A90,15min}$ values for each day and night period. Days and nights of adverse weather events have been excluded from the analysis for these summary values.

Table 25-16 Baseline Noise Monitoring Results

Measurement Location	**$L_{Aeq,T}$ (dB)**	**L_{AFmax} (dB)**	**L_{A90} (dB)**
Daytime (07:00 – 23:00)			
A (R39)	51	69 to 76	46
B (R43)	59	70 to 80	54
J (R46)	45	62 to 64	40
K (R47)	52	66 to 80	47
N (R45)	54	67 to 73	50
Night-time (23:00 – 07:00)			
A (R39)	43	52 to 60	30
B (R43)	52	66 to 73	32
J (R46)	39	53 to 55	27
K (R47)	43	54 to 63	32
N (R45)	47	60 to 66	33

25.5.2 Future Trends

110. Noise is managed and driven by UK and local legislation and policies. The UK's noise strategy and standards are enacted through management actions at a local authority level. There is a policy trend towards the achievement and maintenance of the noise environment across the UK, which is reflected in current legislation, policy and guidance. Predicted noise levels due to a change in land use, new developments and associated vehicles are assessed as part of the development planning and consent process.

111. Potential impacts to the prevailing soundscape should be minimised, avoided, or mitigated to suitable levels (in accordance with current legislation, policy and guidance), avoiding an adverse impact, where possible. In addition to planning controls there is a clear trend for noise from vehicle, commercial and industrial sources to be driven down in compliance with stricter legislation and guidance.

112. Consequently, in relation to the Projects and its immediate receiving environment it is reasonable to predict a general steady baseline soundscape would be maintained.

25.6 Assessment of Significance

25.6.1 Potential Effects During Construction

113. Assumptions regarding the plant for each construction activity covered in the assessments for Impacts 1 to 3 are provided in **Appendix 25.2**, along with predicted construction noise level at each NSR.

25.6.1.1 Impact 1: On-site Construction Noise at Landfall Location

25.6.1.1.1 Magnitude of Impact – All Scenarios

114. Construction activities at the landfall location include activities such as construction of the landfall compound (including access and haul roads), laying of offshore export cables (nearshore) and transition jointing. These activities will be undertaken during daytime, with the exception of potential HDD works at trenchless crossings which have the potential to require 24 hour working and which have been assessed separately in Impact 2 (section 25.6.1.2).

115. The highest predicted monthly daytime noise levels at the nearest NSRs during landfall construction activities in isolation are 66 dB $L_{Aeq,T}$ at R1 and 63 dB $L_{Aeq,T}$ at R4. Noise levels could increase by up to 3 dB should the Projects be built concurrently. Results indicate worst case noise levels from landfall activities are predicted to cause, at-worst, a low impact. Noise levels are predicted to be above the LOAEL and therefore as per NPSE guidance, all reasonable steps should be taken to minimise effects. For those NSRs with increased separation from the construction works the magnitude of impacts is no greater than negligible.

25.6.1.1.2 Significance of Effect – All Scenarios

116. The receptors worst-affected by landfall activities (R1 and R4) are of medium sensitivity, therefore without mitigation potential **minor** adverse effects (not significant) are predicted from landfall construction activities, should the Projects be built in isolation or concurrently.

25.6.1.1.3 Mitigation and Residual Significance of Effect – All Scenarios

117. Residual effects due to landfall construction are no more than **minor** adverse (not significant). Exceedances of the LOAEL can be mitigated through implementation of the best practicable means (BPM) noise control measures outlined within the CoCP (see embedded mitigation in **Table 25-3**).

25.6.1.2 Impact 2: On-site Construction Noise at Temporary Construction Compounds and Potential Horizontal Directional Drilling Locations

25.6.1.2.1 Magnitude of Impact – All Scenarios

118. Construction activities along the Onshore Export Cable Corridor include excavation of trenches, construction of temporary haul roads and laying or pull of onshore export cables. The worst-case activities in terms of noise have been identified to be the construction of TCCs and potential 24 hour HDD for crossing of existing infrastructure and natural features.

