RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Chapter 16 – Infrastructure and Other Users

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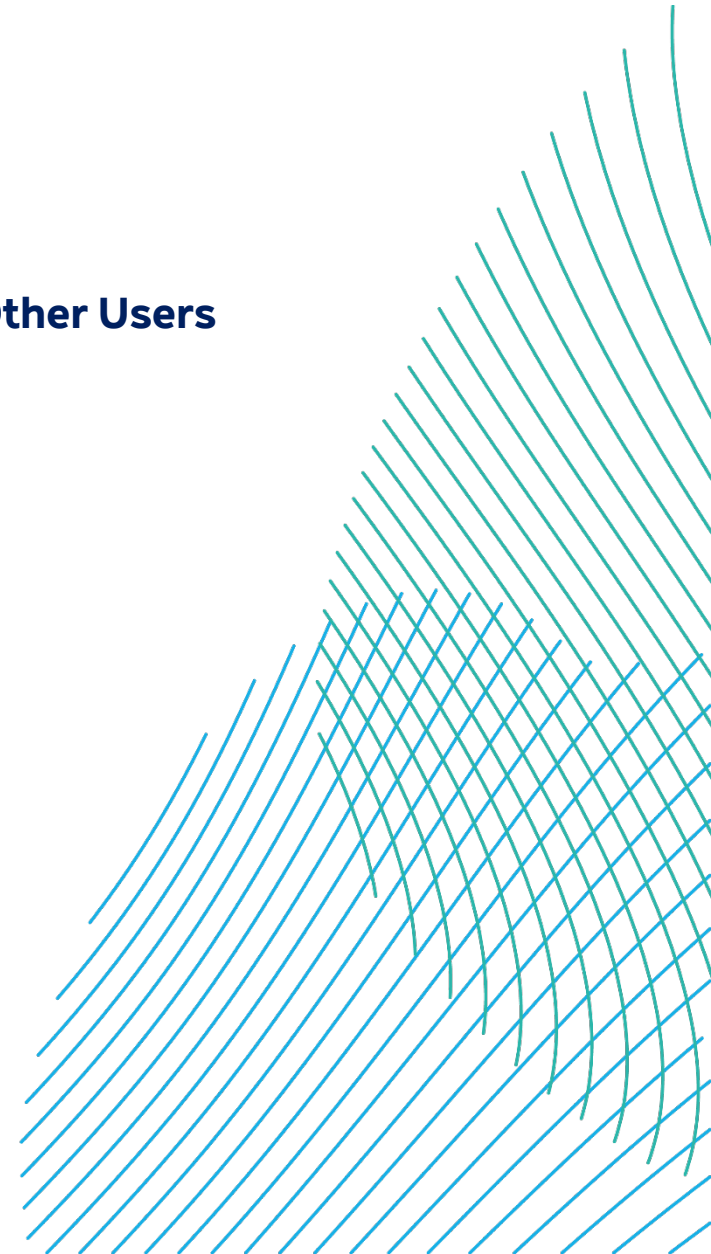

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Glossary

Term	Definition
Accommodation Platform	An offshore platform (situated within either the DBS East or DBS West Array Area) that will provide accommodation and mess facilities for staff when carrying out maintenance activities for the Projects.
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines and array cables will be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Area.
Array cables	Offshore cables which link the wind turbines to the Offshore Converter Platform(s).
Concurrent Scenario	A potential construction scenario for the Projects where DBS East and DBS West are both constructed at the same time.
Development Scenario	Description of how the DBS East and / or DBS West Projects would be constructed either in isolation, sequentially or concurrently.
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Electrical Switching Platform (ESP)	The Electrical Switching Platform (ESP), if required would be located either within one of the Array Areas (alongside an Offshore Converter Platform (OCP)) or the Export Cable Platform Search Area.
In Isolation Scenario	A potential construction scenario for one Project which includes either the DBS East or DBS West array, associated offshore and onshore cabling and only the eastern Onshore Converter Station within the Onshore Substation Zone and only the northern route of the onward cable route to the proposed Birkhill Wood National Grid Substation.

Term	Definition
Inter-Platform Cable Corridor	The area where Inter-Platform Cables would route between the DBS East and DBS West Array Areas, should both Projects be constructed.
Inter-Platform Cables	Buried offshore cables which link offshore platforms.
Offshore Converter Platforms (OCPs)	The OCPs are fixed structures located within the Array Areas that collect the AC power generated by the wind turbines and convert the power to DC, before transmission through the Offshore Export Cables to the Project's Onshore Grid Connection Points.
Offshore Development Area	The Offshore Development Area for ES encompasses both the DBS East and West Array Areas, the Inter-Platform Cable Corridor, the Offshore Export Cable Corridor, plus the associated Construction Buffer Zones.
Offshore Export Cable Corridor	This is the area which will contain the offshore export cables (and potentially the ESP) between the Offshore Converter Platforms and Transition Joint Bays at the landfall.
Offshore Export Cables	The cables which would bring electricity from the offshore platforms to the Transition Joint Bays (TJBs).
Safety zones	Legislated under the Energy Act 2004, safety zones are rolling buffer areas which protect construction activities by preventing unauthorised vessels from entering their boundary.
Scoping opinion	The report adopted by the Planning Inspectorate on behalf of the Secretary of State.
Scoping report	The report that was produced in order to request a scoping opinion from the Secretary of State.
Scour protection	Protective materials to avoid sediment erosion from the base of the wind turbine foundations and offshore platform foundations due to water flow.

Term	Definition
Sequential Scenario	A potential construction scenario for the Projects where DBS East and DBS West are constructed with a lag between the commencement of construction activities. Either Project could be built first.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).

Acronyms

Term	Definition
AEP	Annual Energy Production
CAA	Civil Aviation Authority
CCS	Carbon Capture and Storage
DBS	Dogger Bank South
DC	Direct Current
DCO	Development Consent Order
DML	Deemed Marine Licence
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ESP	Electrical Switching Platform
ETG	Expert Topic Group
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IPMP	In Principle Monitoring Plan
km	Kilometre
MCA	Maritime Coastguard Agency
MW	Megawatt
MGN	Marine Guidance Note
MHWS	Mean High Water Springs

Term	Definition
MMO	Marine Management Organisation
MoD	Ministry of Defence
NPS	National Policy Statement
NSTA	North Sea Transition Authority
OCP	Offshore Converter Platform
PEIR	Preliminary Environmental Information Report
PEXA	Practice and Exercise Area
SAR	Search and Rescue
SNS	Southern North Sea
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance

16 Infrastructure and Other Users

16.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the likely significant effects of the Projects on marine infrastructure and other users. The chapter provides an overview of the existing environment for the proposed Offshore 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 in **Volume 7**:

   - **Chapter 14 Shipping and Navigation (application ref: 7.14)**: and
   - **Chapter 15 Aviation and Radar (application ref: 7.15)**.

16.2 Consultation

3. Consultation with regard to infrastructure and other users has been undertaken in line with the general process described in **Volume 7, Chapter 7 Consultation (application ref: 7.7)** and the **Consultation Report (application ref: 5.1)**. The key elements to date include EIA scoping and formal consultation on the Preliminary Environmental Information Report (PEIR) under section 42 of the Planning Act 2008.

4. The feedback received throughout this process has been considered in preparing the ES. This chapter has been updated following consultation in order to produce the final assessment submitted within the Development Consent Order (DCO) application. **Volume 7, Appendix 16-1 (application ref: 7.16.16.1)** provides a summary of the consultation responses received to date relevant to this topic, and details how the comments have been addressed within this chapter.

16.3 Scope

16.3.1 Study Area

5. The infrastructure and other users study area has been defined on the basis of marine activities within 50km of the Offshore Development Area that have the potential to overlap, be influenced by, or influence the Projects (see **Volume 7, Figure 16-1 (application ref: 7.16.1)**). Given the high number of plans, projects and activities operational or in planning within the Dogger Bank and Southern North Sea, this study area was chosen to ensure every receptor which is reasonably likely to be significantly influenced by the Projects was captured in this assessment.

6. The assessment considers existing as well as planned projects and activities, where information is within the planning system, otherwise publicly available, or has been made available through the consultation process.

16.3.2 Realistic Worst Case Scenario

16.3.2.1 General Approach

7. Following responses to PEIR, a number of updates were made to the Projects' design envelope. Such changes included (but were not limited to):

   - The removal of high voltage alternating current (HVAC) technology for energy export (previously assessed in PEIR) as a potential Development Scenario;
   - A reduction in the size of the Projects' Array Areas;
   - A reduction in the maximum number of Offshore Platforms from 11 to eight;
   - The removal of several Offshore Export Cable Corridor options;
   - The removal of the most southerly landfall option; and
   - A reduction in the potential capacity of the 'large' wind turbines assessed as part of this application.

8. See Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4) for further information.

9. The realistic worst case design parameters for likely significant effects scoped into the Environmental Impact Assessment (EIA) for the infrastructure and other users assessment are summarised in **Table 16-1**. These are based on the project parameters described in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**, which provides further details regarding specific activities and their durations.

10. In addition to the design parameters set out in **Table 16-1**, consideration is also given to the different Development Scenarios still under consideration and the possible phasing of the construction as set out in sections 16.3.2.2 to 16.3.2.4.

