DOGGER BANK D
WIND FARM
Preliminary Environmental Information Report

Volume 1
Chapter 15 Shipping and Navigation

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Glossary

Term	Definition
Additional Mitigation	Measures identified through the EIA process that are required as further action to avoid, prevent, reduce or, if possible, offset likely significant adverse effects to acceptable levels (also known as secondary (foreseeable) mitigation). All additional mitigation measures adopted by the Project are provided in the Commitments Register.
Allision	The act of striking or collision of a moving vessel against a stationary object.
Automatic Identification System (AIS)	A system by which vessels automatically broadcast their identity and key statistics including location, destination, length, speed and current status. Most commercial vessels and United Kingdom / European Union fishing vessels over 15m in length are required to carry AIS.
Collision	The act or process of colliding (crashing) between two moving objects.
Commitment	Refers to any embedded and additional mitigation, enhancement or monitoring measures identified through the EIA process and any commitments outside the EIA process. All commitments adopted by the Project are provided in the Commitments Register.
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Array Area	The area within which the wind turbines, inter-array cables and offshore platform(s) will be located.
Deemed Marine Licence (DML)	A consent required under the Marine and Coastal Access Act 2009 for certain activities undertaken within the UK marine area, which may be granted as part of the Development Consent Order.
Development Consent Order (DCO)	A consent required under Section 37 of the Planning Act 2008 to authorise the development of a Nationally Significant Infrastructure Project, which is granted by the relevant Secretary of State following an application to the Planning Inspectorate.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.

Term	Definition
Embedded Mitigation	Embedded mitigation includes: • Measures that form an inherent part of the project design evolution such as modifications to the location or design of the development made during the pre-application phase (also known as primary (inherent) mitigation); and • Measures that will occur regardless of the EIA process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). All embedded mitigation measures adopted by the Project are provided in the Commitments Register.
Enhancement	Measures committed to by the Project to create or enhance positive benefits to the environment or communities, as a result of the Project. All enhancement measures adopted by the Project are provided in the Commitments Register.
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.
Environmental Statement (ES)	A document reporting the findings of the EIA which describes the measures proposed to mitigate any likely significant effects.
Impact	A change resulting from an activity associated with the Project, defined in terms of magnitude.
Inter-Array Cables	Cables which link the wind turbines to the Offshore Platform(s).
Landfall	The area on the coastline, south-east of Skipsea, at which the offshore export cables are brought ashore, connecting to the onshore export cables at the transition joint bay above Mean High Water Springs.
Main Commercial Route	Defined transit route (mean position) of commercial vessels identified within each Study Area.
Marine Guidance Note (MGN)	A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping.
Mitigation	Any action or process designed to avoid, prevent, reduce or, if possible, offset potentially significant adverse effects of a development. All mitigation measures adopted by the Project are provided in the Commitments Register.

Term	Definition
Monitoring	Measures to ensure the systematic and ongoing collection, analysis and evaluation of data related to the implementation and performance of a development. Monitoring can be undertaken to monitor conditions in the future to verify any environmental effects identified by the EIA, the effectiveness of mitigation or enhancement measures or ensure remedial action are taken should adverse effects above a set threshold occur. All monitoring measures adopted by the Project are provided in the Commitments Register.
Navigational Risk Assessment (NRA)	A document which assesses the hazards to Shipping and Navigation of a proposed Offshore Renewable Energy Installation (OREI) based upon FSA.
Offshore Development Area	The area in which all offshore infrastructure associated with the Project will be located, including any temporary works area during construction, which extends seaward of Mean High Water Springs. There is an overlap with the Onshore Development Area in the intertidal zone.
Offshore Export Cable Corridor (ECC)	The area within which the offshore export cables will be located, extending from the DBD Array Area to Mean High Water Springs at the landfall.
Offshore Export Cables	Cables which bring electricity from the offshore platform(s) to the transition joint bay at landfall.
Offshore Platform(s)	Fixed structures located within the DBD Array Area that contain electrical equipment to aggregate and, where required, convert the power from the wind turbines, into a more suitable voltage for transmission through the export cables to the Onshore Converter Station. Such structures could include (but are not limited to): Offshore Converter Station(s) and an Offshore Switching Station.
Offshore Renewable Energy Installation (OREI)	As defined by MGN 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on United Kingdom (UK) Navigational Practice, Safety and Emergency Response (MCA, 2021). For the purposes of this report and in keeping with the consistency of the EIA, OREI can mean offshore wind turbines and the associated electrical infrastructure such as offshore substations.
Project Design Envelope	A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario. The Project Design Envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.
Radio Detection and Ranging (Radar)	An object-detection system which uses radio waves to determine the range, altitude, direction or speed of objects.
Regular Operator	Commercial operator whose vessel(s) are observed to transit through a particular region on a regular basis.

Term	Definition
Safety Zones	A statutory, temporary marine zone demarcated for safety purposes around a possibly hazardous offshore installation or works / construction area.
Scoping Opinion	A written opinion issued by the Planning Inspectorate on behalf of the Secretary of State regarding the scope and level of detail of the information to be provided in the Applicant's Environmental Statement. The Scoping Opinion for the Project was adopted by the Secretary of State on 02 August 2024.
Scoping Report	A request by the Applicant made to the Planning Inspectorate for a Scoping Opinion on behalf of the Secretary of State. The Scoping Report for the Project was submitted to the Secretary of State on 24 June 2024.
Scour Protection	Protective materials used to avoid sediment erosion from the base of the wind turbine foundations and offshore platform foundations due to water flow.
Study Areas	A geographical area and / or temporal limit defined for each EIA topic to identify sensitive receptors and assess the relevant likely significant effects.
The Applicant	SSE Renewables and Equinor acting through 'Doggerbank Offshore Wind Farm Project 4 Projco Limited'
The Project	Dogger Bank D Offshore Wind Farm Project, also referred to as DBD in this PEIR.
Unique Vessel	An individual vessel identified on any particular calendar day, irrespective of how many tracks were recorded for that vessel on that day. This prevents vessels being over counted. Individual vessels are identified using their Maritime Mobile Service Identity (MMSI).
Wind Turbines	Power generating devices located within the DBD Array Area that convert kinetic energy from wind into electricity.

15 Shipping and Navigation

15.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary results of the Environmental Impact Assessment (EIA) of the Dogger Bank D Offshore Wind Farm (hereafter 'the Project' or 'DBD') on shipping and navigation.

2. **Chapter 4 Project Description** provides a description of the key infrastructure components which form part of the Project and the associated construction, operation and maintenance and decommissioning activities presented in **Section 4.5**.

3. The primary purpose of the PEIR is to support the statutory consultation activities required for a Development Consent Order (DCO) application under the Planning Act 2008. The information presented in this PEIR chapter is based on the baseline characterisation and assessment work undertaken to date. The feedback from the statutory consultation will be used to inform the final design where appropriate and presented in an Environmental Statement (ES), which will be submitted with the DCO application.

4. This PEIR chapter:

   - Describes the baseline environment relating to shipping and navigation;
   - Presents an assessment of the likely significant effects on shipping and navigation during the construction, operation and decommissioning phases of the Project;
   - Identifies any assumptions and limitations encountered in compiling the environmental information;
   - Sets out proposed mitigation measures to avoid, prevent reduce or, if possible, offset potential significant adverse environmental effects identified during the EIA process and, where relevant, monitoring measures or enhancement measures to create or enhance positive effects; and
   - Includes a summary of information contained in **Volume 2**, **Appendix 15.2 Navigational Risk Assessment (NRA)**, hereafter the 'NRA'. The NRA provides the technical assessment of risks associated with shipping and navigation used to inform this chapter.

5. This chapter should be read in conjunction with the following related chapters. Inter-relationships are discussed further in **Section 15.10.1**:

   - **Chapter 4 Project Description**;
   - **Chapter 6 Environmental Impact Assessment Methodology**;
   - **Chapter 14 Commercial Fisheries**;
   - **Chapter 16 Aviation, Radar, and Military**; and
   - **Chapter 18 Other Marine Users**.

6. Additional information to support the shipping and navigation assessment includes:

   - **Volume 2, Appendix 15.1 Consultation Responses for Shipping and Navigation**; and
   - **Volume 2**, **Appendix 15.2 Navigational Risk Assessment**.

15.2 Policy and Legislation

15.2.1 National Policy Statements

7. Planning policy on energy Nationally Significant Infrastructure Projects is set out in the National Policy Statements (NPS). The following NPS are relevant to the shipping and navigation assessment:

   - NPS for Renewable Energy Infrastructure (EN-3) (Department for Energy Security and Net Zero (DESNZ), 2023); and
   - NPS for Ports (Department for Transport (DfT), 2012).

8. The shipping and navigation chapter has been prepared with reference to specific requirements in the above NPS. The relevant parts of the NPS are summarised in **Table 15-1**, along with how and where they have been considered in this PEIR chapter.

Table 15-1 Summary of Relevant National Policy Statement Requirements for Shipping and Navigation

NPS Reference and Requirement	How and Where Considered in the PEIR
NPS for Renewable Energy Infrastructure (EN-3)	
Paragraph 2.8.179: "To ensure safety of shipping, applicants should reduce risks to navigational safety to as low as reasonably practicable (ALARP)"	ALARP principles have been applied to the environmental assessment methodology in line with the Formal Safety Assessment (FSA) process prescribed in Marine Guidance Note (MGN) 654 (MCA, 2021) (see **Section 15.5.3**).
Paragraph 2.8.184: "Applicants should engage with interested parties in the navigation sector early in the pre-application phase of the proposed offshore wind farm or offshore transmission to help identify mitigation measures to reduce navigational risk to ALARP, to facilitate proposed offshore wind development. This includes the MMO or Natural Resources Wales (NRW) in Wales, MCA, the relevant General Lighthouse Authority (GLA), such as Trinity House, the relevant industry bodies (both national and local) and any representatives of recreational users of the sea, such as the Royal Yachting Association (RYA), who may be affected. This should continue throughout the life of the development including during the construction, operation and decommissioning phases."	Consultation with relevant stakeholders has been a key input to the environmental assessment and includes engagement with the MCA, Trinity House, United Kingdom (UK) Chamber of Shipping as per **Section 15.3**. Further, and continued, consultation will occur post-PEIR.
Paragraph 2.8.186: "The presence of the wind turbines can also have impacts on communication and shipborne and shore-based radar systems."	Impacts relating to navigation, communication, and position fixing equipment have been considered (**Section 15** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**).
Paragraph 2.8.187: "Prior to undertaking assessments, applicants should consider information on internationally recognised sea lanes, which is publicly available."	No International Maritime Organization (IMO) routing measures were identified in proximity to the Project when characterising the baseline environment (**Section 15.6.1.1**). However, main commercial routes which are international in nature have been identified (**Section 15.6.1**).
Paragraph 2.8.189: "Applicants must undertake a Navigational Risk Assessment (NRA) in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above."	An NRA has been undertaken in line with MGN 654 and has been informed by consultation with shipping and navigation stakeholders (**Volume 2, Appendix 15.2 Navigational Risk Assessment**).
Paragraph 2.8.190: "The navigation risk assessment will for example necessitate: • A survey of vessel traffic in the vicinity of the proposed wind farm; • A full NRA of the likely impact of the wind farm on navigation in the immediate area of the wind farm in accordance with the relevant guidance; and • Cumulative and in-combination risks associated with the development and other developments (including other wind farms) in the same area of sea."	A vessel traffic survey has been undertaken for the DBD Array Area and further vessel traffic surveys will be undertaken post-PEIR (**Section 15.5.2**). An NRA has been undertaken in line with MGN 654 (**Volume 2, Appendix 15.2 Navigational Risk Assessment**). A full Cumulative Effects Assessment (CEA) has been undertaken with consideration of other developments including offshore wind farms (**Section 15.8**).
Paragraph 2.8.195: "Applicants should undertake a detailed Navigational Risk Assessment, which includes Search and Rescue (SAR) Response Assessment and emergency response assessment prior to applying for consent. The specific SAR requirements will then be discussed and agreed post-consent."	An impact relating to the reduction of emergency response capability (including SAR access) has been scoped into the impact assessment and acknowledges the need to complete a SAR Checklist (**Section 15.4.2**).

NPS Reference and Requirement	How and Where Considered in the PEIR
Paragraph 2.8.259: "Mitigation measures will include site configuration, lighting and marking of projects to take account of any requirements of the GLA"	Lighting and marking are included as an embedded mitigation (see **Section 15.4.3**) and the final array layout will be agreed in consultation with MCA and Trinity House post consent.
NPS for Ports	
Paragraph 5.14.2: "Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES"	Socioeconomic impacts are assessed in **Chapter 30 Socio-Economics, Tourism and Recreation** noting that, given the location offshore of the DBD Array Area, impacts on port access due to the presence of the Project and associated activities have been scoped out.
Paragraph 5.14.4: "Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies."	
Paragraph 5.14.5: "Socio-economic impacts may be linked to other impacts – for example, the visual impact of a development is considered in section 5.11 but may also have an impact on tourism and local businesses "	

15.2.2 Other Policy and Legislation

9. Other policy and legislation relevant to the shipping and navigation assessment, all of which is international in nature, includes:

- The Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) as amended (IMO, 1972/77) which dictates the manner by which all sea going vessels should navigate;
- Chapter V of the International Convention for the Safety of Life at Sea (SOLAS) as amended (IMO, 1974) which identifies provisions relating to safety of navigation applicable to all vessels; and
- United Nations (UN) Convention on the Law of the Sea (UNCLOS) (UN, 1982) which establishes rules governing all uses of oceans and seas.

15.3 Consultation

10. Topic-specific consultation in relation to shipping and navigation has been undertaken in line with the process set out in **Chapter 7 Consultation**. A Scoping Opinion from the Planning Inspectorate was received on 2nd August 2024, which has informed the scope of the assessment presented in this chapter (as outlined in **Section 15.4.2**).

11. Feedback received through technical consultation meetings with relevant stakeholders has been considered in the preparation of this chapter. Details of technical consultation undertaken to date on shipping and navigation are provided in **Table 15-2**, noting that further technical consultation meetings are anticipated post-PEIR.

Table 15-2 Technical Consultation Undertaken to Date on Shipping and Navigation

Meeting	Stakeholder(s)	Date(s) of Meeting / Frequency	Purpose of Meeting
Dedicated Meeting	MCA and Trinity House	5th June 2024	Vessel traffic survey approach and methodology
Dedicated Meeting	UK Chamber of Shipping	24th October 2024	Pre-PEIR consultation and Project update
Dedicated Meeting	MCA and Trinity House	28th October 2024	Pre-PEIR consultation and Project update

12. **Volume 2, Appendix 15.1 Consultation Responses for Shipping and Navigation** summarises how consultation responses received to date are addressed in this chapter. It is noted that Regular Operators identified in the area were contacted and provided with an overview of the Project and given the opportunity to provide any comment or feedback. Details on the outreach and Hazard Workshop are provided in **Section 4.1** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**.

13. This chapter will be updated based on refinements made to the Project Design Envelope and to consider, where appropriate, stakeholder feedback on the PEIR. The updated chapter will form part of the Environmental Statement to be submitted with the DCO Application.

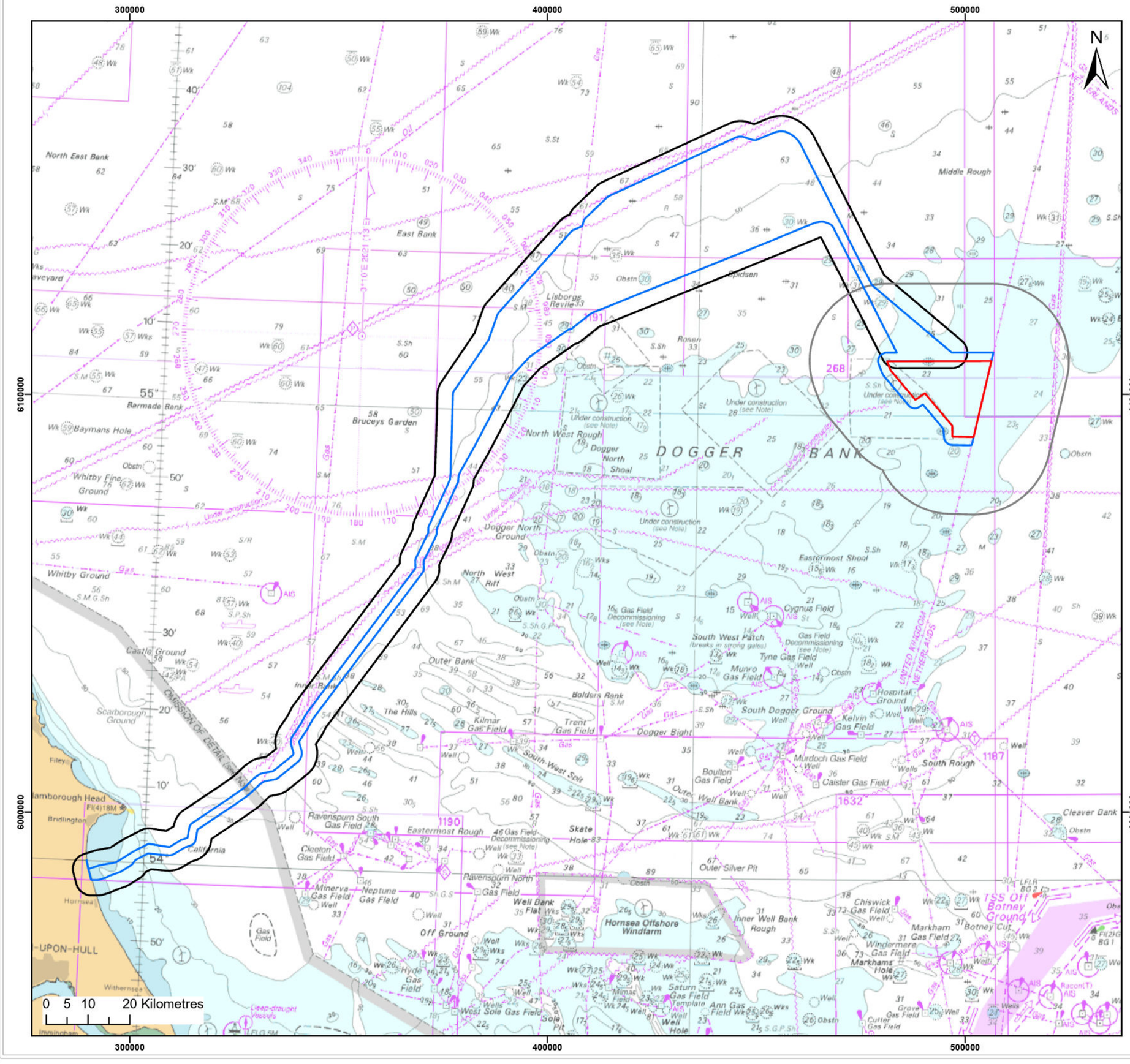
15.4 Basis of the Assessment

14. The following sections establish the basis of the assessment of likely significant effects, which is defined by the study area(s), assessment scope, and realistic worst-case scenarios. This section should be read in conjunction with **Volume 2, Appendix 6.2 Impacts Register** and **Volume 2, Appendix 6.3 Commitments Register**.

15.4.1 Study Area

15. The shipping and navigation Study Area has been defined as a 10 nautical miles (nm) buffer surrounding the DBD Array Area and is shown on **Figure 15-1**. The 10nm buffer is standard for shipping and navigation assessment as it captures relevant routeing in the region whilst still remaining site-specific and providing local context to the analysis of risks.

16. It is noted that a detailed assessment of vessel traffic within a separate 2nm buffer of the offshore Export Cable Corridor (ECC) Study Area (hereafter referred to as the 'shipping and navigation offshore ECC Study Area') has been carried out and is also shown on **Figure 15-1**. The 2nm buffer is again standard practice for shipping and navigation assessment and has been used in the majority of NRAs for UK offshore wind farm. Additionally, the 2nm buffer is sufficient to ensure vessel traffic movements within potentially sensitive areas within and in proximity to the offshore ECC are suitably characterised. Full details are provided in **Section 10.2** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**.



Legend:

- DBD Array Area
- Offshore ECC
- Shipping and Navigation Array Area Study Area
- Shipping and Navigation Offshore ECC Study Area

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Overview of DBD Study Areas

Figure: 15.1 | Drawing No: A4968_ANA_DBD_PEIR_001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:900,000
02	26/05/2025	DS	RR	A3	1:900,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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15.4.2 Scope of the Assessment

17. A number of impacts have been scoped out of the shipping and navigation assessment. These impacts are outlined in **Volume 2, Appendix 6.2 Impacts and Effects Register**, along with supporting justification and are in line with the Scoping Opinion (discussed in **Section 15.3**) and the project description outlined in **Chapter 4 Project Description**.

18. Impacts scoped out of the assessment include the impact on interference with vessel navigation and communication equipment due to the Project at all phases (SN-C-07, SN-O-07, SN-D-07). A detailed assessment for this impact was carried out in **Section 15** of **Volume 2, Appendix 15.2 Navigational Risk Assessment** and based on the detailed technical assessment of the effects due to the presence of the Project on navigation, communication and position fixing equipment, associated risks are screened out of the detailed risk assessment undertaken in **Section 15.7** for this impact.

19. Other impacts have been screened out of the construction and decommissioning phase of the Project and so scoped out of the assessment in agreement with the Planning Inspectorate during the Scoping Opinion. These include SN-C-04, SN-D-04, SN-C-05, SN-D-05, SN-C-06, SN-D-06, SN-C-08, and SN-D-08.

20. Impacts scoped into the assessment relating to shipping and navigation are outlined in **Table 15-3** and discussed further in **Section 15.7**.

Table 15-3 Shipping and Navigation – Impacts Scoped into the Assessment

Impact ID	Impact and Project Activity	Rationale
Construction		
SN-C-01	Vessel displacement – Construction / decommissioning activities associated with the Project as well as the presence of the Project	Activities associated with the installation, and decommissioning of structures and sub-sea cables as well as the presence of surface structures may displace third-party vessels from their existing routes or activity.
SN-C-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Construction / decommissioning activities associated with the Project as well as the presence of the Project	Activities associated with the installation, and decommissioning of structures and sub-sea cables as well as the presence of surface structures may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels.
SN-C-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Construction / decommissioning activities associated with the Project as well as the presence of the Project	Project vessels associated with construction, and decommissioning activities may increase encounters and collision risk for other third-party vessels already in the area.
Operation and Maintenance		
SN-O-01	Vessel displacement –the presence of the Project	Activities associated with the maintenance of structures and sub-sea cables as well as the presence of surface structures may displace third-party vessels from their existing routes or activity.
SN-O-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement - the presence of the Project	Activities associated with the maintenance of structures and sub-sea cables as well as the presence of surface structures may displace third-party vessels from their existing routes or activity. This displacement may result in increased collision risk with other third-party vessels.
SN-O-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel –the presence of the Project	Project vessels associated with operation and maintenance activities may increase encounters and collision risk for other third-party vessels already in the area.
SN-O-04	Vessel to structure allision risk for third party vessels due to the presence of project structures – the presence of the Project	The presence of surface structures within the DBD Array Area may result in the creation of a risk of allision for vessels. This impact is considered only in relation to the DBD Array Area since there are no surface structures associated with the offshore ECC, underwater allision risk due to reduction in under keel clearance is considered separately in SN-C-05.
SN-O-05	Reduction in under keel clearance due to the presence of cable protection or cable crossings – the presence of cable protection or cable crossings	The presence of cable protection associated with the sub-sea cables may result in reductions to water depth and the creation of an under keel clearance risk for vessels.