119. **Table 25-17** presents the predicted number of NSRs per magnitude of impact for the worst case onshore export cable corridor construction activities. Further details are provided in **Appendix 25.2.**

Table 25-17 Magnitude of Impact Due to Construction Noise Along the Cable Route

Negligible	Low	Medium	High
TCCs Daytime*			
15	25	8	1
HDD Night-time*			
13	26	6	3
*Note that there are 49 and 48 receptors within the 300 m study area for TCC and HDD locations respectively.			

120. The highest predicted monthly daytime noise levels (87 dB LAeq,T) due to TCCs are at NSRs within approximately 10-15 m from the works. These noise levels are likely to lead to a high impact at one NSR (see Table 25.2.4 3, **Appendix 25-2**). It is predicted that there will also be medium adverse impacts at eight NSRs due to construction noise from TCCs.

121. The highest predicted monthly night-time noise levels (60-67 dB $L_{Aeq,T}$) at the NSRs due to potential HDD locations are within approximately 110 m of the works . These noise levels are likely to lead to a high impact at three NSRs (see Table 25.2.4 4, **Appendix 25-2**). It is predicted that there will also be medium adverse impacts at six NSRs due to construction noise from HDD works.

25.6.1.2.2 Significance of Effect – All Scenarios

122. The assessment results show that, without mitigation, the magnitude of impact of medium or high is predicted for a total of seventeen receptors, including nine receptors due to daytime TCC activities and nine receptors due and night-time HDD activities, with one receptor (R22) affected by both. A medium impact is predicted at R22 from both daytime TCC and night-time HDD activities. For those NSRs with increased separation from the construction works the magnitude of impacts is no greater than low.

123. NSRs along the onshore export cable corridor are at-worst medium sensitivity. For those NSRs potentially experiencing a medium or high magnitude of construction noise this would represent effects of **moderate** at thirteen NSRs and **major** adverse significance at four NSRs without mitigation.

25.6.1.2.3 Mitigation and Residual Significance of Effect

124. The assessed locations for TCCs are currently a series of options, with the final locations to be confirmed. The location of TCCs and the proximity of NSRs to construction works will be reviewed as part of the iterative design process prior to the completion of the ES. The obstacles that require HDD (including 24 hour works) are also to be confirmed and more information on durations at specific locations is likely to be available at ES stage. Therefore, construction noise effects (including significant effects) can be potentially decreased or removed by the appropriate selection of sites through optioneering and investigation of obstacles (and need for 24 hour working) along the onshore export cable corridor.

125. At this stage, the level of information for TCC options has been provided in terms of identified parcels of land, rather than specific areas/locations. Noise emissions from the TCC options have been modelled covering the whole parcel of land. The specific location of the TCC within the parcel of land will be chosen with consideration to noise levels at NSRs generated by the set-up and operation of the TCC. Therefore, construction noise effects can potentially be decreased by the design and placement of TCCs.

126. Should significant effects remain after the final selection of TCC sites and HDD locations has been made, the following mitigation measures (or other measures deemed appropriate) will be considered and included in the CoCP, where applicable:

- Temporary screening around the work area or construction compound;
- Use of silencers and/or enclosures around noisy equipment; and
- Choosing alternative, lower impact equipment or methods where practicable.

127. It is generally considered that screening can provide approximately 5 – 10 dB of attenuation but the effectiveness is dependent on the distance to the noise source, and the height and length of the screening.

128. After implementation of generic mitigation and specific targeted noise control measures, and on the basis that a 5-10 dB noise reduction is readily achievable with screening, the magnitude of the impact would be reduced to low and the residual significance of effect reduced to **minor** adverse effect (not significant) at NSRs (all medium sensitivity).

129. A **moderate** adverse effect (significant) may remain at R43, which is approximately 65m from the A164 (obstacle S14-RX-1), should the obstacle require HDD works at night. This receptor is the closest receptor to a potential trenchless crossing location.

130. Exceedances of the LOAEL can be mitigated through implementation of the best practicable means (BPM) noise control measures outlined within the CoCP (see embedded mitigation in **Table 25-3**).

