# RWE Renewables UK Dogger Bank South (West) Limited

# RWE Renewables UK Dogger Bank South (East) Limited

# Dogger Bank South Offshore Wind Farms

**Environmental Statement**

**Volume 7**

**Chapter 14 – Shipping and Navigation**

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| Company: | **RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited** | Asset: | **Development** |
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## Glossary

| Term | Definition |
|---|---|
| Allision | The act of striking or collision of a moving vessel against a stationary object. |
| Array Areas | The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables would be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area. |
| Automatic Identification System (AIS) | A system by which vessels automatically broadcast their identity and key statistics including location, destination, length, speed and current status, e.g., under power. Most commercial vessels and United Kingdom/European Union fishing vessels over 15m length are required to carry AIS. |
| Baseline | The existing conditions as represented by the latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of the Projects. |
| Collision | The act or process of colliding (crashing) between two moving objects. |
| Cumulative Effects | The combined effect of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor / resource. |
| Cumulative Effects Assessment (CEA) | The assessment of the combined effect of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor/resource. |
| Dogger Bank South (DBS) Offshore Wind Farms | The collective name for the two Projects, DBS East and DBS West. |

| Term | Definition |
| --- | --- |
| Electrical Switching Platform (ESP) | The Electrical Switching Platform (ESP), if required would be located either within one of the Array Areas (alongside an Offshore Converter Platform (OCP)) or the Export Cable Platform Search Area. |
| Environmental Impact Assessment (EIA) | A statutory 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, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES). |
| Export Cable Platform Search Area | The Export Cable Platform Search Area is located mid-way along the Offshore Export Cable Corridor and is the area of search for the Electrical Switching Platform (ESP). |
| Export Cable Platform Search Area Shipping and Navigation Study Area | A buffer of ten nautical miles applied around the Export Cable Platform Search Area. |
| Formal Safety Assessment (FSA) | A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity. |
| Future Case | The assessment of risk based on the predicted growth in future shipping densities and traffic types as well as foreseeable changes in the marine environment. |
| Main Commercial Route | Defined transit route (mean position) of commercial vessels identified within each Shipping and Navigation Study Area. |
| Marine Guidance Note (MGN) | A system of guidance notes issued by the Maritime and Coastguard Agency which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping. |

| Term | Definition |
|---|---|
| Navigational Risk Assessment (NRA) | A document which assesses the hazards to shipping and navigation of a proposed Offshore Renewable Energy Installation based upon Formal Safety Assessment. |
| Offshore Development Area | The Offshore Development Area for ES encompasses both the DBS East and West Array Areas, the Inter-Platform Cable Corridor, the Offshore Export Cable Corridor, plus the associated Construction Buffer Zones. |
| Offshore Export Cable Corridor | This is the area which will contain the offshore export cables (and potentially the ESP) between the Offshore Converter Platforms and Transition Joint Bays at the landfall. |
| Offshore Export Cable Corridor Shipping and Navigation Study Area | A buffer of two nautical miles applied around the Offshore Export Cable Corridor. |
| Offshore Renewable Energy Installation (OREI) | As defined by Marine Guidance Note 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (Maritime and Coastguard Agency, 2021). For the purposes of this report and in keeping with the consistency of the Environmental Impact Assessment, OREI can mean offshore wind turbines and the associated electrical infrastructure such as offshore substations. |
| 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. |
| Safety Zone | A statutory marine zone demarcated for the purposes of safety around a possibly hazardous installation or works / construction area. |

| Term | Definition |
|---|---|
| Scoping opinion | The report adopted by the Planning Inspectorate on behalf of the Secretary of State. |
| Scoping report | The report that was produced in order to request a Scoping Opinion from the Secretary of State. |
| Scour protection | Protective materials placed on the seabed to avoid sediment erosion from the base of the wind turbine foundations and offshore platform foundations due to water flow. |
| Shipping and Navigation Study Area | A buffer of ten nautical miles applied around each Array Area. The Shipping and Navigation Study Areas for DBS East and DBS West are referred to as the 'DBS East Shipping and Navigation Study Area' and 'DBS West Shipping and Navigation Study Area' respectively. |
| The Applicants | The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake). |
| The Projects | DBS East and DBS West (collectively referred to as the Dogger Bank South offshore wind farms). |
| 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. |

## Acronyms

| Term | Definition |
|---|---|
| AIS | Automatic Identification System |
| ALARP | As Low as Reasonably Practicable |
| ARPA | Automatic Radar Plotting Aid |
| BEIS | Department for Business, Energy and Industrial Strategy |
| CAA | Civil Aviation Authority |
| CD | Chart Datum |
| CEA | Cumulative Effect Assessment |
| COLREGs | Convention on the International Regulations for Preventing Collisions at Sea |
| CTV | Crew Transfer Vessel |
| DBS | Dogger Bank South |
| DCO | Development Consent Order |
| DECC | Department of Energy and Climate Change |
| DfT | Department for Transport |
| dML | Deemed Marine Licence |
| EEA | European Economic Area |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| ERCoP | Emergency Response Cooperation Plan |
| ES | Environmental Statement |

| Term | Definition |
|---|---|
| FLO | Fisheries Liaison Officer |
| FSA | Formal Safety Assessment |
| GLA | General Lighthouse Authority |
| GT | Gross Tonnage |
| HRA | Helicopter Refuge Area |
| HVDC | High Voltage Direct Current |
| IALA | International Association of Marine Aids to Navigation and Lighthouse Authorities |
| IMO | International Maritime Organization |
| IPMP | In-Principle Monitoring Plan |
| LOA | Length Overall |
| m | Metre |
| MAIB | Marine Accident Investigation Branch |
| MCA | Maritime and Coastguard Agency |
| MDA | Managed Danger Area |
| MGN | Marine Guidance Note |
| MHWS | Mean High Water Springs |
| MMO | Marine Management Organisation |
| MoD | Ministry of Defence |
| MSL | Mean Sea Level |
| nm | Nautical Mile |

| Term | Definition |
|---|---|
| $nm^2$ | Square Nautical Mile |
| NPS | National Policy Statement |
| NRA | Navigational Risk Assessment |
| NUC | Not Under Command |
| OREI | Offshore Renewable Energy Installation |
| PEIR | Preliminary Environmental Information Report |
| PEXA | Practice and Exercise Area |
| PLL | Potential Loss of Life |
| Radar | Radio Detection and Ranging |
| RAM | Restricted in Ability to Manoeuvre |
| RNLI | Royal National Lifeboat Institution |
| RoRo | Roll-on / Roll-off Cargo |
| RoPax | Roll-on / Roll-off Passenger |
| RYA | Royal Yachting Association |
| SAR | Search and Rescue |
| SLoO | Single Line of Orientation |
| SOLAS | International Convention for the Safety of Life at Sea |
| UK | United Kingdom |
| UKHO | United Kingdom Hydrography Office |
| VHF | Very High Frequency |

# 14 Shipping and Navigation

## 14.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the likely significant effects of the Projects on shipping and navigation. The chapter provides an overview of the existing environment for the proposed Offshore Development Area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Projects.

2. The assessment should be read in conjunction with the following linked chapters in **Volume 7**:

- **Chapter 5 Project Description (application ref: 7.5)**;
- **Chapter 13 Commercial Fisheries (application ref: 7.13)**;
- **Chapter 15 Aviation and Radar (application ref: 7.15)**; and
- **Chapter 16 Infrastructure and Other Users (application ref: 7.16)**.

Additional information to support the shipping and navigation assessment includes:

- **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**.

## 14.2 Consultation

3. Consultation with regard to shipping and navigation has been undertaken in line with the general process described in **Volume 7, Chapter 7 Consultation (application ref: 7.7)** and the **Consultation Report (application ref: 5.1)**. The key elements to date include Environmental Impact Assessment (EIA) scoping, formal consultation on the Preliminary Environmental Information Report (PEIR) under section 42 of the Planning Act 2008, and meetings with relevant shipping and navigation stakeholders including (but not limited to):

- Chamber of Shipping;
- Trinity House;
- Maritime and Coastguard Agency;
- Royal Yachting Association; and
- Cruising Association.

4. The feedback received throughout this process has been considered in preparing the ES. This chapter has been updated following consultation in order to produce the final assessment submitted within the Development Consent Order (DCO) application. **Volume 7, Appendix 14-1 (application ref: 7.14.14.1)** provides a summary of the consultation responses received to date of relevance to this topic, and details how the comments have been addressed within this chapter.

## 14.3 Scope

### 14.3.1 Shipping and Navigation Study Areas

5. The Shipping and Navigation Study Areas have been defined on the basis of 10nm buffers of each of the Array Areas, as shown on **Volume 7, Figure 14-1 (application ref: 7.14.1)**. Using a buffer of 10nm is standard practice for defining shipping and navigation assessment study areas and has been used in the majority of UK offshore wind farms as it captures relevant routeing in the area that may be affected, whilst remaining site-specific.

6. A 2nm buffer has been applied around the Offshore Export Cable Corridor (hereafter the 'Offshore Export Cable Corridor Shipping and Navigation Study Area') as also shown on **Volume 7, Figure 14-1 (application ref: 7.14.1)**.

7. A 10nm buffer has been applied around the Export Cable Platform Search Area (the 'Export Cable Platform Search Area Shipping and Navigation Study Area') as shown on **Volume 7, Figure 14-2 (application ref: 7.14.1)**.

8. As with each Array Area Shipping and Navigation Study Area, the Shipping and Navigation Study Areas relating to the Offshore Export Cable Corridor and Export Cable Platform Search Area have been defined to capture relevant receptors and their movements within, and in proximity to, the Offshore Export Cable Corridor and Export Cable Platform Search Area. These study areas are also considered standard for shipping and navigation assessment around cable corridors and export cable platforms for UK offshore wind farms.

## 14.3.2 Realistic Worst Case Scenario

### 14.3.2.1 General Approach

9. The realistic worst case design parameters for likely significant effects scoped into the ES for the shipping and navigation assessment are summarised in **Table 14-1**. These are based on the project parameters described in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**, which provides further details regarding specific activities and their durations. How these parameters relate to each impact is detailed in section 6.7 of **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**.

10. In addition to the design parameters set out in **Table 14-1**, consideration is also given to the different development scenarios still under consideration and the possible phasing of the construction as set out in sections 14.3.2.2 to 14.3.2.4.

11. Two indicative array layouts are considered as part of the realistic worst case scenario, consisting of full build out of the Array Areas (Layout A) and a demonstration of minimum spacing (Layout B). Further details pertaining to these two indicative array layouts is provided in section 6 of **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**.