Impact ID	Impact and Project Activity	Rationale
SN-O-06	Vessel interaction with sub-sea cables associated with the project – the presence of sub-sea cables	The presence of sub-sea cables may result in the creation of a risk of a vessel anchor making contact with sub-sea cable.
SN-O-08	Reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders – the presence of the Project	The presence of surface structures within the DBD Array Area and operation and maintenance activities associated with the DBD Array Area and offshore ECC may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface air responders, including SAR assets.
Decommissioning		
SN-D-01	Vessel displacement – Decommissioning activities not yet defined	Decommissioning impacts are scoped in; however, details of offshore decommissioning activities are not known at this stage. Decommissioning impacts will be assessed in detail through the Offshore Decommissioning Programme (see**Table 15-4**, Commitment ID CO21) where relevant, which will be developed prior to the construction of the offshore works. In this assessment, it is assumed that most decommissioning activities would be the reverse of their construction counterparts, and that their impacts would be of similar nature to, and no worse than, those identified during the construction phase.
SN-D-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Decommissioning activities not yet defined	
SN-D-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Decommissioning activities not yet defined	

21. A full list of impacts scoped in / out of the shipping and navigation assessment is summarised in **Volume 2, Appendix 6.2 Impacts and Effects Register**. A description of how the Impacts and Effects Register should be used alongside the PEIR chapter is provided in **Chapter 6 Environmental Impact Assessment Methodology**.

15.4.3 Embedded Mitigation Measures

22. The Project has made several commitments to avoid, reduce or offset potential adverse environmental effects through mitigation measures embedded into the project design. These measures include actions that will be undertaken to meet other existing legislative requirements and those considered to be standard or best practice to manage commonly occurring environmental effects. The assessment of likely significant effects has therefore been undertaken on the assumption that these measures are adopted during the construction, operation and decommissioning phases. **Table 15-4** identifies proposed embedded mitigation measures that are relevant to the shipping and navigation assessment.

23. Proposed commitments may evolve during the pre-application phase as the EIA progresses and in response to refinements to the Project Design Envelope and stakeholder feedback. The final commitments will be confirmed in the Commitments Register submitted along with the DCO application.

24. Full details of all commitments made by the Project are provided within the Commitments Register in **Volume 2**, **Appendix 6.3 Commitments Register**. A description of how the Commitments Register should be used alongside the PEIR chapter is provided in **Volume 2, Appendix 1.2 Guide to PEIR** and **Chapter 6 Environmental Impact Assessment Methodology**. In addition, a list of outline management plans which are submitted with the PEIR for consultation is provided in **Section 1.10** of **Chapter 1 Introduction**. These documents will be further refined and submitted along with the DCO application. See **Volume 2, Appendix 1.2 Guide to PEIR** for a list of all PEIR documents.

25. The Commitments Register is provided at PEIR stage to provide stakeholders with an early opportunity to review and comment on the proposed commitments. Proposed commitments may evolve during the pre-application phase as the EIA progresses and in response to refinements to the Project Design Envelope and stakeholder feedback. The final commitments will be confirmed in the Commitments Register submitted along with the DCO application.

Table 15-4 Embedded Mitigation Measures Relevant to Shipping and Navigation

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Shipping and Navigation Assessment	Relevance to Impact ID
CO2	A Layout Plan (including sub-sea cables and the wind turbines) will be provided and agreed with the Marine Management Organisation (MMO) following consultation with Trinity House and the Maritime and Coastguard Agency (MCA). The Layout Plan will take account of the distribution of geophysical anomalies of archaeological interest and the requirement to avoid Archaeological Exclusion Zones (AEZ).	DML Condition - Layout Plan	Ensures the final array layout is suitable for both surface and air based (for SAR purposes) navigation and is compliant with MGN 654.	SN-O-08
CO7	The Project will ensure compliance with Marine Guidance Note (MGN) 654 and its annexes, where applicable, including implementation of an Emergency Response Cooperation Plan (ERCoP) for all phases of the Project and completion of a Search and Rescue (SAR) checklist.	DML Condition - Emergency Response and Cooperation Plan	Compliance with MGN 654 will ensure impacts on navigational safety and emergency response are suitably assessed.	SN_C_01, SN_C_02, SN_C_03, SN_O_01, SN_O_02, SN_O_03, SN_O_04, SN_O_05. SN_O_08
CO9	Aids to navigation (marking and lighting) will be deployed in accordance with the latest relevant available standard industry guidance and as advised by Trinity House, Maritime and Coastguard Agency (MCA) and Civil Aviation Authority (CAA) and Ministry of Defence (MoD) as appropriate. This will include a buoyed construction area around the Array Area. Consultation with Trinity House, MCA, and CAA will occur to determine appropriate lighting and marking.	DML Condition - Aids to Navigation Plan	Maximises awareness in both day and night conditions including in restricted visibility and assists with SAR operations and protects third-party vessels from project vessels involved in construction and major maintenance activities which may be Restricted in their Ability to Manoeuvre (RAM).	SN_C_01, SN_C_02, SN_C_03, SN_O_01, SN_O_02, SN_O_03, SN_O_04, SN_O_08
CO10	A Vessel Traffic Monitoring Plan will be developed and will include provision for monitoring of vessel traffic during the construction phase.	DML Condition	Monitoring of vessel traffic in and around the DBD Array Area will allow the effectiveness of embedded mitigation measures to be suitably reviewed and any additional mitigation required to be identified.	SN_C_01, SN_C_02, SN_C_03, SN_O_01, SN_O_02, SN_O_03
CO11	Advanced warning and accurate location details of construction, maintenance, and decommissioning operations, associated safety zones and advisory safe passing distances will be given via Notifications to Mariners and Kingfisher Bulletins at least 14 days prior where possible. The Project 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 and supplemented with very high frequency (VHF) radio broadcasts agreed with the Maritime and Coastguard Agency (MCA) in accordance with the construction and monitoring programme approved under the relevant Deemed Marine Licence (DML) condition. In the event of any cable exposure on or above the seabed, notification to other marine users will be issued via Notices to Mariners and Kingfisher Bulletins confirming the location and extent of the exposure.	DML Condition	Maximises awareness of the infrastructure allowing vessels to passage plan in advance.	SN_C_01, SN_C_02, SN_C_03, SN_O_01, SN_O_02, SN_O_03, SN_O_04, SN_O_05. SN_O_06, SN_O_08

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Shipping and Navigation Assessment	Relevance to Impact ID
CO12	Project vessels will ensure compliance with Flag State regulations including the Convention on the International Regulations for Preventing Collisions at Sea (COLREG) (International Maritime Organization (IMO), 1972/77) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	International maritime regulations	Minimises the risk introduced due to the presence of project vessels.	SN_C_03, SN_O_03, SN_O_08
CO13	There will be a minimum blade tip clearance of at least 26m above highest astronomical tide, and 28m above lowest astronomical tide.	DCO Works	Minimises the risk of blade allision particularly for sailing vessels with a mast.	SN_O_04
CO14	Marine coordination for project vessels will be implemented through Detailed Construction and Monitoring Programme (Construction Phase) and Offshore Operations and Maintenance Plan (O&M Phase).	DML Condition - Offshore Construction and Monitoring Programme DML Condition - Offshore Operations and Maintenance Plan	Ensures project vessels are suitably managed to minimise the likelihood of involvement in incidents and maximise the ability to assist in the event of a third-party incident.	SN_C_03, SN_O_03, SN_O_08
CO15	A Fisheries Liaison and Coexistence Plan (FLCP) will be provided in accordance with the Outline FLCP. The FLCP will include commitment to ongoing liaison with fishermen throughout all stages of the Project, based upon the Fisheries Liaison with Offshore Wind and Wet Renewables Group (FLOWW) (2014, 2015) guidance (or latest relevant available guidance) and specifically the following: • The appointment of a company Fisheries Liaison Officer (FLO) to maintain effective communications between the Project and fishermen; • Appropriate liaison with relevant fishing interests to ensure that they are appropriately fully informed of development planning and any offshore activities and works; • The provision of advance warning and accurate location details of construction, maintenance and decommissioning operations, associated safety zones and advisory passing distances, to be given via Notices to Mariners and Kingfisher Bulletins; and • Specific to the UK potting fishery the implementation of evidence-based mitigation in line with relevant FLOWW guidelines.	DML Condition - Fisheries Liaison and Coexistence Plan	Will assist in raising awareness of the Project and associated operations with the fishing industry.	SN_O_04
CO16	There will be appropriate marking of all offshore infrastructure associated with the Project on suitably scaled UK Hydrographic Office (UKHO) Admiralty Charts.	DML Condition	Maximises awareness of the infrastructure allowing vessels to passage plan in advance.	SN_C_01, SN_C_02, SN_C_03, SN_O_01, SN_O_02, SN_O_03, SN_O_05. SN_O_06, SN_O_08

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Shipping and Navigation Assessment	Relevance to Impact ID
CO17	Safety zones of up to 500m will be applied for during construction, major maintenance and decommissioning phases and up to 50m for installed structures pre-commissioning. Where defined by risk assessment, guard vessels will also be used to ensure adherence with safety zones or advisory passing distances to mitigate impacts which pose a risk to surface navigation during construction, maintenance and decommissioning phases. Where deemed appropriate by risk assessment, guard vessels will be used to reduce risks to surface navigation during construction, maintenance and decommissioning.	Secured through a Safety Zone Application submitted post-consent	Protects third-party vessels from project vessels involved in construction and major maintenance activities which may be RAM.	SN_C_01, SN_C_02, SN_C_03, SN_O_01, SN_O_02, SN_O_03, SN_O_04, SN_O_05. SN_O_06
CO21	An Offshore Decommissioning Programme will be provided prior to the construction of the offshore works and implemented at the time of decommissioning, based on the relevant guidance and legislation.	DCO Requirement - Offshore Decommissioning Programme	The development and agreement of a Decommissioning Programme will ensure that the process of decommissioning the Project minimises shipping and navigation effects.	SN_D_01, SN_D_02, SN_D_03, SN_D_04, SN_D_05, SN_D_06, SN_D_07, SN_D_08
CO24	A Cable Specification and Installation Plan will be provided and submitted for approval prior to offshore construction. The Cable Specification and Installation Plan will detail the methods used for construction of offshore export and inter-array cables. Where possible, cable burial will be the preferred method for cable protection. Where cable protection is required, this will be minimised so far as is feasible. All cable protection will adhere to the requirements of Marine Guidance Note (MGN) 654 with respect to changes greater than 5% to the under-keel clearance in consultation with the Maritime and Coastguard Agency (MCA) and Trinity House. Any damage, destruction or decay of cables must be notified to the MCA, Trinity House, Kingfisher and UK Hydrographic Office (UKHO) no later than 24 hours after being discovered.	DML Condition - Cable Specification and Installation Plan	Minimises the risks of underwater allision with cable protection, anchor or fishing gear interaction with sub-sea cables and interference with magnetic position fixing equipment.	SN_O_05, SN_O_06
CO25	A Project Environmental Management Plan (PEMP) will be provided in accordance with the Outline PEMP and will include: • A Marine Pollution Contingency Plan (MPCP), which will include plans to address the risks, methods and procedures to deal with any spills and collision incidents in relation to all activities carried out below Mean High Water Springs (MHWS) to safeguard the marine environment; • Best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the construction phase; • A Chemical Risk Assessment (CRA) to ensure any chemicals, substances and materials to be used will be suitable for use in the marine environment and in accordance with the Health and Safety Executive and the Environment Agency Pollution Prevention Control Guidelines or latest relevant available guidelines; • A marine biosecurity plan detailing how the risk of introduction and spread of invasive non-native species will be minimised; and • Details of waste management and disposal arrangements.	DML Condition - Project Environmental Management Plan	Minimises the environmental effects in the event of an incident involving pollution.	SN_C_02, SN_C_03, SN_O_02, SN_O_03, SN_O_04, SN_O_05, SN_O_08

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Shipping and Navigation Assessment	Relevance to Impact ID
CO28	An Offshore Operations and Maintenance Plan (O&M) will be provided prior to commencement of operation and will outline the reasonably foreseeable O&M offshore activities.	DML Condition - Offshore Operations and Maintenance Plan	Maximises awareness and minimises the risks of collision or allision.	SN_O_03, SN_O_05, SN_O_06, SN_O_08

26. An Outline Marine Traffic Monitoring Plan and Aid to Navigation Management Plan will be submitted with the DCO application, which will detail measures relevant to shipping and navigation that will be secured in the plans. Indicative embedded mitigation measures which are proposed to be included in these plans are set out in **Table 15-5** and **Table 15-6,** respectively.

Table 15-5 Indicative Embedded Mitigation Measures to be Included in the Outline Marine Traffic Monitoring Plan

Measures to be Included: Outline Marine Traffic Monitoring Plan
Outline methodology by which vessel traffic monitoring will be undertaken
Guidance used to inform vessel traffic monitoring strategy
Scope of planned type, duration, area, and frequency of vessel traffic monitoring
Overview of planned data sources for assessment

Table 15-6 Indicative Embedded Mitigation Measures to be Included in the Aid to Navigation Management Plan

Measures to be Included: Aid to Navigation Management Plan
Outline of marine aids to navigation required across construction and operation
Outline of aviation lighting required across construction and operation, including SAR
Cumulative marking of the Project
Maintenance of aids to navigation
Emergency procedures
Outline of decommissioning requirements

15.4.4 Realistic Worst-Case Scenarios

27. To provide a precautionary, but robust, assessment at this stage of the Project's development process, a realistic worst-case scenario has been defined in **Table 15-7** for each impact scoped into the assessment (as outlined in **Section 15.4.2**). The realistic worst-case scenarios are derived from the range of parameters included in the design envelope. They ensure that the assessment of likely significant effects is based on the maximum potential impact on the environment. Should an alternative development scenario be taken forward in the final design of the Project, the resulting effects would not be greater in effect significance. Further details on the Project Design Envelope are provided in **Chapter 6 Environmental Impact Assessment Methodology**.

28. Following the PEIR publication, further design refinements will be made based on ongoing engineering studies and considerations of the EIA and stakeholder feedback. Therefore, realistic worst-case scenarios presented in the PEIR may be updated in the ES. The Project Design Envelope will be refined where possible to retain design flexibility only where it is needed.

29. An indicative worst-case layout has been determined for shipping and navigation. This layout is referenced in **Table 15-7** and presented in **Figure 15-2**, inclusive of spare locations (120 locations total). Only 113 wind turbines and the two Offshore Platform locations have been used throughout the modelling process detailed in **Section 16** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**, to align with maximum parameters detailed in **Chapter 4 Project Description**. Internal locations considered to be less exposed to passing vessel traffic have been designated as the five spare locations.

30. The worst-case assumptions are for the purposes of modelling / risk assessment only and the final array layout will need to be agreed with the MCA and Trinity House post consent.

31. The minimum spacing between wind turbines (measured centre-to-centre) is 826m and two lines of orientation have been maintained throughout the indicative worst-case layout. Should the Applicant consider a Single Line of Orientation (SLoO) layout post consent then a safety justification would be undertaken in line with MGN 654 requirements.

Table 15-7 Realistic Worst-Case Scenarios for Impacts on Shipping and Navigation

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
Construction			
SN-C-01	Vessel displacement – Construction activities associated with the Project	• Maximum extent of buoyed construction area; • Use of safety zone radius of 500m whilst construction vessels are present, typically reducing to within 50m of an asset whilst no construction vessels are present; • HVDC cable length: 800km comprising two cables in two trenches of 400km length; • Maximum peak of 90 construction vessels offshore; and • Single offshore construction phase of approximately five years.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement.
SN-C-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Construction activities associated with the Project		Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent vessel to vessel collision risk.
SN-C-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Construction activities associated with the Project		Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel to vessel collision risk involving a third-party vessel and a project vessel.
Operation and Maintenance			
SN-O-01	Vessel displacement – Maintenance activities and presence of the Project	• Full buildout of DBD Array Area; • Maximum number of wind turbines – 113; • Surface dimensions of fixed four-legged jacket foundations of up to 35m×35m (length × width); • Up to two fixed Offshore Platforms; • Offshore platform topside dimensions of up to 75m×60m (length × width); • Up to 400km of inter-array cables; • Use of 500m major maintenance safety zones; and • Operational life of 35 years.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement.
SN-O-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Presence of the Project		Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel displacement and subsequent vessel to vessel collision risk.
SN-O-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Presence of the Project	• Full buildout of DBD Array Area; • Use of 500m major maintenance safety zones; • Peak of 16 maintenance vessels with up to 96 round trips per year; and • Operational life of 35 years.	Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on vessel to vessel collision risk involving a third-party vessel and a project vessel.

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
SN-O-04	Vessel to structure allision risk for third party vessels due to the presence of project structures – Presence of surface structures within the DBD Array Area	• Full build out of DBD Array Area; • Up to 113 fixed wind turbines; • Surface dimensions of fixed four-legged jacket foundations of up to 35m×35m (length × width); • Up to two fixed Offshore Platforms; • Offshore platform topside dimensions of up to 75m×60m (length × width); • Indicative worst-case array layout as per **Figure 15-2**; • Use of 500m major maintenance safety zones; • Minimum spacing of 826m between wind turbines; and • Operational life of 35 years.	Largest possible extent of surface infrastructure, greatest number of surface structures and greatest duration resulting in the maximum spatial and temporal effect on vessel to structure allision risk.
SN-O-05	Reduction in under keel clearance due to the presence of cable protection or cable crossings – Presence of cable protection or cable crossings	• Full buildout of DBD Array Area; • Up to 400km of inter-array cables with a potential of five cable crossings considered; • Maximum of two offshore export cables with a combined length of 432nm (800km) with a potential of 16 cable crossings and three pipeline crossings considered; • Minimum burial depth of 0.2m for inter-array cables and for the offshore export cables; • External protection where needed for up to 10% of inter-array cables and up to 20% for offshore export cables, with a height of up to 1.5m; and • Operational life of 35 years.	Largest possible extent of sub-sea infrastructure and greatest duration resulting in the maximum spatial and temporal effect on under keel clearance.
SN-O-06	Vessel interaction with sub-sea cables – Presence of sub-sea cables associated with the Project		Largest possible extent of sub-sea infrastructure and greatest duration resulting in the maximum spatial and temporal effect on anchor interaction with sub-sea cables.
SN-O-08	Reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders – Presence of the Project	• Full build out of DBD Array Area; • Up to 113 fixed wind turbines; • Up to two fixed Offshore Platforms; • Peak of 16 maintenance vessels with up to 96 round trips per year; and • Operational life of 35 years.	Largest possible extent, greatest number of surface structures, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect on emergency response capability.
Decommissioning			
SN-D-01	The final decommissioning strategy of the Project's offshore infrastructure has not yet been decided. For a description of potential offshore decommissioning works, refer to **Chapter 4 Project Description**.		
SN-D-02	It is recognised that regulatory requirements and industry best practice change over time. Therefore, the details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning. Specific arrangements will be detailed in an Offshore Decommissioning Plan (see **Table 15-4**, Commitment ID CO21), which will be submitted and agreed with the relevant authorities prior to the commencement of offshore decommissioning works.		
SN-D-03	For this assessment, it is assumed that decommissioning is likely to operate within the parameters identified for construction (i.e. any activities are likely to occur within the temporary construction working areas and require no greater amount or duration of activity than assessed for construction). The decommissioning sequence will generally be the reverse of the construction sequence. It is therefore assumed that decommissioning impacts would likely be of similar nature to, and no worse than, those identified during the construction phase.		

500000

6100000

N

Dogger Bank C Offshore Wind Farm

Under Construction (2024-2026) (see Note)

VQ
N2
BY
Wk
PA
Fl.Y.5s
SP2
SP3
SP4
SP5
SP6
SP7
Q(3)10s
E1
BYB
VQ(3)5s
E2
BYB
VQ(6)+LFl.10s
S1
YB

55° 05′
55° 00′

0 1 2 4 Kilometres

Legend:

- Wind Turbine
- Spare Wind Turbine
- Offshore Platform

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Worst Case Layout for Shipping and Navigation

Figure:	Drawing No:				
15.2	A4968_ANA_DBD_PEIR_002				
Revision:	**Date:**	**Drawn:**	**Checked:**	**Size:**	**Scale:**
01	24/01/2024	DS	RR	A3	1:100,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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15.5 Assessment Methodology

15.5.1 Guidance Documents

32. The following guidance documents have been used to inform the baseline characterisation, assessment methodology and mitigation design for shipping and navigation:

- MGN 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021);
- Revised Guidelines for FSA for Use in the IMO Rule-Making Process (IMO, 2018);
- MGN 372 Amendment 1 (Merchant and Fishing) Offshore Renewable Energy Installations (OREI): Guidance to Mariners Operating in the Vicinity of UK OREI (MCA, 2022);
- IALA Guideline G1162 Guidance on the Marking of Offshore Man-Made Structures (IALA, 2021 (a));
- IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA, 2021 (b));
- The RYA's Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy (RYA, 2019);
- Standard Marking Schedule for Offshore Installations (DECC, 2011); and
- UK Marine Policy Statement (HM Government, 2011).

15.5.2 Data and Information Sources

15.5.2.1 Desk Study

33. A desk study has been undertaken to compile baseline information in the previously defined Study Area(s) (see **Section 15.4.1**) using the sources of information set out in **Table 15-8**.