25.6.1.3 Impact 3: On-site Construction Noise at Onshore Substation Zones

25.6.1.3.1 Magnitude of Impact – All Scenarios

131. Construction activities related to the substation include establishment of a level platform (cut, fill and import of material), construction of permanent access to the site and construction of foundations and the structure.

132. The highest predicted monthly daytime noise levels at the nearest NSRs during substation construction activities in isolation are 59-61 dB $L_{Aeq,T}$. This could increase by up to 3 dB should the Projects be built concurrently due to an increase in the quantities of construction plant. Therefore, the worst case noise levels from substation activities are predicted to cause a negligible impact and be below the LOAEL.

25.6.1.3.2 Significance of Effect – All Scenarios

133. The receptors worst-affected by substation construction activities are of medium sensitivity, therefore effect would be **minor adverse** (not significant) for substation construction activities under all scenarios. No mitigation is required however best practice measures should be followed at all construction sites and works should follow the CoCP.

25.6.1.4 Impact 4: Noise from Off-Site Construction Traffic – All Scenarios

134. Road links required to be used by construction traffic for the Projects are presented in **Chapter 24 Traffic and Transport**. These road links were assessed by undertaking BNL calculations, which are provided in full in **Appendix 25.3**.

135. The construction road traffic noise assessment predicts changes in road traffic noise levels due to construction traffic. The results can be seen in **Table 25-18**, which shows that all links with flows above 1000 AAWT (i.e. valid for CRTN methodology) are predicted to cause impacts of no greater than low magnitude of impact,

136. It is noted that Link 36 (Dunflat Road off A164) is predicted to have a +3.0 dB change in road traffic noise due to construction traffic in the concurrent scenario, which is on the threshold of a medium impact. Link 36 is approximately 300m from the nearest NSRs in Bentley (Coppleflat Lane/Manor Farm Cottages) where the dominant road traffic noise will be from the A164 (link 35, 2026 Future Base BNL = 75.5 dB $L_{A10,18hr}$) 350m away. Given the context of the nearest NSRs and the predicted change in noise levels, it is concluded that the change in road traffic due to construction traffic on link 36 is likely to cause no more than a low impact at the nearest NSRs.

Table 25-18 Magnitude of Impact Due to Construction Road Traffic (Excluding <1000 AAWT Links)

No impact	Negligible	Low	Medium	High
Projects in Isolation				
6	36	19	0	0
Projects Concurrently				
5	22	34*	0*	0
*Link 36 reduced from a medium to low impact based on context (see paragraph 136)				

25.6.1.4.1 Significance of Effect – All Scenarios

137. All NSRs along the identified road links are considered to be medium sensitivity, and no high sensitivity receptors have been identified. Therefore, taking the worst-case concurrent scenario, the assessment indicates that the effect from peak construction traffic, without mitigation, will be:

- No change – 5 links;
- Minor adverse (not significant) – 56 links .

138. Five road links do not meet the minimum 1000 vehicles AAWT required for the assessment and therefore are not included in the assessment of impacts shown in **Table 25-18**. The assessment methodology for links with less than 1000 vehicles AAWT will be further developed within the ES. A qualitative assessment of effects of these remaining links has been undertaken and presented in **Table 25-19**. Three links (IDs 8, 11 and 73) have been identified as potential significant adverse noise effects due to construction road traffic noise.

Table 25-19 Qualitative Assessment of Construction Road Traffic Impacts for Flows of Less Than 1000 AAWT