Table 16-1 Realistic Worst Case Design Parameters

	Parameter			
	DBS East in isolation	**DBS West in isolation**	**DBS West and DBS East concurrently and / or in sequence**	**Notes and rationale**
Construction In the instance of sequential development, up to a two year delay between the start of construction activities for either Project is possible. The final overall footprint of development would be identical to the concurrent design scenario.				
Impact 1: Potential interference with other wind farms Impact 2: Potential interference with oil & gas and CCS operations including decommissioning activities Impact 3: Physical impacts on subsea cables and pipelines Impact 5: Impacts on MOD Activities	**Array Area** Total Array Area assessed for ES – 427km² (349km² for Array Area + 78km² construction buffer area) Installation of up to 100 small turbines and four offshore platforms within the Array Area 325km array cable length with up to 10% of the cable length requiring surface laid cable protection 115km Inter-Platform Cable length with up to 10% of the cable length requiring surface laid cable protection Approximate number of cable / pipeline crossings (array and Inter-Platform Cables) – 19 Safety zones of 500m radius from any construction activity (to be applied for) **Offshore Export Cable Corridor** Installation of one Electrical Switching Platform (ESP) along the Offshore Export Cable Corridor 376km export cable length with up to 20% of the cable length requiring surface laid cable protection (2x 188km export cables) Approximate number of cable / pipeline crossings – 24	**Array Area** Total Array Area assessed for ES – 434km² (355km² for Array Area + 79km² construction buffer area) Installation of up to 100 small turbines and four offshore platforms within the Array Area 325km array cable length with up to 10% of the cable length requiring surface laid cable protection 129km Inter-Platform Cable length with up to 10% of the cable length requiring surface laid cable protection Approximate number of cable / pipeline crossings (array and Inter-Platform Cables) – 27 Safety zones of 500m radius from any construction activity (to be applied for) **Offshore Export Cable Corridor** Installation of one ESP along the Offshore Export Cable Corridor 306km export cable length with up to 20% of the cable length requiring surface laid cable protection (2x 153km export cables) Approximate number of cable / pipeline crossings – 24	**Array Areas and Inter Platform Cable Corridor** Total Array Area assessed for ES – 1,008km² (874km² for Array Areas and Inter Platform Cabling Area + 134km² construction buffer area) Installation of up to 200 small turbines and eight offshore platforms within the Array Area 650km array cable length with up to 10% of the cable length requiring surface laid cable protection 342km Inter-Platform Cable length with up to 10% of the cable length requiring surface laid cable protection Approximate number of cable / pipeline crossings (array and Inter-Platform Cables) – 61 Safety zones of 500m radius from any construction activity (to be applied for) **Offshore Export Cable Corridors** Installation of one ESP along the Offshore Export Cable Corridor 682km export cable length cables with up to 20% of the cable length requiring surface laid cable protection (4x export cable circuits, 2x 188km in length and 2x 153km in length)	Assumes even split of the total 650km array cable length between DBS East and DBS West. Maximum export cable length assumes worst case that cable circuits are laid and buried in separate trenches rather than bundled. Construction buffer area measures 1km surrounding each Array Area, and 500m surrounding the Inter Platform Cable Corridor. Construction vessels may occupy this area but no construction will occur within these areas based upon the latest turbine layout at the time of writing.

	Parameter			
	DBS East in isolation	**DBS West in isolation**	**DBS West and DBS East concurrently and / or in sequence**	**Notes and rationale**
	Vessel Movements Maximum total vessels offshore on site simultaneously - 80 *Note – This figure is a combination of the estimated peaks for separate tasks. It is unlikely (but possible) that each of the packages use their maximum quantity of vessels and very unlikely that this occurs simultaneously. Assumes half of the vessel numbers required for installation of both Array Areas.*	**Vessel Movements** Maximum total vessels offshore on site simultaneously - 80 *Note – This figure is a combination of the estimated peaks for separate tasks. It is unlikely (but possible) that each of the packages use their maximum quantity of vessels and very unlikely that this occurs simultaneously. Assumes half of the vessel numbers required for installation of both Array Areas.*	Approximate number of cable / pipeline crossings – 48 **Vessel Movements** Maximum total vessels offshore on site simultaneously -134 *Note – This figure is a combination of the estimated peaks for separate tasks. It is unlikely (but possible) that each of the packages use their maximum quantity of vessels and very unlikely that this occurs simultaneously.*	
Operation				
Impact 1: Potential interference with other wind farms Impact 2: Potential interference with oil & gas and CCS operations including decommissioning activities Impact 3: Physical impacts on subsea cables and pipelines Impact 5: Impacts on MOD Activities	**Maximum infrastructure** 100 small turbines and four offshore platforms within the Offshore Development Area Max Upper Blade Tip Height above MHWS – 394.08m (above MHWS) Total area of array and inter-platform cable protection – **496,212m²** (312,900m² array cable protection + 183,312m² inter-platform cable protection) Total area of pipeline / cable crossing material (array + Inter–Platform Cables) – **61,300m²** Total area of export cable protection – **1,000,282m²** Total area of pipeline / cable crossing material (offshore export cable) – **147,133m²** Approximate 30 year design lifespan	**Maximum infrastructure** 100 small turbines and four offshore platforms within the Offshore Development Area Max Upper Blade Tip Height above MHWS – 394.08m (above MHWS) Total area of array and inter-platform cable protection – **516,004m²** (310,500m² array cable protection + 205,504m² inter-platform cable protection) Total area of pipeline / cable crossing material (array + inter–platform cables) – **73,600m²** Total area of export cable protection – **788,941m²** Total area of pipeline / cable crossing material (offshore export cable) – **147,133m²** Approximate 30 year design lifespan	**Maximum infrastructure** 200 small turbines and eight offshore platforms within the Offshore Development Area Max Upper Blade Tip Height above MHWS – 394.08m (above MHWS) Total area of array and Inter-Platform Cable protection – **1,159,884m²** (623,400m² array cable protection + 536,484m² Inter-Platform Cable protection) Total area of pipeline / cable crossing material (array + inter–platform cables) – **226,600m²** Total area of export cable protection – **1,789,222m²** Total area of pipeline / cable crossing material (offshore export cable) – **294,267m²** Approximate 30 year design lifespan (+ 2 years if the Projects were built sequentially)	There will be maximum of eight platforms, with the ESP potentially being located within the Array Areas or the Offshore Export Cable Corridor. As such, the ESP has been assessed as being within both the Offshore Export Cable Corridor, DBS East or DBS West as a precautionary approach.

	Parameter			
	DBS East in isolation	**DBS West in isolation**	**DBS West and DBS East concurrently and / or in sequence**	**Notes and rationale**
	Vessel Movements Maximum total vessels offshore on site simultaneously –20	**Vessel Movements** Maximum total vessels offshore on site simultaneously - 20	**Vessel Movements** Maximum total vessels offshore on site simultaneously - 21	
Decommissioning				
No final decision regarding the final decommissioning policy for the offshore project infrastructure including landfall, has yet been made. It is also recognised that legislation and industry best practice change over time. It is likely that offshore project infrastructure will be removed above the seabed and reused or recycled where practicable. 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. A decommissioning plan for the offshore works would be submitted prior to any decommissioning commencing.				

16.3.2.2 Development Options

11. Following Statutory Consultation high voltage alternating current (HVAC) technology (previously assessed in PEIR) was removed from the Projects' design envelope (see **Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4)** for further information). As a result, only high voltage direct current (HVDC) technology has been taken forward for assessment purposes. The ES considers the following Development Scenarios.

    - Either DBS East or DBS West is built In Isolation; or
    - DBS East and DBS West are both built either Sequentially or Concurrently.

12. An In Isolation Scenario has been assessed within the ES on the basis that theoretically one Project could be taken forward without the other being built out. If an In Isolation Project is taken forward, either DBS East or DBS West may be constructed. As such the offshore assessment considers both DBS East and DBS West in isolation.

13. In order to ensure that a robust assessment has been undertaken, all Development Scenarios have been considered to ensure the realistic worst case scenario for each topic has been assessed. A summary is provided here, and further details are provided in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**.

14. The three Development Scenarios to be considered for assessment purposes are outlined in **Table 16-2**:

Table 16-2 Development Scenarios and Construction Durations

Development Scenario	Description	Total Maximum Construction Duration (Years)	Maximum construction Duration Offshore (Years)	Maximum construction Duration Onshore (Years)
In Isolation	Either DBS East or DBS West is built in Isolation	Five	Five	Four
Sequential	DBS East and DBS West are both built sequentially, either Project could commence construction first with staggered / overlapping construction	Seven	A five year period of construction for each project with a lag of up to two years in the start of construction of the second project (excluding landfall duct installation) – reflecting the maximum duration of effects of seven years.	Construction works (i.e. onshore cable civil works, including duct installation) to be completed for both Projects simultaneously in the first four years, with additional works at the landfall, substation zone and cable joint bays in the following two years. Maximum duration of effects of six years.

Development Scenario	Description	Total Maximum Construction Duration (Years)	Maximum construction Duration Offshore (Years)	Maximum construction Duration Onshore (Years)
Concurrent	DBS East and DBS West are both built concurrently reflecting the maximum peak effects	Five	Five	Four

15. The In Isolation, Concurrent and Sequential Development Scenarios all allow for flexibility to build out either or both Projects using a phased approach offshore. Under a phased approach the maximum timescales for individual elements of the construction are assessed.

16. 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 lag) are identified and discussed where relevant in section 16.6. For each potential impact, the worst case construction scenario for the In Isolation Scenario and the Concurrent or Sequential Scenario is presented. The worst case scenario presented for the Concurrent or Sequential Scenario will depend on which of these is the worst case for the potential impact being considered. The justification for what constitutes the worst case is provided, where necessary, in section 16.6.

16.3.2.3 Operation Scenarios

17. Operation scenarios are described in detail in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**. The assessment considers the following scenarios:

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

18. If the Projects are built using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phases for the Projects have been assessed. See section 5.1.1 of **Volume 7, Chapter 5 Project Description (application ref: 7.5)** for further information on phasing scenarios for the Projects.

19. The operational lifetime of each Project is expected to be 30 years.

16.3.2.4 Decommissioning Scenarios

20. Decommissioning scenarios are described in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**. Decommissioning arrangements would be agreed through the submission of a Decommissioning Plan to be submitted and approved following cessation of commercial operation prior to decommissioning commencing, For the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

16.3.3 Embedded Mitigation

21. This section outlines the embedded mitigation relevant to the infrastructure and other users assessment, which has been incorporated into the design of the Projects or constitutes standard mitigation measures for this topic (**Table 16-3**). Mitigation is also detailed within the **Volume 8, Commitments Register (application ref: 8.6)** and cross-referenced within **Table 16-3**. Where other mitigation measures are proposed, these are detailed in the impact assessment (section 16.6).