Table 15-8 Desk-Based Sources for Shipping and Navigation Data

Data Source	Spatial Coverage	Year(s)	Summary of Data Contents
Vissim Automatic Identification System (AIS)	DBD Array Area and shipping and navigation Study Area	2024	40 days of AIS (July – September 2024) recorded via the Dogger Bank A (DBA) offshore substation platforms (OSP) which aids in characterising vessel traffic movements within and in proximity to the boundary of the DBD Array Area.
Vissim AIS	Offshore ECC and shipping and navigation offshore ECC Study Area	2024	40 days of AIS (July – September 2024) recorded via the DBA OSP which aids in characterising vessel traffic movements within and in proximity to the offshore ECC.
Anatec's ShipRoutes Database	Shipping and navigation Study Areas	2024	Secondary source for characterising vessel traffic movements including cumulatively within and in proximity to the boundary of the DBD Array Area. Regularly updated based on vessel traffic data throughout the North Sea.
Marine Accident Investigation Branch (MAIB) marine accidents database	Shipping and navigation Study Areas	2003 to 2022	Latest maritime incident dataset available from the MAIB database. Detailed review limited to latest ten years of data (2013 to 2022) with high level review undertaken for earlier data (2003 to 2012).
Royal National Lifeboat Institution (RNLI) incident data	Shipping and navigation Study Areas	2008 to 2023	Latest maritime incident dataset available from RNLI. Detailed review limited to latest ten years of data (2014 to 2023) with high level review undertaken for earlier data (2008 to 2013).
DfT UK civilian SAR helicopter taskings	Shipping and navigation Study Areas	2015 to 2024	Latest SAR helicopter tasking dataset available from DfT (April 2015 to March 2024).
The Crown Estate marine aggregate dredging areas	In proximity to the Project	2024	Dataset detailing the marine aggregate dredging areas within and in proximity to the Project.
UKHO Admiralty Charts (UKHO, 2024)	In proximity to the Project	2024	UKHO charts 105, 107, 121, 129, 266, 267, 268, 1187, 1191, 1192, and 2182 used for characterising other navigational features in proximity to the Project.

Data Source	Spatial Coverage	Year(s)	Summary of Data Contents
UKHO Admiralty Sailing Directions North Sea (West) Pilot NP54 (UKHO, 2021)	In proximity to the Project	2021	UKHO sailing directions used for characterising other navigational features in proximity to the Project.
Anatec sourced wind direction and significant wave height data	In proximity to the Project	2024	Wind direction and significant wave height in proximity to the Project for use as input in the collision and allision risk modelling.
Tidal data from Admiralty Chart 266 (UKHO, 2024)	In proximity to the Project	2024	Tidal data in proximity to the Project for use as input in the collision and allision risk modelling.
Visibility data from Admiralty Sailing Directions North Sea (West) Pilot NP54 (UKHO, 2021)	In proximity to the Project	2021	Visibility data in proximity to the Project for use as input in the collision and allision risk modelling.
Met Office Case Studies of Past Weather Events (Met Office, 2024)	In proximity to the Project	2023 to 2024	Past weather event case studies used to identify periods of adverse weather.

15.5.2.2 Site-Specific Surveys

34. In addition to desk-based sources, site-specific surveys were undertaken to provide detailed baseline information on shipping and navigation. **Table 15-9** summarises surveys that have been completed or are planned to be undertaken to inform the ES which are relevant to the shipping and navigation baseline characterisation.

Table 15-9 Site-Specific Survey Data for Shipping and Navigation

Survey	Spatial Coverage	Year(s)	Summary of Survey Data
Completed			
Summer vessel traffic survey	DBD Array Area and shipping and navigation Study Area	2023	14 days of summer AIS, Radar, and visual observation data collected via an onsite dedicated survey vessel between 18 July to 1 August 2023. Data collection in agreement with MCA and Trinity House as outlined in **Volume 2, Appendix 15.1 Consultation Responses for Shipping and Navigation**.
Ongoing			
Winter vessel traffic survey	DBD Array Area and shipping and navigation Study Area	2025	14 days of winter AIS, Radar, and visual observation data to be collected via an onsite dedicated survey vessel during the winter of 2025 (Q1). Data collection in agreement with MCA and Trinity House as outlined in **Volume 2, Appendix 15.1 Consultation Responses for Shipping and Navigation**. As this data is not yet available, inclusion of the survey data will occur at ES.
Summer vessel traffic survey	DBD Array Area and shipping and navigation Study Area	2025	14 days of summer AIS, Radar, and visual observation data to be collected via an onsite dedicated survey vessel during the summer of 2025. Data collection in agreement with MCA and Trinity House as outlined in **Volume 2, Appendix 15.1 Consultation Responses for Shipping and Navigation**. As this data is not yet available, inclusion of the survey data will occur at ES.

15.5.3 Impact Assessment Methodology

35. **Chapter 6 Environmental Impact Assessment Methodology** sets out the overarching approach to the impact assessment methodology. The topic-specific methodology for the shipping and navigation assessment is described further in this section.

15.5.3.1 Impact Assessment Criteria

36. Unlike most other offshore topics, the impact assessment methodology applied is bespoke to shipping and navigation. In particular, the IMO FSA methodology – which is the internationally recognised approach for assessing shipping and navigation impacts – has been applied, in line with stakeholder preference and the requirements of MGN 654 (MCA, 2021).

37. The FSA process is a structured and systematic methodology based upon risk analysis and Cost Benefit Analysis (if applicable) to reduce impacts to ALARP. Each impact is assigned a “severity of consequence” and “frequency of occurrence”, which are then used to determine adverse significance via a risk matrix approach (noting that beneficial significance is not considered under the FSA process).

38. There are differences between standard EIA terminology applied for other offshore topics and FSA terminology applied for shipping and navigation. This chapter adapts the standard EIA terminology where possible (whilst maintaining the overarching IMO FSA methodology), whilst the NRA uses FSA terminology throughout. The key differences in terminology are summarised in **Table 15-10**.

Table 15-10 Summary of Differences in Terminology between EIA and NRA

EIA term	NRA term	Definition
Impact	Hazard	A potential threat to human life, health, property, or the environment.
Effect	Risk	The combination of frequency of occurrence and severity of consequence of an impact.
Receptor	User	Sufferer of effect.

39. 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 on given receptors based on two key factors – the frequency of occurrence and severity of consequence. The definitions of frequency of occurrence and severity of consequence for the purpose of the shipping and navigation assessment are provided in **Table 15-11** and **Table 15-12**, respectively.

Table 15-11 Definition of Frequency of Occurrence of Impacts for Shipping and Navigation

Frequency of Occurrence	Definition
Frequent	Yearly.
Reasonably Probable	One occurrence per 1 to 10 years.
Remote	One occurrence per 10 to 100 years.
Extremely Unlikely	One occurrence per 100 to 10,000 years.
Negligible	Less than 1 occurrence per 10,000 years

15.5.3.2 Effect Significance

40. The assessment of significance of an effect is informed by the frequency of occurrence and severity of consequence. The determination of significance is guided by the use of a shipping and navigation significance of effect matrix, as informed by thresholds defined throughout the IMO FSA process (IMO, 2018) under Maritime Safety Committee – Marine Environment Protection Committee (MECP).2/circ.12/Rev.2. The shipping and navigation effect matrix is as shown in **Table 15-13**.

Table 15-12 Definition of Severity of Consequence of Impacts for Shipping and Navigation

Severity of Consequence	Definition
Major	More than one fatality, total loss of property, tier 3 national assistance required and international reputational effects.
Serious	Multiple serious injuries or single fatality, damage resulting in critical impact on operations, tier 2 regional assistance required, and national reputational effects.
Moderate	Multiple minor or single serious injury, damage not critical to operations, tier 2 limited external assistance required, and local reputational effects.
Minor	Slight injury to people, minor damage to property, tier 1 local assistance required, and minor reputational effects limited to receptors.
Negligible	No perceptible impact on people, property, environment, and / or business.

Table 15-13 Shipping and Navigation Significance of Effect Matrix

		Frequency of Occurrence				
		Frequent	**Reasonably Probable**	**Remote**	**Extremely Unlikely**	**Negligible**
Severity of Consequence	**Major**	Unacceptable	Unacceptable	Unacceptable	Tolerable with Mitigation	Tolerable with Mitigation
	Serious	Unacceptable	Unacceptable	Tolerable with Mitigation	Tolerable with Mitigation	Broadly Acceptable
	Moderate	Unacceptable	Tolerable with Mitigation	Tolerable with Mitigation	Broadly Acceptable	Broadly Acceptable
	Minor	Tolerable with Mitigation	Tolerable with Mitigation	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable
	Negligible	Tolerable with Mitigation	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable

41. Effects determined to be of **Broadly Acceptable** significance are low risk (ALARP) and not significant in EIA terms. Effects determined to be of **Tolerable with Mitigation** significance are intermediate risk (with the embedded mitigation measures applied) (ALARP) are not significant in EIA terms. Effects determined to be of **Unacceptable** significance are high risk and significant in EIA terms. For all impacts it should be ensured that the significance of effect is ALARP.

15.5.4 Cumulative Effects Assessment Methodology

42. The CEA considers other plans and projects that may act collectively with the Project to give rise to cumulative effects on shipping and navigation receptors. The general approach to the CEA for shipping and navigation involves screening for potential cumulative effects, identifying a short list of plans and projects for consideration and evaluating the significance of cumulative effects. **Chapter 6 Environmental Impact Assessment Methodology** and **Volume 2, Appendix 6.4 Cumulative Effects Screening Report – Offshore** provide further details on the general framework and approach to the CEA.

43. In assessing the potential cumulative impacts for the Project in relation to shipping and navigation it is important to note that some projects, predominantly those "proposed" or identified in development plans, may not actually be taken forward, or be fully built out as described. Given the varying type, status and location of developments, a tiered approach to CEA has been undertaken, which splits developments into tiers depending upon project status, proximity to the Project and the level to which they are anticipated to cumulatively impact relevant receptors. It also considers data confidence, most notably in terms of the level of certainty over the location and timescales for a development.

44. The tiers applied in the shipping and navigation CEA are summarised in **Table 15-14**, with the level of assessment undertaken for each tier included. It is noted that an aggregate of the criterion is used to determine the tier of each development. For example, if a development is located within 25nm of the Project and may impact a main commercial route within 1nm of the DBD Array Area but the development is only scoped, it may still be allocated to Tier 1.

Table 15-14 Tiered CEA Approach for Shipping and Navigation

Tier	Minimum Development Status	Criterion	Data Confidence Level	Level of Cumulative Risk Assessment
1	Consent application submitted	• May impact a main commercial route passing within 1nm of the DBD Array Area and / or interacts with traffic which may be directly displaced by the DBD Array Area; • Raised as having possible cumulative effect during consultation; • Offshore wind farms up to 25nm from the DBD Array Area ; • Oil and gas infrastructure up to 5nm from the DBD Array Area; and • Marine aggregate dredging areas up to 15nm from the DBD Array Area.	High or medium	Quantitative cumulative re-routing of main commercial routes.
2	Consent application submitted	• May impact a main commercial route passing within 1nm of the DBD Array Area and / or interacts with traffic which may be directly displaced by the DBD Array Area; • Offshore wind farms between 25nm and 50nm from the DBD Array Area; • Oil and gas infrastructure between 5 and 10nm from the DBD Array Area; and • Marine aggregate dredging areas between 15 and 30nm from the DBD Array Area.	High or medium	Quantitative cumulative re-routing of main commercial routes.
3	Scoped	• Does not impact a main commercial route passing within 1nm of the DBD Array Area and does not interact with traffic which may be directly displaced by the DBD Array Area; • Offshore wind farms up to 50nm from the DBD Array Area; • Oil and gas infrastructure up to 10nm from the DBD Array Area; and • Marine aggregate dredging areas up to 30nm from the DBD Array Area.	Low	Qualitative assumptions of routing only.

15.5.5 Transboundary Effects Assessment Methodology

45. The transboundary effect assessment considers the potential for effects to occur as a result of the Project on shipping and navigation receptors within the Exclusive Economic Zone (EEZ) of other European Economic Area (EEA) member states or other interests of EEA member states, e.g. a non-UK fishing vessel. **Chapter 6 Environmental Impact Assessment Methodology** provides further details on the general framework and approach to the transboundary effect assessment.

46. For shipping and navigation the potential for transboundary effects has been identified in relation to recorded international commercial routeing (see **Section 15.8.3.6.2**).

15.5.6 Assumptions and Limitations

15.5.6.1 Automatic Identification System Data

47. The carriage of AIS is required on board all vessels of greater than 300 Gross Tonnage (GT) engaged on international voyages, cargo vessels of more than 500GT not engaged on international voyages, passenger vessels irrespective of size built on or after 1st July 2002, and fishing vessels over 15m length overall (LOA).

48. Therefore, for the vessel traffic surveys, larger vessels were recorded on AIS, while smaller vessels without AIS installed (including fishing vessels under 15m LOA and recreational craft) were recorded, where possible, on the ARPA on board the survey vessel. A proportion of smaller vessels also carry AIS voluntarily, typically utilising a Class B AIS device.

49. For the summer survey data, recorded Radar tracks were reviewed but, in each instance, the AIS receiver tracked the vessel over a greater range than the corresponding Radar track and provided more accurate information on position and vessel characteristics. Therefore, the AIS track has been prioritised and used alone where the vessel was recorded by both systems.

15.5.6.2 Historical Incident Data

50. Although all UK commercial vessels are required to report accidents to the MAIB, non-UK vessels do not have to report unless they are in a UK port or within 12nm territorial waters (noting that the shipping and navigation Study Area is not located entirely within 12nm territorial waters) or carrying passengers to a UK port. There are also no requirements for non-commercial recreational craft to report accidents to the MAIB.

51. The RNLI incident data cannot be considered comprehensive of all incidents in the shipping and navigation Study Area as not all incidents require assistance from a RNLI resource. Although hoaxes and false alarms are excluded, any incident to which a RNLI resource was not mobilised has not been accounted for in this dataset. Given that the RNLI have an operational limit of 100nm (185km), and so it is anticipated that an incident occurring in proximity to the DBD Array Area would be unlikely to result in a response from an RNLI asset.

15.5.6.3 United Kingdom Hydrographic Office Admiralty Charts

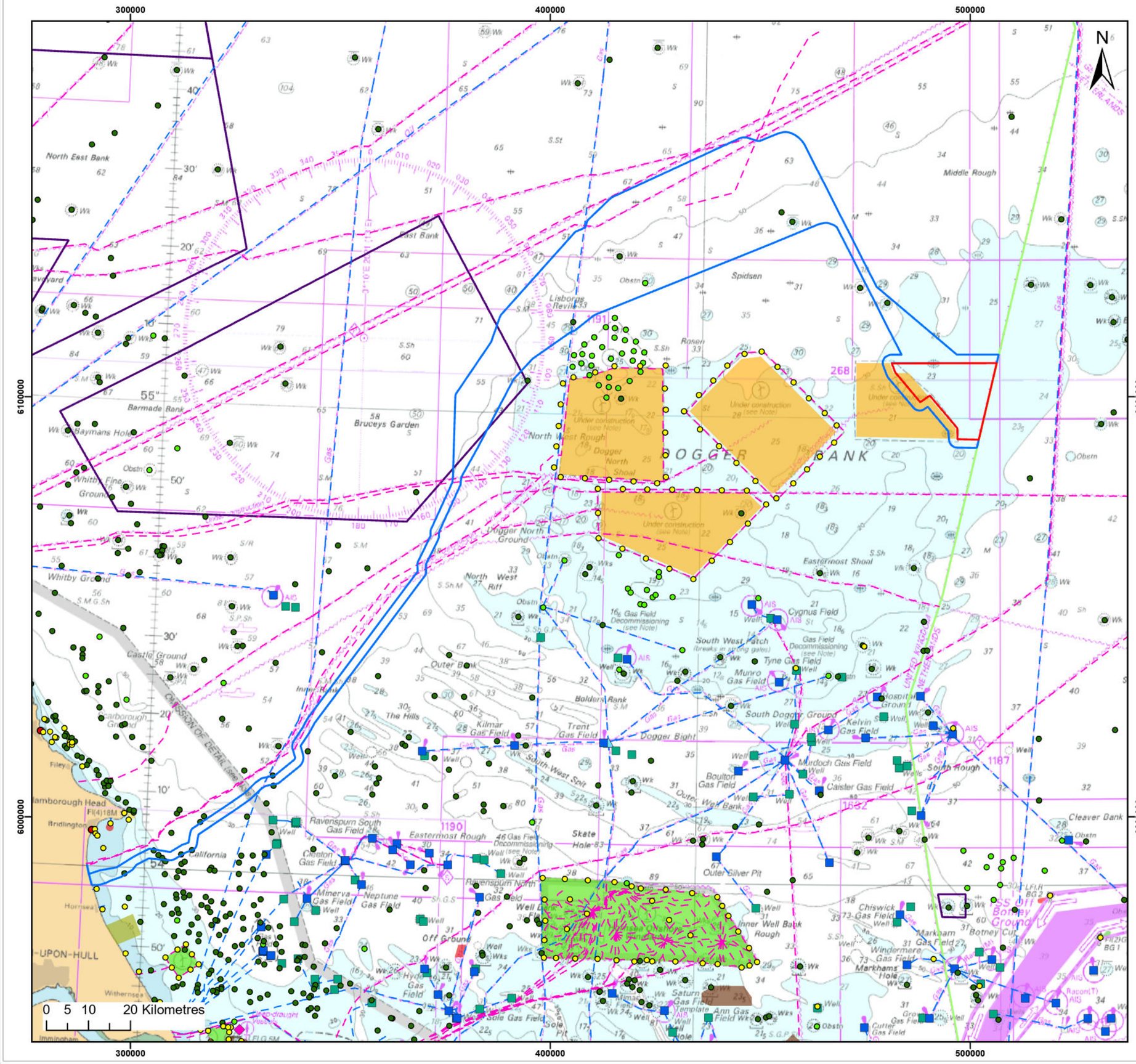
52. The UKHO Admiralty Charts are updated periodically and therefore the information shown may not reflect the real time features within the region with total accuracy. For aids to navigation, only those charted and considered key to establishing the shipping and navigation baseline are shown. During consultation input has been sought from relevant stakeholders regarding the navigational features baseline. Navigational features are based upon the most recently available UKHO Admiralty Charts and Sailing Directions at the time of writing.

15.6 Baseline Environment

15.6.1 Existing Baseline

15.6.1.1 Navigational Features

53. A plot of the navigational features in proximity to the Project is presented in **Figure 15-3**. Each feature has been identified using the most detailed UKHO Admiralty Charts available as well as information from Admiralty Sailing Directions North Sea (West) Pilot NP54 (UKHO, 2021).



Legend:

- DBD Array Area
- Offshore ECC
- Aid to Navigation
- Harbour
- Pilot Boarding Station
- Charted Wreck
- Charted Obstruction
- Platform
- Well
- Manifold
- Subsea Cable
- Subsea Pipeline
- International Maritime Boundary
- PEXA
- TSS
- Foul Ground
- Dredge Area
- Spoil Ground
- Anchorage Area

Other OWFs

- Operational
- Under Construction

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Navigational Features

Figure:	Drawing No:
15.3	A4968_ANA_DBD_PEIR_003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:900,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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54. Key navigational features include other offshore wind farm developments in proximity to the Project, noting only developments that are either under construction or already operational are deemed to be part of the baseline assessment. In terms of operational wind farm developments, Hornsea Project Two is the closest to the DBD Array Area at approximately 66nm south-west. Hornsea Project Two became operational as of August 2022 while the neighbouring Hornsea Project One has been operational since early 2020. Westermost Rough is located approximately 11nm south of the offshore ECC, close to the landfall location, and became operational in May 2015. Although not operational at the time of writing, DBA, Dogger Bank B (DBB), Dogger Bank C (DBC), and Sofia are all currently under construction and are therefore considered part of the surrounding baseline environment. DBC shares its eastern border with the western boundary of the DBD Array Area and is due to begin operation in 2026. Spare locations associated with DBC coincide with locations selected for the indicative worst-case layout – these will not be utilised unless a planned DBC location is found to be unfeasible during installation. Should any spare locations be utilised for DBC then they will be accounted for when determining the final array layout for the Project post consent.

55. The closest AtoN to the DBD Array Area is the construction buoyage for DBC including three buoys located within the DBD Array Area and two on the perimeter, each of which is also within the offshore ECC. This construction buoyage will be removed following the completion of installation activities for DBC. The closest AtoN to the offshore ECC is located approximately 0.5nm to the south near the landfall location and is located at the 5m contour line, close to the end of a coastal outflow pipeline. Apart from the construction buoyage associated with DBC, no AtoNs are located within the DBD Array Area or offshore ECC.

56. There are several platforms located to the east of the DBD Array Area located in Dutch waters, with the closest to the DBD Array Area approximately 25nm. The closest platform to the DBD Array Area within the UK EEZ is the active Cygnus Alpha within the Cygnus gas field, located approximately 33nm to the south-west. No oil and gas infrastructure are located within the DBD Array Area or within the offshore ECC.

57. Eight sub-sea cables including those offshore export cables under construction for DBA, DBB and Sofia, the VSLN Northern Europe interconnector telecommunications cable between Hunmanby Bay (UK) and Eemshaven (the Netherlands), the Pangea cable system linking Redcar (UK) and Fanø (Denmark), and part of the Havhingsten cable route between Seaton Sleuice (UK), and Houstrup (Denmark) intersect the offshore ECC. Two pipelines intersect the offshore ECC and are the Langeled (Britpipe) pipeline connecting Norway to the UK making landfall in Easington (UK) and the Shearwater Elgin Area Line (SEAL) pipeline between oil and gas fields in the Northern North Sea and the Bacton Gas Terminal on the Norfolk (UK) coast. No sub-sea cables or pipelines intersect the DBD Array Area.

58. Running parallel in close proximity to the eastern boundary of the DBD Array Area is the International Maritime Boundary between the UK and the Netherlands. This border separates the North Sea into UK and Dutch international waters and delineates the edge of the UK EEZ / Renewable Energy Zone (REZ).

59. The closest harbour to the Project is Bridlington Harbour, located approximately 5nm north of the offshore ECC, near landfall, and approximately 117nm south-west of the DBD Array Area. The closest large-scale commercial ports are the Humber ports located approximately 30nm south of the offshore ECC.

60. A spoil ground is located to the east of Bridlington Harbour and approximately 4nm north of the offshore ECC. A foul ground is located on the Hornsea coastline, approximately 5nm south of the offshore ECC.

61. There are no IMO routeing measures in proximity to the Project with the closest to the DBD Array Area being the Off Botney Ground Traffic Separation Scheme (TSS) approximately 60nm to the south.

62. The closest charted anchorage area to the Project is approximately 25nm south of the offshore ECC and is the Humber Deep Water (DW) Anchorage (not illustrated in the extent of **Figure 7-1 in Volume 2, Appendix 15.2 Navigational Risk Assessment**).

63. No charted wrecks or obstructions are located within the DBD Array Area with 11 wrecks and one obstruction located within the offshore ECC.