*Table 14-1 Realistic Worst Case Design Parameters*

| Element of Projects | Parameter | | | |
|---|---|---|---|---|
| | **DBS East or DBS West in-isolation** | **DBS West and DBS East concurrently** | **DBS West and DBS East sequentially** | **Notes and rationale** |
| **Construction** | | | | |
| Array Areas | Construction in isolation of up to five years.<br>Full build out of either DBS East or DBS West taken forward (Layout A).<br>Up to 175nm of array cables for DBS East or up to 175nm of array cables for DBS West.<br>Up to 62nm of inter platform cables for DBS East and up to 70nm of inter platform cables for DBS West.<br>Buoyed construction area encompassing the maximum extent of either the Offshore Development Area for DBS East or Offshore Development Area for DBS West.<br>Presence of 500m construction safety zones and 50m pre commissioning safety zones.<br>Up to 82 construction vessels on-site simultaneously and up to 3,857 round trips to port. | Concurrent construction of DBS East and DBS West of up to five years.<br>Full build out of the Array Areas (Layout A)<br>Up to 350nm of array cables.<br>Up to 185nm of inter platform cables.<br>Buoyed construction area encompassing the maximum extent of the Array Areas.<br>Presence of 500m construction safety zones and 50m pre commissioning safety zones.<br>Up to 137 construction vessels on-site simultaneously and up to 7,512 round trips to port. | Sequential construction of DBS East and DBS West of up to seven years.<br>Full build out of the Array Areas (Layout A).<br>Up to 350nm of array cables.<br>Up to 185nm of inter platform cables.<br>Buoyed construction area encompassing the maximum extent of the Array Areas.<br>Presence of 500m construction safety zones and 50m pre commissioning Safety Zones.<br>Up to 137 construction / decommissioning vessels on-site simultaneously and up to 7,512 round trips to port. | Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect of impacts. |
| Offshore Export Cable Corridor | Up to two offshore export cables each of 102nm length for DBS East or up to four offshore export cables each of 83nm length for DBS West.<br>Indicative separation of 50m between offshore export cables. | Up to four offshore export cables including two of 102nm length (for DBS East) and two of 83nm length (for DBS West).<br>Indicative separation of 50m between offshore export cables. | Up to four offshore export cables including four of 107nm length (for DBS East) and two of 85nm length (for DBS West).<br>Indicative separation of 50m between offshore export cables. | Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect of impacts. |

| Element of Projects | Parameter | | | |
|---|---|---|---|---|
| | DBS East or DBS West in-isolation | DBS West and DBS East concurrently | DBS West and DBS East sequentially | Notes and rationale |
| **Operation** | | | | |
| Array Areas | Maximum operational life of 30 years.<br>Full build out of DBS East or DBS West taken forward (Layout A).<br>Up to 100 wind turbines on four-legged pile jackets with sea surface dimensions of 27.5x27.5m.<br>Up to four platforms with topside dimensions of 125x110m.<br>Minimum spacing of 830m between array structures (Layout B).<br>Single line of orientation (SLoO) in array layout.<br>Minimum wind turbine air gap of 34m above Mean Sea Level (MSL).<br>Up to 175nm of array cables for DBS East or up to 175nm of array cables for DBS West.<br>Up to four inter-platform cables with combined 62nm length for DBS East and combined 70nm length for DBS West.<br>Target burial depth for array cables and inter-platform cables of between 0.5 and 1m.<br>Indicative maximum proportion of array cable protection requirement of 10%.<br>Indicative maximum proportion of inter-platform cable protection requirement of 10%.<br>Up to 15 cable / pipeline crossings per array cable for DBS East and 25 cable / pipeline crossings per array cable for DBS West.<br>Up to four cable / pipeline crossings per inter-platform cable for DBS East and two cable / pipeline crossings per inter-platform cable for DBS West. | Maximum operational life of 30 years.<br>Full build out of the Array Areas (Layout A).<br>Up to 200 wind turbines on four-legged pile jackets with sea surface dimensions of 27.5x27.5m.<br>Up to eight platforms with topside dimensions of 125x110m.<br>Minimum spacing of 830m between array structures (Layout B).<br>Single line of orientation in array layout.<br>Minimum wind turbine air gap of 34m above MSL.<br>Up to 350nm of array cables.<br>Up to four inter-platform cables with combined 185nm length.<br>Target burial depth for array cables and inter-platform cables of between 0.5 and 1m.<br>Indicative maximum proportion of array cable protection requirement of 10%.<br>Indicative maximum proportion of inter-platform cable protection requirement of 10%.<br>Up to 40 cable / pipeline crossings per array cable.<br>Up to 21 cable / pipeline crossings per inter-platform cable.<br>Indicative height of protection for array cables (including crossings) of 1.0m.<br>Indicative height of protection for inter-platform cables (including crossings) of 1.4m.<br>Presence of 500m safety zones during major maintenance. | Maximum operational life of 32 years.<br>Full build out of the Array Areas (Layout A).<br>Up to 200 wind turbines on four-legged pile jackets with sea surface dimensions of 27.5x27.5m.<br>Up to eight platforms with topside dimensions of 125x110m.<br>Minimum spacing of 830m between array structures (Layout B).<br>Single line of orientation in array layout.<br>Minimum wind turbine air gap of 34m above MSL.<br>Up to 350nm of array cables.<br>Up to four inter-platform cables with combined 185nm length.<br>Target burial depth for array cables and inter-platform cables of between 0.5 and 1m.<br>Indicative maximum proportion of array cable protection requirement of 10%.<br>Indicative maximum proportion of inter-platform cable protection requirement of 10%.<br>Up to 40 cable / pipeline crossings per array cable.<br>Up to 21 cable / pipeline crossings per inter-platform cable.<br>Indicative height of protection for array cables (including crossings) of 1.0m.<br>Indicative height of protection for inter-platform cables (including crossings) of 1.4m.<br>Presence of 500m safety zones during major maintenance. | Largest possible extent of infrastructure, greatest number of simultaneous vessel activities and greatest duration resulting in the maximum spatial and temporal effect of impacts. |

| Element of Projects | Parameter | | | |
|---|---|---|---|---|
| | DBS East or DBS West in-isolation | DBS West and DBS East concurrently | DBS West and DBS East sequentially | Notes and rationale |
| | Indicative height of protection for array cables (including crossings) of 1.0m.<br>Indicative height of protection for inter-platform cables (including crossings) of 1.4m.<br>Presence of 500m safety zones during major maintenance.<br>Up to 20 operation and maintenance vessels on-site simultaneously and up to 239 annual round trips to port. | Up to 21 operation and maintenance vessels on-site simultaneously and up to 473 annual round trips to port. | Up to 21 operation and maintenance vessels on-site simultaneously and up to 473 annual round trips to port. | |
| Offshore Export Cable Corridor | Maximum operational life of 30 years.<br>Up to one platform with topside dimensions of 125x110m, located within the Export Cable Platform Search Area.<br>Up to two offshore export cables each of 102nm length for DBS East or up to four offshore export cables each of 83nm length for DBS West.<br>Indicative separation of 50m between offshore export cables.<br>Target burial depth for offshore export cables of between 0.5 and 1.5m.<br>Indicative maximum proportion of export cable protection requirement of 20%.<br>Up to 24 cable / pipeline crossings per offshore export cable for both DBS East and DBS West.<br>Indicative height of protection for offshore export cables (including crossings) of 1.4m. | Maximum operational life of 30 years.<br>Up to one platform with topside dimensions of 125x110m, located within the Export Cable Platform Search Area.<br>Up to four offshore export cables including four of 102nm length (for DBS East) and two of 83nm length (for DBS West).<br>Indicative separation of 50m between offshore export cables.<br>Target burial depth for offshore export cables of between 0.5 and 1.5m.<br>Indicative maximum proportion of export cable protection requirement of 20%.<br>Up to 48 cable / pipeline crossings per offshore export cable for both DBS East and DBS West.<br>Indicative height of protection for offshore export cables (including crossings) of 1.4m. | Maximum operational life of 32 years.<br>Up to one platform with topside dimensions of 125x110m, located within the Export Cable Platform Search Area.<br>Up to four offshore export cables including two of 107nm length (for DBS East) and two of 85nm length (for DBS West).<br>Indicative separation of 50m between offshore export cables.<br>Target burial depth for offshore export cables of between 0.5 and 1.5m.<br>Indicative maximum proportion of export cable protection requirement of 20%.<br>Up to 48 cable / pipeline crossings per offshore export cable.<br>Indicative height of protection for offshore export cables (including crossings) of 1.4m. | Largest possible extent of sub-sea infrastructure and greatest duration resulting in the maximum spatial and temporal effect of impacts. |
| **Decommissioning** | | | | |
| No final decision regarding the final decommissioning policy for the offshore project infrastructure including landfall, has yet been made. It is also recognised that legislation and industry best practice change over time. However, it is likely that offshore project infrastructure would be removed above the seabed and reused or recycled where practicable. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst case scenario, the impacts would be no greater than those identified for the construction phase. A decommissioning plan for the offshore works would be submitted prior to any decommissioning commencing. | | | | |

#### 14.3.2.2 Development Scenarios

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

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

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

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

15. The three development scenarios to be considered for assessment purposes are outlined in **Table 14-2.**

*Table 14-2 Development Scenarios and Construction Durations*

| Development scenario | Description | Total Maximum Construction Duration (Years) | Maximum construction Duration Offshore (Years) | Maximum construction Duration Onshore (Years) |
|---|---|---|---|---|
| In-isolation | Either DBS East or DBS West is built in-isolation | Five | Five | Four |

| Development scenario | Description | Total Maximum Construction Duration (Years) | Maximum construction Duration Offshore (Years) | Maximum construction Duration Onshore (Years) |
|---|---|---|---|---|
| Sequential | DBS East and DBS West are both built sequentially, either Project could commence construction first with staggered / overlapping construction | Seven | A five year period of construction for each project with a lag of up to two years in the start of construction of the second project– reflecting the maximum duration of effects of seven years. | Construction works to be completed for both Projects simultaneously in the first four years, with additional works in the substation zone and at cable joint bays in the following two years. Maximum duration of effects of six years. |
| Concurrent | DBS East and DBS West are both built concurrently reflecting the maximum peak effects | Five | Five | Four |

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

17. Any differences between the Projects, or differences that could result from the manner in which the first and the second Projects are built (concurrent or sequential and the length of any lag) are identified and discussed where relevant in section 14.6. For each potential impact, the worst case construction scenario for the in-isolation scenario and the concurrent or sequential scenario is presented. The worst case scenario presented for the concurrent or sequential scenario will depend on which of these is the worst case for the potential impact being considered. The justification for what constitutes the worst case is provided, where necessary, in section 14.6.

#### 14.3.2.3 Operation Scenarios

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

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

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

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

#### 14.3.2.4 Decommissioning Scenarios

21. Decommissioning scenarios are described in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**. Decommissioning arrangements will be agreed through the submission of a Decommissioning Programme prior to construction, however for the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

### 14.3.3 Embedded Mitigation

22. This section outlines the mitigation relevant to the shipping and navigation assessment, which has been incorporated into the design of the Projects or constitutes standard mitigation measures for this topic (**Table 14-3**). Mitigation is also detailed within **Volume 8, Commitments Register (application ref: 8.6)** and cross-referenced within **Table 14-3.** Where additional mitigation measures are proposed, these are detailed in the impact assessment (section 14.4).

*Table 14-3 Embedded Mitigation*

| Parameter | Embedded Mitigation Measures | Where commitment is secured |
|---|---|---|
| Aids to navigation management plan | One or more Aids To Navigation Management Plans (including marking and lighting) for the Projects would be agreed with the MMO following consultation with MCA, UKHO and Trinity House post-consent. | Aids to Navigation Management Plan<br>Deemed Marine Licence (DML) 1 & 2 - Condition 10<br>DML 3 & 4 - Condition 8<br>DML 5 - Condition 6 |
| Application for safety zones | One or more applications would be made to DESNZ for safety zones post consent including up to 500m around ongoing activities during construction, major maintenance, and decommissioning and up to 50m for installed structures pre commissioning. The application will be made in compliance with MGN654. This would to ensure navigational safety and minimise risk of snagging. | Safety Zone Statement<br>DML 1 & 2 - Condition 18<br>DML 3 & 4 - Condition 16<br>DML 5 - Condition 12 |

| Parameter | Embedded Mitigation Measures | Where commitment is secured |
|---|---|---|
| Cable burial risk assessment | Final Cable Burial Risk Assessments and Cable Protection Plans will be produced in line with the detail provided in the **Cable Statement (application ref: 8.20)** that has been submitted with the DCO application, and in accordance with conditions attached to the DMLs in the **Draft DCO (application ref: 3.1)**. Any damage, destruction or decay of cables must be notified to Maritime Coastguard Agency (MCA), Trinity House, Kingfisher and United Kingdom Hydrographic Office (UKHO) no later than 24 hours after discovered. | DML 1 &2 - Condition 15<br>DML 3 & 4 - Condition 13<br>DML 5 - Condition 11 |
| Charting of infrastructure | Aids to navigation (marking and lighting) will be deployed in accordance with the latest relevant available standard industry guidance.<br>The United Kingdom Hydrographic Office (UKHO) will be notified of both the commencement, progress, and completion of offshore construction works, to allow marking of installed infrastructure on nautical charts. | DML 1 & 2 - Condition 10<br>DML 3 &4 - Condition 8<br>DML 5 - Condition 6 |
| Compliance with MGN 654 | The Projects will ensure compliance with MGN 654 and its annexes, where applicable, including completion of a SAR checklist. | DML 1 & 2 - Condition 18<br>DML 3 & 4-Condition 16<br>DML 5 - Condition 12 |