Table 16-3 Embedded Mitigation Measures

Parameter	Embedded Mitigation Measures	Where Commitment is Secured?
Application for safety zones	One or more applications would be made to DESNZ for Safety Zones post consent including up to 500m around ongoing activities during construction, major maintenance, and decommissioning and up to 50m for installed structures pre commissioning. The application will be made in compliance with MGN654. This would ensure navigational safety and minimise risk of snagging.	Safety Zone Statement DML 1 & 2 - Condition 18 DML 3 & 4 - Condition 16 DML 5 - Condition 12

Parameter	Embedded Mitigation Measures	Where Commitment is Secured?
Cable burial risk assessment	Final Cable Burial Risk Assessments and Cable Protection Plans will be produced in line with the detail provided in the **Outline Cable Statement (application ref: 8.20)** that has been submitted with the DCO application, and in accordance with conditions attached to the DMLs in the **Draft DCO (application ref: 3.1)**. Any damage, destruction or decay of cables must be notified to Maritime Coastguard Agency (MCA), Trinity House, Kingfisher and United Kingdom Hydrographic Office (UKHO) no later than 24 hours after discovered.	DML 1 & 2 - Condition 15 DML 3 & 4- Condition 13 DML 5 - Condition 11
Charting of infrastructure	There will be appropriate marking of all offshore infrastructure associated with the Projects on UKHO admiralty charts. Appropriate notification to UKHO would be secured through the conditions of the DMLs contained in the Order.	DML 1 & 2 - Conditions 9, 15, & 24 DML 3 & 4- Conditions 7, 13, & 22 DML 5 - Conditions 5, 11 & 18
Compliance with Marine Guidance Note (MGN) 654	The Projects will ensure compliance with MGN 654 and its annexes, where applicable, including completion of a SAR checklist.	DML 1 & 2 - Condition 18 DML 3 & 4- Condition 16 DML 5 - Condition 12
Guard vessel(s)	Where appropriate, guard vessels will also be used to ensure navigational safety to mitigate impacts which pose a risk to surface navigation during construction and maintenance. This will be committed to within the **Fisheries Liaison and Coexistence Plan(s) (application ref: 8.28)**.	DML 1 & 2 - Condition 15 DML 3 & 4- Condition 13 DML 5 - Condition 11

Parameter	Embedded Mitigation Measures	Where Commitment is Secured?
Layout plan	One or more Layout Plan(s) setting out the relevant proposed details of the Projects within the Offshore Development Area would be agreed with the MMO following appropriate consultation with Trinity House and the MCA.	Layout Plan DML 1 & 2 - Condition 15 DML 3 & 4- Condition 13 DML 5 - Condition 11
Lighting and marking	Lighting and marking of obstacles would be in accordance with the latest relevant industry guidance, as required by Trinity House, MCA, and Civil Aviation Authority (CAA). Final requirements will be detailed and agreed pre-construction in a Lighting and Marking Plan(s) produced as part of the Aids to Navigation Management Plan(s).	Aids to Navigation Management Plan DML 1 & 2 - Condition 10 DML 3 & 4 - Condition 8 DML 5 - Condition 6
Project vessel compliance with international marine regulations	Project vessels will ensure compliance with Flag State regulations including the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974). This is detailed within the **Outline PEMP (application ref: 8.21)**.	Pollution Environmental Management Plan (PEMP) DML 1 & 2 - Conditions 15 & 21 DML 3 & 4- Conditions 13 & 19 DML 5 - Conditions 11 & 15

Parameter	Embedded Mitigation Measures	Where Commitment is Secured?
Promulgation of information	The Projects will ensure that local Notifications to Mariners are updated and reissued at weekly intervals during construction activities and at least five days before any planned operation and maintenance works. Advance warning and accurate location details of construction, maintenance and decommissioning operations (including details of vessel routes, timings and locations), associated safety zones and advisory passing distances will be given via Kingfisher Bulletins at least 14 days prior where possible.	DML 1 & 2 - Condition 9 DML 3 & 4- Condition 7 DML 5 - Condition 5
Traffic monitoring	Monitoring of vessel traffic will be undertaken for the duration of the construction phase and during the first three years of the operation and maintenance phase. This would be secured through carrying out vessel traffic monitoring in accordance with the **Outline Marine Traffic Monitoring Plan (application ref: 8.30)**.	Fisheries Liaison and Coexistence Plan DML 1 & 2 - Condition 21 & 22 DML 3 & 4- Condition 19 & 20 DML 5 - Condition 15 & 16

16.4 Assessment Methodology

16.4.1 Policy, Legislation and Guidance

16.4.1.1 National Policy Statements

22. The assessment of potential impacts upon infrastructure and other users has been made with specific reference to the relevant National Policy Statements (NPS) including the Overarching NPS for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5). These were published in November 2023 and were designated in January 2024. The specific assessment requirements for infrastructure and other users, as detailed in the NPS, are summarised in **Table 16-4** together with an indication of the section of this chapter where each is addressed.

Table 16-4 NPS Assessment Requirements

NPS Requirement	NPS Reference	ES Section Reference
EN-3 NPS for Renewable Energy Infrastructure		
There may be constraints imposed on the siting or design of offshore wind farms because of the presence of other offshore infrastructure, such as oil and gas, Carbon Capture, Usage and Storage (CCUS), co-location of electrolysers for hydrogen production, marine aggregate dredging, telecommunications, or activities, such as aviation and recreation	Paragraph 2.8.34.	**Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4)** provides the rationale for the location of the Array Areas, Offshore Export Cable Corridor platform area of search and Offshore Export Cable Corridor, which includes consideration of constraints associated with other offshore infrastructure.

NPS Requirement	NPS Reference	ES Section Reference
Where a potential offshore wind farm is proposed close to existing operational offshore infrastructure or has the potential to affect activities for which a licence has been issued by government, The Applicant should undertake an assessment of the potential effects of the proposed development on such existing or permitted infrastructure or activities. The assessment should be undertaken for all stages of the lifespan of the proposed wind farm in accordance with the appropriate policy and guidance for offshore wind farm EIAs.	Paragraphs 2.8.187 and 2.8.188	The potential impacts are assessed in section 16.6.
Applicants should engage with interested parties in the potentially affected offshore sectors early in the pre-application phase of the proposed offshore wind farm, with an aim to resolve as many issues as possible prior to the submission of an application.	Paragraph 2.8.190	Consultation with owners and operators of offshore infrastructure has been undertaken by the Applicants both formally through statutory consultation and through further discussions.

NPS Requirement	NPS Reference	ES Section Reference
Such stakeholder engagement should continue throughout the life of the development including construction, operation and decommissioning phases where necessary. As many offshore industries are regulated by government, the relevant Secretary of State should also be a consultee where necessary. Such engagement should be taken to ensure that solutions are sought that allow offshore wind farms and other uses of the sea to successfully co-exist.	Paragraph 2.8.191 to 2.8.193	Consultation with the Planning Inspectorate has been undertaken as part of the scoping and PEIR phases of the Projects. The scoping opinion from the Planning Inspectorate, and other relevant responses to the PEIR, in relation to the infrastructure and other users of the marine environment are shown in **Volume 7, Appendix 16-1 (application ref: 7.16.16.1).** Consultation with developers and operators of other assets and infrastructure will also continue across the life-cycle of the Projects.

16.4.1.2 Other

23. In addition to the NPS, there are pieces of policy and guidance applicable to the assessment of infrastructure and other users. These include:

- East Inshore East Offshore and North East Offshore Marine Plan (MMO, 2014), North East Inshore and North East Offshore Marine Plans (MMO, 2021)
- European Subsea Cable UK Association (ESCA) Guideline No. 6 – The Proximity of Offshore Renewable Energy Installations and Submarine Cable Infrastructure in UK Waters (ESCA, 2016);
- The International Cable Protection Committee (ICPC) has issued a series of recommendations for marine cables, specifically:
  - Recommendations No. 2 – Recommended Routing and Reporting Criteria for Cables in Proximity to Others (ICPC, 2015);
  - Recommendations No. 3 – Criteria to be Applied to Proposed Crossings Submarine Cables and/or Pipelines (ICPC, 2014);
  - Recommendations No. 13 – The Proximity of Offshore Renewable Wind Energy Installations and Submarine Cable Infrastructure in National Waters (ICPC, 2013); and
- Oil and gas licencing rounds information (NSTA, 2023).

24. The guidance regarding submarine cables and offshore renewable developments and their proximity is of relevance to this chapter, given the potential for the Array Areas and Offshore Export Cable Corridor to be located in close proximity, or be directly crossing, other third-party infrastructure (see section 16.5 for further information). Further detail on general policy and guidance is provided in **Volume 7, Chapter 3 Policy and Legislative Context (application ref: 7.3)**.

16.4.2 Data and Information Sources

25. Sources that have been used to inform the assessment are listed in **Table 16-5.**

Table 16-5 Available Data and Information Sources

Data Set	Spatial Coverage	Year	Source
Offshore Cables	UK	2023	https://www.marinefind.co.uk/
Wind farms	UK and EU	2023	https://www.4coffshore.com/offshorewind/

Data Set	Spatial Coverage	Year	Source
Oil and Gas Infrastructure	UK	2023	https://ogauthority.maps.arcgis.com/home/index.html
Aggregate Sites	UK	2023	https://thecrownestate.maps.arcgis.com/home/index.html
Dredger Transit Routes	UK	2023	https://bmapa.org/issues/renewable_energy.php
Disposal Sites	UK	2023	https://data.cefas.co.uk/view/407

16.4.3 Impact Assessment Methodology

26. **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)** provides a summary of the general impact assessment methodology applied. The following sections describe the methods used to assess the likely significant effects on infrastructure and other users.

16.4.3.1 Definitions

27. 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 infrastructure and other users assessment are provided in **Table 16-6** and **Table 16-7**.

Table 16-6 Definition of Sensitivity for an Infrastructure and Other Users Receptor

Sensitivity	Definition
High	High value activity/activity fundamental to the operator or infrastructure that is of international or national economic importance. No redundancy available in the event of impact. Asset very sensitive to the impact. For example, a gas pipeline, electrical infrastructure or telecommunication cable supporting UK or European activity or nationally important aggregates area where extraction company has no access to areas of equal quality aggregates.
Medium	Medium value activity. Impact to asset would significantly reduce operators' activities but not result in complete failure to continue operations. Limited redundancy available. Asset regionally important. Asset has limited tolerance of impact. For example, a gas pipeline, electrical infrastructure or telecommunication cable, where asset owners have some potential for redundancy planning. Aggregates areas where extraction company has some, but limited access to equal quality aggregate.
Low	Low value activity. Impact to asset would have limited implications on operator/public either due to the availability of redundancy or limited pathway for impact. Asset has some tolerance of impact. For example, an electrical or telecommunication cable with ability to undertake redundancy planning to limit impact. Aggregates area where extraction company has access to large areas of equal quality aggregate.
Negligible	Low value activity. Operators' activities would not be significantly reduced by an impact. Asset generally tolerant of impact. Limited impact to asset owners or local community in case of damage or failure.

Table 16-7 Definition of Magnitude of Impacts

Magnitude	Definition
High	Loss of resource and / or quality and integrity of a receptor; severe damage to key characteristics, features or elements. For example, accidental damage to an asset resulting in permanent or long term inoperability or complete loss of access to economically important asset.
Medium	Loss of resource, but not adversely affecting the integrity of resource; partial loss of / damage to key characteristics, features or elements. For example, damage to an asset that results in either short term, complete inoperability or long term reduced functionality. Partial loss of access to an economically important asset, or short term complete loss of access.

Magnitude	Definition
Low	Some measurable change in resource attributes, quality or vulnerability, minor loss, or alteration to, one (maybe more) key characteristics, features or elements. For example, accidental damage to an asset resulting in short term reduction of functionality but not complete loss of function. Short term disruption to access to an asset.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements, and / or slight alteration to a receptor.

16.4.3.2 Significance of Effect

28. 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 **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6.1)**. Definitions of each level of significance are provided in **Table 16-8**. 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 is minor or negligible is deemed not significant.