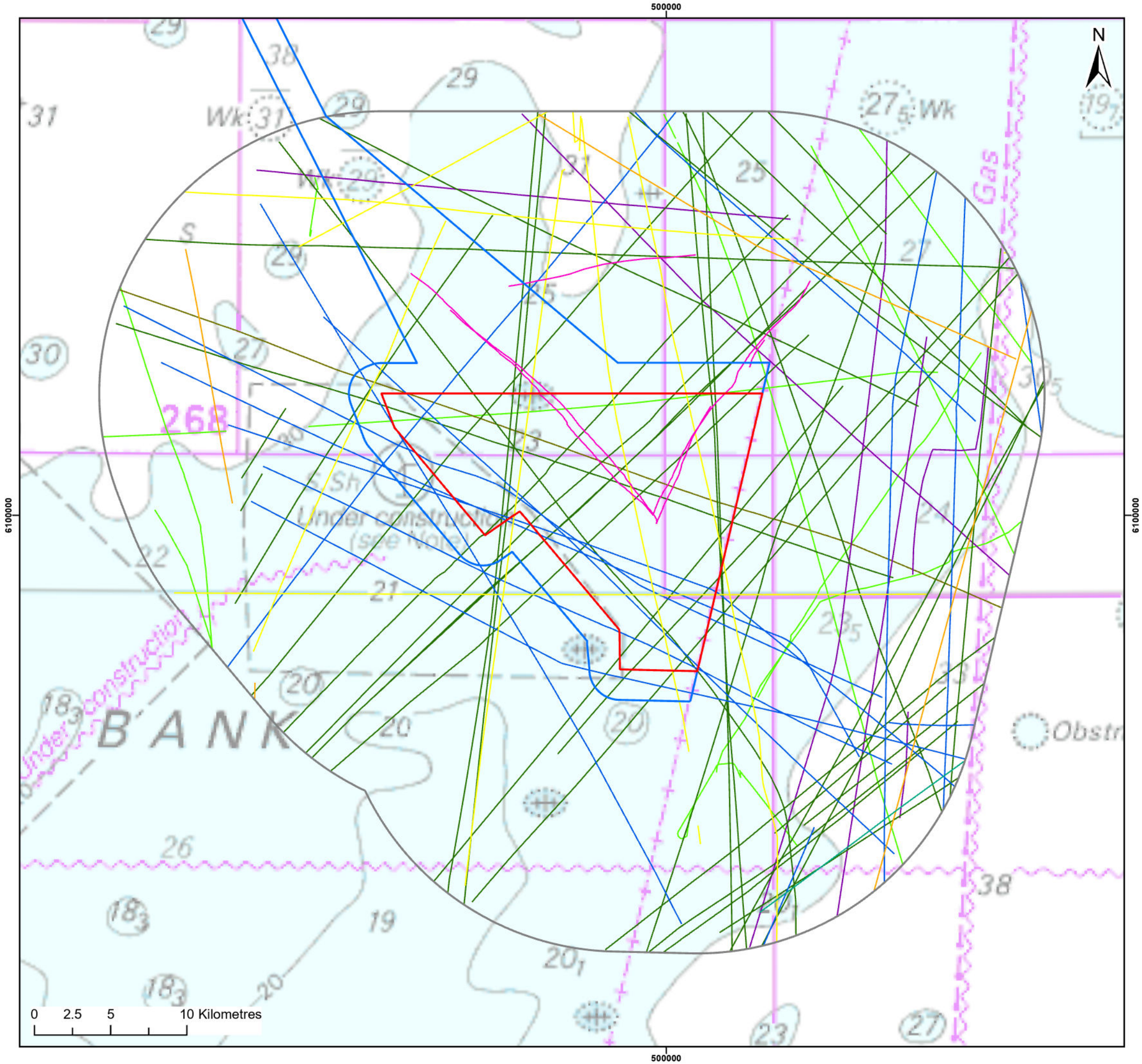
64. The closest charted military practice and exercise area (PEXA) is located approximately 46nm to the west of the DBD Array Area, this PEXA is the D412 Saxton Firing Practice Area and overlaps the offshore ECC to the west of DBB. As noted on the UKHO Admiralty Charts, there are no restrictions in place on the right to transit within the firing practice areas at any given time. These areas are operated using a clear range procedure with operations only taking place when the areas are considered clear of all shipping.

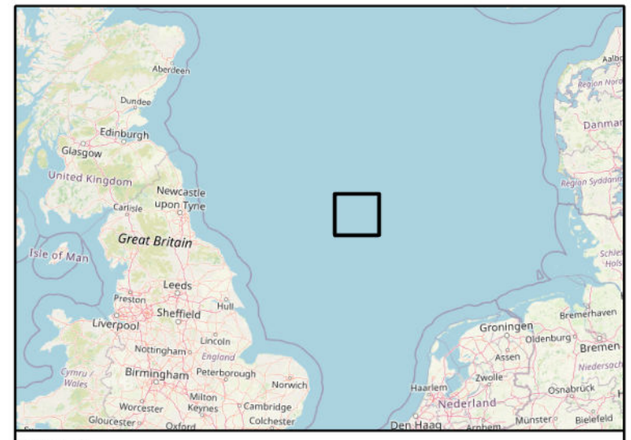
15.6.1.2 Vessel Traffic Movements

15.6.1.2.1 DBD Array Area

65. A plot of the vessel traffic recorded via AIS and Radar over the summer 2023 survey period within the shipping and navigation Study Area is colour-coded by vessel type and presented on **Figure 15-4**. Following this, a plot of the supplementary 40-day vessel traffic recorded via AIS only across 2024 within the shipping and navigation Study Area is colour-coded by vessel type and presented on **Figure 15-5**.

66. Throughout the summer survey, all Radar data was also recorded on AIS, meaning that no targets without AIS were included in the analysis.





Legend:

- DBD Array Area
- Offshore ECC
- Shipping and Navigation Array Area Study Area

Vessel Type

- Fishing
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil and Gas
- Wind Farm

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

14-Day Vessel Traffic Survey Data by Vessel Type (DBD Array Area, Summer 2023)

Figure: 15.4 | Drawing No: A4968_ANA_DBD_PEIR_004

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:250,000
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Co-ordinate system: WGS 1984 UTM Zone 31N

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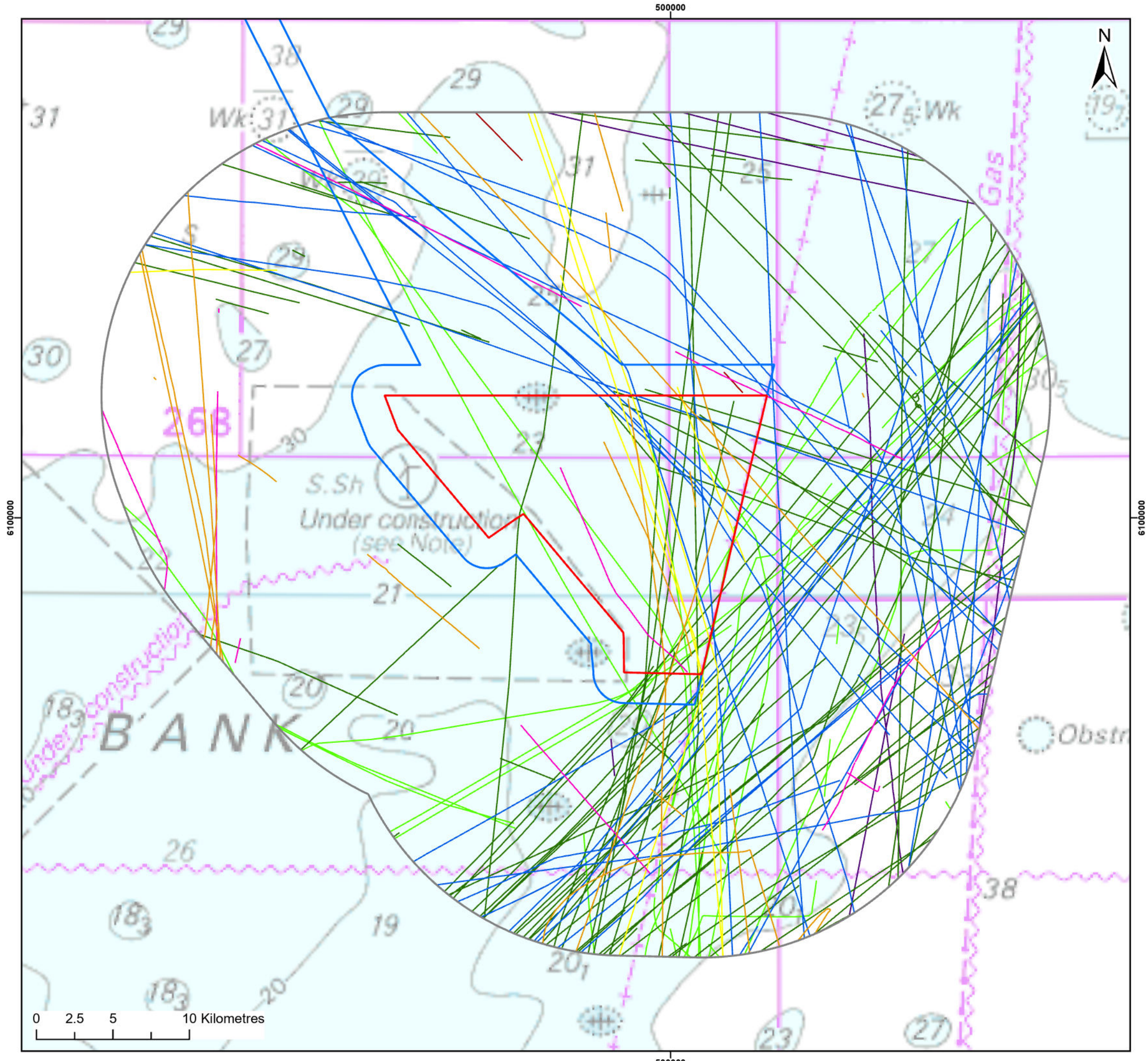

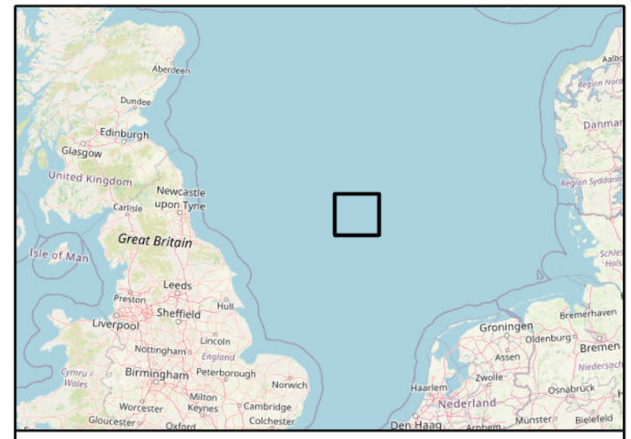

Legend:

- DBD Array Area
- Offshore ECC
- Shipping and Navigation Array Area Study Area

Vessel Type

- Fishing
- Military
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil and Gas

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

40-Day AIS Data by Vessel Type (DBD Array Area, 2024)

Figure: 15.5

Drawing No: A4968_ANA_DBD_PEIR_005

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:250,000
02	26/05/2025	DS	RR	A3	1:250,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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67. For the 14 days survey data analysed in summer 2023, there was an average of six unique vessels per day recorded within the shipping and navigation Study Area. An average of two unique vessels per day were recorded intersecting the DBD Array Area, or 37% of all vessel traffic recorded during the summer survey period. For the 40 days AIS data analysed in 2024, there was an average of four unique vessels per day recorded within the shipping and navigation Study Area. An average of one unique vessel per day was recorded intersecting the DBD Array Area, or 26% of all vessel traffic recorded during the data period.

68. Across the combined datasets, the main vessel types within the shipping and navigation Study Area were cargo vessels (45%), tankers (19%), and fishing vessels in transit (14%). A breakdown of each main vessel type is included in **Section 10.1.2** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**.

69. Vessel length was available for all vessels recorded throughout the combined data period within the shipping and navigation Study Area and ranged from 9m for a sailing vessel to 382m for a crane vessel. The average length of vessels within the shipping and navigation Study Area throughout the combined data period was 116m.

70. Vessel draught was available for approximately 82% of vessels recorded throughout the combined data period within the shipping and navigation Study Area and ranged from 2.5m for emergency response and rescue vessel (ERRV) to 20.2m for a crude oil tanker. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the shipping and navigation Study Area throughout the combined data period was 6.3m.

71. The methodology for identifying vessels at anchor is provided in **Section 10.1.2.6** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**. After applying the criteria, no vessels were deemed to be at anchor within the shipping and navigation Study Area across the combined data period.

72. Main Commercial Routes have been identified using the principles set out in MGN 654 (MCA, 2021). A total of seven Main Commercial Routes were identified within the shipping and navigation Study Area from the vessel traffic data i.e. the pre-wind farm scenario. A plot of the Main Commercial Routes and corresponding 90th percentiles is presented on **Figure 15-6**. Descriptions for each of the Main Commercial Routes are provided in **Table 15-15**.

Table 15-15 Main Commercial Route Details

Route Number	Vessels per Week	Route Details
1	5	**Between Humber ports and ports in Norway**. Mainly consists of cargo vessels (69%) and tankers (21%).
2	4	**Between Forth ports and ports in Germany**. Mainly consists of tankers (41%), cargo vessels (32%).
3	3	**Between Humber ports and ports in Denmark**. Mainly consists of cargo vessels (95%).
4	2 to 3	**Between Rotterdam and ports in Norway.** Consists of tankers (72%) and cargo vessels (28%).
5	2 to 3	**Between German ports and the Pentland Firth**. Consists of tankers (50%), cargo vessels (43%).
6	2	**North Sea oil and gas locations to ports in the Netherlands and Belgium**. Mainly consist of cargo vessels (54%) and oil and gas vessels (36%); only operating one way.
7	1	**Between Forth ports and ports in Germany**. Mainly consists of cargo vessels (57%) and tankers (30%).

15.6.1.2.2 Offshore Export Cable Corridor

73. A plot of the vessel traffic recorded via AIS over a 40-day data period in 2024 within the offshore ECC is colour coded by vessel type and presented on **Figure 15-7**.

74. For the 40-day data analysed in 2024, there was an average of 21 unique vessels per day recorded within the shipping and navigation offshore ECC Study Area. An average of 19 unique vessels per day were recorded crossing the offshore ECC, or 88% of all vessel traffic recorded during the data period.

75. The main vessel types within the shipping and navigation offshore ECC Study Area were cargo vessels (45%), tankers (24%), and fishing vessels in transit (11%). A breakdown of each main vessel type is included in **Section 10.2.2** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**.

76. Vessel length was available for all vessels recorded throughout the data period within the shipping and navigation offshore ECC Study Area and ranged from 8m for a fishing vessel to 382m for the same crane vessel aforementioned for the DBD Array Area. The average length of vessels within the shipping and navigation offshore ECC Study Area throughout the data period was 129m.

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(see Note)

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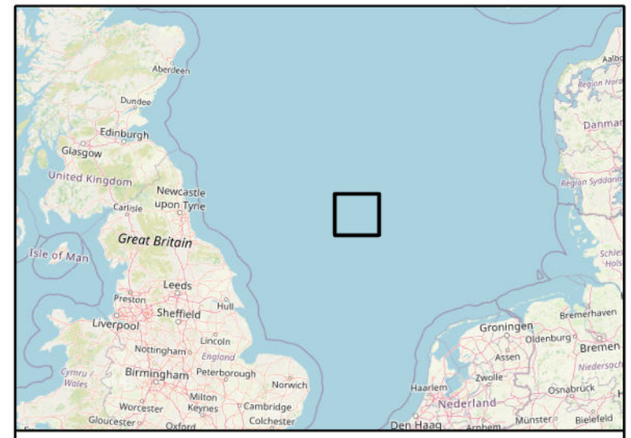

Legend:

- DBD Array Area
- Shipping and Navigation Array Area Study Area

Main Commercial Routes

- Pre-WF Routes
- 90th Percentiles

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Pre-Wind Farm Main Commercial Route
Mean Positions and 90th Percentiles

Figure: 15.6

Drawing No: A4968_ANA_DBD_PEIR_006

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:250,000
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Co-ordinate system: WGS 1984 UTM Zone 31N

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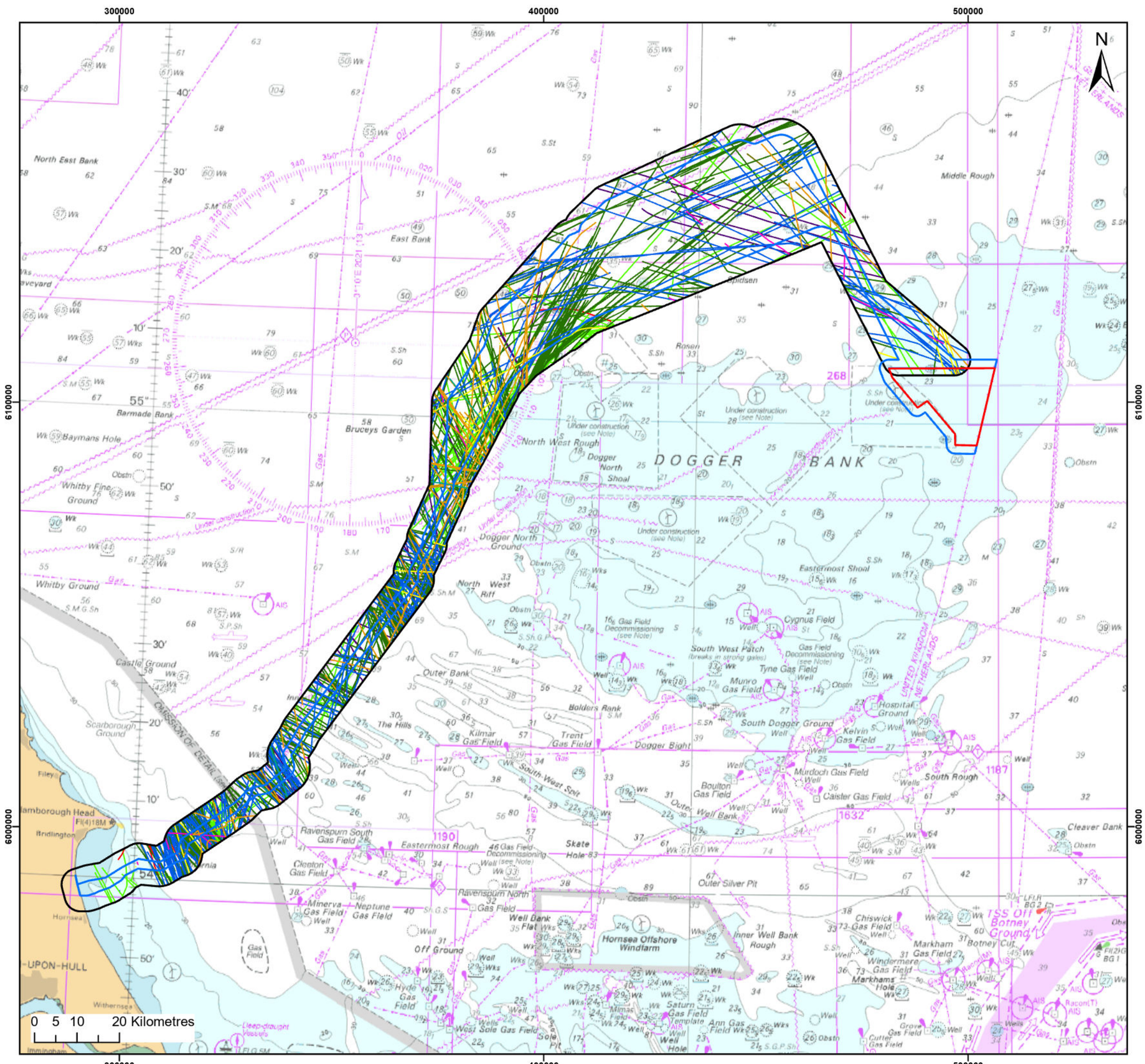

Legend:

- DBD Array Area
- Offshore ECC
- Shipping and Navigation Offshore ECC Study Area

Vessel Type

- Fishing
- Military
- Dredger / Underwater Ops
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil and Gas
- Wind Farm

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

40-Day Vessel Traffic Data by Vessel Type (Offshore ECC, 2024)

Figure: 15.7

Drawing No: A4968_ANA_DBD_PEIR_007

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:900,000
02	26/05/2025	DS	RR	A3	1:900,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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77. Vessel draught was available for approximately 89% of vessels recorded throughout the combined data period within the shipping and navigation offshore ECC Study Area and ranged from 1.8m for a wind farm support vessel to 20.4m for a crude oil tanker. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the shipping and navigation offshore ECC Study Area throughout the data period was 6.6m.

78. The same methodology used for determining anchored vessels for the DBD Array Area analysis was again applied to the vessel traffic recorded within the shipping and navigation offshore ECC Study Area. After applying the criteria, no vessels were deemed to be at anchor within the shipping and navigation offshore ECC Study Area across the data period.

15.6.1.3 Historical Maritime Incidents

79. This section summarises the existing emergency response resources (including SAR) and reviews historical maritime incident data to assess baseline incident rates in proximity to the Project.

15.6.1.3.1 Marine Accident Investigation Branch

80. All UK flagged vessels and non-UK flagged vessels in UK territorial waters (12nm), a UK port or carrying passengers to a UK port are required to report incidents to the MAIB. Data arising from these reports are assessed in this section, primarily covering the ten-year period between 2013 and 2022. A plot of the incidents recorded within this 10-year period occurring within the combined shipping and navigation Study Areas are presented on **Figure 15-8**, colour-coded by incident type.

81. A total of four incidents were reported to the MAIB across the 10-year period within the shipping and navigation Study Area, equivalent to one incident every two to three years, noting none of these incidents were recorded within the DBD Array Area. These four incidents all consisted of passenger vessels with three incidents being an ‘Accident to Person’ and one was ‘Unspecified’. The three ‘Accident to Person’ incidents occurred in 2018 and were all reported from cruise liners. Two reported an injury to a passenger while another reported an injury to a crew member.

82. Within the shipping and navigation offshore ECC Study Area, a total of 18 incidents were reported across the 10-year period, equivalent to two incidents per year, with only three of these incidents occurring within the offshore ECC itself (17%). The main incident type recorded was ‘Machinery Failure’ (39%). As for casualty type, fishing vessels accounted for 56%.

83. A further review of older MAIB data is included in **Section 9.5** of **Volume 2, Appendix 15.2 Navigational Risk Assessment.**

15.6.1.3.2 Royal National Lifeboat Institution

84. The RNLI is organised into six divisions, with the relevant region for the Project being the ‘North and East’ division. The closest RNLI station to the DBD Array Area is Flamborough (151nm south-west of the DBD Array Area) where an Inshore Lifeboat (ILB) is in use.

85. Given that the RNLI have an operational limit of 100nm, it is anticipated that an incident occurring in proximity to the DBD Array Area would be unlikely to result in a response from a RNLI asset which is reflected within the data as no incidents were recorded between 2014 and 2023 within the DBD Array Area or surrounding shipping and navigation Study Area.