Link ID	Link Description	Indicative Assessment	Commentary
7	Dunnington Lane	Scoped out	The nearest receptor is on A165 Beeford to Brandesburton (Link 3). Noise at this receptor is likely to be dominated by Link 3 (2026 Future Base BNL = 71.4 dB $L_{A10,18hr}$).
8	Catfoss Road	Potential significant adverse effect	The nearest receptors are approximately 5-10 residential properties 10 – 40 m from the edge of Catfoss Road. 42% increase in total traffic from 822 (2026 Future Base) to 1165 (2026 Future Base + Construction Concurrent) and a 756% increase in HGVs from 16 to 137. Construction traffic will enter/exit Catfoss from Bridlington Road, which is west of an industrial estate. There is a potential under-prediction of baseline flows for some receptors along Catfoss road as the automatic traffic counter placement was east of the industrial estate.
11	Catwick Stub	Potential significant adverse effect	120% increase in traffic from 204 (2026 Future Base) to 449 (2026 Future Base + Construction Concurrent). The link leads to TCC S3-TCC-C which is adjacent to Catfoss Farm (R38). This is a TCC option and has the potential to not be included at ES stage.

Link ID	Link Description	Indicative Assessment	Commentary
58	Stub off A1035	Scoped out	The nearest receptor is adjacent to A1035/A164 (Link 57). Noise at this receptor is likely to be dominated by Link 57 (2026 Future Base BNL = 71.9 dB $L_{A10,18hr}$).
73	Eske Lane	Potential significant adverse effect	The nearest receptors are two individual residential properties 5 – 10 m from the road edge of Eske Lane. 627% increase in traffic from 48 (2026 Future Base) to 349 (2026 Future Base + Construction Concurrent). The link leads to Section 7 TCCs S7-TCC-A and S7-TCC-B (totality of TCC options for Section 7).

25.6.1.4.2 Mitigation and Residual Significance of Effect

139. For the 61 road links that are above 1000 AAWT, the residual effect of road traffic noise at NSRs will be at worst minor adverse (not significant), with five links having no change in road traffic noise.

140. Following the implementation of agreed traffic measures within the Outline CTMP (see embedded mitigation **Table 25-3**), the impact magnitude would be expected to reduce to minor during peak construction traffic scenario for links 8 and 11 representing a residual **minor** adverse effect (not significant).

141. Due to the large increase of traffic on Eske Lane it is likely that the effect, with mitigation incorporated, could be of **moderate** adverse (significant) at NSRs on Eske Lane.

25.6.1.5 Impact 5: Construction Vibration

25.6.1.5.1 Magnitude of Impact – All Scenarios

142. The operation of HDD rigs and ancillary equipment would produce the greatest vibration impact along the onshore export cable corridor and is therefore taken forward as the worst case for the vibration assessment.

143. Vibration levels decay very rapidly with distance from a source. A representative example of HDD given within BS 5228-2:2009+A1:2014 is for boring through silts overlying sandstone and generating a PPV of 8 mm/s at 4.5 m from the source, decreasing to a PPV of 2.7 mm/s at 7 m from the source and 1.8 mm/s at 12 m from the source.

144. Given the distance of separation between trenchless crossing locations and the NSRs (at least 65 m) PPV levels would be below the criteria outlined in **Table 25-13** at all NSRs along the onshore export cable corridor. Vibration impacts from onshore export cable corridor construction activities would therefore be of no greater than negligible magnitude.

145. The operation of piling rigs is considered to produce the greatest vibration levels from the onshore substation, however there are no NSRs within 100 m of the substation sites, therefore this impact is scoped out.

25.6.1.5.2 Significance of Effect – All scenarios

146. Vibration impacts are predicted to be no greater than negligible impact. The NSRs within 100 m of the HDD locations are at-worst medium sensitivity. This represents an effect of no greater than **minor** significance at medium sensitivity receptors. No mitigation measures are proposed.

25.6.2 Potential Effects During Operation

25.6.2.1 Impact 6: Operation of Onshore Substations

25.6.2.1.1 Substation Outline Noise Criteria

147. On-site fixed plant at the onshore substations have not been quantitively assessed at this stage as the design and specifications of plant is not yet confirmed.

148. The noise criteria for the operation of the substations will be relative to the existing background noise level at receptors, with consideration given to site specific contextual factors (as outlined earlier in this chapter). Where existing background noise levels at night are low, the NNG criteria will also be considered, where the LOAEL is 40 dB $L_{night,outside}$ Noise from the majority of fixed plant items can be attenuated, should this be required, and this is considered to be achievable. Significant adverse effects can therefore be avoided.