Table 16-8 Definition of Effect Significance

Significance	Definition
Major	Very large or large change in receptor condition, which is likely to give rise to important considerations at a regional or district level because the receptor contributes 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 an important consideration 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.
No change	No impact, therefore no change in receptor condition.

16.4.4 Cumulative Effect Assessment Methodology

29. The cumulative effect assessment (CEA) considers other schemes, plans, projects and activities that may result in significant effects in cumulation with the Projects. **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)** (and accompanying **Volume 7, Appendix 6-2 Offshore Cumulative Assessment (application ref: 7.6.6.2)**) provides details of the general framework and approach to the CEA.

30. For infrastructure and other users, this includes other offshore wind farm projects, oil and gas development activities, pipelines and cables, and restricted areas e.g. military practice and exercise areas.

31. Further detail on potential cumulative effects is provided in section 16.7.

16.4.5 Transboundary Effect Assessment Methodology

32. The transboundary assessment considers the potential for transboundary effects to occur on other marine users as a result of the Projects; either those that might arise within the Exclusive Economic Zone (EEZ) of European Economic Area (EEA) states or arising on the interests of EEA states e.g., a non UK fishing vessel. **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)** provides further details of the general framework and approach to the assessment of the transboundary effects.

16.4.6 Assumptions and Limitations

33. The characterisation of the existing environment and the resulting impact assessment is based on publicly available information, purchased data or information gained directly from the relevant operators / organisations during consultation. There may be elements of uncertainty associated with the locations of some existing infrastructure and where this is the case, this would be discussed with the owners and operators and confirmed, if required, during pre-construction surveys.

16.5 Existing Environment

34. The following infrastructure and other users receptors are located within the 50km study area for this chapter:

- Offshore wind farms;
- Oil and gas infrastructure;
- Subsea cables;
- Pipelines;
- Carbon capture storage;
- Aggregate extraction;

- Disposal sites; and
- Ministry of Defence activities.

16.5.1 Offshore Wind Farms

16.5.1.1 Active / In Operation Offshore Wind Farms

35. Nearby operational offshore wind farms within 50km of the Projects (at the time of writing) include the Hornsea One and Hornsea Project Two offshore wind farms, Westermost Rough and Humber Gateway. A list of all offshore wind farm array and export cables within 50km of the Projects is provided in **Table 16-9** and displayed on **Volume 7, Figure 16-2 (application ref: 7.16.1)**.

16.5.1.2 Consented / Under Construction Offshore Wind Farms

36. Nearby consented offshore wind farms within 50km of the Projects (at the time of writing) include Dogger Bank A (under construction), Dogger Bank B (under construction), Dogger Bank C (under construction), Sofia (under construction), Hornsea Project Three (consented) and Hornsea Project Four (consented). The Offshore Export Cable Corridor of the Projects runs parallel to the Dogger Bank A and B export cable route for approximately 48km (see **Volume 7, Figure 16-2 (application ref: 7.16.1)** for further context), with the majority of this route falling within the temporary construction area of the Dogger Bank A and B export cable route. The Projects' Offshore Export Cable Corridor also crosses the Hornsea Project Four export cable route, approximately 8.5km from the East Yorkshire coastline at its closest point.

16.5.1.3 Offshore Wind Farms In-Planning

37. The only nearby offshore wind farm within 50km of the Projects in the planning stages (at the time of writing) is Dogger Bank D (Equinor, 2023), proposed to be located in the eastern portion of Dogger Bank C. Should this location be chosen as final for the project, this would place the project outside of the 50km search area for this assessment. However, at the time of writing the Dogger Bank D export cable corridor is proposed to run adjacent to the DBS East Array Area (see **Volume 7, Figure 16-2 (application ref: 7.16.1)**. It should be noted this potential export corridor is common to both the hydrogen offtake Development Scenario for Dogger Bank D, wherein the Offshore Export Cable Corridor would connect into a Hydrogen Production Facility in the East Riding of Yorkshire, and the National Grid Option, whereby the Offshore Export Cables connect to an Offshore Collector Platform (Dogger Bank Wind Farm, 2023).

Table 16-9 Offshore Wind Farm Array Areas / Export Cables Within 50km of the Projects Array Areas or Offshore Export Cable Corridor

Offshore Wind Farm Array Area	Closest Distance from the Projects (km)		
	DBS West	DBS East	Offshore Export Cable Corridor
Dogger Bank A Array Area (under construction)	8	9	20
Dogger Bank A Export Cable (under construction)	4	24	0
Dogger Bank B Array Area (under construction)	17	32	20
Dogger Bank B Export Cable (under construction)	8	37	0
Dogger Bank C Export Cable (under construction)	15	35	17
Dogger Bank D Export Cable (in development)	30	0 (adjacent to Array Area)	17
Hornsea One Array Area (in operation)	Over 50km	43	Over 50km
Hornsea Project Two Array Area (in operation)	Over 50km	41	47
Hornsea Project Three Array Area (pre-construction)	Over 50km	45	Over 50km
Hornsea Project Three Export Cable (pre-construction)	Over 50km	45	Over 50km
Hornsea Project Four Array Area(pre-construction)	42	41	30
Hornsea Project Four Export Cable (pre-construction)	Over 50km	41	0

Offshore Wind Farm Array Area	Closest Distance from the Projects (km)		
	DBS West	DBS East	Offshore Export Cable Corridor
Humber Gateway Array Area (in operation)	Over 50km	Over 50km	43
Humber Gateway Export Cable (in operation)	Over 50km	Over 50km	41
Sofia Array Area (under construction)	37	35	49
Sofia Export Cable (under construction)	15	30	18
Westermost Rough Array Area (in operation)	Over 50km	Over 50km	23
Westermost Rough Export Cable (in operation)	Over 50km	Over 50km	25

16.5.2 Oil and Gas Infrastructure

38. The existing oil and gas infrastructure nearest to the Projects is associated with the Cavendish, Gordon, Esmond and Forbes gas fields. There is no surface infrastructure in the Array Areas. The nearest platform (Cavendish) is 0.5km west of the DBS East Array Area, this platform ceased production in August 2018 and was approved for decommissioning in June 2020 (Offshore Petroleum Regulator for Environment and Decommissioning, 2021). Decommissioning activities for Cavendish are scheduled to conclude in 2024 (Lepic, 2020). As of April 2022, decommissioning activities were yet to commence (INEOS, 2022) with no further updates being provided since this date. All oil and gas infrastructure within 50km of the Offshore Development Area is provided in **Volume 7, Figure 16-2 (application ref: 7.16.1)**.

39. The nearest active gas field outside of the Array Areas, located around 11km from the DBS East Array Area, is the Cygnus field. It is associated with Neptune Energy.

40. There are no active wells within or adjacent to the Array Areas (**Volume 7, Figure 16-3 (application ref: 7.16.1)**). Within 15km of Array Areas, there are five active subsurface infrastructures (five wellheads – 43/09A-4/5 and 43/15A-B2/3/4).

41. Within both the Array Areas and the Offshore Export Cable Corridor there are three active pipelines that contain natural gas. Pipelines that run through the Array Areas and Projects' Export Cable Corridor are listed in **Table 16-10** and displayed on **Volume 7, Figure 16-3 (application ref: 7.16.1)**. In addition, the active Langeled gas pipeline (UK to Norway) crosses the Projects Offshore Export Cable Corridor approximately 47km offshore from the coastline.

42. It has been noted that the recent 33rd Licensing Round for oil and gas licences was published in May 2024, and that consideration will be given to any relevant projects moving forward.

Table 16-10 Existing Oil and Gas Pipelines Within Array Areas

Project	Pipeline	Material	Status
DBS West	Shearwater to Bacton (SEAL)*	Gas	Active
	Esmond to Trent WYE Manifold		Not in Use
	Esmond to Forbes		Abandoned
	Esmond to Gordon**		Abandoned
DBS East	Esmond to Gordon**		Abandoned
	Cygnus to ETS		Active
	Cavendish		Not in Use
	Cavendish	Methanol	Not in Use
DBS West and DBS East Export Cable Corridor	Shearwater to Bacton (SEAL)*	Gas	Active
	Esmond to Trent WYE Manifold		Not in Use
	Langeled		Active

**Shearwater to Baction (SEAL) runs through both the DBS West Array Area and the Offshore Export Cable Corridor*

***Esmond to Gordon pipeline runs through both Array Areas*

43. The Array Areas of both Projects overlap with several oil and gas blocks licensed for exploration and production as listed in **Table 16-11**.

Table 16-11 Licensed Blocks Within the Array Areas

Project Element	Licence Blocks
DBS West	43/7; 43/8; 43/12b
DBS East	43/15a; 43/19a; 43/20b; 44/11d
Offshore Export Cable Corridor	43/19a; 43/11; 42/20b; 42/19; 42/18; 42/23; 42/22; 42/27

16.5.3 Electrical Infrastructure

44. One disused subsea cable (UK-Germany 6) is located within 1km of the DBS West Array Area. The proposed Eastern Green Link 2 (also referred to as EGL2) HDVC power cable route is located approximately 2km north of the Offshore Export Cable Corridor for the Projects (see **Volume 7, Figure 16-4 (application ref: 7.16.1)**). The routes for a proposed third Eastern Green Link HVDC cable (referred to as EGL3, routing from Fife to the south Humber area) and fourth Eastern Green Link HVDC cable (referred to as EGL4, routing from Peterhead to the south Humber area) cross the Offshore Export Cable Corridor for the Projects. Both projects are listed as being in the 'Strategic Optioneering' stage of development by National Grid (National Grid ESO, 2023b), with limited information being publicly available at the time of writing. Public consultation on the projects is due to commence in early 2024 (National Grid ESO, 2023c).

45. The consented route for the Viking Link HVDC interconnector power cable is located approximately 29km south of the DBS East Array Area. The project was commissioned on the 29th December 2023 (Offshore Energy, 2022a). The Continental Link Multi-Purpose Interconnector, in planning by National Grid (Planning Inspectorate, 2024) is planned to connect into the existing Creyke Beck National Grid substation near Cottingham, East Yorkshire. While no publicly available information is available at this time regarding the routing of this cable, it is likely to be located within the vicinity and feature an overlap in construction with the Projects.

46. There are no existing cables in the DBS East Array Area.

47. There also exists the potential for the National Grid Holistic Network Design (HND) bootstrap cable(s) to route through, or connect to, the Offshore Development Area for the Projects. The HND is described as a single, integrated approach to support large scale delivery of electricity from offshore wind through the coordination of transmission infrastructure both on and offshore (National Grid ESO, 2023a). As the offshore routing for the HND is still in the early stages of planning, with publicly available information listed as 'for illustrative purposes only' at the time of writing (National Grid ESO, 2023b), it cannot yet be determined where exactly any interactions between the HND and the Projects would occur.