| Parameter | Embedded Mitigation Measures | Where commitment is secured |
|---|---|---|
| Fishing liaison | Ongoing liaison with the fishing industry through the Fisheries Liaison Officer (FLO) and adhere to good practice guidance with regards to fisheries liaison.<br><br>Advance warning and accurate location details will be provided to fishing fleets of construction, maintenance and decommissioning activities, associated safety zones and advisory passing distances; communication will be via timely and efficient Notices to Mariners (NtMs) and Kingfisher Bulletins. This is to ensure that the fishing industry is fully informed in advance of any offshore activities.<br><br>This will be committed to within the **Fisheries Liaison and Coexistence Plan(s) (application ref: 8.28).** | Fisheries Liaison and Coexistence Plan<br><br>DML 1 & 2 - Condition 18<br><br>DML 3 & 4 - Condition 20<br><br>DML 5 - Condition 14 |
| Guard vessel(s) | Where appropriate, guard vessels will also be used to ensure navigational safety to mitigate impacts which pose a risk to surface navigation during construction and maintenance.<br><br>This will be committed to within the **Fisheries Liaison and Coexistence Plan(s) (application ref: 8.28).** | DML 1 & 2 - Condition 15<br><br>DML 3 & 4 - Condition 13<br><br>DML 5 - Condition 11 |
| Layout plan | One or more Layout Plan(s) setting out the relevant proposed details of the Projects within the Offshore Development Area would be agreed with the MMO following appropriate consultation with Trinity House and the MCA. | Layout Plan<br><br>DML 1 &2 - Condition 15<br><br>DML 3 & 4 - Condition 13<br><br>DML 5 - Condition 11 |

| Parameter | Embedded Mitigation Measures | Where commitment is secured |
|---|---|---|
| Lighting and marking | Lighting and marking of obstacles would be in accordance with the latest relevant industry guidance, as required by Trinity House, MCA, and Civil Aviation Authority (CAA).<br>Final requirements will be detailed and agreed pre-construction in a Lighting and Marking Plan(s) produced as part of the Aids to Navigation Management Plan(s). | Aids to Navigation Management Plan<br>DML 1 & 2 - Condition 10<br>DML 3 & 4 - Condition 8<br>DML 5 - Condition 6 |
| Marine coordination for project vessels | Marine coordination would be implemented to manage project vessels throughout construction and maintenance periods, and will be detailed in one or more  Emergency Response Cooperation Plans (ERCoPs) produced in compliance with MGN654. | ERCoPs<br>DML 1 & 2 - Condition 18<br>DML 3 & 4 - Condition 16<br>DML 5 - Condition 12 |
| Minimum blade clearance | There would be a minimum blade tip clearance (air draft height) of at least 34m above MSL.<br>Project parameters would be secured within the **Draft DCO (application ref: 3.1).** | DML 1 & 2 - Condition 2 |

| Parameter | Embedded Mitigation Measures | Where commitment is secured |
|---|---|---|
| Pollution Prevention Measures | Due to the presence and movements of construction and operation and maintenance vessels/equipment there is the potential for spills and leaks which could result in changes to water quality. All vessels involved will be required to comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78.<br><br>The production of one or more Project Environmental Management Plans (PEMPs) is a Condition of the five Deemed Marine Licences (DMLs). The final PEMP(s) would be in accordance with the **Outline PEMP (application ref: 8.21**) and would detail all procedures and measures (in the form of a Marine Pollution Contingency Plan (MPCP)) to be followed during the different phases of the Projects to minimise the risk of, and effects in, the event of an accidental spill. The final PEMP will identify all potential sources and types of accidental pollution for the relevant project phase and set out the proposed mitigation measures and will be developed in consultation with key stakeholders for approval by the MMO. The individual Projects and phases may require separate final PEMP(s). In addition separate PEMPs may also be produced for individual packages. | PEMP<br><br>MPCP<br><br>DML 1 & 2 - Condition 15<br><br>DML 3 & 4 - Condition 13<br><br>DML 5 - Condition 11 |
| Project vessel compliance with international marine regulations | Project vessels will ensure compliance with Flag State regulations including the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974). This is detailed within the **Outline PEMP (application ref: 8.21).** | PEMP<br><br>DML 1 & 2 - Conditions 15 & 21<br><br>DML 3 & 4 - Conditions 13 & 19<br><br>DML 5 - Conditions 11 & 15 |

| Parameter | Embedded Mitigation Measures | Where commitment is secured |
| --- | --- | --- |
| Promulgation of information | The Projects will ensure that local Notifications to Mariners are updated and reissued at weekly intervals during construction activities and at least five days before any planned operation and maintenance works.<br>Advance warning and accurate location details of construction, maintenance and decommissioning operations (including details of vessel routes, timings and locations), associated safety zones and advisory passing distances will be given via Kingfisher Bulletins at least 14 days prior where possible. | DML 1 & 2 - Condition 9<br>DML 3 & 4 - Condition 7<br>DML 5 - Condition 5 |
| Traffic monitoring | Monitoring of vessel traffic will be undertaken for the duration of the construction phase and during the first three years of the operation and maintenance phase.<br>This would be secured through carrying out vessel traffic monitoring in accordance with the **Outline Marine Traffic Monitoring Plan (application ref: 8.30)**. | Marine Traffic Monitoring Plan<br>DML 1 & 2 - Conditions 19 & 20<br>DML 3 & 4 - Conditions 21 &22<br>DML 5 - Conditions 15 & 16 |
| Under keel clearance | Where scour protection is required, MGN 654 will be adhered to with respect to changes greater than 5% to the charted water depth referenced to CD in consultation with the MCA and Trinity House.<br>Compliance with MGN 654 would be secured within the **Draft DCO (application ref: 3.1)**. | DML 1 & 2 - Condition 18<br>DML 3 & 4 - Condition 16<br>DML 5 - Condition 12 |

23. An offshore Decommissioning Plan would be developed prior to commencement of the offshore works based on the relevant guidance and legislation at the time. The Decommissioning Plan would contain all the required mitigation measures. The Decommissioning Plan would be secured by Requirement 7 of **Volume 3, Draft DCO (application ref: 3.1)**.

# 14.4 Assessment Methodology

## 14.4.1 Policy, Legislation and Guidance

### 14.4.1.1 National Policy Statements

24. The assessment of potential impacts upon shipping and navigation has been made with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for shipping and navigation, as detailed in the NPS for Renewable Energy Infrastructure (EN-3) (Department for Energy Security & Net Zero (DESNZ), 2023a) and the NPS for Ports, are summarised in **Table 14-4** together with an indication of the section of this chapter where each is addressed.

25. Although the overarching guidance principles set out in the Overarching NPS for Energy (EN-1) (DESNZ, 2023b) and the NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2023c) do not specifically refer to shipping and navigation, they have been considered.

*Table 14-4 NPS Assessment Requirements*

| NPS Requirement | NPS Reference | ES Section Reference |
|---|---|---|
| **EN-3 NPS for Renewable Energy Infrastructure** | | |
| To ensure safety of shipping applicants should reduce risks to navigational safety to as low as reasonably practicable (ALARP). | Paragraph 2.8.179 | ALARP principles have been applied to the impact assessment methodology in line with the Formal Safety Assessment (FSA) process prescribed in MGN 654 (see section 14.4.3). |
| 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 Marine Management Organisation (MMO) or Natural Resources Wales (NRW) in Wales, MCA, the relevant General Lighthouse Authority (GLA), such as Trinity House, the relevant industry bodies (both | Paragraph 2.8.184 | Consultation with relevant stakeholders has been a key input to the impact assessment and includes engagement with the MCA, Trinity House, and RYA (see section 14.2). |

| NPS Requirement | NPS Reference | ES Section Reference |
|---|---|---|
| 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. | | |
| The presence of the wind turbines can also have impacts on communication and shipborne and shore-based Radar systems. | Paragraph 2.8.186 | Impacts relating to navigation, communication, and position fixing equipment have been considered (see section 13 of **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**). |
| Prior to undertaking assessments applicants should consider information on internationally recognised sea lanes, which is publicly available. | Paragraph 2.8.187 | Main Commercial Routes – which are international in nature – have been identified (see section 14.6). There are no IMO routeing measures in proximity to the Projects. |
| Applicants must undertake an NRA in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above [Paragraph 2.8.174]. | Paragraph 2.8.189 | An NRA has been undertaken in line with MGN 654 and has been informed by consultation with shipping and navigation stakeholders (see **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**). |
| The NRA would for example necessitate:<br>• A survey of vessel traffic in the vicinity of the proposed wind farm; | Paragraph 2.8.190 | Vessel traffic surveys have been undertaken for the Array Areas and Export Cable Platform Search Area.<br>An NRA has been undertaken in line with MGN 654 (see |

| NPS Requirement | NPS Reference | ES Section Reference |
|---|---|---|
| • 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 marine guidance; and<br>• Cumulative and in-combination risks associated with the development and other developments (including other wind farms) in the same area of sea. | | **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**).<br>A full CEA has been undertaken with consideration of other developments including offshore wind farms (see section 14.8). |
| Applicants should undertake a detailed NRA, which includes Search and Rescue (SAR) Response Assessment and emergency response assessment prior to applying for consent. The specific SAR requirements would then be discussed and agreed post-consent. | Paragraph 2.8.195 | 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 (see section 14.6). |
| Mitigation measures would include site configuration, lighting and marking of projects to take account of any requirements of the GLA. | Paragraph 2.8.259 | A layout plan and lighting and marking as required Trinity House, MCA, and CAA are included as embedded mitigation measures (see section 14.3.3). |
| **NPS for Ports** | | |
| Potential effects on recreational craft should be considered. | Paragraph 5.14.2 | Socioeconomics impacts are assessed in **Volume 7, Chapter 28 Socioeconomics (application ref: 7.28)**. |
| Where likely to occur, socio-economic impacts should be incorporated. | Paragraph 5.14.4 | |
| The existing socioeconomic conditions should be described and the impact correlated with local planning policies. | Paragraph 5.14.5 | |

#### 14.4.1.2 Other

26. In addition to the NPS, there a number of pieces of policy and guidance applicable to the assessment of shipping and navigation. These include:

- 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 International Maritime Organization (International Maritime Organization (IMO)) Rule-Making Process (IMO, 2018);
- MGN 372 Amendment 1 (Merchant and Fishing) Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs (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)

27. Further detail is provided in **Volume 7, Chapter 3 Policy and Legislative Context (application ref: 7.3)**.

### 14.4.2 Data and Information Sources

#### 14.4.2.1 Site Specific Surveys

28. To provide site specific and up to date information on which to base the impact assessment for the Array Areas, three vessel traffic surveys were conducted, consisting of two winter surveys (14 days at each Array Area in January / February 2022 and October / November 2022) and one summer survey (14 days at each Array Area in July 2022).

29. The first winter vessel traffic survey and summer vessel traffic survey were undertaken by the guard vessel *Star of Hope*, while the second winter vessel traffic survey was undertaken by the guard vessel *Karima*. For each survey, the survey vessel was situated at the DBS East Array Area for 14 full days followed by the DBS West Array Area for 14 full days.

30. The first winter vessel traffic survey was undertaken prior to the start of offshore construction works for the Dogger Bank A Offshore Wind Farm and will have been undertaken more than 24 months prior to the time of the DCO application. Therefore, this survey is considered as a secondary source only, with the summer and second winter vessel traffic surveys (totalling 28 days at each of the Array Areas) serving as the MGN 654 (MCA, 2021) compliant vessel traffic data.

31. To provide site specific and up to date information on which to base the impact assessment for the Export Cable Platform Search Area, vessel surveys in January / February and June / July 2023 were conducted in order to analyse traffic data for seasonal winter and summer periods respectively.

32. The winter survey was undertaken by the *Karima*, with the *Star of Hope* conducting the summer survey. For each survey, the respective survey vessel was situated within the Export Cable Platform Search Area for 14 full days.

33. A number of vessel tracks recorded during the surveys were deemed as temporary (non-routine) in nature, such as the tracks of the survey vessels themselves and the tracks of vessels associated with the ongoing construction of Dogger Bank A, and these vessels were therefore excluded from the vessel traffic Baseline. Other temporary traffic excluded from the analysis included the tracks of a vessel undertaking a geophysical survey.