86. Within the shipping and navigation offshore ECC Study Area, there were six hoaxes or false alarms recorded during the 10-year period. Excluding these cases, 34 RNLI lifeboat responses to 34 unique incidents were recorded, equating to three to four unique incidents per year. The most common incident type recorded was ‘Machinery Failure’ (44%). Fishing vessels were the most commonly reported casualty type (32%). A total of 26% of these incidents occurred within the offshore ECC itself, or one incident per year.

87. A total of 88% of all RNLI incidents were recorded within 10nm of the coast, with only one incident exceeding 30nm offshore. Bridlington RNLI station responded to 88% of all incidents.

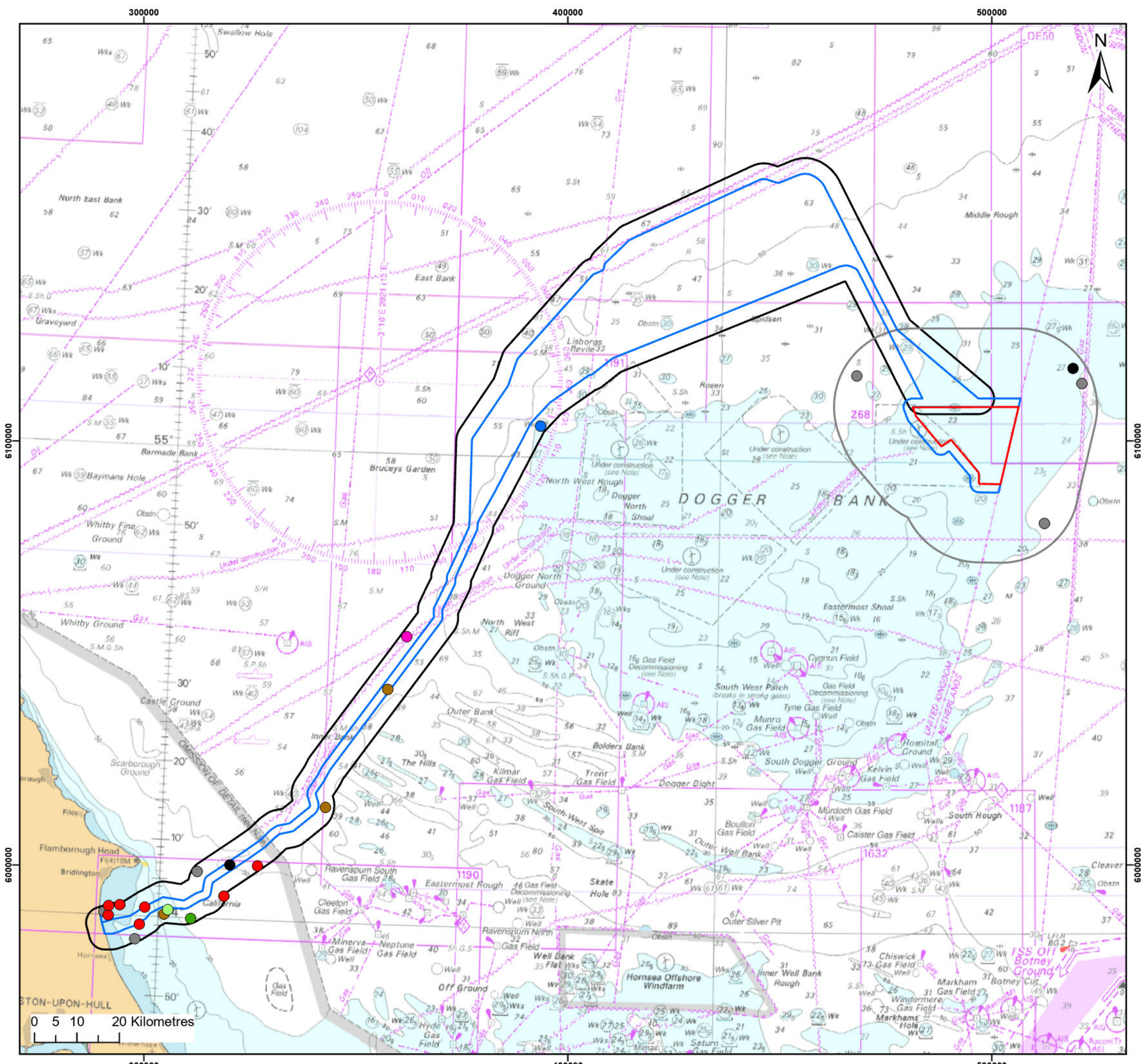
88. A further review of older RNLI data is included in **Section 9.2** of **Volume 2, Appendix 15.2 Navigational Risk Assessment.**

15.6.1.3.3 Search and Rescue Helicopters

89. In July 2022, the Bristow Group were awarded a new ten-year contract by the MCA (as an executive agency of the DfT) beginning in September 2024 to provide helicopter SAR operations in the UK. Bristow have been operating the service since April 2015 and the DfT has produced data on civilian SAR helicopter activity in the UK by the Bristow Group on behalf of the MCA between April 2015 and March 2024.

90. The SAR helicopter service is currently operated out of ten base locations around the UK, with the closest to the Project, Humberside, located approximately 142nm to the south-west of the DBD Array Area.

91. No SAR helicopter taskings have occurred within the DBD Array Area or surrounding shipping and navigation Study Area across the data period available.



Legend:

- DBD Array Area
- Offshore ECC
- Shipping and Navigation Array Area Study Area
- Shipping and Navigation Offshore ECC Study Area

MAIB Incident Type
(2013-2022)

- Accident To Person
- Damage / loss of equipment
- Flooding / foundering
- Grounding / stranding
- Machinery Failure
- Non-accidental event
- Pollution
- Unspecified

Project:
Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
MAIB Incident Data by Incident Type
(Combined Study Areas, 2013-2022)

Figure: 15.8 | Drawing No: A4968_ANA_DBD_PEIR_008

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/01/2024	DS	RR	A3	1:900,000
02	26/05/2025	DS	RR	A3	1:900,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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92. Over the nine-year period, 28 helicopter taskings were recorded within the shipping and navigation offshore ECC Study Area, equating to an average of three incidents per year. Of the incidents recorded, 78% were '*Rescue / Recovery*'. Both '*Search Only´* and '*Support´* accounted for 11% each. Only 21% of these recorded incidents occurred within the offshore ECC itself and a total of 57% of these incidents were within 10nm of the coast. All incidents were responded to by the Humberside base.

93. Further details are included in **Section 9.1** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**.

15.6.2 Predicted Future Baseline

94. In the event that the Project is not developed, an assessment of future conditions, covering the lifetime of the Project, for shipping and navigation has been carried out and is described within this section.

95. There is uncertainty associated with long-term predictions of vessel traffic growth including the potential for any other new developments in UK or transboundary ports. Therefore, two independent scenarios of potential growth in commercial vessel movements of 10% and 20% have been estimated throughout the lifetime of the Project. The standard 10% and 20% increase values are based on industry standard across Offshore Wind Farm (OWF) developments as well as professional experience and are generally agreed with key stakeholders during the EIA process. These values also consider that oil and gas vessels may decrease over time due to the decommissioning of oil and gas structures in the North Sea.

96. There is similar uncertainty associated with long-term predictions for commercial fishing vessels and recreational vessel transits given the limited reliable information on future trends upon which any firm assumption could be made. There are no known major developments which would increase commercial fishing or recreational activity in the area. Therefore, a conservative potential growth in commercial fishing vessel and recreational vessel movements of 10% and 20% has been estimated throughout the lifetime of the Project. Changes in fishing activity are considered further in **Chapter 14 Commercial Fisheries**, noting that in 2022 the 'Dogger Bank Special Area of Conservation (Specified Area) Bottom Towed Fishing Gear Byelaw' came into force which prohibits bottom towed fishing gear across the Dogger Bank area (sandbank)[1]. Should this bylaw be revoked in the future then increases may be greater but at the time of writing there is no firm basis for considering this scenario.

15.7 Assessment of Effects

97. The likely significant effects to shipping and navigation receptors that may occur during construction, operation and decommissioning of the Project are assessed in the following sections. The assessment follows the methodology set out in **Section 15.5** and is based on the realistic worst-case scenarios defined in **Section 15.4.4**, with consideration of embedded mitigation measures identified in **Section 15.4.3**.

15.7.1 Potential Effects

15.7.1.1 Impact on Vessel Displacement Due to the Presence of the Project and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels (Route-Based) Due to Displacement (SN-C-01, SN-O-01, SN-D-01, SN-C-02, SN-O-02, SN-D-02)

98. Activities associated with the installation, maintenance and decommissioning of structures and sub-sea cables as well as the presence of surface structures may displace third-party vessels from their existing routes or activity, increasing the collision risk with other third-party vessels.

99. This impact is associated with all project phases; construction, operation, and decommissioning.

[1] https://www.gov.uk/government/publications/the-dogger-bank-special-area-of-conservation-specified-area-bottom-towed-fishing-gear-byelaw-2022

15.7.1.1.1 Qualification of Risk

100. Each element of this impact is considered in turn in terms of frequency of occurrence and severity of consequence, with the resulting significance of the residual risk across the various elements summarised at the end of the assessment. The elements considered include:

- Vessel displacement from main commercial routes;
- Adverse weather routeing; and
- Increased third-party to third-party vessel collision risk.

15.7.1.1.1.1. Vessel Displacement from Main Commercial Routes

101. During the construction and decommissioning phases, a buoyed construction / decommissioning area will be deployed around the DBD Array Area. No restrictions on entry would be enforced for the buoyed construction / decommissioning area or the operational array during the operation and maintenance phase outside of any statutory Safety Zones. However, based on experience at previously under construction and existing operational offshore wind farms, inclusive of the neighbouring under construction sites, it is anticipated that commercial vessels would choose not to navigate internally within the buoyed construction / decommissioning area or the operational array.

102. Seven main commercial routes have been identified in line with the principles set out in MGN 654 (MCA, 2021) and have been based primarily on vessel traffic data collected during the dedicated survey, supplementary AIS data and Anatec's ShipRoutes database. Further details of the methodology for main commercial route identification are provided in **Section 11.1** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**, noting that the vessel traffic data has been agreed as appropriate by the MCA and Trinity House. As part of the future case considerations, increases in 10% and 20% of all traffic including commercial vessels is assumed (**Section 15.6.2**).

103. A deviation would be required for all phases of the Project for three of the main commercial routes. The level of deviation varies between an increase of 0.4nm for Route 1 and an increase of 1.7nm for Route 6, with the maximum percentage change in total route length being 0.4% for Route 6. The size of these deviations is proportionally small when considered relative to the length of the routes overall, all of which cross the North Sea and are transcontinental.

104. The deviated route with the highest vessel traffic volume was Route 1 (cargo vessels and tankers routeing between Humber ports and Norway), with approximately five transits per week, i.e. deviations are expected to be a moderate occurrence. As per the vessel traffic analysis and the main commercial route identification in **Section 15.6.1,** commercial ferries were not recorded on any route and so no deviation of any timetabled commercial ferries would occur as a result of surface structures within the DBD Array Area.

105. From the vessel traffic survey data, which incorporated Radar and visual observations in addition to AIS (although AIS was prioritised on each occurrence), regular transits by commercial fishing vessels and recreational vessels through the DBD Array Area are infrequent (noting that the displacement of active commercial fishing activity is assessed in **Chapter 14 Commercial Fisheries**). Based on experience at previously under construction offshore wind farms, it is anticipated that commercial fishing vessels and recreational vessels would choose not to navigate internally within the buoyed construction / decommissioning area. Therefore, some displacement of transits by small craft may be required during the construction and decommissioning phases. For the operation and maintenance phase, based on experience at existing operational offshore wind farms, commercial fishing vessels and recreational vessels may choose to navigate internally within the operational array, particularly in favourable weather conditions and as awareness of the arrays increases throughout the operation and maintenance phases. In situations where small craft do navigate internally, the level of displacement is considered negligible. Also, if a recreational vessel was transiting as far offshore as the DBD Array Area, the vessel is likely transiting transcontinental and would be expected to undertake due diligence of their intended route (i.e. adequate passage planning).

106. Given the location and length of the offshore ECC, it is considered likely that cable installation / removal activities will lead to displacement with many commercial vessels routeing in a north south bearing crossing the offshore ECC as well as those transiting to / from locations on the English east coast at times routeing parallel with the offshore ECC, although as illustrated by the vessel traffic analysis this is not as common. Any activity will be short-term and temporary in nature and cover only a small extent at any given time and so any displacement associated with the offshore ECC will be temporary and spatially limited to the area around the activity. The greatest concern would be the displacement of commercial ferries routeing across the offshore ECC but again, any deviation will be minor and temporary.

107. There will be no displacement impact in relation to the offshore ECC once the cables are laid, other than during any periods of maintenance, which would be anticipated to be a low frequency event; maximum of 35 visits to the offshore ECC over the lifetime of the project or once per year. Therefore, deviations are expected to be manageable, particularly with the promulgation of information allowing mariners to passage plan accordingly.

108. The most likely consequences of vessel displacement would be increased journey times and distances for affected third-party vessels. The impact will occur over a local spatial extent given that the buoyed construction / decommissioning area would be deployed around the maximum extent of the DBD Array Area. Vessels are expected to comply with international and flag state regulations (including the COLREGs and SOLAS) and will be able to passage plan in advance given the promulgation of information relating to the Project and relevant nautical charts. This high level of awareness will assist with ensuring that vessels make safe and effective deviations which minimise journey increases. It is also noted that vessels are already familiar with deviating and routeing in this area of the North Sea due to the four sites under construction in proximity to the Project, inclusive of DBC which shares its border with DBD.

109. As a worst-case, there could be disruption to schedules. However, given the size of the deviations, that no timetabled commercial ferries are present on any main commercial routes, the international nature of routeing in the area and the ability to passage plan, it is anticipated that disruption to schedules are expected to be minimal.

15.7.1.1.1.2. Adverse Weather Routeing

110. From the vessel traffic survey data, there were no instances of alternative routeing due to possible adverse weather conditions.

111. The most likely consequences of displacement of adverse weather routeing are similar to that of displacement of standard weather routeing, i.e. increased journey times and distances for affected third-party vessels with the impact occurring over a local spatial extent given that the buoyed construction / decommissioning areas and infrastructure will be deployed around the maximum extent of the DBD Array Area. All vessels are expected to comply with flag state regulations including Regulation 34 of SOLAS Chapter V – which states that "*the voyage plan shall identify a route which… anticipates all known navigational hazards and adverse weather conditions*" (IMO, 1974) – and IMO Resolution A.893(21) on the Guidelines for Voyage Planning (IMO, 1999). The promulgation of information relating to the Project will assist such passage planning.

112. As a worst-case, the deviated route may be considered unsafe for navigation in adverse weather conditions resulting in the vessel being unable to make the transit. It is considered highly unlikely that the vessel would undertake an unsafe transit and therefore effects to the vessel or crew are negligible due to the very low frequency of occurrence.

15.7.1.1.1.3. Increased Third-Party to Third-Party Vessel Collision Risk

113. It is anticipated that three of the seven main commercial routes identified will deviate as a result of the presence of the Project. This could lead to increased vessel densities within the area, which could in turn lead to an increase in vessel to vessel encounters and therefore increased collision risk.

114. Based on the pre-wind farm modelling, the baseline collision risk levels within the shipping and navigation Study Area are very low with an estimated vessel to vessel collision risk of one every 56,176 years. This is due to the low volume of traffic in the area relative to available sea room. This baseline collision frequency increases to one every 44,813 years in the post-wind farm scenario using the main commercial route deviations as input, rising to one every 31,200 years for the highest tier of future case traffic levels post-wind farm (20%).

115. The increase in frequency, albeit still very low, is due to a further reduction in navigable sea room and vessel traffic being condensed, particularly to the south-east of the array where the busiest main commercial routes have been deviated. It is also conservatively anticipated that two routes (Route 2 and 7 (**Table 15-15**)) will coincide in terms of mean position, exacerbating collision risk. The base case collision result represents a 25% increase compared to the pre-wind farm base case result indicating that the influence of the array on the overall collision risk for commercial traffic is notable. However, the overall change in base case collision risk between pre- and post-wind scenarios was one in 221,540 years.

116. The baseline assessment of MAIB incident data (see **Section 15.6.1.3.1**) indicated no collisions were recorded in the 10-year period between 2013 and 2022 within the shipping and navigation Study Area.

117. Due to the construction of the DBC, Sofia, DBA, and DBB developments to the west of the Project, vessels routeing in the area will already have good familiarity and experience operating in proximity to surface structures and buoyed construction areas. As DBC shares its perimeter with the DBD Array Area, there is no anticipated corridors for vessels to transit between projects and so there is no increased collision risk between projects. All vessels operating in the area are expected to comply with international flag state regulations (including the COLREGs and SOLAS) and will have a raised level of awareness of construction and decommissioning activities of the Project given the promulgation of information relating to the Project including the charting of the construction / decommissioning areas on relevant nautical charts and the use of Safety Zones. The buoyed construction / decommissioning areas will also serve to maximise awareness. Likewise, during the operation and maintenance phase infrastructure will be appropriately marked on relevant nautical charts and awareness of the operational arrays will be very high and continue to increase with the longevity of the Project.

118. In poor visibility, third-party vessels may experience limitations regarding visual identification of other third-party vessels, either when passing on another side of the buoyed construction / decommissioning areas and operational array, or when navigating internally within the operational array (small craft only). These limitations may increase the potential for an encounter. However, this would be mitigated by the application of the COLREGs (including reduced speeds) in adverse weather conditions. Moreover, the minimum spacing between structures (826m) will be sufficient to ensure any visual hindrance is very short-term in nature.

119. It is anticipated that fishing vessels may still navigate while on transit within the operational array, particularly in favourable weather conditions and as awareness of the array increases throughout the operation and maintenance phase, and so any displacement of fishing vessels is expected to be minimal during the construction / decommissioning phases. This is based on experience at existing operational wind farms. If displacement was to occur, the levels of vessels are low, and it is anticipated potential receptors will be able to navigate in the presence of any activity. In situations where small craft do navigate internally, the level of displacement is considered negligible and thus so is third-party collision risk.

120. Given that recreational traffic is very low in proximity to the DBD Array Area, the effect of the main commercial route deviations outlined on such traffic is expected to be negligible. The application of good seamanship including compliance with the fundamental principles of safe navigation such as COLREGs and SOLAS, the likelihood of an encounter between small craft developing into a collision situation is low. In the event of a collision incident the likelihood of a worst-case outcome (the small craft foundering with Potential Loss of Life (PLL) and pollution) is greater due to the size and likely hull material of the small craft.

121. With respect to all vessels, the risk will be present throughout all phases of the Project, but the promulgation of information relating to construction / decommissioning and operation and maintenance activities – including the deployment of the buoyed construction / decommissioning area, and charting of infrastructure will allow vessel masters to passage plan in advance, minimising disruption. Additionally, information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via an appointed FLO. Experience from previous under construction offshore wind farms indicated that the extensive promulgation of information is an effective mitigation, with evidence suggesting that masters regularly choose to transit further than 1nm from any ongoing works. The Applicant will exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House and MCA including the buoyed construction / decommissioning area. These navigational aids will further maximise mariner awareness when in proximity, both in day and night conditions including in poor visibility.

122. As for all vessel types intersecting the offshore ECC, the crossing distance is minimal and there is ample sea room available for the temporary minor deviations that may need to occur to avoid any ongoing activities. This is also relevant to small craft that transit north south across the offshore ECC which are low volume, again with ample sea room available for minor deviations as required. Mariners navigating in proximity to the offshore ECC will have a raised level of awareness of the area given the proximity to the coast and this will be heightened by the promulgation of information relating to the Project including the publication of Notifications to Mariners as cable installation / removal progresses and maintenance activities are required.

123. Once installed, the presence of the offshore ECC will not directly result in vessel displacement (noting that impacts associated with under keel clearance is assessed separately in **Section 15.7.1.4**). Therefore, this impact is only considered in relation to installation / removal and operation and maintenance activities. Given that displacement associated with installation / removal, and operation and maintenance activities will be small-scale, increases in collision risk will be limited.

124. If vessels are displaced, the risk of encounters increase. In the event that an encounter does occur, it is likely to be very localised and occur for only a short duration, with collision avoidance action implemented by the vessels involved, in line with the COLREGs, thus ensuring that the situation does not develop into a collision incident. This is supported by experience at previous under construction wind farms, where no collision incidents involving two third-party vessels have been reported.

125. The most likely consequences in the event of an encounter between two or more third-party vessels is the implementation of avoidance action in line with the COLREGs, with the vessels involved able to resume their respective passages with no long-term consequences.

126. Should an encounter develop into a collision incident, it is most likely to involve minor contact resulting in minor damage to the vessels with no harm to people and no substantial reputational risks. As a worst-case with very low frequency of occurrence one of the vessels could incur substantial damage or founder with PLL and pollution, with this outcome more likely where one of the vessels is a small craft (e.g. fishing vessel, recreational vessel or crew transfer vessel (CTV)).

127. It is acknowledged that vessel traffic monitoring will be undertaken throughout the construction phase to characterise changes to routeing patterns. This will be compared against anticipated deviations to allow a comprehensive review of the embedded mitigation measures applied at the time.

15.7.1.1.2 Frequency of Occurrence

128. The frequency of occurrence in relation to vessel displacement for the DBD Array Area for all phases is considered **frequent**.

129. The frequency of occurrence in relation to vessel displacement for the offshore ECC for all phases is considered **reasonably probable**.

130. The frequency of occurrence in relation to increased third-party collision risk due to displacement for the DBD Area for all phases is considered **remote**.

131. The frequency of occurrence in relation to increased third-party collision risk due to displacement for the offshore ECC for all phases is considered **extremely unlikely**.

15.7.1.1.3 Severity of Consequence

132. The severity of consequence in relation to vessel displacement for the DBD Array Area for all phases is considered **minor**.

133. The severity of consequence in relation to vessel displacement for the offshore ECC for all phases is considered **minor**.

134. The severity of consequence in relation to increased third-party collision risk due to displacement for the DBD Array Area for all phases is considered **moderate**.

135. The severity of consequence in relation to increased third-party collision risk due to displacement for the offshore ECC for all phases is considered **moderate**.