16.5.4 Carbon Capture and Storage

48. Overlapping the Offshore Export Cable Corridor is the proposed site of Northern Endurance Carbon Capture Storage (CCS) project. The associated pipelines are proposed to run from Redcar, Teesside and from Easington, Hull. The project was awarded an Agreement for Lease by The Crown Estate in October 2023 (Offshore Engineer, 2023). Installation of the pipelines and seabed infrastructure for the project is scheduled to commence in 2024, with the first CO_2 injection anticipated to take place in 2026 (Xodus, 2021). At the time of writing, the Projects' Offshore Export Cable Corridor would cross the intended pipeline route to Redcar for the Northern Endurance CSS (**Volume 7**, **Figure 16-4 (application ref: 7.16.1)**).

49. In addition, the CCS leasing round opened by the North Sea Transition Authority (NSTA) in June 2022 recently concluded in September 2023 with the award of 21 licences for projects across the North Sea (NSTA, 2023). The original leasing round included areas of seabed overlapping the Array Areas and infrastructure and other users study Area (see **Volume 7, Figure 16-4 (application ref: 7.16.1)**) (Offshore Energy, 2022b), namely the Southern North Sea (SNS) Area 1 (which overlaps with a small part the Array Areas and the Projects' Export Cable Corridor) and SNS Area 3 (which overlaps the Offshore Export Cable Corridor approximately 5.6km from the coastline).

50. Within a 50km radius of the Projects, SNS Areas 5 and 7 are located approximately 26km and 8km from the DBS East Array Areas respectively, with SNS Area 6 being located approximately 35km south of the Offshore Cable Corridor.

51. The following relevant CCS licences were awarded in 2023 (NSTA, 2023):

- Neptune Energy - CS020, SNS Area 1 BC05 sub area;

- BP - CS025, SNS Area 1 BC42 sub area;
- Shell - CS028, SNS Area 3;
- Neptune Energy – CS021, SNS Area 5 Bunter BC13;
- Perenco – CS018, SNS Area 6A West Sole;
- Perenco – CS017, SNS Area 6B Amethyst; and
- Neptune Energy – CS022, SNS Area 7 Caister Bunter.

16.5.5 Aggregate Extraction

52. There are no licenced aggregate production areas or active subsurface mining sites within the Offshore Development Area. The closest licenced offshore minerals aggregates site to the Projects is the Humber 2 production area, located approximately 48km south-east of the Offshore Export Cable Corridor. Therefore, impacts on these areas were scoped out of further assessment due to the distance from the Projects.

16.5.6 Dumping and Disposal Sites

53. There are no dumping or disposal sites located within the Array Areas or the Offshore Export Cable Corridor. The closest open disposal site is Bridlington A (HU015), located approximately 7km north of the Offshore Export Cable Corridor. The closest closed disposal site is Bridlington Bay B, located approximately 5km north-west of the Offshore Export Cable Corridor (see **Volume 7, Figure 16-5 (application ref: 7.16.1)**).

54. The nearby offshore wind farms of Dogger Bank A, Dogger Bank B, Dogger Bank C, Sofia and the Hornsea Projects have been granted licences to dispose of sediment across the entirety of their array boundaries. Given that these are within their respective array boundaries there is no spatial overlap with the Projects, therefore impacts on these areas were scoped out of further assessment.

16.5.7 Ministry of Defence Activities

55. The following Practice and Exercise Areas (PEXA) encompass the Infrastructure and Other Users Study Area (see **Volume 7, Figure 16-6 (application ref: 7.16.1)**):

- D323B;
- D323C;
- D323D; and
- D323F.

56. These sites are designated as RAF Danger Areas for Air Combat Training and High Energy Manoeuvres between 5,000 and 66,000 ft (BEIS, 2009). Admiralty charts also indicate the presence of a submarine exercise area within the vicinity of the Offshore Export Cable Corridor. No reference to the extent, purpose or current status of this exercise area is detailed publicly, however.

57. As a result of both World War 1 and World War 2, there is also potential for UXO within the infrastructure and other users study area and in the wider southern North Sea region. For example, there exists evidence of a World War 2 era British Armament Training Area being located in the vicinity of the proposed landfall locations at Skipsea (Ordtek, 2023).

58. Exact locations of any UXO would be determined post-consent, and if required a clearance programme would be carried out prior to construction of the Projects, following a hierarchy of steps to reduce the numbers of UXO for detonation as far as possible.

59. To aid in reporting for the ES, Ordtek (2023) has produced a report predicting the number of potential UXO that may be found within the Offshore Development Area (**Table 16-12**). This has been achieved through the examination of data sources including past potential UXO quantities seen on similar projects, geophysical data available for the Projects and historic use of the Offshore Development Area. It should be noted that real-world number of UXO may differ from these predicted figures.

Table 16-12 Predictive UXO Numbers Within the Offshore Development Area Above Threshold

UXO Type	Nearshore Cable Route (<10m LAT)	Offshore Cable Route (>10m LAT)	DBS East Array Area	DBS West Array Area	Subtotal
German SC-50 Bomb	1	2	0	0	3
British 250lb MC Bomb	1	1	0	0	2
WWI German Mine	0	3	2	2	7
WWI British Mine	0	2	1	1	4
British 500lb MC Bomb	3	3	1	1	8

UXO Type	Nearshore Cable Route (<10m LAT)	Offshore Cable Route (>10m LAT)	DBS East Array Area	DBS West Array Area	Subtotal
WWI U-Boat Torpedo (Multiple Variants)	0	1	0	0	1
German SC-250 Bomb	0	1	1	1	3
WWII British Buoyant Mine	0	2	1	1	4
German SC-500 Bomb	0	1	1	1	3
British 1000lb MC Bomb	0	1	1	1	3
WWII U-Boat Torpedo (Multiple Variants)	0	1	0	0	1
British 2000lb MC Bomb	0	0	0	0	0
German LMB Mine	0	1	0	0	1
German TMB Mine	0	0	0	0	0
German SC-1000 Bomb	0	1	0	0	1
German TMC Mine	0	0	0	0	0
Totals	5	20	8	8	41

60. An Unexploded Ordnance Clearance Information and Assessment Plan which details measures for reducing the impacts of UXO disposal has been submitted with the ES (see **Volume 7, Appendix 11-6 UXO Assessment (application ref: 7.11.11.6)**. A separate Marine Licence would be sought to cover the investigation and clearance of UXO. The topic of UXO is considered further in **Volume 7**:

- **Chapter 9 Benthic and Intertidal Ecology (application ref: 7.9)**;
- **Chapter 10 Fish and Shellfish Ecology (application ref: 7.10)**;
- **Chapter 11 Marine Mammals (application ref: 7.11)**; and
- **Chapter 17 Offshore Archaeology and Cultural Heritage (application ref: 7.17)**.

16.5.8 Future Trends

61. The deployment of offshore wind in the UK is set to continue with an existing pipeline of projects in planning and further expansion expected to achieve a target of 50GW offshore wind capacity by 2030. This includes potential new projects within the Dogger Bank itself. Therefore, offshore wind deployment in the North Sea and Dogger Bank itself is likely to increase over the next decade.

62. There are plans to further integrate the UK electrical network and the European markets through the installation of interconnector cables. This is likely to lead to an increase in electricity transmission cables across the North Sea and in the vicinity of the Dogger Bank.

63. Oil and gas exploration in the North Sea is set to continue, albeit at a slower rate than seen in previous decades, with the NSTA launching the 33rd licensing round for oil and gas exploration in September 2022 (NSTA, 2022). This licensing round included blocks in the vicinity of the Projects. Furthermore, a commitment to undertake future licensing rounds past the current 33rd round was announced on the 31st July 2023 by the UK Government and NSTA (MH Government, 2023). However, decommissioning of existing platforms and infrastructure is also expected to occur in the coming decades (Royal Academy of Engineering, 2013).

64. Rounds for carbon capture and storage licensing may take place in the future, which may be of a similar scale to the recent round launched by the NSTA in June 2022. This included several areas in the vicinity of the Dogger Bank (Offshore Energy, 2022b). In September 2023 NSTA announced a list of companies (total of 14) which have accepted licences following the UK's first-ever carbon storage licensing round. Twenty one licenses have been awarded in areas of depleted oil and gas reservoirs, which could store up to 30 million tonnes on CO_2 per year by 2023, including an area within the Offshore Development Area (see section 16.5.4 above). In addition, there is also potential for future aggregate extraction leasing rounds, held regularly by The Crown Estate (The Crown Estate, 2023), to be located in the vicinity of the Projects.

16.6 Assessment of Significance

65. It should be noted that the potential effects during the construction, operation and decommissioning phases of the Projects have been assessed together in this chapter. This is because the effects would occur at a similar magnitude across each phase of the Projects lifespan, with the sensitivity of each receptor remaining the same also.

66. Issues arising from shipping and navigation and aviation are assessed in **Volume 7, Chapter 14 Shipping and Navigation (application ref: 7.14)** and **Volume 7, Chapter 15 Aviation and Radar (application ref: 7.15)**, respectively. These are noted below for relevant receptors but are not considered further in this chapter.

16.6.1 Potential Effects During Construction, Operation and Decommissioning

16.6.1.1 Impact 1: Potential Interference with Other Wind Farms

67. Interference of the Projects with other wind farms could arise from the following:

- Navigational safety issues (e.g. vessel traffic and structures related to the Projects interfering with existing vessel traffic routes to other wind farms);
- Aviation (e.g. emergency helicopter operations from other wind farms being disrupted by presence of turbines within the Array Areas);
- Overlap of infrastructure and potential interactions during construction; and
- Wake losses for nearby wind farms resulting from the presence of wind turbines for the Projects.

16.6.1.1.1 Magnitude of Impact – DBS East or DBS West in Isolation

68. As a result of the site selection process undertaken for the Projects, there would be no overlap with any other offshore wind farm Array Areas, with no potential for interactions between the Projects and Sofia and Dogger Bank C. The only interaction between the Projects and other offshore wind farms would be the crossing of the export cables for the Hornsea Project Four offshore wind farm, and the overlap of the Offshore Export Cable Corridor to the working area buffer for the Dogger Bank A and B Export Cable Corridor. At the time of writing the Dogger Bank D export cable corridor is planned to run adjacent to the south-easterly edge of the DBS East Array Area (Dogger Bank Wind Farm, 2023).

69. Crossing and proximity agreements with the operators of the other projects would determine how cable crossings are enabled and outline the proximity arrangements of construction activities for the existing subsea cables. The resultant locations, design and construction methodologies would reduce the physical impact upon other offshore wind export cables which may affect their operation.