149. Fixed plant noise levels can be controlled through DCO requirements.

25.6.3 Potential Effects During Decommissioning

150. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it recognised that industry best practice, rules and legislation change over time. It is likely the cables would be pulled through the ducts and recycled, with the transition pits and ducts capped and sealed then left in situ.

151. A full EIA will be carried out if required ahead of any decommissioning works. The programme for onshore decommissioning is expected to be similar in duration to the construction phase. The detailed activities and methodology for decommissioning will be determined later within the Projects lifetime, in line within relevant policies at the time, but would be expected to include:

- Dismantling and removal of electrical equipment;
- Removal of cabling from site;
- Removal of any building services equipment;
- Demolition of the buildings and removal of fences; and
- Landscaping and reinstatement of the sites.

152. Whilst details regarding the decommissioning are currently unknown, it is anticipated that the effects would be similar to those during construction.

25.7 Preliminary Assessment of Cumulative Effects

153. As detailed in section 25.4.4, this section presents a preliminary assessment of cumulative effects in relation to **Chapter 25 Noise and Vibration**. The final CEA will be undertaken within the ES chapter.

25.7.1 Initial Screening for Cumulative Effects

154. **Table 25-20** details the potential cumulative effects that may occur between the Projects and other plans, projects and activities. Only potential impacts assessed in section 25.6 where the potential for cumulative effects has been identified (minor, moderate or major) will be taken forward to the final CEA (i.e. those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact).

Table 25-20 Potential Cumulative Effects

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Construction			
Impact 1: Potential interaction with construction noise at landfall location	No	Medium	There are a no known plans or projects within 1km of the landfall location at this stage, therefore no cumulative effects are expected at NSRs in proximity of the landfall.
Impact 2: Potential interaction with construction noise along the Onshore Cable Corridor	Yes	Medium	Residual noise effects on NSRs may be exacerbated by other projects that are located in proximity to the NSRs.
Impact 3: Potential interaction	Yes	Medium	Residual noise effects on NSRs may be exacerbated by other projects

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
with construction noise at Onshore Substation locations			that are located in proximity to the NSRs.
Impact 4: Construction Road Traffic Noise	Yes	High	Plans and projects currently in planning have potential cause increases in road traffic during construction stage. Therefore, there is potential for cumulative road traffic noise effects on NSRs in proximity to the road links scoped into the construction road traffic noise assessment.
Impact 5: Construction Vibration	Yes	Medium	Plans and projects currently in planning have potential to cause vibration impacts. However, it is considered that there is a low likelihood of interactions as high vibration activities are often over short durations and would need to be in close proximity to cause cumulative effects.
Operation & Maintenance			
Impact 6: Potential interaction with operational noise at Onshore Substation locations	Yes	Medium	Residual noise effects on NSRs may be exacerbated by other projects that are located in proximity to the NSRs.

25.7.2 Plans/Projects Considered for Cumulative Impacts

155. A high-level list of plans/projects that may result in cumulative effects with the Projects is detailed in **Table 25-21**. For **Chapter 25 Noise and Vibration**, the following search distances (matching those used for the study area, defined in section 25.3.1) from the onshore development area have been used to determine the initial list of projects considered for the CEA:

- Cumulative construction noise - plans/projects approximately 300m from NSRs identified in the construction noise assessments (Impacts 1-3);
- Cumulative construction road traffic noise – plans/projects that have the potential to use road traffic links included in the construction road traffic noise assessment (Impact 4).
- Cumulative construction vibration - plans/projects approximately 100m from NSRs identified is the construction vibration assessment (Impact 5); and
- Cumulative operational noise - plans/projects approximately 500m from the NSRs identified for the operational assessment (Impact 6).

156. Plans / projects have been assigned a tier level between 1 and 7, based on the most recent guidance (see **Chapter 6 EIA Methodology**). For the final CEA at ES, this high-level list will be reviewed and screened to ensure all relevant plans / projects are considered in the final assessment. All listed plans / projects will be re-examined at ES to ensure each assigned tier remains accurate at the time of writing.