#### 14.4.2.2 Other Available Sources

34. Other sources that have been used to inform the assessment are listed in **Table 14-5**.

*Table 14-5 Other Available Data and Information Sources*

| Data Set | Spatial Coverage | Year | Notes |
|---|---|---|---|
| Winter vessel traffic (14 days, January / February) | DBS East and DBS West Shipping and Navigation Study Areas | 2022 | Secondary source collected on-site including use of AIS, Radar and visual observations. |
| Vessel traffic (79 days, April to July 2022) | DBS East and DBS West Shipping and Navigation Study Areas | 2022 | Secondary source collected on-site including AIS only. |
| Summer vessel traffic (14 days, July/August) | DBS East and DBS West Shipping and Navigation Study Areas | 2022 | Primary source (compliant with MGN 654) collected on-site including use of AIS, Radar and visual observations. |
| Summer vessel traffic (14 days, July) | Offshore Export Cable Corridor Shipping and Navigation Study Area | 2022 | AIS only collected from shore based receivers and DBS West Array Area. |
| Winter vessel traffic (14 days, October / November) | DBS East and DBS West Shipping and Navigation Study Areas | 2022 | Primary source (compliant with MGN 654) collected on-site including use of AIS, Radar and visual observations. |
| Winter vessel traffic (14 days, October / November) | Offshore Export Cable Corridor Shipping and Navigation Study Area | 2022 | AIS only collected from shore based receivers and DBS West Array Area. |
| Winter vessel traffic (14 days, January / February) | Export Cable Platform Search Area study area | 2023 | Primary source (compliant with MGN 654) collected on-site including use of AIS, Radar and visual observations. |
| Summer vessel traffic (14 days, June / July) | Export Cable Platform Search Area study area | 2023 | Primary source (compliant with MGN 654) collected on-site including use of AIS, Radar and visual observations. |
| Anatec ShipRoutes database | Shipping and Navigation Study Areas | 2022 | Regularly updated based on vessel traffic data throughout the North Sea. |

| Data Set | Spatial Coverage | Year | Notes |
|---|---|---|---|
| Marine Accident Investigation Branch (MAIB) marine incidents | Shipping and Navigation Study Areas | 2002 – 2021 | Latest dataset available. Detailed review limited to latest ten years of data (2012 to 2021) with high level review undertaken for earlier data (2002 to 2011). |
| Royal National Lifeboat Institute (RNLI) marine incidents | Shipping and Navigation Study Areas | 2013 – 2022 | Latest dataset available. |
| Department for Transport (DfT) UK civilian SAR helicopter taskings data | Shipping and Navigation Study Areas | 2015 – 2022 | Latest dataset available. |
| UKHO Admiralty Charts 266, 1187, 1191, and 1192 | In proximity to the Projects | 2023 | Source is updated periodically and therefore may not reflect real time features with total accuracy. |
| UKHO Admiralty Sailing Directions North Sea (West) Pilot NP54 | Central and Southern North Sea | 2021 | Latest publication available. |

### 14.4.3 Impact Assessment Methodology

35. Unlike most other offshore topics, the impact assessment methodology applied is bespoke to shipping and navigation. In particular, the IMO Formal Safety Assessment (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).

36. The following sections describe the methods used to assess the likely significant effects on shipping and navigation.

### 14.4.3.1 Definitions

37. 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 14-6**.

*Table 14-6 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. |

38. 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 14-7** and **Table 14-8**.

*Table 14-7 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 one occurrence per 10,000 years. |

*Table 14-8 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. |

#### 14.4.3.2 Significance of Effect

39. 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 shown in **Table 14-9**.

40. Effects determined to be of **Broadly Acceptable** significance are low risk and not significant in EIA terms. Effects determined to be of **Tolerable with Mitigation** significance are intermediate risk (with the embedded mitigation measures applied) and 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.

*Table 14-9 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 |

### 14.4.4 Cumulative Effect Assessment Methodology

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

42. It is possible to identify a number of projects and plans relevant to the assessment and consider the extent to which Cumulative Effects might arise. section 14.8 presents a screening of projects and plans and an assessment of Cumulative Effects for the impacts deemed relevant, with justification provided for impacts not considered on a cumulative level.

### 14.4.5 Transboundary Effect Assessment Methodology

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

44. For shipping and navigation, the potential for transboundary effects has been identified in relation to international commercial routeing recorded (see section 14.8).

### 14.4.6 Assumptions and Limitations

#### 14.4.6.1 Automatic Identification System Data

45. 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).

46. 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 Automatic Radar Plotting Aid (ARPA) on board the survey vessel. A proportion of smaller vessels also carry AIS voluntarily, typically utilising a Class B AIS device.

#### 14.4.6.2 Historical Incident Data

47. 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 Areas are not located 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.

48. The RNLI incident data cannot be considered comprehensive of all incidents in the Shipping and Navigation Study Areas. Although hoaxes and false alarms are excluded, any incident to which an RNLI resource was not mobilised has not been accounted for in this dataset.

#### 14.4.6.3 United Kingdom Hydrographic Office Admiralty Charts

49. 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. However, during consultation input has been sought from relevant stakeholders regarding the navigational features in the existing environment.

## 14.5 Existing Environment

### 14.5.1 Navigational Features

50. A plot of the navigational features in proximity to the Array Areas and Offshore Export Cable Corridor is presented on **Volume 7**, **Figure 14-3 (application ref: 7.14.1)**.

51. Dogger Bank A is located approximately 4.1nm to the north-east of the Array Areas and is currently under construction, with offshore works having commenced in May 2022 (Dogger Bank Wind Farm, 2022). It covers an area of approximately 150 square nautical miles ($nm^2$) and would comprise 95 wind turbines once commissioned, with this anticipated in 2024. Dogger Bank B (9.2nm north) and Sofia (18.6nm north-east) are also under construction, with offshore works commencing in February 2023 and May 2023, respectively.

52. Dogger Bank A, Dogger Bank B, and Sofia are marked with buoyed construction areas, featuring various cardinal marks and special marks. These would be removed following commissioning of the developments, which is anticipated in 2024 for Dogger Bank A and 2025/26 for Dogger Bank B and Sofia. A special mark is also located at the Munro Gas Field, marking the location of a well.

53. Various oil and gas infrastructure associated with the nearby gas fields, including wells, platforms and manifolds, is located in proximity to the Array Areas. The closest platform to the Array Areas is Cavendish, located approximately 1.6nm south of the DBS East Array Area and directly south of the Offshore Export Cable Corridor.

54. Other nearby oil and gas surface infrastructure include the:

- Munro platform approximately 6.0nm east of the DBS East Array Area;
- Cygnus platforms approximately 6.7nm and 8.9nm north-east of the DBS East Array Area;
- Trent platform approximately 9.3nm south-west of the DBS East Array Area; and
- Boulton platform approximately 9.6nm south-east of the DBS East Array Area.

55. It is acknowledged that some of the fields these platforms are associated with could be decommissioned prior to the start of construction, although the Cygnus gas field is a recent development and therefore is expected to remain *in situ* during the Projects' life. The closest surface piercing oil and gas infrastructure to the Export Cable Platform Search Area is the Garrow platform, located approximately 11.3nm to the east.

56. Sub-sea pipelines connect the oil and gas infrastructure in proximity to the Array Areas. A sub-sea pipeline connecting the Shearwater gas field and Bacton Gas Terminal (the SEAL pipeline) passes north-south through the DBS West Array Area. Three additional sub-sea pipelines are also located within DBS West Array Area but are disused; one of these also runs through the DBS East Array Area and is one of three sub-sea pipelines within DBS East Array Area, with two of these disused.

57. Two of the disused sub-sea pipelines also intersect the Offshore Export Cable Corridor.

58. Currently under installation sub-sea cables are located to the north and north-west of the DBS West Array Area, connecting to Dogger Bank A. These sub-sea cables pass alongside the Offshore Export Cable Corridor for much of its length and intersect over a distance of approximately 6.2nm. There is also a disused sub-sea cable passing through Dogger Bank A which stops approximately 0.8nm short of the DBS West Array Area. A sub-sea cable is also located approximately 8.4nm east of the Array Areas, connecting the Cygnus and Murdoch platforms.

59. Various charted wrecks and obstructions are located in proximity to the Array Areas. Three charted obstructions are located within the Array Areas; two within the DBS West Array Area, and one within the DBS East Array Area. The shallowest of these features is a charted wreck at 15m below CD.

60. There are also six charted wrecks and obstructions located within the Offshore Export Cable Corridor, with the shallowest of these featuring a charted wreck at 23m below CD. No charted wrecks or obstructions are located within the Export Cable Platform Search Area.

61. Marine aggregate dredging areas in the southern North Sea are located well south of the Offshore Development Area, with the closest approximately 25nm south of the Offshore Export Cable Corridor.

62. The Offshore Export Cable Corridor overlaps with a submarine exercise area. This area is used for training by submarines operated for the Royal Navy. There are also Practice and Exercise Areas (PEXA) for aircraft which overlap the Array Areas.

## 14.5.2 Vessel Traffic Movements

### 14.5.2.1 Array Areas

63. A plot of the vessel traffic recorded via AIS and Radar over the summer and winter survey periods within the DBS East Shipping and Navigation Study Area is colour-coded by vessel type and presented on **Volume 7, Figure 14-4 (application ref: 7.14.1)**. A plot of the vessel traffic recorded via AIS and Radar over the summer and winter survey periods within the DBS West Shipping and Navigation Study Area is colour-coded by vessel type and presented on **Volume 7, Figure 14-5 (application ref: 7.14.1)**.

64. Throughout the summer surveys, approximately 96% of vessel tracks were recorded via AIS with the remaining 4% recorded via Radar. Throughout the winter surveys, approximately 98% of vessel tracks were recorded via AIS with the remaining 2% recorded via Radar.

65. For the 14 days analysed in summer, there was an average of 14 Unique Vessels per day recorded within the DBS East Shipping and Navigation Study Area, and two to three Unique Vessels per day intersecting the DBS East Array Area. For the 14 days analysed in winter, there was again an average of 14 Unique Vessels per day recorded within the DBS East Shipping and Navigation Study Area, and three Unique Vessels per day intersecting the DBS East Array Area. The main vessel types within the DBS East Shipping and Navigation Study Area were cargo vessels (40%), oil and gas vessels (30%), and tankers (14%).

66. For the 14 days analysed in summer, there was an average of 11 Unique Vessels per day recorded within the DBS West Shipping and Navigation Study Area, and three to four Unique Vessels per day intersecting the DBS West Array Area. For the 14 days analysed in winter, there was an average of nine Unique Vessels per day recorded within the DBS West Shipping and Navigation Study Area, and two to three Unique Vessels per day intersecting the DBS West Array Area. The main vessel types within the DBS West Shipping and Navigation Study Area were cargo vessels (46%), tankers (18%), and oil and gas vessels (14%). Volumes of fishing vessels and recreational vessels recorded were low. The records of recreational vessels align with consultation feedback from the Cruising Association (see 29th November 2023 entry in **Volume 7, Appendix 14-1 (application ref: 7.14.14.1).**

67. Vessel length was available for approximately 99% of vessels recorded throughout the two 14-day survey periods for the DBS East Shipping and Navigation Study Area and ranged from 9m for a sailing vessel to 336m for a crude oil tanker. Excluding the proportion of vessels for which length was not available, the average length of vessels within the DBS East Shipping and Navigation Study Area throughout the summer and winter survey periods was 119m and 110m, respectively. Vessel length was available for approximately 94% of vessels recorded throughout the two 14-day survey periods for the DBS West Shipping and Navigation Study Area and ranged from 11m for a sailing vessel to 300m for two container vessels. Excluding the proportion of vessels for which length was not available, the average length of vessels within the DBS West Shipping and Navigation Study Area throughout the summer and winter survey periods was 124m and 128m, respectively.

68. Vessel draught was available for approximately 84% of vessels recorded throughout the two 14-day survey periods for DBS East Shipping and Navigation Study Area and ranged from 2.4m for two wind farm vessels and 13.8m for a bulk carrier. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the DBS East Shipping and Navigation Study Area throughout the summer and winter survey periods was 6.1m and 5.3m, respectively. Vessel draught was available for approximately 86% of vessels recorded throughout the two 14-day survey periods for DBS West Shipping and Navigation Study Area and ranged from 2.5m for a wind farm vessel to 14.6m for a shuttle tanker. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the DBS West Shipping and Navigation Study Area throughout the summer and winter survey periods was 6.7m for both.

69. A methodology for identifying vessels at anchor is provided in the **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**. One vessel recorded on AIS was deemed as being at anchor across the 28-day periods for the Shipping and Navigation Study Areas, based on track behaviour and navigation status. This was an oil and gas vessel and was recorded within the DBS East Array Area.