70. Wind farms located in close proximity have the potential to reduce the efficiency of the neighbouring project through wake losses, potentially reducing the Annual Energy Production (AEP) for each project (Nygaard and Hansen, 2016). Due to the close proximity of the Projects to the Dogger Bank A wind farm (8km at its' closest point), the potential AEP loss for Dogger Bank A was modelled. This modelling determined that, in the worst case scenario, the overall AEP loss for Dogger Bank A would be negligible when compared to the wind resource available.

71. Discussions with cable owners with whom the Projects interface are underway. Cable owners would continue to be consulted by the Applicants during the development, pre-construction and construction phases of the Projects. All commercial and technical agreements required would be put in place ahead of the commencement of construction of the offshore works. Crossing and proximity agreements would be agreed post-consent during the Projects' design period.

72. Continued engagement with external stakeholders and the promulgation of information regarding planned vessel activities for the Projects would keep all relevant stakeholders informed in advance of construction/operation and maintenance and decommissioning activities for the Projects.

73. Given the minimal AEP losses modelled for DBS in the worst case layout scenario, and taking into account the embedded mitigation measures outlined in section 16.3.3 (including advance promulgation of information regarding activities related to the Projects), in addition to securing crossing and proximity agreements with operators, the magnitude of impact would be negligible.

16.6.1.1.2 Magnitude of Impact – DBS East and DBS West Together

74. While DBS East and DBS West together would encompass a larger spatial scale than that of either Project in isolation, taking into account the embedded mitigation measures outlined in section 16.3.3 and crossing and proximity agreements, the magnitude of impact would be negligible.

16.6.1.1.3 Sensitivity of Receptor

75. Wind farm construction/decommissioning activities have the potential to interfere with the activities of other wind farms. Any potential disruption caused to other wind farms could impact projects construction schedules and increase the likelihood of navigational safety issues. During the operational phase of the Projects, other nearby wind farms (such as Dogger Bank A) may also be impacted by wake losses as a result of the Projects.

76. A worst case scenario is assumed as being accidental damage to a subsea cable resulting from the wind farm construction activities, reducing the cable capacity or making the cable operation redundant.

77. The sensitivity of offshore wind farms to interference is high.

16.6.1.1.4 Significance of Effect – DBS East or DBS West in Isolation

78. Based on the worst case negligible magnitude and high sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.1.5 Significance of Effect – DBS East and DBS West Together

79. Based on the worst case negligible magnitude and high sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.2 Impact 2: Potential Interference with Oil & Gas and CCS Operations Including Decommissioning Activities

80. Wind farm construction, operation and decommissioning activities have the potential to interfere with oil & gas and CCS operations in the following capacity:

- Navigational safety issues (e.g. vessel traffic and structures related to the Projects interfering with existing vessel traffic routes to existing oil and gas infrastructure);
- Aviation (e.g. emergency helicopter operations from oil and gas platforms within the Dogger Bank being disrupted by presence of turbines within the Array Areas); and
- Overlap of infrastructure and potential interactions during construction.

16.6.1.2.1 Magnitude of Impact – DBS East or DBS West in Isolation

81. As detailed in section 16.5.2, there are no currently active oil and gas platforms within the Array Areas. The only interaction between the Projects and existing oil and gas infrastructure would be the potential crossing of the pipelines that run through the Offshore Development Area, such as the active Langeled gas pipeline that routes through the Projects' Offshore Export Cable Corridor.

82. As also detailed in section 16.5.2, the Projects do not overlap with the proposed Northern Endurance CCS site. However, the Offshore Export Cable Corridor does partially overlap with the Southern North Sea Area 1 Licence Areas CS020 and CS025 and Southern North Sea Area 3 Licence Area CS028 (see **Volume 7, Figure 16-4 (application ref: 7.16.1)**) (see section 16.5.4). CCS projects store carbon deep below the seabed, with the Northern Endurance CCS site proposed to store carbon at approximately 1 mile below the seabed (National Grid, 2023). As such, there would be no direct spatial overlap between the storage of carbon and the Projects, with any potential cable burial within the CCS areas occurring at a maximum depth of 1.5m.

83. The crossing and proximity agreements agreed by the Applicants with existing operators would determine how pipeline or cable crossings are enabled and outline the proximity arrangements of construction activities to the existing pipelines or cables. The resultant locations, design and construction methodologies would aim to reduce the physical impact upon other pipelines which may affect their operation.

84. The precise number of pipeline or cable crossings is not yet known as the array cable layout would be determined post-consent.

85. Pipeline owners would continue to be consulted by the Applicants during the development and pre-construction phases of the project. All commercial and technical agreements would be put in place ahead of the commencement of construction of any relevant infrastructure. Crossing and proximity agreements would be agreed post-consent during the Projects' design period.

86. Engagement with external stakeholders and the promulgation of information regarding planned vessel activities for the Projects would keep all relevant stakeholders informed in advance of construction/operation and maintenance and decommissioning activities for the Projects.

87. Taking into account the embedded mitigation measures outlined in section 16.3.3, including advance promulgation of information regarding activities related to the Projects, the magnitude of impact would be negligible.

16.6.1.2.2 Magnitude of Impact – DBS East and DBS West Together

88. While construction of DBS East and DBS West together would encompass a larger spatial scale than that of either Projects in isolation, taking into account the embedded mitigation measures outlined in section 16.3.3, the magnitude of impact would still be negligible.

16.6.1.2.3 Sensitivity of Receptor

89. Wind farm construction activities have the potential to interfere with the activities of nearby oil and gas and CCS operations. Any potential disruption caused to other oil and gas operations could impact the Projects construction schedule and increase the likelihood of navigational safety issues. A worst case scenario is assumed as being accidental damage to a pipeline resulting from the wind farm construction activities, reducing the pipeline capacity or making the pipeline operation redundant.

90. The sensitivity of oil and gas infrastructure to interference is high.

16.6.1.2.4 Significance of Effect – DBS East or DBS West in Isolation

91. Based on the worst case negligible magnitude and high sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.2.5 Significance of Effect – DBS East and DBS West Together

92. As above, based on the worst case negligible magnitude and high sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.3 Impact 3: Physical Impacts on Electrical Infrastructure

93. Wind farm construction, operation and decommissioning activities (such as cable and foundation installation, vessel anchoring and seabed preparation operations) have the potential to cause damage to the other electrical infrastructure in close proximity to the Projects. This includes the disused UK-Germany 6 subsea cable that routes to the north, but outside of, the DBS West Array Area, the potential National Grid HND Bootstrap cable that may route through the Array Areas and a number of further planned cables. Any damage caused to electrical infrastructure would be expensive to repair and could disrupt the telecommunications or power supply of the subsea cable operations, for example. Note that potential impacts on other offshore wind farm cables are assessed in section 16.6.1.1 of this report.

16.6.1.3.1 Magnitude of Impact – DBS East or DBS West in Isolation

94. Crossing and proximity agreements would determine how cable crossings are enabled and outline the proximity arrangements of construction activities to the existing subsea cables. The resultant locations, design and construction methodologies would aim to reduce the physical impact upon other cables which may affect their operation.

95. The precise number of cable crossings is not yet known as the array cable and inter platform cable layouts would be determined post-consent and information on the routes of a number of planned interconnector cables is not available.

96. Discussions with cable owners are ongoing and would continue during the development and pre-construction phases of the Projects. All commercial and technical agreements would be put in place ahead of the commencement of construction. Crossing and proximity agreements would be agreed post-consent during the Projects design period.

97. Taking into account the embedded mitigation measures outlined in section 16.3.3, in addition to securing proximity and crossings agreements with operators, any impact is extremely unlikely and therefore the impact magnitude is negligible.

16.6.1.3.2 Magnitude of Impact – DBS East and DBS West Together

98. The magnitude of impact would be identical in the instance of DBS East and DBS West being built together (taking into account the embedded mitigation measures outlined in section 16.3.3, and securing proximity and crossing agreements with operators), therefore the impact magnitude is negligible.

16.6.1.3.3 Sensitivity of Receptor

99. A worst case scenario is assumed as being accidental damage to a subsea cable/pipeline resulting from the wind farm construction activities, reduce the cable/pipeline capacity or make the cable / pipeline operation redundant. It is therefore considered that the sensitivity of the receptor is high.

16.6.1.3.4 Significance of Effect – DBS East or DBS West in Isolation

100. Based on the negligible magnitude and high sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.3.5 Significance of Effect – DBS East and DBS West Together

101. Based on the negligible magnitude and high sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.4 Impact 4: Impacts on Disposal Sites

102. Wind farm construction, operation and decommissioning activities (such as cable and foundation installation) have the potential to impact on the operation of disposal sites. This may occur through sediment dispersed by activities for the Projects settling within these sites, or vessel traffic and structures related to the Projects interfering with existing vessel traffic routes to such sites.

16.6.1.4.1 Magnitude of Impact – DBS East or DBS West in Isolation

103. The nearest open disposal site is Bridlington A (HU015), located approximately 7km north of the Offshore Export Cable Corridor, with the closest closed disposal site is Bridlington Bay B, located approximately 5.2km north-west of the Offshore Export Cable Corridor.

104. The assessment conducted in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)** indicates that that the maximum predicted deposition resulting from a sediment plume would be <0.5cm in localised areas immediately adjacent to the Offshore Export Cable trench. Outside the immediate vicinity of the cable trench, the sediment plume may be transported up to 2km from the point of disturbance, likely due to the sheltering effect of Flamborough Head with tidal currents being much lower in the nearshore environment. As such, there will be no interaction between cable trenching activities for the Projects and any disposal sites. As the nearest aggregate extraction site is 47km from the Offshore Export Cable Corridor, sediments dispersed by the Projects activities would not reach this site.

105. Given the distance between the sites, there would be no impact to the operation of disposal or aggregate extraction sites through overlap of infrastructure or disturbance to existing vessel traffic routes to these sites.

106. Given the imperceptible/lack of impact on disposal sites and aggregate extraction sites, the magnitude of impact is negligible.

16.6.1.4.2 Magnitude of Impact – DBS East and DBS West Together

107. As the distance at which sediment would be transported would remain identical for both Projects being built together, the negligible magnitude determined in section 16.6.1.4.1 above remains the same in this instance.

16.6.1.4.3 Sensitivity of Receptor

108. Any potential disruption to the operation of disposal sites through restricted access or dispersal of significant levels of sediment within their boundaries could result in adverse impacts to the running of the disposal site or a reduction in volume of the site available for disposal of material. Any potential disruption caused to aggregate extraction sites could result in some loss of earnings due to restricted access. It is therefore considered that the sensitivity of these receptors is medium.

16.6.1.4.4 Significance of Effect – DBS East or DBS West in Isolation

109. Based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.4.5 Significance of effect – DBS East and DBS West together

110. Based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be **minor adverse**. No additional mitigation is considered to be required for this effect.