Table 25-21 High-Level List of Plans/Projects Screened For Further Assessment in the Final CEA

Tier	Plan / Project	Distance to Onshore Development Area (km)
2	Dogger Bank A & B Offshore Wind Farm	Crosses onshore export cable corridor
3	A164 and Jock Lodge Junction Improvement Scheme	Crosses onshore export cable corridor
3	Solar Farm – Land south of Creyke Beck Substation, 4875 Park Lane, Cottingham	Within Onshore Development Area
3	Solar Farm – Land east and west of West of Tickton Bridge Plantation, Main Road, Routh	Adjacent to the Onshore Development Area
4	Hornsea Project Four Offshore Wind Farm	Adjacent to onshore export cable corridor
4	Scotland England Green Link 2	3.5
4	Solar Farm – Land north east and west of Carr Plantation, Ferry Road, Wawne	1.5
4	Household Recycling Centre – Land north west of Ings Road Picnic Site, Molescroft	Within Onshore Development Area
6	Solar Farm – Robson & Co, White Hall, Shepard Lane, Woodmansey	Within Onshore Development Area
7	New National Grid Substation (Birkill Wood)	Within Onshore Development Area
7	North Humber to High Marnham	Within Onshore Development Area
7	Creyke Beck Substation Extension	400m from Onshore Development Area

25.8 Potential Monitoring Requirements

158. Construction noise and vibration will be monitored in line with a CoCP), which will detail the procedure for dealing with complaints and managing potential exceedances of relevant noise and vibration criteria.

159. It is suggested that operational noise tests are undertaken at the Projects' commissioning stage.

25.9 Interactions

160. The effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects are presented in **Table 25-22**. This provides a screening tool for which effects have the potential to interact. **Table 25-23** provides an assessment for each receptor (or receptor group) as related to these impacts.

161. Within **Table 25-23** the effects are assessed relative to each development phase to see if multiple effects could increase the significance of the effect upon a receptor. Following this a lifetime assessment is undertaken which considers the potential for effect to affect receptors across all development phases.

Table 25-22 Interactions Between Impacts - Screening

Potential Interactions between Impacts					
Construction					
	Impact 1: Construction Noise at Landfall Location	Impact 2: Construction Noise along Onshore Cable Corridor (TCCs and HDD)	Impact 3: Construction Noise at Onshore Substation	Impact 4: Construction Road Traffic Noise	Impact 5: Construction Vibration
Impact 1: Construction Noise at Landfall Location		Yes	No	Yes	Yes
Impact 2: Construction Noise along Onshore Cable Corridor (TCCs and HDD)	Yes		Yes	Yes	Yes
Impact 3: Construction Noise at Onshore Substation	No	Yes		Yes	Yes

Potential Interactions between Impacts					
Impact 4: Construction Road Traffic Noise	Yes	Yes	Yes		Yes
Impact 5: Construction Vibration	Yes	Yes	Yes	Yes	
Operation					
	Impact 6: Operation of Onshore Substation				
Impact 6: Operation of Onshore Substation					
Decommissioning					
It is anticipated that the decommissioning impacts would be similar in nature to those of construction.					

Table 25-23 Interaction Between Impacts - Phase and Lifetime Assessment

Receptor	Highest Significance Level				
	Construction	**Operation**	**Decommissioning**	**Phase Assessment**	**Lifetime Assessment**
Residential	Moderate adverse	Minor adverse	Moderate adverse	No greater than individually assessed impacts The impacts (Impacts 1-6) are considered to range from negligible to moderate adverse impact significance at residential receptors. Given the predicated impact significance and that each impact will be managed with standard and best practice methodologies it is considered that there would be no interactions or that these would not result in greater impact than assessed individually	No greater than individually assessed impacts There may be interactions between the landfall and onshore export cable corridor construction as well as the onshore export cable corridor and onshore substation construction. It should be noted that worst case assumptions have been used for each impact (Impacts 1-3) of the construction noise assessment therefore the effect level is unlikely increase the significance of effect over the lifetime of the project. The onshore substation assessment indicates minor adverse effects for throughout the project lifetime which is considered not significant in EIA terms; therefore, it is considered that these impacts would not combine to increase the significance level of any impacts identified in this assessment.