70. Main Commercial Routes have been identified using the principles set out in MGN 654 (MCA, 2021). A total of ten Main Commercial Routes were identified within the Array Areas Shipping and Navigation Study Area. A plot of the Main Commercial Routes and corresponding 90th percentiles is presented on **Volume 7, Figure 14-6 (application ref: 7.14.1)**.

71. Descriptions for each of the Main Commercial Routes are provided in **Table 14-10**.

*Table 14-10 Details of the Main Commercial Routes within the Shipping and Navigation Study Areas*

| Route Number | Average Vessels per Day | Average Vessels per Week | Description |
|---|---|---|---|
| 1 | 1 | 7 to 8 | **Immingham (UK) – Gothenburg (Sweden)**. Mainly used by cargo vessels (95%), including the DFDS Seaways operated Roll-on / Roll-off cargo (RoRo) services between Immingham and Gothenburg / Immingham and Brevik (Norway) and the Finnlines operated RoRo services between Immingham and Helsinki (Finland). |
| 2 | 1 | 7 to 8 | **Aberdeen (UK) – Rotterdam (Netherlands)**. Generally used by tankers (53%) and cargo vessels (22%). |
| 3 | 1 | 3 to 4 | **Tees (UK) – Gdynia (Poland)**. Generally used by cargo vessels (62%), tankers (19%), and tugs (19%). |
| 4 | 0 to 1 | 3 to 4 | **Grimsby (UK) – Thyborøn (Denmark)**. Mainly used by cargo vessels (92%). |
| 5 | 0 to 1 | 2 to 3 | **Rotterdam – Tórshavn (Faroe Islands)**. Mainly used by cargo vessels (78%). |
| 6 | 0 to 1 | 2 | **Aberdeen – Rotterdam**. Generally used by oil and gas vessels (56%) and cargo vessels (28%). |
| 7 | 0 to 1 | 2 | **Immingham – Odda (Norway)**. Mainly used by cargo vessels (78%). |
| 8 | 0 to 1 | 1 to 2 | **Aberdeen – Cygnus gas field**. Only used by oil and gas vessels (100%). |
| 9 | 0 to 1 | 1 to 2 | **Rotterdam – Icelandic ports**. Mainly used by cargo vessels (86%). |
| 10 | 0 to 1 | 1 to 2 | **Immingham – Kristiansand (Norway)**. Mainly used by cargo vessels (89%). |

#### 14.5.2.2 Offshore Export Cable Corridor

72. A plot of the vessel traffic recorded via AIS and Radar over the summer and winter survey periods within the Offshore Export Cable Corridor is colour-coded by vessel type and presented on **Volume 7**, **Figure 14-7 (application ref: 7.14.1)**.

73. For the 14 days analysed in summer, there was an average of 53 Unique Vessels per day recorded within the Offshore Export Cable Corridor Shipping and Navigation Study Area, and 51 Unique Vessels per day intersecting the Offshore Export Cable Corridor itself. For the 14 days analysed in winter, there was an average of 46 Unique Vessels per day recorded within the Offshore Export Cable Corridor Shipping and Navigation Study Area, and 44 Unique Vessels per day intersecting the Offshore Export Cable Corridor. The main vessel types within the Offshore Export Cable Corridor Shipping and Navigation Study Area were cargo vessels (42%), tankers (24%), and fishing vessels (13%).

74. Vessel length was available for over 99% of vessels recorded throughout the two 14-day survey periods and ranged from 8m for a RNLI lifeboat to 333m for a crude oil tanker. Excluding the proportion of vessels for which length was not available, the average length of vessels within the Offshore Export Cable Corridor Shipping and Navigation Study Area throughout the summer and winter survey periods was 100m and 113m, respectively.

75. Vessel draught was available for approximately 78% of vessels recorded throughout the two 14-day survey periods and ranged from 1.0m for charter vessel and 19.5m for a crude oil carrier. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the Offshore Export Cable Corridor Shipping and Navigation Study Area throughout the summer and winter survey periods was 5.6m and 6.2m, respectively.

76. One vessel recorded on AIS was deemed as being at anchor during the 28-day period, based on its track behaviour and navigation status. This was a cargo vessel recorded 1.4nm south of the Offshore Export Cable Corridor in The Hills (a series of banks) with the behaviour characteristic of anchoring activity occurring over the course of six days.

#### 14.5.2.3 Export Cable Platform Search Area

77. A plot of the vessel traffic recorded via AIS and Radar over the winter and summer survey periods within the Export Cable Platform Search Area is colour-coded by vessel type and presented on **Volume 7, Figure 14-8 (application ref: 7.14.1)**.

78. For the 14 days analysed in winter, there was an average of 15 to 16 Unique Vessels per day recorded within the Export Cable Platform Search Area Shipping and Navigation Study Area, and four Unique Vessels per day intersecting the Export Cable Platform Search Area itself. For the 14 days analysed in summer, there was an average of 19 Unique Vessels per day recorded within the Export Cable Platform Search Area Shipping and Navigation Study Area, and four Unique Vessels per day intersecting the Export Cable Platform Search Area itself. The main vessel types within the Export Cable Platform Search Area Shipping and Navigation Study Area were tankers (33%), cargo vessels (32%), and oil and gas vessels (14%).

79. Vessel length was available for approximately 99% of vessels recorded throughout the two 14-day survey periods and ranged from 10m for a sailing vessel to 330m for two cruise liners. Excluding the proportion of vessels for which length was not available, the average length of vessels within the Export Cable Platform Search Area Shipping and Navigation Study Area throughout the winter and summer survey periods was 128m and 111m, respectively.

80. Vessel draught was available for approximately 88% of vessels recorded throughout the two 14-day survey periods and ranged from 1.2m for a wind farm support vessel and 14.2m for a shuttle tanker. Excluding the proportion of vessels for which draught was not available, the average draught of vessels within the Export Cable Platform Search Area Shipping and Navigation Study Area throughout the winter and summer survey periods was 6.5m and 6.0m, respectively.

81. No vessels recorded on AIS or Radar were deemed as being at anchor during the 28-day period, based on track behaviour and navigation status.

82. Main Commercial Routes in proximity to the Export Cable Platform Search Area have also been identified using the principles set out in MGN 654 (MCA, 2021). A total of eleven Main Commercial Routes were identified within the Export Cable Platform Search Area Shipping and Navigation Study Area. A plot of the Main Commercial Routes and corresponding 90$^{th}$ percentiles is presented on **Volume 7, Figure 14-6 (application ref: 7.14.1)**.

83. Descriptions for each of these Main Commercial Routes are provided in **Table 14-11**.

*Table 14-11 Details of the Main Commercial Routes within the Export Cable Platform Search Area Study Area*

| Route Number | Average Vessels per Day | Average Vessels per Week | Description |
|---|---|---|---|
| 1 | 1 to 2 | 11 | **Newcastle – Ijmuiden**. Generally used by passenger vessels (38%), cargo vessels (30%), and tankers (25%). Includes the DFDS Seaways operated RoPax service between North Shields and Ijmuiden. |
| 2 | 1 to 2 | 10 to 11 | **Grangemouth – Rotterdam**. Generally used by tankers (56%) and cargo vessels (39%) |
| 3 | 1 | 6 to 7 | **Grangemouth – Antwerp**. Generally used by tankers (58%) and cargo vessels (31%). |
| 4 | 1 | 5 to 6 | **Grangemouth – Immingham**. Generally used by tankers (57%) and cargo vessels (30%). |
| 5 | 0 to 1 | 5 to 6 | **Tees – Dutch ports**. Generally used by cargo vessels (52%) and tankers (38%). |
| 6 | 0 to 1 | 4 to 5 | **Aberdeen – Immingham**. Generally used by tankers (47%), cargo vessels (36%), and oil and gas vessels (18%). |
| 7 | 0 to 1 | 4 to 5 | **Tees – Dutch ports**. Generally used by tankers (70%) and cargo vessels (30%). |
| 8 | 0 to 1 | 4 | **Grangemouth – Rotterdam**. Generally used by cargo vessels (56%) and tankers (38%). |
| 9 | 0 to 1 | 4 | **Newcastle – Amsterdam**. Generally used by cargo vessels (75%) and tankers (19%). |
| 10 | 0 to 1 | 3 to 4 | **Hull – Norwegian ports**. Mainly used by cargo vessels (87%). |
| 11 | 0 to 1 | 3 to 4 | **Rotterdam – Þorlákshöfn (Iceland).** Generally used by cargo vessels (60%) and tankers (33%). |

### 14.5.3 Historical Maritime Incidents

84. A plot of the locations of the incidents reported to the MAIB between 2012 and 2021 within the DBS East and DBS West Shipping and Navigation Array Areas, Offshore Export Cable Corridor Shipping and Navigation Study Area, and Export Cable Platform Search Area Shipping and Navigation Study Area, colour-coded by incident type, is presented on **Volume 7**, **Figure 14-10 (application ref: 7.14.1)**.

85. A total of three unique incidents were recorded by the MAIB within the DBS East Shipping and Navigation Study Area between 2012 and 2021, which corresponds to an average of one incident every three years. Two of the incidents involved support vessels while the other involved a vessel of "other commercial" type. All three incidents involved an "accident to person. None of these incidents occurred within the DBS East Array Area itself.

86. There were two documented MAIBs incident during the ten year period within the DBS West Shipping and Navigation Study Area, involving the grounding of a barge towing another vessel and the machinery failure of a fishing vessel.

87. A total of 12 incidents were recorded by the MAIB within The Offshore Export Cable Corridor Shipping and Navigation Study Area between 2012 and 2011, which corresponds to an average of one incident per year. There was one incident within the Offshore Export Cable Corridor itself. The most common incident types recorded were "machinery failure" (50%), "accident to person" (25%) and "damage / loss of equipment" (17%). The vessel types involved in incidents were fishing vessels (67%), support vessels (17%), and pleasure craft (17%).

88. A total of seven incidents were recorded by the MAIB within the Export Cable Platform Search Area Shipping and Navigation Study Area between 2012 and 2021, which corresponds to an average of zero to one incidents per year. There was one incident within the Export Cable Platform Search Area itself. The most common incident type was "machinery failure" with five counts, with one count each of "accident to person" and "damage / loss of equipment" noted. All vessels involved were fishing vessels. There were no incidents recorded within the Export Cable Platform Search Area itself.

### 14.5.4 Future Trends

89. In the event that the Projects are not developed, an assessment of future conditions for shipping and navigation has been carried out and is described within this section.

90. 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 and the long-term effects of Brexit. Therefore, two independent scenarios of potential growth in commercial vessel movements of 10% and 20% have been estimated throughout the lifetime of the Projects.

91. There is similar uncertainty associated with long-term predictions for commercial fishing vessel 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 vessel activity in the region. 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 Projects. Changes in fishing activity are considered further in **Volume 7, Chapter 13 Commercial Fisheries (application ref: 7.13)** noting that in 2022 the 'Dogger Bank Special Area of Conservation (Specified Area) Bottom Towed Fishing Gear Bylaw' came into force which prohibits bottom towed fishing gear across the Dogger Bank area (sandbank)[1].

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

## 14.6 Assessment of Significance

### 14.6.1 Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels (All Phases)

92. Activities associated with the installation, maintenance and decommissioning of structures and 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.

#### 14.6.1.1 DBS East and DBS West Together – All Receptors

##### *14.6.1.1.1 Main Commercial Route Displacement*

93. During the construction and decommissioning phases, a buoyed construction / decommissioning area would be deployed around each Array Area. No restrictions on entry would be enforced for the buoyed construction / decommissioning area or the arrays during the operations and maintenance phase outside of any statutory safety zones. However, based on experience at previously under construction and existing operational offshore wind farms, it is anticipated that commercial vessels would choose not to navigate internally within the buoyed construction / decommissioning area or the operational arrays.

94. Main Commercial Routes have been identified in line with the principles set out in MGN 654 (MCA, 2021) based primarily on vessel traffic data collected during dedicated surveys (28 days in winter and summer 2022) and Anatec's ShipRoutes database. Further details of the methodology for Main Commercial Route identification are provided in section 14.5.2, 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.