16.6.1.5 Impact 5: Impacts on MOD Activities

111. Wind farm construction, operation and decommissioning activities, due to the presence of infrastructure related to the Projects, could disrupt military exercises planned in the designated PEXAs that the Projects' Array Areas and Offshore Export Cable Corridor are located within.

112. While there is a submarine PEXA listed on admiralty charts in the region, as detailed in section 16.5.7 there is no publicly available information regarding the extent, purpose and current status of this exercise area. As such, it is not possible at this time to assess how construction of the Projects would potentially impact upon this submarine PEXA. The Applicants have requested further information on this PEXA from the MoD during the application process (see **Consultation Report (application ref: 5.1)** for further information). However, as of the latest request for information dated 4th April 2024 no response had been received.

16.6.1.5.1 Magnitude of Impact – DBS East or DBS West in Isolation

113. In isolation, the construction of DBS East would overlap with four PEXAs, in comparison to only three in the instance of DBS West in isolation. All of the PEXAs the Projects Array Areas and Offshore Export Cable Corridor are located within are designated as RAF Danger Areas for Air Combat Training and High Energy Manoeuvres between 5,000 and 66,000ft. Given the maximum height of the turbines would be 394.08m above mean high water springs (MHWS), equating to approximately 1,293ft which is significantly lower than that of the lowest point of the exercise area which is 5,000ft, the potential for interaction between the Projects and any military practice exercises is minimal.

114. Taking into account the height difference between the installed turbines and the lowest point of the aircraft exercise area, any impact on MOD access to these PEXAs is extremely unlikely and therefore the impact magnitude is negligible.

16.6.1.5.2 Magnitude of Impact – DBS East and DBS West Together

115. While DBS East and DBS West being built together would cover a larger geographical area within the PEXAs, taking into account the lack of interaction between the Projects activities and PEXAs, and the height difference between the maximum height of the turbines and the lowest point of the aircraft exercise area, any impact on MOD access to these PEXAs is extremely unlikely and therefore the impact magnitude is negligible.

16.6.1.5.3 Sensitivity of Receptor

116. Given that there is no spatial overlap between the exercises and the Projects given the exercises would occur above the maximum height of the turbines, there would not be a requirement for the exercises to move to an alternate area. As such, the sensitivity of the receptor is negligible.

16.6.1.5.4 Significance of Effect – DBS East or DBS West in isolation

117. Based on the worst case negligible magnitude and negligible sensitivity, the significance of adverse effect would be **negligible**. No additional mitigation is considered to be required for this effect.

16.6.1.5.5 Significance of effect – DBS East and DBS West Together

118. Based on the worst case negligible magnitude and negligible sensitivity, the significance of adverse effect would be **negligible**. No additional mitigation is considered to be required for this effect.

16.7 Cumulative Effects Assessment

119. As detailed in section 16.4.4, this section presents CEA in relation to infrastructure and other users.

120. Cumulative effects can be defined as incremental effects on that same receptor from other proposed and reasonably foreseeable schemes and developments in combination with the Projects. This includes all schemes that result in a comparative effect that is not intrinsically considered as part of the existing environment and is not limited to offshore wind projects.

16.7.1 Initial Screening for Cumulative Effects

121. The overarching method followed in identifying and assessing potential cumulative effects is set out in Volume 7, Chapter 6 EIA Methodology (application ref: 7.6) and Volume 7, Appendix 6-2 Offshore Cumulative Assessment (application ref: 7.6.6.2). The overall approach is based upon the Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment (PINS, 2017) and Phase III Best Practice by Natural England and DEFRA (Parker *et al.*, 2022). The approach to the CEA is intended to be specific to the Projects and takes account of the available knowledge or the environment and other activities around the Offshore Development Area.

122. The CEA has followed a four-stage approach developed from the Planning Inspectorate Advice Note Seventeen. These stages are set out in Table 1-1 of **Volume 7, Appendix 6-2 Offshore Cumulative Assessment (application ref: 7.6.6.2)**. Stage four of this process, the CEA assessment is undertaken in two phases. The first step in the CEA is the identification of which residual impacts assessed for the Projects on their own have the potential for a cumulative impact with other schemes, plans, projects and activities. This information is set out in **Table 16-13** which sets out the potential impacts assessed in this chapter and identifies the potential for cumulative effects to arise, providing a rationale for such determinations. Only potential impacts assessed in section 16.6 where the potential for cumulative effects has been identified (minor, moderate or major), have been taken forward to the final CEA (i.e. those assessed as 'negligible' or 'no change' are not taken forward, as there is no potential for them to contribute to a cumulative effect). Each project has been considered on a case by case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial / temporal scales involved.

Table 16-13 Potential Cumulative Impacts

Impact (All phases)	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 1: Potential interference with other wind farms	Yes	High	Schemes currently in planning have potential to have cumulative effects on existing offshore wind farms, such as wind wake/productivity losses.
Impact 2: Potential interference with oil & gas and CCS operations including decommissioning activities	Yes	High	Schemes currently in planning have potential to have cumulative effects on existing oil and gas infrastructure and proposed CCS projects, such as a reduction in available operational area.
Impact 3: Physical impacts on subsea cables and pipelines	Yes	Medium	Schemes currently in planning have potential to have cumulative effects on existing subsea cables and pipelines, such as an increase in the number of required crossings.
Impact 4: Impacts on disposal sites and aggregate extraction sites	Yes	Medium	Schemes currently in planning have potential to have cumulative effects on disposal sites and aggregate extraction sites, such as vessel traffic restrictions.
Impact 5: Impacts on MOD Activities	No	Low	No likely significant effect from the Projects is predicted.

16.7.2 Schemes Considered for Cumulative Impacts

123. The second phase of the CEA is a project specific assessment of the potential for any significant cumulative effects to arise due to the construction and / or operation and maintenance of the Projects. To do this, a short-list of schemes for the CEA has been produced relevant to infrastructure and other users following the approach outlined in **Volume 7, Offshore Cumulative Assessment Appendix 6-2 (application ref: 7.6.6.2)**. The second phase of this assessment is only undertaken if the first phase identifies that cumulative effects are possible.

124. The CEA has been based on information available on each relevant scheme as of January 2024. It is noted that the further information regarding the identified schemes may become available in the period up to construction, or may not be available in detail at all prior to construction. The assessment presented here is therefore considered to be conservative, with the level of impacts expected to be reduced compared to those presented here.

125. Schemes have been assigned a tier, based on information used within the CEA. A seven tier system, based on the guidance issued by Natural England and Defra (Parker *et al.*, 2022), has been employed as presented below:

126. This approach has been agreed via EIA scoping and consultation with technical working groups and follows advice from Natural England. Further information on the methodology can be found in **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)**.

127. Types of schemes that could potentially be considered for the cumulative assessment of infrastructure and other users includes:

- Marine aggregate extraction;
- Oil and gas exploration and extraction;
- Sub-sea cables and pipelines; and
- Commercial shipping.

128. With respect to these types of schemes, for those that are fully operational (i.e. Tier 1 schemes) at the time of this assessment, the cumulative assessment methodology considers them to be part of the baseline conditions for the surrounding area (and assumes that any residual effect has been captured within the baseline). As such, it is not expected that the Projects would contribute to cumulative effects with these existing activities and, therefore, these have not been the subject of further assessment.

129. For schemes that are not currently fully operational, i.e. those in planning / pre-construction stages, or even where construction may have commenced but not yet be complete, these are screened in for further assessment in the final cumulative assessment.

130. Schemes included in the CEA, and their distance to the Array Areas and Offshore Export Cable Corridor for the Projects are provided below in **Table 16-14**.

Table 16-14 List of Schemes Screened for Assessment

Tier	Scheme Name	Distance to Offshore Development Area (km)	
		Offshore Export Cable Corridor	Array Areas
Offshore Wind Farms			
2	Sofia Array Area	49	35
2	Sofia Export Cable	18	15
2	Dogger Bank A Array Area	20	8
2	Dogger Bank A Export Cable	0	4
2	Dogger Bank B Array Area	20	17
2	Dogger Bank B Export Cable	0	8
3	Dogger Bank C Export Cable	17	15
6	Dogger Bank D Export Cable	11	0
3	Hornsea Project Three Array Area	Over 50	45
3	Hornsea Project Three Export Cable	Over 50	45
3	Hornsea Project Four Array Area	30	41
3	Hornsea Project Four Export Cable	0	41

Tier	Scheme Name	Distance to Offshore Development Area (km)	
		Offshore Export Cable Corridor	Array Areas
Carbon Capture and Storage			
6	Northern Endurance CCS	0 (Export Cable Corridor crosses the Projects)	45
6	CCS North Sea Leasing Round SNS Area 1 - Licence CS020	0 (Overlaps Offshore Export Cable Corridor and Array Areas)	
6	CCS North Sea Leasing Round SNS Area 1 – CS025	0 (Overlaps Offshore Export Cable Corridor and Array Areas)	
6	CCS North Sea Leasing Round SNS Area 3 – Licence CS028	0 (Overlaps Offshore Export Cable Corridor)	Over 50
Electrical Infrastructure			
2	Viking Link Interconnector	44	29
6	Eastern Green Link 2 (EGL2)	2	Over 50
7	Continental Link*	TBC	TBC
7	Eastern Green Link 3 (EGL3)*	0km (Overlaps Offshore Export Cable Corridor)	TBC
7	Eastern Green Link 4 (EGL4)*	0km (Overlaps Offshore Export Cable Corridor)	TBC
7	National Grid HND Bootstrap*	Potentially within the Array Areas	TBC

**Cable route not yet finalised*

16.7.3 Assessment of Cumulative Effects

131. Having established the potential cumulative effects in section 16.7.1 and the relevant schemes, plans, projects and activities in section 16.7.2 above, the following sections provide an assessment of the potential cumulative effects between the Projects and the identified schemes.

16.7.3.1 Cumulative Impact 1 - Potential interference with other wind farms

132. Construction activities for the Projects may overlap with those of Hornsea Project Three, Hornsea Project Four, Sofia, Dogger Bank C and Dogger Bank D. As detailed in section 16.6.1.1, the only interaction between the Projects and other wind farms under construction would be in the potential crossing of the export cables for the Hornsea Project Four offshore wind farm. The impact from the Projects on other wind farms is assessed as **minor adverse** for the construction, operation and decommissioning phases assuming proximity agreements would be agreed. As with the Projects, it is expected that Hornsea Project Three, Hornsea Project Four, Sofia and Dogger Bank C and Dogger Bank D would reach agreements with any affected developers (including proximity and crossing agreements) such that cumulative impacts remain **minor adverse** significance during all stages of the projects.