15.7.1.1.4 Effect Significance

136. Overall, it is predicted that frequency of occurrence for vessel displacement for the DBD Array Area is **frequent** and the severity of consequence is **minor** for all phases. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

137. Overall, it is predicted that frequency of occurrence for vessel displacement for the offshore ECC is **reasonably probable** and the severity of consequence is **minor** for all phases. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

138. Overall, it is predicted that frequency of occurrence for increased third-party collision risk due to displacement for the DBD Array Area is **remote** and the severity of consequence is **moderate** for all phases. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

139. Overall, it is predicted that frequency of occurrence for increased third-party collision risk due to displacement for the offshore ECC is **extremely unlikely** and the severity of consequence is **moderate** for all phases. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.7.1.2 Impact on Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel (SN-C-03, SN-O-03, SN-D-03)

140. Project vessels associated with construction, operation and maintenance, and decommissioning activities may increase encounters and collision risk for other third-party vessels already in the area.

141. This impact is associated with all project phases; construction, operation, and decommissioning.

15.7.1.2.1 Qualification of Risk

142. The construction and decommissioning phases may each last for up to approximately five years and three and a half year, respectively. For both phases up to 159 construction / decommissioning vessels may be located on site simultaneously, in turn making a maximum of 7,527 return trips to port, however it is anticipated a peak of 90 vessels will be on site at any given time. The operation and maintenance phase may last for up to 35 years with up to 16 operation and maintenance vessels making a maximum of 103 annual return trips to port. Some project vessels may be RAM, and it is anticipated that project vessels will undertake construction / decommissioning or operation and maintenance works associated with the array within the buoyed construction / decommissioning areas or operational array, both of which third-party vessels are generally expected to avoid.

143. From historical incident data, there has been one instance of a third-party vessel colliding with a project vessel associated with a UK offshore wind farm. In this incident, occurring in 2011, moderate vessel damage was reported with no harm to persons. Since then, awareness of offshore wind farm developments and the application of the measures outlined below has improved, or been refined, considerably in the interim, with no further collision incidents reported since.

144. Project vessel movements will be managed by the Applicant's marine coordination centre and any associated procedures implemented will account for those areas where collision risk is assessed as greatest (where regular commercial routeing passes close to the array). Additionally, project vessels will carry AIS and be compliant with Flag State regulations including IMO conventions such as the COLREGs, and information for fishing vessels will be promulgated through ongoing liaison with fishing fleets via an appointed FLO.

145. In poor visibility, third-party vessels may experience limitations regarding visual identification of project vessels entering and exiting the buoyed construction / decommissioning areas and the operational array; however, this impact will be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and AIS carriage by project vessels.

146. Up to two offshore export cables with a combined maximum length of approximately 432nm (800km) may be installed within the offshore ECC. Once installed, the presence of the offshore export cables will not directly result in third-party to project vessel collision risk. Therefore, this impact is considered only in relation to offshore ECC installation / removal and maintenance activities.

147. It is anticipated that up to 15 main vessels will be involved in the cable laying activities comprised of three large cable lay vessels and up to 12 support vessels. During the O&M visits to the offshore ECC for corrective maintenance, repairs, or replacement is anticipated 35 times over the lifetime of the Project; or once per operational year. The spatial extent of the impact will be limited to where installation / removal or maintenance activities are ongoing, with routeing vessels required to make deviations to pass around installation / removal or maintenance works which may involve project vessels which are RAM. These deviations will only be small and will be short-term.

148. The level of exposure to this impact for third-party vessels will depend upon the location of offshore ECC installation / removal or maintenance at any given time. The portions of the offshore ECC that are considered to have higher exposure are those areas in which main commercial routes are intersecting, especially routes passing to the north of the DBD Array Area and those in shallower waters, closer to the coast. Certain commercial ferry routes intersect the offshore ECC, but the spatial extent of these routes is small.

149. There is sea room available for minor deviations as required, noting such deviations would be relatively small. This is also relevant to small craft that transit through the offshore ECC; this is again low volume and highly seasonal. The majority of these vessels are passing perpendicular across the offshore ECC, and this will also reduce exposure time in periods of project vessel activity.

150. Shipping is also international in nature and the majority of vessels present within this area of the North Sea are routeing transcontinental and will be familiar with navigating in proximity to offshore wind farms at different stages of construction and operation. Therefore, mariners will likely be experienced in working around offshore wind farm activities. This may be less common for local fishing and recreational receptors; however, with the ongoing construction of the neighbouring DBA, DBB, DBC and Sofia developments, vessels will be aware of construction activities if transiting this far offshore. To help aid local and international mariner knowledge, details of authorised minimum advisory safe passing distances, as defined by a risk assessment, may be applied with advanced warning and accurate locations of any minimum advisory passing distances provided by Notifications to Mariners and Kingfisher Bulletins. These will be particularly effective in the event of smaller craft such as commercial fishing vessels and recreational vessels choosing to navigate internally within the operational array, where a project vessel may be undertaking major maintenance at a structure. This information promulgated alongside the details of any ongoing activity will maximise awareness for all third-party receptors, including in both day and night conditions. A guard vessel may also be deployed based on a risk assessment, particularly during the operation and maintenance phase where there is a cable exposure requiring reburial.

151. Should an encounter occur between a third-party vessel and a project vessel, it is likely to be very localised and occur for only a short duration and so the most likely consequence (during any phase) would be collision avoidance action implemented in line with the COLREGs. The vessels involved will likely be able to resume their respective passages and / or activities with no long-term consequences.

152. Should an encounter develop into a collision incident, the most likely consequences will be similar to that outlined for the case of a collision between two third-party vessels. As an unlikely effect, one of the vessels could founder resulting in PLL and pollution, with this outcome more likely where one of the vessels is a small craft (e.g. fishing vessel, recreational vessel or CTV) with comparatively weaker structural integrity given hull materials.

15.7.1.2.2 Frequency of Occurrence

153. The frequency of occurrence in relation to vessel to vessel collision risk between a third-party vessel and a project vessel for the DBD Array Area during construction and decommissioning is considered **extremely unlikely** and during operation and maintenance is considered **negligible**.

154. The frequency of occurrence in relation to vessel to vessel collision risk between a third-party vessel and a project vessel for the offshore ECC for all phases is considered **negligible**.

15.7.1.2.3 Severity of Consequence

155. The severity of consequence in relation to vessel to vessel collision risk between a third-party vessel and a project vessel for the DBD Array Area for all phases is considered **moderate**.

156. The severity of consequence in relation to vessel to vessel collision risk between a third-party vessel and a project vessel for the offshore ECC for all phases is considered **moderate**.

15.7.1.2.4 Effect Significance

157. Overall, it is predicted that frequency of occurrence for vessel to vessel collision risk between a third-party vessel and a project vessel for the DBD Array Area is **extremely unlikely** during construction and decommissioning and **negligible** during operation and maintenance. The severity of consequence is **moderate** for all phases. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

158. Overall, it is predicted that frequency of occurrence for vessel to vessel collision risk between a third-party vessel and a project vessel for the offshore ECC is **negligible** and the severity of consequence is **moderate** for all phases. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.7.1.3 Impact on Vessel to Structure Allision Risk for Third-Party Vessels Due to the Presence of Project Structures (SN-O-04)

159. The presence of surface structures within the DBD Array Area may result in the creation of a risk of allision for vessels.

160. This impact is considered only in relation to the DBD Array Area since there are no surface structures associated with the offshore ECC (underwater allision risk due to reduction in under keel clearance is considered separately in **Section 15.7.1.4**).

161. This impact is only associated with the operation and maintenance phase of the Project.

15.7.1.3.1 Qualification of Risk

162. The main commercial route deviations and future case considerations described for the vessel displacement impact have also been assumed for this impact, noting that a full build out of the array is assumed and internal navigation by commercial vessels is not anticipated. However, commercial fishing vessels and recreational vessels may choose to navigate internally within the array, particularly in favourable weather conditions.

163. Shipping is international in nature and the majority of vessels present within the datasets are on routes to / from areas where offshore wind farms are present, including the Dogger Bank sites under construction to the west of the DBD Array Area – which most main commercial routes are in proximity to. Therefore, mariners will be experienced in working around offshore wind farm installations. Smaller craft which transit this far offshore should also be familiar with offshore wind farm installation and be familiar with undertaking adequate passage planning. To help aid local and international mariner knowledge, details of authorised minimum advisory safe passing distances, as defined by a risk assessment, may be applied, with advanced warning and accurate locations of any minimum advisory passing distances provided by Notifications to Mariners and Kingfisher Bulletins. These will be particularly effective in the event of smaller craft such as commercial fishing vessels and recreational vessels choosing to navigate internally within the operational array. This information promulgated alongside the details of any ongoing activity will maximise awareness for all third-party receptors, including in both day and night conditions.

164. The spatial extent of the impact is small given that a vessel must be in close proximity to a surface structure for an allision incident to occur. However, it is acknowledged that the presence of new surface structures does introduce new allision risk which can be considered across three forms, all of which are localised in nature given that a vessel must be in close proximity to a structure for an allision incident to occur:

- Powered allision risk;
- Drifting allision risk; and
- Internal allision risk.

15.7.1.3.1.1. Powered Allision Risk

165. Post-wind farm modelling using the main commercial route deviations as input gives an estimated powered allision return period of one in 10,038 years for base case traffic levels, rising to one in 8,376 years for future case traffic levels (20%). This allision risk is lower than the average recorded for powered allision risk in other UK offshore wind farm developments. The greatest allision risk was associated with structures on the south-east of the array with higher risk also estimated on the eastern extent of the array, where a higher volume of traffic from multiple main commercial routes, including those associated with vessel deviations, pass in the closest proximity to the array (minimum mean distance of 1nm from the array).

166. From historical incident data, there have been two instances of a third-party vessel alliding with an operational wind farm structure in the UK. These incidents each involved a fishing vessel, with a RNLI lifeboat attending on each occasion and a helicopter deployed in one case. Given the volume of vessel traffic in the area and subsequent heightened mariner alertness, it is unlikely that such an incident will occur at the Project.

167. Additionally, vessels are expected to comply with international flag state regulations (including COLREGs and SOLAS) and will be able to effectively passage plan a route which minimises effects given the promulgation of information relating to the Project including the charting of infrastructure on relevant nautical charts. On approach, the operational lighting and marking of the array will also assist in maximising marine awareness.

168. The Offshore Platforms carry increased powered allision risk and consequences due to their greater size and resistant force, albeit one is located internally within the array. The increase is not considered substantial and may be mitigated by the effective use of operational lighting and marking in accordance with requirements from Trinity House and MCA. Moreover, since one of the Offshore Platforms is located within the array and the other on the perimeter of the array where vessel traffic is low (due to the construction of DBC), exposure will be greatly reduced (as indicated by the powered allision modelling), noting this is the worst-case scenario of Offshore Platform location for shipping and navigation and final locations determined post-consent.

169. Should a powered allision incident occur, the consequences will depend on multiple factors including the energy of the contact, structural integrity of the vessel involved, type of structure contacted, and the sea state at the time of the contact. Small craft including commercial fishing vessels and recreational vessels are considered most vulnerable to the impact given the potential for a non-steel construction and possible internal navigation within the array. In such cases the most likely consequences will be minor damage with the vessel able to resume passage and undertake a full inspection at the next port. As part of the worst-case scenario, the vessel could allide with an Offshore Platform, resulting in the vessel foundering with PLL and pollution, although this is highly unlikely to occur.

15.7.1.3.1.2. Drifting Allision Risk

170. A vessel adrift may only develop into an allision situation where the vessel is in proximity to a structure and the direction of the wind and / or tide is such as to direct the vessel towards the structure.

171. With the main commercial route deviations associated with the presence of the Project in place, an estimated drifting allision return period of one in 40,364 years for base case traffic levels, rising to one in 37,098 years for future case traffic levels (20%). This is a low allision risk compared to that estimated for UK offshore wind farm developments and is reflective of the volume of vessel traffic in the area. The greatest allision risk was again associated with structures on the south-east.

172. From historical incident data, there have been no instances of a third-party vessel alliding with an operational wind farm structure whilst Not Under Command (NUC). However, there is some potential for a vessel to be adrift but this is not common in the area surrounding the Project as no machinery failure incidents (which may involve the errant vessel being adrift) were reported by the RNLI or MAIB in proximity to the DBD Array Area.

173. In circumstances where a vessel drifts towards a structure, there are actions which may be taken to prevent the incident developing into an allision situation. For a powered vessel, the ideal and likely solution would be regaining power prior to reaching the array (by rectifying any faults). Failing this, an emergency anchoring event may be initiated following a check of the relevant nautical charts to ensure the deployment of the anchor will not lead to other effects (such as the anchor snagging on a sub-sea cable) but as there are no sub-sea cables or pipelines in proximity to the DBD Array Area, as well as relatively shallow water depths, then emergency anchoring is a feasible option.

174. Where the deployment of the anchor is not possible (such as for small craft) then project vessels, if on-site, may be able to render assistance including under SOLAS obligations (IMO, 1974) and this response will be managed via marine coordination and depends on the type and capability of vessels on site. This would be particularly relevant for sailing vessels whose propulsion is dictated solely by the metocean conditions, although if the vessel becomes adrift in proximity to a structure there may be limited time to render assistance. Recreational activity in the area is minimal, as expected this far offshore.

175. Should a drifting allision incident occur, the consequences will be similar to those outlined for a powered allision incident, including the determining factors. However, the speed at which the contact occurs will likely be lower than for a powered allision, resulting in the contact energy being lower.

176. It is acknowledged that as per the assessment of powered allision risk, an allision with an Offshore Platform is likely to create higher consequence given the size of the structure although this is highly unlikely given the Offshore Platform will be located internally within the array or, if located on the perimeter, then in an area where less vessel traffic passes in proximity.

15.7.1.3.1.3. Internal Allision Risk

177. As described for the vessel displacement impact, commercial vessels are not anticipated to navigate internally within the array and therefore the likelihood of an internal allision risk for such vessels is negligible. It is anticipated that commercial fishing and recreational vessels may choose to navigate internally within the array. This is more likely by fishing vessels as based on the vessel traffic survey data, recreational vessels tend to stay closer to the coast and activity near the DBD Array Area is limited. Fishing vessels are also not common in the area and vessels recorded during the summer survey period were all in transit as opposed to engaged in any fishing activity.

178. Post-wind farm modelling using the vessel traffic survey data as input gives an estimated commercial fishing allision return period of one in 82 years for base case traffic levels, rising to one in 68 years for future case traffic levels (20%). Although this is a high return period, it is low in comparison to the average internal allision risk estimated for UK offshore wind farm developments and is reflective of the low volume of fishing vessel transits through the array.

179. The minimum spacing between structures (826m) is sufficient for safe internal navigation and is greater than that associated with many UK offshore wind farms, some of which are located close to shore and navigated by commercial fishing vessels in favourable conditions. The final array layout will be developed post consent and will be compliant with the requirements of MGN 654 (MCA, 2021) and a layout plan will be agreed following appropriate consultation with Trinity House and the MCA.

180. As with any passage, a vessel navigating internally within the array is expected to passage plan in accordance with SOLAS Chapter V (IMO, 1974). The lighting and marking of the array and MGN 654 (MCA, 2021) compliant unique identification marking of structures in an easily identifiable pattern will assist with minimising the likelihood of a mariner becoming disoriented whilst navigation internally within the array. Such mitigation will take account of the equivalent mitigation for the adjacent DBC project.

181. For recreational vessels under sail navigating internally within the array there is also potential for effects such as a wind shear, masking, and turbulence to occur. From previous studies of offshore wind developments, it has been concluded that wind turbines do reduce wind velocity downwind of a wind turbine (MCA, 2022) but that no negative effects on recreational craft have been reported on the basis of the limited spatial extent of the effect and its similarity to that experienced when passing a large vessel or close to other large structures (such as bridges) or the coastline. In addition, no practical issues have been reported by recreational receptors to date when operating in proximity to existing offshore wind developments.

182. An additional allision risk associated with the wind turbine blades applies for recreational vessels with a mast when navigating internally within the array. However, the minimum air gap will be 26.37m above Mean High Water Springs (MHWS) which is greater than the minimum clearance the RYA recommend for minimising allision risk (RYA, 2019) and which is also noted in MGN 654.

183. Should an internal allision occur, the consequences will be similar to those outlined for a powered allision incident, including the determining factors. However, as with a drifting allision incident, the speed at which the contact occurs will likely be lower than for an external allision since internal navigation would likely be undertaken with caution, resulting in the contact energy being lower.

15.7.1.3.2 Frequency of Occurrence

184. The frequency of occurrence in relation to vessel to structure allision risk for third-party vessels due to the presence of project structures for the DBD Array Area during the operation and maintenance phase is considered **extremely unlikely**.

15.7.1.3.3 Severity of Consequence

185. The severity of consequence in relation to vessel to structure allision risk for third-party vessels due to the presence of project structures during the operation and maintenance phase is considered **moderate**.

15.7.1.3.4 Effect Significance

186. Overall, it is predicted that frequency of occurrence for vessel to structure allision risk for third-party vessels due to the presence of project structures during the operation and maintenance phase for the DBD Array Area is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.7.1.4 Impact on Reduction of Under Keel Clearance Due to the Presence of Cable Protection or Cable Crossings (SN-O-05)

187. The presence of cable protection associated with the sub-sea cables may result in reductions to water depth and the creation of an under keel clearance risk for vessels.

188. This impact is only associated with the operation and maintenance phase of the Project.

15.7.1.4.1 Qualification of Risk

189. For the inter-array cables and offshore export cables the minimum burial depth is 0.2m, with this depth varying depending on the conclusions of the CBRA. However, a target burial depth of 3.5m is being considered. Seabed burial will be the primary means of cable burial and the burial depth plus any external cable protection will be determined by the CBRA (commitment ID CO24, see **Table 15-4**). Indicatively up to 10% of inter-array cables and up to 20% of offshore export cables will need additional cable protection with a maximum height of 1.5m for additional protection in the form of rock placement or mattressing.

190. It is noted that up to 16 cable crossings and three pipeline crossings could occur for the offshore export cable and up to five cable crossings for the inter-array cables. Again, all crossings will be determined via the CBRA, but the Applicant intends to follow the guidance contained in MGN 654 in relation to cable protection, namely that cable protection will not change the charted water depth by more than 5%, unless otherwise agreed with the MCA and Trinity House. This aligns with the RYA's recommendation that the "minimum safe under keel clearance over submerged structures and associated infrastructure should be determined in accordance with the methodology set out in MGN 543 [since superseded by MGN 654]" (RYA, 2019). With this guidance adhered to, the likelihood of an underwater allision is considered very low.

191. Should this percentage be exceeded, further assessment including consultation with the MCA and Trinity House may be required to determine whether any additional mitigation measures (e.g. post consent lighting and marking, charting, etc.) are necessary to ensure the safety of navigation.

192. Charted water depths within the DBD Array Area are between 21.2m and 34.6m. Given the expected reduction in water depth and the expectation that deep-draught vessels will not transit within the array, the risk of an underwater allision is minimised. Vessels likely to transit within the array include small fishing and recreational vessels which tend to have smaller draughts than commercial vessels, meaning there would be no significant effect to under keel clearance for these vessel types.

193. There is a higher risk of an under keel clearance interaction with the offshore export cables when compared to the inter-array cables. This is due to the offshore export cables being more exposed to shallower water depths closer to the coast, as well as having increased crossing traffic volumes.

194. Charted water depths within the offshore ECC range between zero (at landfall nearshore) and 118m below CD. The charted 10m contour in the offshore ECC is 3.7nm at its farthest distance from the coast and the charted 20m contour is less than 7nm at its farthest distance from the coast. However, due to the location of Flamborough Head to the north of the offshore ECC, the majority of routeing vessels are recorded further offshore, routeing to the east of Flamborough Head and so crossing the offshore ECC at a minimum distance of approximately 10nm offshore where water depths are greater than 30m below CD. From the vessel traffic data analysis, only 11 unique transits were recorded inshore of these routeing vessels, and all were fishing vessels on transit to / from Bridlington. Any vessels at transit further inshore are more at risk of an underwater allision; however, the vessels recorded in this area are small fishing vessels (less than 20m length) which typically have shallower vessel draughts, and thus minimal exposure to under keel clearance risks.

195. Should an underwater allision occur, the consequences may include the grounding of the vessel. Minor damage incurred is the most likely consequence, and foundering of the vessel resulting in a PLL and pollution are the unlikely worst-case consequences, with the environmental risks of the latter minimised by the implementation of the pollution planning protocols.

15.7.1.4.2 Frequency of Occurrence

196. The frequency of occurrence in relation to reduction of under keel clearance due to the presence of cable protection or cable crossings for the Project during the operation and maintenance phase is considered **extremely unlikely**.

15.7.1.4.3 Severity of Consequence

197. The severity of consequence in relation to under keel clearance due to the presence of cable protection or cable crossings for the Project during the operation and maintenance phase is considered **minor**.

15.7.1.4.4 Effect Significance

198. Overall, it is predicted that frequency of occurrence for under keel clearance due to the presence of cable protection or cable crossings for the Project during the operation and maintenance phase for the Project is **extremely unlikely** and the severity of consequence is **minor**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.7.1.5 Impact on Vessel Interactions with Sub-sea Cables Associated with the Project (SN-O-06)

199. The presence of sub-sea cables may result in the creation of a risk of a vessel anchor making contact with sub-sea cable.

200. This impact is only associated with the operation and maintenance phase of the Project.

15.7.1.5.1 Qualification of Risk

201. Up to 216nm (400km) of inter-array cables may be located within the DBD Array Area. Up to 432nm (800km) of offshore export cables may be located within the offshore ECC. Where available, the primary means of cable protection will be by seabed burial, with an indicative minimal burial depth of 0.2m, with this depth varying depending on the conclusions of the CBRA (commitment ID CO24, see **Table 15-4)**. However, a target burial depth of 3.5m is being considered. Where seabed burial is not possible, it is anticipated that up to 10% of inter-array cables and up to 20% of offshore export cables may require alternative cable protection with a height (including for crossings) of 1.5m. The burial depth will be informed by the CBRA.

202. There are three anchoring scenarios which are considered for this impact:

- Planned anchoring – most likely as vessel awaits a berth to enter port but may also result from adverse weather conditions, machinery failure, or sub-sea operations;
- Unplanned anchoring – generally resulting from an emergency situation where the vessels has experienced steering failure; and
- Anchor dragging – caused by anchor failure.

203. Since the inter-array cables would be fully contained within the DBD Array Area, it is considered unlikely that a vessel will choose to anchor in close proximity to an inter-array cable due to the distance offshore.

204. Unlike for the inter-array cables, the offshore export cables may be crossed frequently by vessels on transit offshore. Given that an interaction risk exists only where the anchoring occurs in proximity to a sub-sea cable, the impact is local in nature and has a short temporal overlap – vessels enroute will generally be located over the offshore export cables for only a short period of time.

205. However, the export cables associated with DBA and DBB run parallel with the offshore ECC for considerable length. Therefore, the spatial extent of the interaction risk will be greater for this section of the offshore ECC.