95. A deviation would be required for all phases of the Projects for five of the Main Commercial Routes, noting that this assumes full build out of the Array Areas (Layout A). The level of deviation varies between an increase of 0.1nm for Route 4 and an increase of 6.8nm for Route 9, with the maximum percentage change in total route length being 1.1% for Route 10. The size of these deviations is small when considered relative to the length of the routes overall, which typically cross the North Sea.

96. The deviated route with the highest vessel traffic was Route 3, with approximately one transit per day, i.e., deviations are expected to be a frequent occurrence. Regular RoRo and Roll-on / Roll-off Passenger (RoPax) vessels were only recorded on Route 1, which is not expected to require deviation due to the presence of the Array Areas.

97. The most likely consequences of vessel displacement would be increased journey times and distances for affected third-party vessels. The impact would occur over a local spatial extent given that the buoyed construction / decommissioning area would be deployed around the maximum extent of the Array Areas.

98. As a worst case, there could be disruption to schedules, particularly for the DFDS Seaways-operated RoRo route. However, given that no deviations are anticipated for this route, and the international nature of routeing in the region alongside the ability to passage plan, disruptions to schedule are expected to be minimal.

*14.6.1.1.2 Collision Risk*

99. From historical incident data, no Collision incidents between third-party vessels have occurred directly as a result of a UK offshore wind farm.

100. 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 arrays, or when navigating internally within the operational arrays (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 (830m) would be sufficient to ensure any visual hindrance is very short-term in nature.

101. Collision risk modelling has been undertaken for the pre wind farm scenario based on the main commercial routes detailed in **Table 14-10.** Details of the modelling process are provided in section 16 of **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**. Based on the pre wind farm modelling, the Baseline collision risk levels within the Array Areas shipping and navigation study area are low, with an estimated vessel to vessel collision risk of one every 8,104 years. This is due to the volume of traffic in the area relative to available sea space.

102. Post wind farm, the collision frequency was estimated at one in 5,593 years, representing a 45% increase on the pre wind farm scenario. Although this is a high increase, the likelihood of a collision incident remains low, and is also reflected when considering future case traffic levels.

103. Given the presence of surface infrastructure to both the port and starboard side, it is possible that limitations in available sea room may increase collision risk between the Array Areas, or between the DBS West Array Area and Dogger Bank A. For the gap between the Array Areas, the minimum distance of 4.4nm is considered "*broadly acceptable*"[2] and would allow encountering vessels to safely pass each other. Additionally, and noting the presence of Dogger Bank A to the north-east, no Main Commercial Routes are anticipated to use this gap. Therefore, the likelihood of an encounter arising whilst two vessels are transiting through the gap is exceptionally low and stakeholders were in agreement during consultation (see 09/10/2023 entry in **Volume 7, Appendix 14-1 (application ref: 7.14.14.1)**.

104. For the gap between the DBS West Array Area and Dogger Bank A, there is a consistent width of 4.1nm (conservatively measured from the Dogger Bank A boundary rather than the nearest planned surface structures). Again, this distance is considered "*broadly acceptable*"[2]. Unlike for the gap between the Array Areas, it is anticipated that a Main Commercial Route – Route 8 – may use this gap. Therefore, the 20-degree rule provided in MGN 654 has been applied, with the length of the gap[3] measured to be approximately 5.8nm. Under the 20-degree rule, a corridor of this length should achieve a minimum width of 2.1nm and thus the gap is MGN 654 compliant.

105. It is also acknowledged that Route 8 is used only by oil and gas vessels accessing the nearby Cygnus gas field and such vessels will have good familiarity and experience operating in proximity to surface structures.

106. 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.

107. 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 effects. As a worst case with very low frequency of occurrence one of the vessels could receive substantial damage or founder with Potential Loss of Life (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)).

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[2] As per the Shipping Route Template included in MGN 654 (MCA, 2021).

[3] The length of the gap has been measured as the distance over which there are surface structures to both port and starboard for a vessel passing through.

108. It is acknowledged that vessel traffic monitoring would be undertaken throughout the construction phase and the first three years of the operation and maintenance phase to characterise changes to routeing patterns (see **Table 14-3**). These would be compared against anticipated deviations to allow a comprehensive review of the mitigation measures applied at the time.

#### *14.6.1.1.3 Adverse Weather Routeing*

109. From the vessel traffic survey data, no instances of alternative routeing due to possible adverse weather were recorded, although from previous experience of the area it has been identified that the DFDS Seaways route between Immingham and Gothenburg does occasionally pass west of the Array Areas during periods of adverse weather. These instances occur a sufficient distance from the Array Areas to assert that disruption due to the presence of the Array Areas would be minimal.

110. 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 would be deployed around the maximum extent of the Array Areas.

111. 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 risk to the vessel or crew are negligible due to the very low frequency of occurrence.

#### *14.6.1.1.4 Promulgation of Information and Passage Planning*

112. All vessels operating in the area are expected to comply with international flag state regulations (including the COLREGs and SOLAS) and would have a raised level of awareness of construction and decommissioning activities given the promulgation of information relating to the Projects including the charting of the construction / decommissioning areas on relevant nautical charts and the use of safety zones. The buoyed construction / decommissioning areas would also serve to maximise awareness. Likewise, during the operations and maintenance phase infrastructure would be appropriately marked on relevant nautical charts and awareness of the operational arrays would be very high and continue to increase with the longevity of the Projects.

113. 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 Projects would assist such passage planning.

###### *14.6.1.1.5 Small Craft Displacement*

114. From the vessel traffic survey data (which incorporates Radar and visual observations in addition to AIS) regular transits by commercial fishing vessels and recreational vessels through the Array Areas are infrequent (noting that displacement of commercial fishing vessels engaged in fishing activity is assessed in **Volume 7, Chapter 13 Commercial Fisheries (application Ref: 7.13)**).

115. 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 areas. Therefore, some displacement of transits by small craft may be required during the construction and decommissioning phases.

116. For the operations 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 arrays, particularly in favourable weather conditions and as awareness of the arrays increases throughout the operations and maintenance phase. However, during consultation the Cruising Association did confirm that the majority of recreational vessels would likely pass around the arrays (see 29th November 2023 entry in **Volume 7, Appendix 14-1 (application ref: 7.14.14.1)**). In situations where small craft do navigate internally, the level of displacement is considered negligible.

###### *14.6.1.1.6 Collision Risk Involving Small Craft*

117. From the vessel traffic survey data (which incorporates radar and visual observations in addition to AIS) regular transits by commercial fishing vessels and recreational vessels through the Array Areas are infrequent.

118. In the event of a collision incident the likelihood of a worst case outcome (the small craft foundering with PLL and pollution) is greater due to the size and likely hull material of the small craft.

##### *14.6.1.1.7 Frequency of Occurrence*

119. The frequency of occurrence of effects due to vessel displacement and third-party collision risk is reasonably probable for the construction / decommissioning phases and reasonably probable for the operations and maintenance phase.

##### *14.6.1.1.8 Severity of Consequence*

120. The severity of consequence of effects due to vessel displacement and third-party collision risk is moderate for the construction / decommissioning phases and moderate for the operations and maintenance phase.

#### 14.6.1.2 DBS East or DBS West In Isolation – All Receptors

##### *14.6.1.2.1 DBS East in Isolation*

121. Should only DBS East in isolation be developed, this would result both in a greater area of available sea room for routeing commercial vessels, and fewer routes requiring a deviation; four route deviations would be necessary compared to five for DBS East and DBS West together. Therefore, it is expected that both the severity of consequence and frequency of occurrence for this impact would decrease compared to if both DBS East and DBS West are built together although would remain in the same risk level as for DBS East and DBS West together. The decreases are particularly notable in the absence of DBS West with consideration of those vessels transiting further west. For example, as Route 6 transits through the DBS West Array Area only, vessels on this route would not be required to deviate.

##### *14.6.1.2.2 DBS West in Isolation*

122. Should only DBS West in isolation be developed, this would result both in a greater area of available sea room able to be utilised, and fewer routes requiring a deviation; two route deviations would be necessary compared to five for DBS East and DBS West together. Therefore, it is expected that the frequency of occurrence would decrease compared to if both DBS East and DBS West are built together, with the severity of consequence remaining the same risk level as for DBS East and DBS West together but the frequency of occurrence remote (rather than reasonably probable). The decreases are particularly noticeable in the absence of DBS East with consideration of those vessels transiting further east. For example, as Routes 4 and 10 transit through the DBS East Array Area only, vessels on this route would not be required to deviate.

#### 14.6.1.3 Export Cable Platform Search Area

123. During the construction and decommissioning of the ESP, a safety zone of 500m radius would be deployed around the structure. As with the Array Areas, Main Commercial Routes in the vicinity of the Export Cable Platform Search Area have been identified from primary vessel traffic data collected during dedicated surveys covering 28 days in winter and summer 2023, as well as Anatec's ShipRoutes database.

124. Deviations would be required for all phases of the Projects for two of the Main Commercial Routes. These include a 0.2nm deviation for Route 1, and a 0.1nm deviation for Route 8. Both the absolute value of deviation, as well as the percentage deviation of the overall route length (less than 0.1% for both) are relatively small and are not expected to materially affect journey times and distances for third-party vessels. However, with one to two transits per day, both routes are frequently operated. Regular RoPax vessels were identified on Route 1, but the deviation on this route is expected to be minimal.

125. 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 Safety Zone would be implemented around the ESP during construction, major maintenance, and decommissioning.

#### 14.6.1.4 Significance of Effect – DBS East and DBS West Together

126. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from vessel displacement and third-party collision risk for DBS East and DBS West together, is presented in **Table 14-12**.

##### *14.6.1.4.1 Mitigation and residual significance of effect*

127. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Tolerable with Mitigation**.

#### 14.6.1.5 Significance of Effect – DBS East or DBS West in Isolation

128. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from vessel displacement and third-party collision risk for DBS East and DBS West in isolation, is presented in **Table 14-13**.

##### *14.6.1.5.1 Mitigation and residual significance of effect*

129. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Tolerable with Mitigation**.

#### 14.6.1.6 Significance of Effect – Export Cable Platform Search Area

130. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from vessel displacement and third-party collision risk for the Export Cable Platform Search Area, is presented in **Table 14-14.**

##### *14.6.1.6.1 Mitigation and residual significance of effect*

131. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Tolerable with Mitigation**.

*Table 14-12 Significance of Effect for Vessel Displacement and Third-Party Collision Risk of DBS East and West Together*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West together | Construction | Displacement with effects on schedule and Collision incident occurs with vessel damage, PLL, and / or pollution. | Reasonably Probable | Moderate | Tolerable with Mitigation |
| | Operations and maintenance | | Reasonably Probable | Moderate | Tolerable with Mitigation |
| | Decommissioning | | Reasonably Probable | Moderate | Tolerable with Mitigation |

*Table 14-13 Significance of Effect for Vessel Displacement and Third-Party Collision Risk of DBS East and West in Isolation*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East in isolation | Construction | Displacement with effects on schedule and Collision incident occurs with vessel damage, PLL, and / or pollution. | Reasonably Probable | Moderate | Tolerable with Mitigation |
| | Operations and maintenance | | Reasonably Probable | Moderate | Tolerable with Mitigation |
| | Decommissioning | | Reasonably Probable | Moderate | Tolerable with Mitigation |

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS West in isolation | Construction | | Remote | Moderate | Tolerable with Mitigation |
| | Operations and maintenance | | Remote | Moderate | Tolerable with Mitigation |
| | Decommissioning | | Remote | Moderate | Tolerable with Mitigation |

*Table 14-14 Significance of Effect for Vessel Displacement and Third-Party Collision Risk of the Export Cable Platform Search Area*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| Export Cable Platform Search Area | Construction | Displacement with effects on schedule and Collision incident occurs with vessel damage, PLL, and / or pollution. | Reasonably Probable | Moderate | Tolerable with Mitigation |
| | Operations and maintenance | | Reasonably Probable | Moderate | Tolerable with Mitigation |
| | Decommissioning | | Reasonably Probable | Moderate | Tolerable with Mitigation |

### 14.6.2 Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel (All Phases)

132. The presence of vessels associated with construction, operations and maintenance, and decommissioning activities may result in increased risk of a Collision between a third-party vessel and a project vessel.