25.10 Inter-relationships

162. For Noise and Vibration there are potential inter-relationships between other topics assessed within this PEIR including Traffic and Transport, Ecology and Health. A summary of the potential inter-relationships between these topics is provided in **Table 25-24**.

Table 25-24 Noise and Vibration Inter-relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction			
Construction Traffic	**Chapter 24 Traffic and Transport**	Section 25.6.1.4	Influence of noise associated with construction traffic on local amenity
Construction and Operation			
Onshore Ecology Noise Levels	**Chapter 18 Terrestrial Ecology and Ornithology**	Section 25.6	Potential noise impacts at ecological receptors is addressed separately in **Chapter 18 Terrestrial Ecology and Ornithology**
Heath Impacts	**Chapter 27 Human Health**	Section 25.6	Potential human health impacts related to increase in noise at NSRs
Decommissioning			
As per construction			

25.11 Summary

163. This chapter has provided a characterisation of the existing environment for noise and vibration based on baseline noise survey data and baseline road traffic data.

164. The chapter should be read in conjunction with **Appendices 25-1 to 25-3** which provide further detail on the baseline noise monitoring, noise modelling methodology and results.

165. Temporary noise and vibration effects during construction have been assessed. With appropriate mitigation in place, adverse effects can be largely avoided, although a temporary adverse noise effect of moderate significance may be experienced for short periods at receptors closest to the trenchless crossing (assuming HDD) of the A164, should 24 hour working be required.

166. The change in noise levels due to increases in construction traffic relating to the Projects has been assessed. The calculated increases in noise level are mostly of minor significance or less, however a temporary moderate adverse effect may be experienced at receptors along Eske Lane during construction works.

167. Noise emission magnitude of impact criteria have been proposed in relation to noise from fixed plant associated with substation(s) of the Project, in accordance with the guidance of BS4142 and WHO Night Noise Guidelines. With suitable acoustic design, including selection of plant and mitigation if required, noise relating to fixed plant is unlikely to cause significant effects.

168. A summary of noise and vibration effects of the Projects is provided below in **Table 25-25**.

Table 25-25 Summary of Potential Likely Significant Effects on Noise and Vibration

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Construction						
Impact 1: Construction Noise at Landfall Location	Residential	Medium	Low	Minor Adverse (exceedances of LOAEL)	BPM, CoCP	**Minor Adverse** (mitigated exceedances of LOAEL)
Impact 2: Construction Noise along Onshore Cable Corridor – TCCs (Daytime)	Residential	Medium	High	Major Adverse	BPM, CoCP, selection/investigation of sites, shielding/barriers	**Minor Adverse**
Impact 2: Construction Noise along Onshore Cable Corridor – HDD (Daytime)	Residential	Medium	High	Major Adverse	BPM, CoCP, shielding/barriers	**Moderate Adverse** (1 NSR: R43)
Impact 3: Construction Noise at Onshore Substation	Residential	Medium	Negligible	Minor Adverse (below LOAEL)	N/A	**Minor Adverse** (below LOAEL)
Impact 4: Construction Road Traffic Noise (AAWT > 1000)	Residential	Medium	Low	Minor Adverse	N/A	**Minor Adverse**
Impact 4: Construction Road Traffic Noise (AAWT < 1000)	Residential	Medium	Medium/High	Moderate / Major Adverse	CTMP	**Moderate Adverse** (1 NSR: Eske Lane)
Impact 5: Construction Vibration	Residential	Medium	Negligible	Minor Adverse	N/A	**Minor Adverse**
Operation						
Impact 6: Operation of Onshore Substation	Residential	Medium	Negligible/Low The substation will be designed to minimise and mitigate potential noise impacts.	Minor Adverse	N/A	**Minor Adverse**

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