206. Despite being localised, the risk is elevated in areas where a sub-sea cable has been exposed. Following the CBRA, and in order to increase third-party vessel awareness, a guard vessel may be deployed to the area of interest.

207. Vessel traffic data shows no anchoring activity within and in proximity to the offshore ECC. There are no charted anchorage areas located in proximity to the offshore ECC with the closest charted anchorage area located approximately 25nm south of the offshore ECC.

208. It is anticipated that the charting of infrastructure including all sub-sea cables will inform the decision to anchor, as per Regulation 34 of SOLAS (IMO, 1974). This includes in an emergency situation with general feedback from mariners indicating that even where time for decision-making is limited a key priority for the bridge crew whilst the anchor is being readied would be to check charts.

209. Anchor dragging features a relatively wider extent than planned or unplanned anchoring. However, from the vessel traffic data, the likelihood of a vessel dragging anchor close enough to interact with a sub-sea cable is very low. In such a circumstance, it is likely that the anchor dragging will be stopped prior to any interaction with a sub-sea cable becoming possible.

210. The most likely consequences in the event of a vessel anchoring over an inter-array cable is that no interaction occurs given the protection applied to the cable (by burial or other means). Should an interaction occur, historical incident data suggests that the consequences would be negligible, with no damage caused to the vessel or sub-sea cable.

211. As a worst-case, a snagging incident could occur to a commercial fishing vessel with damage caused to the anchor and / or the cable, compromising the stability of the vessel.

15.7.1.5.2 Frequency of Occurrence

212. The frequency of occurrence in relation to vessel interaction with sub-sea cables associated with the project for the Project during the operation and maintenance phase is considered **extremely unlikely**.

15.7.1.5.3 Severity of Consequence

213. The severity of consequence in relation to vessel interaction with sub-sea cables associated with the project for the Project during the operation and maintenance phase is considered **minor**.

15.7.1.5.4 Effect Significance

214. Overall, it is predicted that frequency of occurrence for vessel interaction with sub-sea cables associated with the project for the Project during the operation and maintenance phase is **extremely unlikely** and the severity of consequence is **minor**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.7.1.6 Reduction of Emergency Response Capability Due to Increased Incident Rates and / or Reduced Access for SAR Responders (SN-O-08)

215. The presence of surface structures within the DBD Array Area and operation and maintenance activities associated with the DBD Array Area and offshore ECC may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface air responders, including SAR assets.

216. This impact is only associated with the operation and maintenance phase of the Project.

15.7.1.6.1 Qualification of Risk

15.7.1.6.1.1. Emergency Response Resources

217. The operation and maintenance phase may last for up to 35 years with up to 103 annual round trips made by a peak of 16 vessels undertaking operation and maintenance activities. With a full build out of the DBD Array Area, these vessels will increase the likelihood of an incident requiring an emergency response and subsequently increase the likelihood of multiple incidents occurring simultaneously, diminishing emergency response capability.

218. Given the distance that may be covered by the air-based SAR support (the SAR helicopter base at Humberside is located approximately 142nm south-west of the DBD Array Area), but also the national nature of this resource, the spatial extent of this impact is considered large. Additionally, the DBD Array Area covers approximately 76nm^2 which represents a large area to search. However, it is unlikely that a SAR operation will require the entire DBD Array Area to be searched; it is much more likely that a search could be restricted to a smaller area within which a casualty is known to be located (inclusive of any assumptions relating to the drift of the casualty). As part of an unlikely worst-case scenario, the consequences of such a situation could include a failure of emergency response to an incident, resulting in a PLL and pollution.

219. From historical incident data, there is a moderate rate of incidents in the region of the offshore ECC, however, for the DBD Array Area, there were no SAR helicopter taskings or RNLI incidents, and only four MAIB incidents recorded across the data periods within the shipping and navigation Study Area; none of these were within the DBD Array Area itself. A total of six SAR helicopter taskings across a nine-year period occurred within the offshore ECC, six RNLI responded to incidents across a 10-year period, and three MAIB reported incidents across a 10-year period. The likelihood of an incident related to the Project occurring at the same time is very low.

220. Additionally, based on the number of collision and allision incidents associated with UK offshore wind farms reported to date, there is an average of one incident per 1,310 operational wind turbine years (as of December 2024). Therefore, the Project itself is not expected to result in a marked increase in the frequency of incidents requiring an emergency response.

221. With project vessels to be managed through marine coordination and compliance with Flag State regulations, the likelihood of an incident is minimised. Additionally, should an incident occur, project vessels will be well equipped to assist, either through self-help capability or – for an incident involving a nearby third-party vessel – through SOLAS obligations (IMO, 1974), all in liaison with His Majesty's Coastguard. This is reflected in past experience, with 12 known instances of a vessel (or persons on a vessel) being assisted by an industry vessel for a nearby UK offshore wind farm.

222. The most likely consequences in the event of an incident in the region requiring an emergency response is that emergency responders are able to assist without any limitations on capability. As part of the worst-case scenario, there could be a delay to a response request due to a simultaneous incident associated with the Project leading to PLL, pollution, and vessel damage. However, this worst-case scenario is highly unlikely.

15.7.1.6.1.2. Search and Rescue Access

223. With a full build out of the DBD Array Area, its physical presence may restrict access for SAR responders, either due to the incident in question occurring within the array or the array itself obstructing the most effective path to an incident. With DBD sharing its western boundary with DBC, there is an increased likelihood of this scenario arising. Access issues are more likely to be a concern in adverse weather conditions also. The Applicant would work within the parameters of MGN 654 to minimise risks by assuring there is alignment in array layout with the DBC layout and if not a set-back may be required, again in line with MGN 654. This was raised by HM Coastguard during consultation (outlined in **Volume 2, Appendix 15.1 Consultation Responses for Shipping and Navigation**) with agreement that this will be addressed post consent during the final array layout development, at which time the as-built layout for DBC will be known.

224. The minimum spacing between all structures of 826m is similar to many other consented offshore wind farms in the UK (DBA and DBB were consented with a minimum spacing of 700m (Forewind, 2013) and DBC consented with a minimum of 750m, (Forewind, 2014)). The worst-case array layout includes two lines of orientation; should a SLoO layout be taken forward post consent then this would be subject to a safety justification, including consideration of accessibility for SAR operations.

225. A layout plan will be agreed with the MMO following appropriate consultation with Trinity House and the MCA, with the final array layout agreed with the MCA and Trinity House post consent (commitment ID CO2, see **Table 15-4**). However, the final array layout will be compliant with the requirements of MGN 654 (MCA, 2021), including:

- Safety justification for a SLoO (if taken forward);
- Inclusion of Helicopter Refuge Areas (HRA) as deemed necessary including in conjunction with the adjacent DBC;
- Completion of a SAR Checklist;
- Completion of an ERCoP; and
- Application of unique identification marking of structures in an easily identifiable pattern.

226. The SAR Checklist and ERCoP will remain live documents throughout the operation and maintenance phase.

227. The most likely consequences in the event of a SAR operation are that SAR assets are able to fulfil their objectives without any limitations on capability. As a worst-case, it may not be possible to undertake an effective search. However, given compliance with MGN 654 for the final array layout, this is considered highly unlikely.

15.7.1.6.2 Frequency of Occurrence

228. The frequency of occurrence in relation to reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders for the Project during the operation and maintenance phase is considered **extremely unlikely**.

15.7.1.6.3 Severity of Consequence

229. The severity of consequence in relation to reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders for the Project during the operation and maintenance phase is considered **moderate**.

15.7.1.6.4 Effect Significance

230. Overall, it is predicted that frequency of occurrence for reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders for the Project during the operation and maintenance phase is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.7.2 Additional Mitigation Measures

231. No additional mitigation measures have been proposed for shipping and navigation.

15.8 Cumulative Effects

232. Cumulative effects are the result of the impacts of the Project acting in combination with the impacts of other proposed and reasonably foreseeable developments on receptors. This includes plans and projects that are not inherently considered as part of the current baseline.

233. The overarching framework used to identify and assess cumulative effects is set out in **Chapter 6 Environmental Impact Assessment Methodology**. The four-stage approach is based upon the Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment (Planning Inspectorate, 2017) and the Offshore Wind Marine Environmental Assessments: Best Practice Advance for Evidence and Data Standards (Parker *et al.*, 2022). The fourth stage of the process is the assessment stage, which is detailed within the sections below for potential cumulative effects on shipping and navigation receptors.

15.8.1 Screening for Potential Cumulative Effects

234. The first step of the CEA identifies which impacts associated with the Project alone, as assessed under **Section 15.7**, have the potential to interact with other plans and projects to give rise to cumulative effects. All potential cumulative effects to be taken forward in the CEA are detailed in **Table 15-16** with a rationale for screening in or out. Only impacts determined to have a residual effect of negligible or greater are included in the CEA. Those assessed as 'no impact' are excluded, as there is no potential for them to contribute to a cumulative effect.

Table 15-16 Shipping and Navigation– Potential Cumulative Effects

Impact ID	Impact and Project Activity	Potential for Cumulative Effects	Rationale
Construction			
SN-C-01	Vessel displacement – Construction activities associated with the Project	Yes	Activities associated with the installation of structures and sub-sea cables associated with the Project and other cumulative developments may displace third-party vessels from their existing routes or activity.
SN-C-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Construction activities associated with the Project	Yes	Activities associated with the installation of structures and sub-sea cables associated with the Project and other cumulative developments may displace third-party vessels from their existing routes or activity, increasing the collision risk with other third-party vessels.
SN-C-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Construction activities associated with the Project	Yes	Project vessels associated with construction activities associated with the Project and other cumulative developments may increase encounters and collision risk for other vessels already operating in the area.

Impact ID	Impact and Project Activity	Potential for Cumulative Effects	Rationale
Operation and Maintenance			
SN-O-01	Vessel displacement – Maintenance activities or the presence of the Project	Yes	Activities associated with maintenance of structures and sub-sea cables as well as the presence of surface structures associated with the Project and other cumulative developments may displace third-party vessels from their existing routes or activity.
SN-O-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Maintenance activities associated with the Project as well as the presence of the Project	Yes	Activities associated with maintenance of structures and sub-sea cables as well as the presence of surface structures associated with the Project and other cumulative developments may displace third-party vessels from their existing routes or activity, increasing the collision risk with other third-party vessels.
SN-O-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Maintenance activities associated with the Project as well as the presence of the Project	Yes	Project vessels associated operation and maintenance activities associated with the Project and other cumulative developments may increase encounters and collision risk for other vessels already operating in the area.
SN-O-04	Vessel to structure allision risk for third party vessels due to the presence of project structures – Presence of the Project	Yes	The presence of surface piercing structures during the operation and maintenance phase associated with the Project and other cumulative developments may result in the creation of a risk of allision for vessels.
SN-O-05	Reduction in under keel clearance due to the presence of cable protection or cable crossings – Presence of cable protection or cable crossings	Yes	The presence of cable protection or cable crossings associated with the sub-sea cables associated with the Project and other cumulative developments may result in reductions to water depth and the creation of an under-keel clearance risk for vessels.
SN-O-06	Vessel interaction with sub-sea cables associated with the project – Presence of sub-sea cables	Yes	The presence of sub-sea cables associated with the Project and other cumulative developments may result in the creation of a risk of a vessel anchor making contact with a sub-sea cable.
SN-O-08	Reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders – Presence of the Project	Yes	The presence of surface structures, increased vessel activity, and personnel numbers associated with the Project and other cumulative developments may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface air responders, including SAR assets.
Decommissioning			
SN-D-01	Vessel displacement due to decommissioning activities- Decommissioning activities associated with the Project	Yes	Activities associated with the removal of structures and sub-sea cables associated with the Project and other cumulative developments may displace third-party vessels from their existing routes or activity.
SN-D-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Decommissioning activities associated with the Project	Yes	Activities associated with the removal of structures and sub-sea cables associated with the Project and other cumulative developments may displace third-party vessels from their existing routes or activity, increasing the collision risk with other third-party vessels.
SN-D-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Decommissioning n activities associated with the Project	Yes	Project vessels associated with decommissioning activities associated with the Project and other cumulative developments may increase encounters and collision risk for other vessels already operating in the area.

15.8.2 Screening for Other Plans / Projects

235. The second step of the CEA identifies a short-list of other plans and projects that have the potential to interact with the Project to give rise to significant cumulative effects during the construction and operational phase. The short-list provided in **Table 15-17** has been produced specifically to assess cumulative effects on shipping and navigation receptors. The exhaustive list of all offshore plans and projects considered in the development of the Project's CEA framework is provided in **Volume 2, Appendix 6.4 Cumulative Effects Screening Report - Offshore**.

236. Given the varying type, status and location of developments, a tiered approach to cumulative risk assessment has been undertaken, which splits developments into tiers depending upon project status, proximity to the Project and the level to which they are anticipated to cumulatively impact relevant users. It also considers data confidence, most notably in terms of the level of certainty over the location and timescales for a development. A breakdown and summary of these tiers are included in **Section 3.4** of **Volume 2, Appendix 15.2 Navigational Risk Assessment**.

237. Developments that were fully operational and under construction during baseline characterisation, including at the time of site-specific surveys, are considered as part of baseline conditions for the surrounding environment. It is assumed that any residual effects associated with these developments are captured within the baseline information. As such, these developments are not subject to further assessment within the CEA and excluded from the screening exercise presented in **Table 15-17**.

238. For developments that were in planning / pre-construction stages during baseline characterisation, these are included in the screening exercise presented in **Table 15-17**.

239. The screening exercise has been undertaken based on available information on each plan or project as of 31st December 2024. Information has been obtained from The Crown Estate and directly from other developers through data sharing arrangements with DBD. It is noted that further information regarding the identified plans and projects may become available between PEIR publication and DCO application submission or may not be available in detail prior to construction. The assessment presented here is therefore considered to be conservative at the time of PEIR publication. The list of plans and projects will be updated at ES stage to incorporate more recent information at the time of writing.

240. The project identified in **Table 15-17** have been assigned a tier based on their development status, the level of information available to inform the CEA and the degree of confidence. The tiering system used for shipping and navigation was introduced in **Section 41**, specifically **Table 15-14**. Again, it is noted that an aggregate of the criterion is used to determine the tier of each development.

241. The zone of influence (ZoI) used to identify relevant plans and projects for the shipping and navigation CEA is a search distance of up to 50nm from the DBD Array Area. Operational or under construction offshore wind farms in proximity to the Project are part of the baseline assessment. These include DBA, DBB, DBC, and Sofia.

242. The project in **Table 15-17** has been considered on a case-by-case basis. Only plans and projects with potential for significant cumulative effects with the Project are taken forward to a detailed assessment.

243. The CEA for shipping and navigation has identified a total of one project (Dogger Bank South Offshore Wind Farm) where significant cumulative effects could arise in combination with the Project. A detailed assessment of cumulative effects is provided in the section below.

244. For completeness, non-baseline offshore wind farm developments located in the region but beyond 50nm of the DBD Array Area include the two consented Hornsea Offshore Wind Farm projects with the closest point approximately 58nm to the south. Due to these developments being out with the 50nm search distance, they have not been screened out of the CEA.

15.8.3 Assessment of Cumulative Effects

15.8.3.1 Cumulative Impact 1: Vessel Displacement Due to the Presence of the Project and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels (Route-Based) Due to Displacement (SN-C-01, SN-C-02, SN-O-01, SN-O-02, SN-D-01, SN-D-02)

245. Activities associated with the installation, maintenance and decommissioning of structures and sub-sea cables as well as the presence of surface structures may displace third-party vessels from their existing routes or activity, increasing the collision risk with other third-party vessels at a cumulative level.

15.8.3.1.1 Tier 2

246. Based on the cumulative assessment of vessel routeing, a deviation will be required for four of the seven main commercial routes identified. These routes are illustrated and detailed in **Section 14.6** of **Volume 2, Appendix 15.2 Navigational Risk Assessment.** Of these deviations, two are as per the in-isolation scenario and are not further affected and deviated by the presence of DBS; Route 2 and Route 6.

247. Route 3 would require a deviation at a cumulative level and was not already deviated in isolation. The deviation for this route due to the presence of DBS is 0.6nm which would be an increase of 0.2% on the total route length. Given that this deviation is not associated with the Project and results in the route passing further away from the DBD Array Area it is not considered relevant to assess further in relation to the Project.

Table 15-17 Short List of Plans / Projects for the Shipping and Navigation Cumulative Effect Assessment

Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to DBD Array Area (nm)	Closest Distance to Offshore ECC (nm)	Potential for Significant Cumulative Effects	Rationale
Dogger Bank South Offshore Wind Farm (EN010125)	Offshore Wind Farm	Examination	4	Construction: 2026 to 2033 Operation: 2034+	71km	46km	Yes	Offshore wind farm within 50nm of the DBD Array Area and may impact a main commercial route passing within 1nm of the DBD Array Area and interacts with traffic which may be directly displaced by the DBD Array Area.

248. Route 1 was deviated in isolation but would require a further deviation due to the presence of DBS to a total increase of 1nm which would be an increase of 0.3% on the total route length.

249. Should activities between the offshore ECCs for both the Project and DBS coincide, then it is assumed that suitable marine coordination will be implemented on a cumulative basis to minimise disruption for passing third party vessels.

250. The same main consequences (increased journey times and distances) and mitigation measures relevant for each phase of the equivalent impact for the Project in isolation are again applicable, including promulgation of information and marking on relevant nautical charts. Given the greater length of deviations, although still minimal, compared to the in-isolation scenario, the severity of consequence is greater, although remains within low parameters given the increased distances relative to the length of routes as a whole.

251. Again, vessels navigating in the area will already be familiar with deviating and routeing in this area of the North Sea due to the already under construction developments in proximity to both the Project and DBS. Vessels are expected to comply with international and flag state regulations (including the COLREGs and SOLAS) and will be able to passage plan in advance given the promulgation of information relating to the Project and relevant nautical charts. This high level of awareness will assist with ensuring that vessels make safe and effective deviations which minimise journey increases.

15.8.3.1.2 Cumulative Frequency of Occurrence

252. The frequency of occurrence in relation to cumulative vessel displacement for the DBD Array Area is considered **frequent**.

253. The frequency of occurrence in relation to cumulative vessel displacement for the offshore ECC is considered **reasonably probable**.

254. The frequency of occurrence in relation to cumulative increased third-party collision risk due to displacement for the DBD Array Area is considered **remote**.

255. The frequency of occurrence in relation to cumulative increased third-party collision risk due to displacement for the offshore ECC is considered **extremely unlikely**.

15.8.3.1.3 Cumulative Severity of Consequence

256. The severity of consequence in relation to cumulative vessel displacement for the DBD Array Area is considered **minor**.

257. The severity of consequence in relation to cumulative vessel displacement for the offshore ECC is considered **minor**.

258. The severity of consequence in relation to cumulative increased third-party collision risk due to displacement for the DBD Array Area is considered **moderate**.

259. The severity of consequence in relation to cumulative increased third-party collision risk due to displacement for the offshore ECC is considered **moderate**.

15.8.3.1.4 Cumulative Effect Significance

260. Overall, it is predicted that frequency of occurrence for cumulative vessel displacement for the DBD Array Area is **frequent** and the severity of consequence is **minor**. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

261. Overall, it is predicted that frequency of occurrence for cumulative vessel displacement for the offshore ECC is **reasonable probable** and the severity of consequence is **minor**. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

262. Overall, it is predicted that frequency of occurrence for cumulative increased third-party collision risk due to displacement for the DBD Array Area is **remote** and the severity of consequence is **moderate**. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

263. Overall, it is predicted that frequency of occurrence for cumulative increased third-party collision risk due to displacement for the offshore ECC is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.8.3.2 Cumulative Impact 2: Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel (SN-C-03, SN-C-03, SN-D-03)

264. Project vessels associated with construction, operation and maintenance, and decommissioning activities may increase encounters and collision risk for other vessels already operating in the area on a cumulative level.

15.8.3.2.1 Tier 2

265. There is potential for DBS construction activities to overlap with that of the Project, especially if the same base port(s) or similarly located ports could be used for construction, operation and maintenance, and decommissioning. However, details of base ports are not currently available and so a detailed risk assessment is not possible.

266. Nevertheless, in such circumstances the marine coordination applicable to project vessels associated with the Project would be collaboratively extended as appropriate across both developments, thus ensuring that disruption to third-party vessel movements is minimised. This will also apply for operation and maintenance activities across all Dogger Bank developments, although with lower traffic volumes than would be applicable during construction. It is also anticipated that embedded mitigation measures identified for the equivalent in isolation impact would be applied across project including AIS carriage and compliance with Flag State regulations for project vessels, ongoing liaison with fishing fleets via an appointed FLO, an application for Safety Zones, and promulgation of information. However, given the distance between the Project and DBS, it is very likely that no cumulative overlap in activities would occur.

15.8.3.2.2 Cumulative Frequency of Occurrence

267. The frequency of occurrence in relation to cumulative third-party to project vessel collision risk for the DBD Array Area is considered **extremely unlikely**.

268. The frequency of occurrence in relation to cumulative third-party to project vessel collision risk for the offshore ECC is considered **extremely unlikely**.

15.8.3.2.3 Cumulative Severity of Consequence

269. The severity of consequence in relation to cumulative third-party to project vessel collision risk for the DBD Array Area is considered **moderate**.

270. The severity of consequence in relation to cumulative third-party to project vessel collision risk for the offshore ECC is considered **moderate**.

15.8.3.2.4 Cumulative Effect Significance

271. Overall, it is predicted that frequency of occurrence for cumulative third-party to project vessel collision risk for the DBD Array Area is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

272. Overall, it is predicted that frequency of occurrence for cumulative third-party to project vessel collision risk for the offshore ECC is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.8.3.3 Cumulative Impact 3: Vessel to Structure Allision Risk for Third-Party Vessels Due to the Presence of Project Structures (SN-C-04, SN-D-04)

273. The presence of surface piercing structures during the operation and maintenance phase may result in the creation of a risk of allision for vessels on a cumulative level.

15.8.3.3.1 Tier 2

274. Given the localised nature of vessel to structure allision risk, the cumulative risk for this impact is limited noting that DBS is located approximately 39nm south-west of the DBD Array Area and this is sufficient that no potential allision risk is considered. There may be an increased exposure to allision risk with perimeter structures due to the further deviation of Route 1 and the deviation of Route 3, which in isolation is not required. However, this is expected to be minor. Each development will be required to implement marine lighting and marking in agreement with Trinity House and in compliance with IALA G1162 (IALA, 2021a), meaning the localised risk is managed.

15.8.3.3.2 Cumulative Frequency of Occurrence

275. The frequency of occurrence in relation to cumulative vessel to structure allision risk for third-party vessels due to the presence of project structures for the DBD Array Area during the operation and maintenance phase is considered **extremely unlikely**.