#### 14.6.2.1 DBS East and West Together – All Receptors

133. The construction / decommissioning phases may last for up to seven years with up to 7510 return trips by construction vessels made throughout the construction phase, including vessels Restricted in Ability to Manoeuvre (RAM). It is assumed that construction vessels would be on-site throughout the construction phase. The operations and maintenance phase may last for up to 32 years (for the sequential scenario) with up to 473 annual return trips by operations and maintenance vessels made throughout this period.

134. 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.

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

136. Furthermore, an application for safety zones of 500m would be sought during the construction phase. These would serve to protect project vessels engaged in construction activities associated with surface piercing structures. Minimum advisory passing distances, as defined by a risk assessment, may also be applied, with advanced warning and accurate locations of both safety zones and any minimum advisory passing distances provided by Notifications to Mariners and Kingfisher Bulletins.

137. Also, the Projects would 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 would further maximise mariner awareness when in proximity, both in day and night conditions including in poor visibility.

138. Third-party vessels may experience restrictions on visually identifying project vessels entering and exiting the array during reduced visibility; however, this impact would be mitigated by the application of the COLREGs (reduced speeds) in adverse weather conditions and AIS carriage by project vessels.

139. 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. With Collision avoidance action implemented in line with the COLREGs, the vessels involved would likely be able to resume their respective passages and / or activities with no long-term consequences.

140. Should an encounter develop into a Collision incident, the most likely consequences would be similar to that outlined for the case of a Collision between two third-party vessels. As an unlikely worst case, 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). If pollution were to occur in proximity to the Projects or involving a project vessel, then the pollution planning protocols would be implemented to minimise the environmental effects.

##### *14.6.2.1.1 Frequency of Occurrence*

141. The frequency of occurrence of effects due to increased third-party with Project vessel collision risk is negligible for the construction / decommissioning phases and negligible for the operations and maintenance phase.

##### *14.6.2.1.2 Severity of Consequence*

142. The severity of consequence of effects due to increased third-party with Project vessel collision risk is moderate for the construction / decommissioning phases and moderate for the operations and maintenance phase.

#### 14.6.2.2 DBS East or DBS West In Isolation – All Receptors

143. Should only one Array Area in isolation be developed, it would result in fewer Project vessels being on-site for all phases, leading to fewer encounter opportunities. Additionally, more sea room would be available for third-party vessels to navigate and maintain a safe passing distance from project vessels. As a result, the likelihood of a Collision would be lower than if both sites were to be built together, with the frequency of occurrence remaining negligible.

#### 14.6.2.3 Export Cable Platform Search Area – All Receptors

144. As the Export Cable Platform Search Area would include only a single structure, there would be relatively few Project vessels required on-site across all three phases. The likelihood of a Project vessel encountering a third-party vessel would therefore be low. Additionally, the open sea room in the vicinity of the ESP would allow vessels to safely take avoiding action should an encounter situation arise, resulting in a negligible frequency of occurrence.

#### 14.6.2.4 Significance of Effect – DBS East and DBS West Together

145. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from increased third-party with Project vessel collision risk for DBS East and DBS West together, is presented in **Table 14-15.**

##### *14.6.2.4.1 Mitigation and residual significance of effect*

146. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.2.5 Significance of Effect – DBS East and DBS West in Isolation

147. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from increased third-party with Project vessel collision risk for DBS East and DBS West in isolation, is presented in **Table 14-16**

##### *14.6.2.5.1 Mitigation and residual significance of effect*

148. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.2.6 Significance of Effect – Export Cable Platform Search Area

149. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from increased third-party with Project vessel collision risk for the Export Cable Platform Search Area, is presented in **Table 14-17**.

##### *14.6.2.6.1 Mitigation and residual significance of effect*

150. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

*Table 14-15 Significance of Effect for Increased Third-Party with Project Vessel Collision Risk of DBS East and West Together*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West together | Construction | Collision incident occurs with vessel damage, PLL, and / or pollution. | Negligible | Moderate | Broadly Acceptable |
| | Operations and maintenance | | Negligible | Moderate | Broadly Acceptable |
| | Decommissioning | | Negligible | Moderate | Broadly Acceptable |

*Table 14-16 Significance of Effect for Increased Third-Party with Project Vessel Collision Risk of DBS East and West in Isolation*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West in isolation | Construction | Collision incident occurs with vessel damage, PLL, and / or pollution. | Negligible | Moderate | Broadly Acceptable |
| | Operations and maintenance | | Negligible | Moderate | Broadly Acceptable |
| | Decommissioning | | Negligible | Moderate | Broadly Acceptable |

*Table 14-17 Significance of Effect for Increased Third-Party with Project Vessel Collision Risk of the Export Cable Platform Search Area*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| Export Cable Platform Search Area | Construction | Collision incident occurs with vessel damage, PLL, and / or pollution. | Negligible | Moderate | Broadly Acceptable |
| | Operations and maintenance | | Negligible | Moderate | Broadly Acceptable |
| | Decommissioning | | Negligible | Moderate | Broadly Acceptable |

### 14.6.3 Impact 3 Creation of Vessel to Structure Allision Risk (Operation and Maintenance Phase)

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

#### 14.6.3.1 DBS East and West Together – All Receptors

152. The Main Commercial Route deviations and future case considerations described for the vessel displacement and collision risk impact (see section 14.6.1) have also been assumed for this impact, noting that internal navigation by commercial vessels is not anticipated. However, commercial fishing vessels and recreational vessels may choose to navigate internally within the arrays, particularly in favourable weather conditions.

153. The presence of new surface structures introduces 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. These three forms are listed below alongside the indicative array layout considered the worst case for each:

- Powered allision risk – full build out (Layout A);
- Drifting allision risk – full build out (Layout A); and
- Internal allision risk – minimum spacing (Layout B).

##### *14.6.3.1.1 Powered Allision Risk*

154. 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 both involved a fishing vessel, with a RNLI lifeboat attending on each occasion.

155. Based on the post wind farm modelling, the base case annual powered vessel to structure allision frequency was estimated at one every 24,315 years. This is a low return period compared to that estimated for other UK wind farm developments, and is reflective of the relatively low volume of vessel traffic passing in proximity to the Array Areas. The low return period is also reflected when considering future case traffic levels.

156. Vessels are expected to comply with international flag state regulations (including the COLREGs and SOLAS) and would be able to effectively passage plan a route which minimises effects given the promulgation of information relating to the Projects including the charting of infrastructure on relevant nautical charts and the use of safety zones (for major maintenance). On approach, the operational lighting and marking of the arrays would also assist in maximising marine awareness and Project vessels may alert a vessel on a closing approach with a structure as required.

157. Should a powered allision incident occur, the consequences would depend on multiple factors including the energy of the allision, 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 size and likely hull material of the small craft.

158. With consideration for lesson learned, the most likely consequences are minor damage with the vessel involved able to resume passage and undertake a full inspection at the next port of call. As a worst case, the vessel could allide with a platform, resulting in foundering with PLL and pollution.

##### *14.6.3.1.2 Drifting Allision Risk*

159. A vessel adrift may only develop into an allision situation if in proximity to a wind farm structure. This is only the case where the adrift vessel is located internally within or in close proximity to the array and the direction of the wind and / or tide directs the vessel towards a structure.

160. Based on the post wind farm modelling, the base case annual drifting vessel to structure allision frequency was estimated at one every 18,742 years. This is again a low return period compared to that estimated for other UK wind farm developments, due to relatively low volume of vessel traffic passing in proximity to the Array Areas. The low return period is also reflected when considering future case traffic levels.

161. Based on 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).

162. Should a vessel drift towards a structure, there are outcomes other than an allision incident which are more likely. A powered vessel may regain power prior to reaching the arrays (by rectifying any fault). Failing this, the vessel's emergency response procedures would be implemented – this may include an emergency anchoring event following a check of the relevant nautical charts to ensure the deployment of the anchor would not lead to other impacts (such as anchor snagging on a sub-sea cable or pipeline).

163. Should a drifting allision occur, the consequences would be similar to those noted for the case of a powered allision, including the determining factors. However, a drifting vessel is likely to transit at a reduced speed compared to a powered vessel, thus reducing the allision energy and the likelihood of the worst case consequences arising.

164. The platforms again carry increased allision risk and consequences due to their greater size and resistant force, although this may again be mitigated by effective use of operational lighting and marking in accordance with requirements from Trinity House and MCA.

##### *14.6.3.1.3 Internal Allision Risk*

165. As noted previously, based on experience at existing operational offshore wind farms, it is anticipated that:

- Commercial vessels would choose not to navigate internally within the arrays;
- Fishing vessels may choose to navigate internally within the arrays, particularly in summer months; and
- Recreational vessels are unlikely to choose to navigate internally within the arrays (noting Cruising Association feedback received) with any decision likely to be influenced by the spacing between structures (noting RYA feedback received).

166. Therefore, the likelihood of an internal allision involving a commercial vessel is anticipated to be negligible.

167. Should bridge links be used between platforms then there is an additional allision risk should a vessel choose to navigate under the bridge link and between platforms. Given the maximum separation of 100m between platforms joined by a bridge link it is considered highly unlikely that a vessel would choose to navigate under a bridge link, particularly given the spacing of structures across the arrays as a whole. Additionally, the specific lighting and marking requirements for bridge links will be agreed with Trinity House to ensure that allision risk for vessels (including project vessels and recreational vessels) is minimised.

168. The base case annual fishing vessel to structure allision frequency is at a return period of approximately one in 15.3 years. This return period is reflective of the volume of fishing vessel traffic in the area, both in transit and engaged in fishing activities, and the conservative assumptions made within the modelling process. In particular, it has been assumed that the baseline fishing activity in terms of proximity to wind turbines would not change.

169. A minimum spacing of 830m is considered sufficient for safe internal navigation, allowing vessels to keep clear of the wind farm structures. This spacing is similar to many other consented offshore wind farms in the UK (Dogger Bank A and Dogger Bank B were consented with a minimum spacing of 700m (Forewind, 2013)) and is slightly greater than the minimum spacing at some consented offshore wind farms where evidence suggests that fishing vessels are comfortable operating internally in favourable conditions. Layout plans would be agreed with the MMO post-consent, following appropriate consultation with Trinity House and the MCA, and a safety justification for a SLoO layout would be completed should this be taken forward.

170. As with any passage, any vessel navigating within the array is expected to passage plan in accordance with SOLAS Chapter V (IMO, 1974) and promulgation of information including through ongoing liaison with fishing fleets via an appointed FLO would ensure that such vessels have good awareness of any maintenance works being undertaken. This includes the placement of safety zones of 500m radius which would be applied for around major maintenance activities which itself would assist safe navigation internally within the arrays by guiding vessels on a safe passing distance.

171. The Projects would exhibit lights, marks, sounds, signals and other aids to navigation as required by Trinity House, MCA and CAA. This would include unique identification marking of each wind farm structure in an easily understandable pattern to minimise the likelihood of a mariner navigating internally within the array becoming disoriented.

172. Should a recreational vessel under sail enter the proximity of a wind turbine, there is also potential for effects such as 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 raised by recreational users to date when operating in proximity to existing offshore wind developments.

173. For recreational vessels with a mast there is an additional allision risk when navigating internally within the array associated with the wind turbine blades. However, the minimum blade tip clearance is 34m above MSL which is much greater than the minimum 22m clearance above Mean High Water Springs (MHWS) the RYA recommend for minimising allision risk (RYA, 2019) and which is also noted in MGN 654.

174. Should an internal allision occur, the consequences would be similar to those noted for the case of a powered allision, including the determining factors. However, as with a drifting allision, the speed at which the contact occurs would likely be lower than for an external allision (given that the vessel would knowingly be navigating in an area with allision hazards), resulting in reduced allision energy and a reduced likelihood of the worst case consequences arising.

###### *14.6.3.1.4 Frequency of Occurrence*

175. The frequency of occurrence of effects due to creation of vessel to structure allision risk is extremely unlikely for the operations and maintenance phase.

###### *14.6.3.1.5 Severity of Consequence*

176. The severity of consequence of effects due to creation of vessel to structure allision risk is moderate for the operations and maintenance phase.

##### 14.6.3.2 DBS East or DBS West In Isolation – All Receptors

177. allision risk is heavily dependent upon the number of surface piercing structures. Therefore, should only one Array Area in isolation be installed then the likelihood of an allision incident would be reduced. As DBS West has fewer routes passing in close proximity, it is likely that it would have less exposure than DBS East, although the frequency of occurrence would be negligible for both.