16.7.3.2 Cumulative Impact 2 - Potential interference with oil & gas and CCS operations including decommissioning activities

133. Construction activities for the Projects may overlap with those of the Northern Endurance CCS project, and the CS020, CS025 and CS028 licenced CCS blocks. In addition, the Projects' Offshore Export Cable Corridor crosses the active Langeled gas pipeline, which Hornsea Project Four is also expected to cross approximately 15km south of the Projects crossing, and the Shearwater to Bacton (SEAL) gas pipeline. Within the Array Areas there are two active natural gas pipelines (Shearwater to Bacton (SEAL) and Cygnus to ETS).

134. The impact from the Projects on oil & gas and CCS operations is assessed as **minor adverse** for the construction, operation and decommissioning phases assuming proximity agreements would be agreed. As with the Projects, it is expected that Hornsea Project Four would reach agreements with the affected operators (including proximity and crossing agreements) such that cumulative impacts remain minor adverse significance during all stages of the projects.

16.7.3.3 Cumulative Impact 3 - Physical impacts on electrical infrastructure

135. Construction activities for the Projects may overlap with those of the Viking Link Interconnector, Continental Link, EGL2, EGL3, EGL4 and the National Grid HND Bootstrap cable. The impact from the Projects on other electrical infrastructure is assessed as **minor adverse** for the construction, operation and decommissioning phases assuming proximity agreements would be agreed. As with the Projects, it is expected that the developers of these projects would reach agreements with any other affected developers (including proximity and crossing agreements) such that cumulative impacts remain **minor adverse** significance during all stages of the projects.

16.7.3.4 Cumulative Impact 4 - Impacts on disposal sites

136. The only disposal sites that may be cumulatively affected by the Projects are the open disposal site Bridlington A (HU015), located approximately 7km north of the Offshore Export Cable Corridor, and the closed disposal site Bridlington Bay B located approximately 5.2km north-west of the Offshore Export Cable Corridor. Cumulative effects could occur in conjunction with installation activities for the Hornsea Project Four Export Cable Corridor, should construction timelines overlap between the Projects and Hornsea Project Four.

137. However, as the Hornsea Project Four ES concluded that there was no likely significant effect from the project on disposal sites and thus scoped out the potential impact (Orsted, 2023), there exists no pathway for cumulative effect on the Bridlington A and Bridlington Bay B disposal sites. As such, the impact from the Projects on disposal sites and aggregate extraction sites is assessed as **minor adverse** for the construction, operation and decommissioning phases from the Projects alone.

16.8 Transboundary Effect Assessment

138. For infrastructure and other users, the only potential transboundary receptors within the Array Areas and Offshore Export Cable Corridor are the disused UK-Germany 6 subsea cable that routes through the DBS West Array Area and the active Langeled gas pipeline that routes through the Projects' Offshore Export Cable Corridor. Any potential impacts to these assets are assessed in section 16.6.1.3 of this chapter. This assessment determined that, through crossing agreements being agreed with the operators of this subsea cables and pipelines, the significance of effect on subsea cables and pipelines would be **minor adverse**.

16.9 Potential Monitoring Requirements

139. Monitoring requirements are described in the **In Principle Monitoring Plan (IPMP) (application ref: 8.23)** submitted alongside the DCO application and further developed and agreed with stakeholders prior to construction based on the IPMP and taking account of the final detailed design of the Projects. It is not anticipated, however, that any monitoring specific to infrastructure and other marine users would be required for the Projects.

16.10 Interactions

140. There are no potential interactions between impacts on the infrastructure and other users described in this chapter as these are all separate, non-related receptors.

16.11 Inter-relationships

141. For infrastructure and other users, potential inter-relationships between other topics assessed within this ES including shipping and navigation & aviation and radar. A summary of the potential inter-relationships between these topics is provided in **Table 16-15**. Overall, no additional effects have been identified as a result of these inter-relationships that would increase the level of the impacts assessed in section 16.5.

Table 16-15 Infrastructure and Other Users Inter-Relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction, Operation and Decommissioning			
Impact 1: Potential interference with other wind farms Impact 5: Impacts on MOD Activities	**Volume 7, Chapter 14: Shipping and Navigation (application ref: 7.14)**	Section 14.6.1	The presence of DBS East and DBS West construction and operation vessels, and installation of offshore infrastructure has the potential to be a navigational hazard to shipping associated with shipping related to other offshore wind farms. This may result in the diversion of vessels when in transit.
Impact 2: Potential interference with oil & gas and CCS operations	**Volume 7, Chapter 14: Shipping and Navigation**	Section 14.6.1	The presence of DBS East and DBS West construction and operation vessels, and installation of offshore infrastructure has the potential to be a navigational hazard to

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
including decommissioning activities	**(application ref: 7.14)**		shipping associated with oil and gas shipping. This may result in the diversion of vessels when in transit.
Impact 5: Impacts on MOD Activities	**Volume 7. Chapter 15: Aviation and Radar (application ref: 7.15)**	Section 15.6.2	The presence of the installed turbines could result in an impact on the effectiveness of military radar in the area of the Projects.

16.12 Summary

142. This chapter has provided a characterisation of the existing environment for infrastructure and other users based on existing public data, which indicated the potential for interactions between the Projects and other nearby offshore wind farms, oil and gas infrastructure, carbon capture and storage sites, subsea cables & pipelines and MOD activities.

143. The assessment of the potential effects the Projects may have on these receptors determined that the sensitivity of the infrastructure and other users receptors ranged from negligible (in the case of MOD activities) to high (in the case of subsea cables and pipelines). However, through the embedded mitigation measures in-built into the Projects design and the use of crossing and proximity agreements, it was established that the magnitude of each impact would be negligible.

144. As a result of the assessment conducted in this chapter, only minor or negligible adverse effects on the infrastructure and other users receptors within the study area of the Projects are expected to occur (**Table 16-16**).

Table 16-16 Summary of Potential Likely Significant Effects on Infrastructure and Other Users

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect	Residual Cumulative Effect
Construction, Operation and Decommissioning							
Potential interference with other wind farms	Offshore wind farms	Medium	Negligible	Minor Adverse	N/A	Minor Adverse	Minor Adverse
Potential interference with oil and gas and CCS operations, including decommissioning activities	Oil and gas and CCS infrastructure	Medium	Negligible	Minor Adverse	N/A	Minor Adverse	Minor Adverse
Physical impacts on electrical infrastructure	Electrical infrastructure	High	Negligible	Minor Adverse	N/A	Minor Adverse	Minor Adverse
Impacts on disposal sites	Disposal sites	Medium	Negligible	Minor Adverse	N/A	Minor Adverse	Minor Adverse
Impacts on MOD activities	MOD	Negligible	Negligible	Negligible	N/A	Negligible	N/A

References

Department for Business, Energy and Industrial Strategy (BEIS. (2009). Offshore Energy SEA: Appendix 3h – Other Users And Material Assets (Infrastructure, Other Natural Resources). [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194348/OES_A3h_Other_Users.pdf [Accessed December 2023].

Department for Energy Security and Net Zero. National Policy Statement for Renewable Energy Infrastructure (EN-3). [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147382/NPS_EN-3.pdf [Accessed September 2023].

Dogger Bank Wind Farm. (2023). Dogger Bank D Offshore Wind Farm - EIA Scoping Report Part 1. [Online]. Available at: https://doggerbank.com/wp-content/uploads/2023/04/Dogger-Bank-D-Offshore-Wind-Farm-EIA-Scoping-Report-Part-1.pdf [Accessed December 2023].

HM Government. (2023). Hundreds of new North Sea oil and gas licences to boost British energy independence and grow the economy. [Online]. GOV.UK. Available at: https://www.gov.uk/government/news/hundreds-of-new-north-sea-oil-and-gas-licences-to-boost-british-energy-independence-and-grow-the-economy-31-july-2023 [Accessed December 2023].

INEOS. (2022). 2021 Environmental Report. [Online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1084259/INEOS_UK_SNS_Limited_-_Annual_Public_Statement_2021.pdf [Accessed December 2023].

Marine Management Orngansation. (2021). North East Inshore and North East Offshore Marine Plans. [Online]. Available at: North East Inshore and North East Offshore Marine Plan (publishing.service.gov.uk) [Accessed January 2024].

National Grid ESO. (2023a). A Holistic Network Design for Offshore Wind. [Online]. Available at: https://www.nationalgrideso.com/future-energy/the-pathway-2030-holistic-network-design/hnd [Accessed December 2023].

National Grid ESO. (2023b). Our Interactive Map. [Online]. Available at: https://www.nationalgrideso.com/future-energy/the-pathway-2030-holistic-network-design/interactive-map [Accessed December 2023].

National Grid. (2023c). Eastern Green Link 3 and 4. [Online]. Available at: https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects/eastern-green-link-3-and-4 [Accessed December 2023].

North Sea Transition Authority. (2022). NSTA launches 33rd Offshore Oil and Gas Licensing Round. [Online]. Available at: https://www.nstauthority.co.uk/news-publications/news/2022/nsta-launches-33rd-offshore-oil-and-gas-licensing-round/ [Accessed December 2023].

North Sea Transition Authority. (2023). Net zero boost as carbon storage licences accepted [Online]. Available at: https://www.nstauthority.co.uk/news-publications/news/2023/net-zero-boost-as-carbon-storage-licences-accepted/ [Accessed 18 September 2023].Offshore Energy. (2022a). Final UK land cable piece in for Viking Link interconnector. Offshore Energy. [Online]. Available at: https://www.offshore-energy.biz/final-uk-land-cable-piece-in-for-viking-link-interconnector/ [Accessed November 2023].

Nygaard, N. G. and Hansen, S. D. (2016). Wake effects between two neighbouring wind farms. In: 753 (3). 2016. IOP Publishing. p32020.

Offshore Energy. (2022b). First UK carbon storage licencing round opens for bids. [Online]. Available at: https://www.offshore-energy.biz/first-uk-carbon-storage-licencing-round-opens-for-bids/ [Accessed December 2023].

Offshore Engineer. (2023). BP's 'Endurance' CCS Project Receives Green Light with Agreement for Lease. [Online]. Offshore Engineer Magazine. Available at: https://www.oedigital.com/news/508576-bp-s-endurance-ccs-project-receives-green-light-with-agreement-for-lease [Accessed December 2023].

Orsted. (2021). Hornsea Project Four: Environmental Statement (ES) - Chapter 11: Infrastructure and Other Users. [Online]. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010098/EN010098-000713-A2.11%20ES%20Volume%20A2%20Chapter%2011%20Infrastructure%20and%20Other%20Users.pdf [Accessed October 2023].

Planning Inspectorate. (2024). Continental Link Multi-Purpose Interconnector - Project Information. [Online]. Available at: https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN020025 [Accessed February 2024].

Xodus (2021) Northern Endurance Partnership: Scoping Report for Offshore Environmental Impact Assessment. [Online]. Available at: https://eastcoastcluster.co.uk/wp-content/themes/nep/report.pdf [Accessed December 2023].

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