15.8.3.3.3 Cumulative Severity of Consequence

276. The severity of consequence in relation to cumulative vessel to structure allision risk for third-party vessels due to the presence of project structures for the DBD Array Area during the operation and maintenance phase is considered **moderate**.

15.8.3.3.4 Cumulative Effect Significance

277. Overall, it is predicted that frequency of occurrence for cumulative vessel to structure allision risk for third-party vessels due to the presence of project structures for the DBD Array Area during the operation and maintenance phase is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.8.3.4 Cumulative Impact 4: Reduction of Under Keel Clearance Due to the Presence of Cable Protection or Cable Crossings (SN-C-05, SN-D-05)

278. The presence of cable protection or cable crossings associated with the sub-sea cables may result in reductions to water depth and the creation of an under-keel clearance risk for vessels.

15.8.3.4.1 Tier 2

279. Given the localised nature of under keel clearance risk and the lack of proximity between inter-array cables associated with the Project and cumulative developments, no additional under keel clearance risk is identified at the cumulative level.

280. However, given the offshore ECCs for the Project and DBS will cross, there may be some potential cumulative under keel clearance risk associated with the presence of cable protection. These portions of the offshore ECC which may be shared with the DBS export cable routes are expected to be outside of the nearshore area such that the likelihood of a reduction in charted water depth greater than 5% is low. Nevertheless, as per the assessment of the Project in isolation, in such circumstances the MCA will be consulted on appropriate mitigation (if required) to ensure the under keel interaction risk is ALARP.

15.8.3.4.2 Cumulative Frequency of Occurrence

281. The frequency of occurrence in relation to cumulative reduction of under keel clearance due to the presence of cable protection or cable crossings for the Project during the operation and maintenance phase is considered **extremely unlikely**.

15.8.3.4.3 Cumulative Severity of Consequence

282. The severity of consequence in relation to cumulative reduction of under keel clearance due to the presence of cable protection or cable crossings for the Project during the operation and maintenance phase is considered **moderate**.

15.8.3.4.4 Cumulative Effect Significance

283. Overall, it is predicted that frequency of occurrence for cumulative reduction of under keel clearance due to the presence of cable protection or cable crossings for the Project during the operation and maintenance phase is **extremely unlikely** and the severity of consequence is **moderate**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.8.3.5 Cumulative Impact 5: Vessel Interaction with Sub-sea Cables Associated with the Project (SN-O-6, SN-D-06)

284. The presence of sub-sea cables at a cumulative level may result in the creation of a risk of a vessel anchor making contact with sub-sea cable.

15.8.3.5.1 Tier 2

285. Given the localised nature of anchor interaction and the lack of proximity between inter-array cables associated with the Project and cumulative developments, no additional anchor interaction risk is identified at the cumulative level.

286. Given the offshore ECC for the Project and DBS will cross, there may be some potential cumulative anchor interaction. However, it is assumed that DBS will be subject to the same forms of mitigation as the Project for cable burial and protection such as a CBRA

15.8.3.5.2 Cumulative Frequency of Occurrence

287. The frequency of occurrence in relation to cumulative vessel interaction with sub-sea cables associated with the Project during the operation and maintenance phase is considered **extremely unlikely**.

15.8.3.5.3 Cumulative Severity of Consequence

288. The severity of consequence in relation to cumulative vessel interaction with sub-sea cables associated with the Project during the operation and maintenance phase is considered **minor**.

15.8.3.5.4 Cumulative Effect Significance

289. Overall, it is predicted that frequency of occurrence for cumulative vessel interaction with sub-sea cables associated with the Project during the operation and maintenance phase is **extremely unlikely** and the severity of consequence is **minor**. The effect is therefore **Broadly Acceptable**, which is **not significant** in EIA terms.

15.8.3.6 Cumulative Impact 6: Reduction of Emergency Response Capability Due to Increased Incident Rates and / or Reduced Access for SAR Responders (SN-O-08, SN-D-08)

290. The presence of surface structures increased vessel activity, and personnel numbers on a cumulative level, may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface air responders, including SAR assets.

15.8.3.6.1 Tier 2

291. The presence and activities associated with cumulative developments may further increase the likelihood of incidents requiring an emergency response and could subsequently increase the likelihood of multiple incidents occurring simultaneously, adding additional stress on emergency responders.

292. As with the Project, DBS will have mitigation measures in place to reduce the likelihood of emergency response capability being compromised. This includes marine coordination for project vessels and compliance with Flag State regulations. SOLAS obligations will also be applicable to all cumulative developments and may have a positive effect, e.g. a project vessel for the Dogger Bank developments may be able to assist with an incident associated with the Project, or vice-versa. Nevertheless, the presence of structures and associated activities across multiple developments will increase the likelihood of an incident occurring that requires an emergency response.

15.8.3.6.2 Cumulative Frequency of Occurrence

293. The frequency of occurrence in relation to cumulative reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders for the Project during the operation and maintenance phase is considered **remote**.

15.8.3.6.3 Cumulative Severity of Consequence

294. The severity of consequence in relation to cumulative reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders for the Project during the operation and maintenance phase is considered **moderate**.

15.8.3.6.4 Cumulative Effect Significance

295. Overall, it is predicted that frequency of occurrence for cumulative reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders for the Project during the operation and maintenance phase is **remote** and the severity of consequence is **moderate**. The effect is therefore **Tolerable with Mitigation**, which is **not significant** in EIA terms.

15.9 Transboundary Effects

296. Given the international nature of routeing by commercial vessels – particularly in the region containing the Project given the central position within the North Sea as well as proximity to the international maritime border of the UK and the Netherlands – the potential for a transboundary effect relating to the displacement of commercial vessels undertaking international voyages has been identified.

297. Since the use of AIS transceivers (the primary data source for characterisation of commercial vessel movements) is international, the characterisation of the baseline environment in **Section 15.6** is suitable for identifying relevant other EEAs. Other EEAs with port(s) which feature in the Main Commercial Routes include the Netherlands, Norway, Germany, Denmark, and Belgium.

298. Since such international commercial routeing is captured in the baseline environment, the environmental assessment for the Project only suitably considers this effect in transboundary terms, with no likely significant transboundary effects. This also extends to the assessment of Cumulative Effects, noting that all screened schemes are located within the UK rather than any other EEAs.

15.10 Inter Relationships and Effect Interactions

15.10.1 Inter-Relationships

299. Inter-relationships are defined as effects arising from residual effects associated with different environmental topics acting together upon a single receptor or receptor group. Potential inter-relationships between shipping and navigation and other environmental topics have been considered, where relevant, within the PEIR. **Table 15-18** provides a summary of key inter-relationships and signposts to where they have been addressed in the relevant chapters.

Table 15-18 Shipping and Navigation – Inter-Relationships with Other Topics

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
Construction				
SN-C-01, SN-C-02	Impact on vessel displacement due to the presence of the project and increased vessel to vessel collision risk between third-party vessels (route-based) due to displacement.	**Chapter 14 Commercial Fisheries**	**Section 15.7.1.1**	Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's vessels.
		Chapter 18 Other Marine Users		Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of Project vessels.
		Chapter 12 Marine Mammals		Disturbance to marine mammals due to increased presence from Project vessels.
		Chapter 13 Offshore and Intertidal Ornithology		Disturbance to offshore ornithology due to increased presence from Project vessels.

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
SN-C-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel due to construction, operation and decommissioning activities.	**Chapter 14 Commercial Fisheries**	**Section 15.7.1.2**	Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's vessels.
Operation and Maintenance				
SN-O-01, SN-O-02	Impact on vessel displacement due to the presence of the project and increased vessel to vessel collision risk between third-party vessels (route-based) due to displacement.	**Chapter 14 Commercial Fisheries**	**Section 15.7.1.1**	Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's vessels.
		Chapter 18 Other Marine Users		Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of Project vessels.
		Chapter 12 Marine Mammals		Disturbance to marine mammals due to increased presence from Project vessels.
		Chapter 13 Offshore and Intertidal Ornithology		Disturbance to offshore ornithology due to increased presence from Project vessels.
SN-O-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel due to construction, operation and decommissioning activities.	**Chapter 14 Commercial Fisheries**	**Section 15.7.1.2**	Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's vessels.
SN-O-05	Impact of reduction of under keel clearance due to the presence of cable protection or cable crossings due to Project infrastructure.	**Chapter 18 Other Marine Users**	**Section 15.7.1.4**	Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of Project infrastructure.
		Chapter 14 Commercial Fisheries		Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's infrastructure.
SN-O-06	Impact on vessel interactions with sub-sea cables associated with the Project's infrastructure	**Chapter 18 Other Marine Users**	**Section 15.7.1.5**	Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of Project infrastructure.
		Chapter 14 Commercial Fisheries		Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's infrastructure.

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
Decommissioning				
SN-D-01, SN-D-02	Impact on vessel displacement due to the presence of the project and increased vessel to vessel collision risk between third-party vessels (route-based) due to displacement.	**Chapter 14 Commercial Fisheries**	**Section 15.7.1.1**	Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's vessels.
		Chapter 18 Other Marine Users		Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of Project vessels.
		Chapter 12 Marine Mammals		Disturbance to marine mammals due to increased presence from Project vessels.
		Chapter 13 Offshore and Intertidal Ornithology		Disturbance to offshore ornithology due to increased presence from Project vessels.
SN-D-03	Impact on vessel-to-vessel collision risk between a third-party vessel and a project vessel due to construction, operation and decommissioning activities.	**Chapter 14 Commercial Fisheries**	**Section 15.7.1.2**	Displacement from fishing grounds for commercial fishing vessels due to the presence of the Project's vessels.

15.10.2 Interactions

300. The impacts identified and assessed in this chapter have the potential to interact with each other. Potential interactions between impacts are identified in **Table 15-19**. Where there is potential for interaction between impacts, these are assessed in **Table 15-20** for each receptor or receptor group.

301. Interactions are assessed by development phase ("phase assessment") to see if multiple impacts could increase the overall effect significance experienced by a single receptor or receptor group during each phase. Following from this, a lifetime assessment is undertaken which considers the potential for multiple impacts to accumulate across the construction, operation and decommissioning phases and result in a greater effect on a single receptor or receptor group. When considering synergistic effects from interactions, it is assumed that the receptor sensitivity remains consistent, while the magnitude of different impacts is additive.

15.11 Monitoring Measures

302. Proposed monitoring measures for shipping and navigation where required, are outlined in **Table 15-21**, which would be further developed and agreed with stakeholders prior to construction taking into account of the final detailed design of the Project.

15.12 Summary

303. This chapter has provided a characterisation of the baseline environment for shipping and navigation based the best available data and information**.**

304. The principal receptors with respect to shipping and navigation included in this assessment were those that could pose a risk to the vessels associated with DBD, and in return, those that could be affected by DBD. These included commercial vessels, commercial fishing vessels, recreational vessels and emergency responders.

305. The assessment has established there will a tolerable with mitigation and broadly acceptable effects on shipping and navigation receptors during the construction, operation and decommissioning phases, which is **not significant** in EIA terms.

306. **Table 15-22** presents a summary of the preliminary results of the assessment of likely significant effects on shipping and navigation during the construction, operation and decommissioning of the Project.

15.13 Next Steps

307. It is acknowledged that a number of additional steps will be required post-PEIR to ensure a comprehensive chapter and supporting NRA is submitted at ES stage. These include:

- Additional consultation with shipping and navigation stakeholders;
- Completion of a Hazard Workshop with relevant stakeholders and subsequent hazard log;
- Collection and analysis of MGN 654 compliant vessel traffic surveys for both winter and summer seasonal periods in 2025;
- Consideration of the RYA Coastal Atlas of Recreational Boating (RYA, 2019) to inform the baseline, in particular the offshore ECC;
- Updating of the assessment of effects based on the additional information gathered above;
- Review of the cumulative screening for new information available; and
- Updating of the MGN 654 Checklist within **Volume 2, Appendix 15.2 Navigational Risk Assessment** with consideration of all of the above to ensure that the NRA is fully compliant with MGN 654.

Table 15-19 Shipping and Navigation – Potential Interactions between Impacts throughout the Project's Lifetime

Construction, Operation and Maintenance

	SN-C-01	SN-C-02	SN-C-03	SN-O-01	SN-O-02	SN-O-03	SN-O-04	SN-O-05	SN-O-06	SN-O-08
SN-C-01		Yes	Yes	No	No	No	No	No	No	No
SN-C-02	Yes		Yes	No	No	No	No	No	No	No
SN-C-03	Yes	Yes		No	No	No	No	No	No	No
SN-O-01	No	No	No		Yes	Yes	Yes	No	No	Yes
SN-O-02	No	No	No	Yes		Yes	Yes	No	No	Yes
SN-O-03	No	No	No	Yes	Yes		Yes	No	No	Yes
SN-O-04	No	No	No	Yes	Yes	Yes		No	Yes	Yes
SN-O-05	No	No	No	No	No	No	No		No	Yes
SN-O-06	No	No	No	No	No	No	Yes	No		Yes
SN-O-08	No	No	No	Yes		Yes	Yes	Yes	Yes	

Decommissioning

The details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Offshore Decommissioning Plan (see Commitment ID CO21 in **Volume 2, Appendix 6.3 Commitments Register**).

For this assessment, it is assumed that interactions during the decommissioning phase would be of similar nature to, and no worse than, those identified during the construction phase.

Table 15-20 Interaction Assessment – Phase and Lifetime Effects

Receptor	Impact ID	Highest Significance Level			Phase Assessment	Lifetime Assessment
		Construction	Operation and Maintenance	Decommissioning		
Commercial vessels, commercial fishing vessels in transit, recreational vessels, emergency responders	SN-C-01, SN-C-02, SN-C-03, SN-O-01, SN-O-02, SN-O-03, SN-O-04, SN-O-08, SN-D-01, SN-D-02, SN-D-03	Tolerable with Mitigation	Tolerable with Mitigation	Tolerable with Mitigation	**Construction**: No greater than individually assessed impact. **Operation**: No greater than individually assessed impact. **Decommissioning**: No greater than individually assessed impact. The details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Offshore Decommissioning Plan (see **Volume 2, Appendix 6.3 Commitments Register**, Commitment ID CO21). For this assessment, it is assumed that inter-relationships during the decommissioning phase would be of similar nature to those identified during the construction phase.	No greater than individually assessed impact. It is therefore considered that over the Project's lifetime, these impacts would not interact to change the overall effect significance.
Emergency responders	SN-O-04, SN-O-06, SN-O-08	N/A	Broadly Acceptable	N/A	**Construction**: No greater than individually assessed impact. **Operation**: No greater than individually assessed impact. **Decommissioning**: No greater than individually assessed impact.	No greater than individually assessed impact. It is therefore considered that over the Project's lifetime, these impacts would not interact to change the overall effect significance.
Commercial vessels, commercial fishing vessels in transit, recreational vessels, emergency responders	SN-O-05, SN-O-08	N/A	Broadly Acceptable	N/A	**Construction**: No greater than individually assessed impact. **Operation**: No greater than individually assessed impact. **Decommissioning**: No greater than individually assessed impact.	No greater than individually assessed impact. It is therefore considered that over the Project's lifetime, these impacts would not interact to change the overall effect significance.

Table 15-21 Monitoring Measures Relevant to Shipping and Navigation

Commitment ID	Proposed Monitoring Measure	How the Monitoring Measure Will be Secured	Relevance to Shipping and Navigation Assessment	Relevance to Impact ID
CO10	A Vessel Traffic Monitoring Plan will be developed and will include provision for monitoring of vessel traffic during the construction phase.	Outline Marine Traffic Monitoring Plan	Monitoring of vessel traffic in and around the DBD Array Area will allow the effectiveness of embedded mitigation measures to be suitably reviewed and any additional mitigation required to be identified.	SN-C-01, SN-C-02, SN-C-03, SN-O-01, SN-O-02, SN-O-03, SN-D-01, SN-D-02, SN-D-03

Table 15-22 Summary of Potential Effects Assessed for Shipping and Navigation

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Frequency of Occurrence	Severity of Consequence	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Construction									
SN-C-01	Vessel displacement –Construction activities associated with the Project for the DBD Array Area	CO7, CO9, CO11, CO16, CO17	All Vessels	Frequent	**Minor**	**Tolerable with Mitigation (not significant)**	N/A	N/A	CO10
	Vessel displacement –Construction activities associated with the Project for the offshore ECC	CO7, CO11, CO16, CO17	All Vessels	Reasonably Probable	**Minor**	**Tolerable with Mitigation(not significant)**	N/A	N/A	CO10
SN-C-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Construction activities associated with the Project for the DBD Array Area	CO7, CO9, CO11, CO16, CO17, CO25	All Vessels	Remote	**Moderate**	**Tolerable with Mitigation(not significant)**	N/A	N/A	CO10
	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Construction activities associated with the Project for the offshore ECC	CO7, CO11, CO17, CO16, CO25	All Vessels	Extremely Unlikely	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	CO10
SN-C-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Construction activities associated with the Project for the DBD Array Area	CO7, CO9, CO11, CO12, CO14, CO16, CO17, CO25	All Vessels	Extremely Unlikely	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	CO10
	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Construction activities associated with the Project for the offshore ECC	CO7, CO11, CO12, CO14 CO16, CO17, CO25	All Vessels	Negligible	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	CO10
Operation and Maintenance									
SN-O-01	Vessel displacement –Maintenance activities or the presence of the Project for the DBD Array Area	CO7, CO9, CO11, CO16, CO17	All Vessels	Frequent	**Minor**	**Tolerable with Mitigation(not significant)**	N/A	N/A	CO10
	Vessel displacement – Maintenance activities or the presence of the Project for the offshore ECC	CO7, CO11, CO16, CO17	All Vessels	Reasonably Probable	**Minor**	**Tolerable with Mitigation(not significant)**	N/A	N/A	CO10

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Frequency of Occurrence	Severity of Consequence	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
SN-O-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Maintenance activities or the presence of the Project for the DBD Array Area	CO7, CO9, CO11, CO16, CO17, CO25	All Vessels	Remote	**Moderate**	**Tolerable with Mitigation(not significant)**	N/A	N/A	CO10
	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Maintenance activities or the presence of the Project for the offshore ECC	CO7, CO11, CO16, CO17, CO25	All Vessels	Extremely Unlikely	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	CO10
SN-O-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Maintenance activities associated with the Project as well as the presence of the Project for the DBD Array Area	CO7, CO9, CO11, CO12, CO14, CO16, CO17, CO25, CO28	All Vessels	Negligible	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	CO10
	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Maintenance activities associated with the Project as well as the presence of the Project for the offshore ECC	CO7, CO11, CO12, CO14, CO16, CO17, CO25, C028	All Vessels	Negligible	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	CO10
SN-O-04	Vessel to structure allision risk for third party vessels due to the presence of project structures – Presence of the Project for the DBD Array Area	CO7, CO9, CO11, CO13, CO15, CO16, CO17, CO25	All Vessels	Extremely Unlikely	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	N/A
SN-O-05	Reduction in under keel clearance due to the presence of cable protection or cable crossings – Presence of cable protection or cable crossings for the Project	CO7. CO11, CO16, CO17, CO23,CO24, CO25, CO28	All Vessels	Extremely Unlikely	**Minor**	**Broadly Acceptable(not significant)**	N/A	N/A	N/A
SN-O-06	Vessel interaction with sub-sea cables associated with the project – Presence of sub-sea cables for the Project	CO11, CO17, CO16, CO23, CO24, CO28	All Vessels	Extremely Unlikely	**Minor**	**Broadly Acceptable(not significant)**	N/A	N/A	N/A
SN-O-08	Reduction of emergency response capability due to increased incident rates and / or reduced access for SAR responders – Presence of the Project	CO2, CO7, CO9, CO11, CO12, CO14, CO16, CO25, CO28	All Vessels	Extremely Unlikely	**Moderate**	**Broadly Acceptable(not significant)**	N/A	N/A	N/A

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Frequency of Occurrence	Severity of Consequence	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Decommissioning									
SN-D-01	Vessel displacement –Decommissioning activities associated with the Project for the DBD Array Area	CO21	The details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Offshore Decommissioning Plan (see Commitment ID CO21 in **Volume 2, Appendix 6.3 Commitments Register**). This will include a detailed assessment of decommissioning impacts and appropriate mitigation measures to avoid significant effects. For this assessment, it is assumed that impacts during the decommissioning phase would be of similar nature to, and no worse than, those identified during the construction phase.						
	Vessel displacement – Decommissioning activities associated with the Project for the offshore ECC								
SN-D-02	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Decommissioning activities associated with the Project for the DBD Array Area								
	Increased vessel to vessel collision risk between third-party vessels due to vessel displacement – Decommissioning activities associated with the Project for the offshore ECC								
SN-D-03	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Decommissioning activities associated with the Project for the DBD Array Area								
	Increased vessel to vessel collision risk between a third-party vessel and a project vessel – Decommissioning activities associated with the Project for the offshore ECC								

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Acronym	Definition
AEZ	Archaeological Exclusion Zones
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
ARPA	Automatic Radar Plotting Aid
CAA	Civil Aviation Authority
CBRA	Cable Burial Risk Assessment
CEA	Cumulative Effects Assessment
COLREGS	The Convention on the International Regulations for Preventing Collisions at Sea
CSIP	Cable Specification and Installation Plan
CTV	Crew Transfer Vessel
DBA	Dogger Bank A
DBB	Dogger Bank B
DBC	Dogger Bank C
DBD	Dogger Bank D
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
dML	Deemed Marine Licence
DW	Deep Water
ECC	Export Cable Corridor
EEA	European Economic Area
EEZ	Exclusive Economic Zone

Acronym	Definition
EIA	Environmental Impact Assessment
ERCoP	Emergency Response Cooperation Plan
ERRV	Emergency Response and Rescue Vessel
ES	Environmental Statement
FLCP	Fisheries Liaison and Coexistence Plan
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FSA	Formal Safety Assessment
GLA	General Lighthouse Authority
GT	Gross Tonnage
HRA	Helicopter Refuge Areas
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ILB	Inshore Lifeboat
IMO	International Maritime Organization
km	Kilometre
LAT	Lowest Astronomical Tide
LOA	Length Overall
m	Metre
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MHWS	Mean High Water Springs

Acronym	Definition
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPCP	Marine Pollution Contingency Plan
nm	Nautical Mile
NRA	Navigational Risk Assessment
NRW	Natural Resources Wales
NSP	National Policy Statement
NUC	Not Under Command
O&M	Operation and Maintenance
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Information Report
PEMP	Pollution Environmental Management Plan
PEXA	Practice and Exercise Area
PLL	Potential Loss of Life
RAM	Restricted in their Ability to Manoeuvre
REZ	Renewable Energy Zone
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
SLoO	Single Line of Orientation
SOLAS	International Convention for the Safety of Life at Sea

Acronym	Definition
TSS	Traffic Separation Scheme
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
ZoI	Zone of Influence