#### 14.6.3.3 Export Cable Platform Search Area – All Receptors

178. Based on the post wind farm modelling, the base case annual powered vessel to structure allision frequency was estimated at one every 3,910 years. For the base case annual drifting vessel to structure allision this was one every 104,738 years, with fishing vessel to structure internal allision risk being negligible.

179. Again, allision risk is heavily dependent upon the number of surface piercing structures. With the ESP being a single structure, the likelihood of an allision incident may be reduced. However, traffic volumes are generally greater in the region containing the Export Cable Platform Search Area and a single structure is more exposed than a structure forming part of an array since there is no element of shielding by other structures or external aid to navigation presence in the event of a lighting failure.

180. Similarly to the OCPs, the ESP carries increased allision risk and consequences due to the greater size and resistant force. Embedded mitigation measures applicable to the Array Areas are again relevant, including operational lighting (inclusive of availability standards in line with IALA guidance).

#### 14.6.3.4 Significance of Effect – DBS East and DBS West Together

181. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from creation of vessel to structure allision risk for DBS East and DBS West together, is presented in **Table 14-18**.

##### *14.6.3.4.1 Mitigation and residual significance of effect*

182. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.3.5 Significance of Effect – DBS East or DBS West in Isolation

183. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from creation of vessel to structure allision risk for DBS East and DBS West in isolation, is presented in **Table 14-19**.

##### *14.6.3.5.1 Mitigation and residual significance of effect*

184. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.3.6 Significance of Effect – Export Cable Platform Search Area

185. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from creation of vessel to structure allision risk for the Export Cable Platform Search Area, is presented in **Table 14-20**.

##### *14.6.3.6.1 Mitigation and residual significance of effect*

186. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**

*Table 14-18 Significance of Effect for Creation of Vessel to Structure Allision Risk of DBS East and West Together*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West together | Operations and maintenance | Allision incident occurs with a platform with the vessel foundering, PLL, and / or pollution. | Extremely unlikely | Moderate | Broadly Acceptable |

*Table 14-19 Significance of Effect for Creation of Vessel to Structure Allision Risk of DBS East and West in Isolation*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West in isolation | Operations and maintenance | Allision incident occurs with a platform with the vessel foundering, PLL, and / or pollution. | Negligible | Moderate | Broadly Acceptable |

*Table 14-20 Significance of Effect for Creation of Vessel to Structure Allision Risk of the Export Cable Platform Search Area*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| Export Cable Platform Search Area | Operations and maintenance | Allision incident occurs with a platform with the vessel foundering, PLL, and / or pollution. | Negligible | Serious | Broadly Acceptable |

### 14.6.4 Impact 4 Reduction of Under-Keel Clearance due to Cable Protection (Operation and Maintenance Phase)

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.

#### 14.6.4.1 DBS East and West Together – All Receptors

188. For the array, inter-platform, and export cables the indicative target burial depth is between 0.5 and 1m. Seabed burial would be the primary means of cable burial and the burial depth of any external cable protection would be determined by the cable burial risk assessment.

189. Where cable burial is not possible, alternative cable protection methods may be deployed which would be determined within the cable burial risk assessment. It is noted that there are up to 40 cable or pipeline crossings anticipated for the array cables, up to six cable or pipeline crossings anticipated for the Inter-Platform Cables, and up to 11 cable or pipeline crossings anticipated for the Offshore Export Cables. The Applicants would follow the guidance contained in MGN 654 in relation to cable protection, namely that cable protection would 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.

190. 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.

191. 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 effects of the latter minimised by the implementation of the pollution planning protocols.

##### *14.6.4.1.1 Frequency of Occurrence*

192. The frequency of occurrence of effects due to reduction of under-keel clearance is extremely unlikely for the operations and maintenance phase.

###### *14.6.4.1.2 Severity of Consequence*

193. The severity of consequence of effects due to reduction of under-keel clearance is minor for the operations and maintenance phase.

#### 14.6.4.2 DBS East and DBS West In Isolation – All Receptors

194. Under keel clearance risk is heavily dependent upon the number of cables installed and cable burial method used. Therefore, should only one Array Area in isolation be installed, then the likelihood of an incident relating to reduced under-keel clearance would be reduced. However, it is acknowledged that the sub-sea footprint within the Offshore Export Cable Corridor may not be substantially different and so the lower likelihood of an incident relating to under keel clearance may be applicable to the array cables only and the frequency of occurrence therefore remains extremely unlikely.

#### 14.6.4.3 Export Cable Platform Search Area – All Receptors

195. Since there are no sub-sea cables associated with the Export Cable Platform Search Area (any sub-sea cables within this area would be export cables which are considered in section 14.6.4.1), this impact does not apply in this circumstance.

#### 14.6.4.4 Significance of Effect – DBS East and DBS West Together

196. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from reduction of under-keel clearance for DBS East and DBS West together, is presented in **Table 14-21**.

##### *14.6.4.4.1 Mitigation and residual significance of effect*

197. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.4.5 Significance of Effect – DBS East and DBS West in Isolation

198. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from reduction of under-keel clearance for DBS East and DBS West in isolation, is presented in **Table 14-22**.

##### *14.6.4.5.1 Mitigation and residual significance of effect*

199. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

*Table 14-21 Significance of Effect for Reduction of Under-Keel Clearance of DBS East and West Together*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West together | Operations and maintenance | Grounding incident occurs with the vessel foundering, PLL, and / or pollution. | Extremely unlikely | Minor | Broadly Acceptable |

*Table 14-22 Significance of Effect for Reduction of Under-Keel Clearance of DBS East and West in Isolation*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West in isolation | Operations and maintenance | Grounding incident occurs with the vessel foundering, PLL, and / or pollution. | Extremely unlikely | Minor | Broadly Acceptable |

### 14.6.5 Impact 5 Anchor Interaction with Sub-sea Cables (Operation and Maintenance Phase)

200. The presence of export cables, array cables, and Inter-Platform Cables in the offshore environment may increase the potential for anchor interaction.

#### 14.6.5.1 DBS East and West Together – All Receptors

201. Up to 350nm of array cables may be located within the Array Areas alongside up to 185nm of Inter-Platform Cables. Up to 598nm of Offshore Export Cables may be located within the Offshore Export Cable Corridor. Where available, the primary means of cable protection would be by seabed burial, with a target burial depth of between 0.5 and 1.5m for all sub-sea cables. Indicatively, up to 20% of all sub-sea cables may require alternative cable protection with a height (including for crossings) of 1.0m for array cables and 1.4m for inter-array and Offshore Export Cables. The burial depth would be informed by the cable burial risk assessment.

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 array cables would be fully contained within the Array Areas, it is considered unlikely that a vessel would choose to anchor in close proximity to an array cable due to the distance offshore.

204. Unlike for the array cables, the export cables may be crossed frequently by vessels on passage following the UK east coast. 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 would be located over the export cables for only a short period of time.

205. However, the export cables associated with Dogger Bank B run concurrently with a section of the Offshore Export Cable Corridor (no crossings). Therefore, the spatial extent of the interaction risk would be greater for this section of the Offshore Export Cable Corridor.

206. From the vessel traffic data, anchoring activity within and in proximity to the Offshore Export Cable Corridor was limited, with one instance of a vessel anchoring recorded approximately 1.4nm south of the Offshore Export Cable Corridor, well clear of the location where Dogger Bank B export cables run in parallel. There are no charted anchorage areas located in proximity to the Offshore Export Cable Corridor.

207. It is anticipated that the charting of infrastructure including all sub-sea cables would 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.

208. 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 would be stopped prior to any interaction with a sub-sea cable becoming possible.

209. The most likely consequences in the event of a vessel anchoring over an 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. 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.

###### *14.6.5.1.1 Frequency of Occurrence*

210. The frequency of occurrence of effects due to anchor interaction with sub-sea cables is extremely unlikely for the operations and maintenance phase.

###### *14.6.5.1.2 Severity of Consequence*

211. The severity of consequence of effects due to anchor interaction with sub-sea cables is minor for the operations and maintenance phase.

#### 14.6.5.2 DBS East or DBS West In Isolation – All Receptors

212. Anchor interaction risk is heavily dependent upon the number and length of sub-sea cables installed. Therefore, should only one Array Area in isolation be installed then the likelihood of an anchor interaction incident would be reduced. However, it is acknowledged that the sub-sea footprint within the Offshore Export Cable Corridor may not change substantially and so the lower likelihood of an anchor interaction incident may be applicable to the array cables only. Therefore, the frequency of occurrence remains extremely unlikely.

#### 14.6.5.3 Export Cable Platform Search Area – All Receptors

213. Since there are no sub-sea cables associated with the Export Cable Platform Search Area (any sub-sea cables within this area would be export cables which are considered in section 14.6.5.1). This impact does not apply in this circumstance.

#### 14.6.5.4 Significance of Effect – DBS East and DBS West Together

214. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from anchor interaction with sub-sea cables for DBS East and DBS West together, is presented in **Table 14-23**.

##### *14.6.5.4.1 Mitigation and residual significance of effect*

215. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.5.5 Significance of Effect – DBS East and DBS West in Isolation

216. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from anchor interaction with sub-sea cables for DBS East and DBS West in isolation, is presented in **Table 14-24**.

##### *14.6.5.5.1 Mitigation and residual significance of effect*

217. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

*Table 14-23 Significance of Effect for Anchor Interaction with Sub-sea Cables of DBS East and West Together*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West together | Operations and maintenance | Anchor snagging incident occurs with anchor and / or cable damage and compromised vessel stability. | Extremely unlikely | Minor | Broadly Acceptable |

*Table 14-24 Significance of Effect for Anchor Interaction with Sub-sea Cables of DBS East and West in Isolation*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West in isolation | Operations and maintenance | Anchor snagging incident occurs with anchor and / or cable damage and compromised vessel stability. | Extremely unlikely | Minor | Broadly Acceptable |

### 14.6.6 Impact 6 Reduction of Emergency Response Capability (Including SAR Access) (Operation and Maintenance Phase)

218. The presence of surface structures and operation and maintenance activities associated with the Projects may result in an increased likelihood of an incident occurring which requires an emergency response and may reduce access for surface and air responders, including SAR assets.

#### 14.6.6.1 DBS East and West Together – All Receptors

##### *14.6.6.1.1 Emergency Response Resources*

219. The operation and maintenance phase may last for up to 32 years (for the sequential scenario) with up to 19 operation and maintenance vessels located on-site simultaneously and making up to 473 annual round trips. With a full build out of the Array Areas, these vessels would increase the likelihood of an incident requiring an emergency response and subsequently increase the likelihood of multiple incidents occurring simultaneously, diminishing emergency response capability.

220. There are various emergency response resources serving the region, including RNLI stations (closest at Flamborough approximately 55nm to the south-west) and SAR helicopter bases (closest at Humberside approximately 83nm to the south-west). Given the distances which would be travelled in the event of an emergency response incident in proximity to the Array Areas, this impact covers a regional spatial extent.

221. From historical incident data, there is a low rate of incidents in the region, with the likelihood of an incident relating to the Projects occurring at the same time being unlikely. Additionally, based on the number of Collision and allision incidents [4] associated with UK offshore wind farms reported to date, there is an average of one incident per 1,695 operational wind turbine years (as of November 2023). Therefore, the Projects are not expected to result in a marked increase in the frequency of incidents requiring an emergency response.

[4] Although other types of incidents are acknowledged, collision and allision incidents have the potential to be among the most serious and give a reasonable indication of the rate of incidents requiring an emergency response.

222. Additionally, should an incident occur in proximity to the Array Areas, it is likely that a project vessel (either for the Projects or the other Dogger Bank offshore wind farm developments) would be well equipped to assist under SOLAS obligations (IMO, 1974) and in liaison with the MCA, most likely as the first responder given the distance offshore. 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.

223. 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 a worst case, there could be a delay to a response request due to a simultaneous incident associated with the Projects leading to PLL, pollution, and vessel damage. However, this worst case scenario is highly unlikely.

#### *14.6.6.1.2 Search and Rescue Access*

224. With a full build out of the Array Areas (Layout A), its physical presence may restrict access for SAR responders, either due to the incident in question occurring within the arrays or the arrays obstructing the most effective path to an incident (likely further offshore). The separation of the two Array Areas (introduced post PEIR) reduces the likelihood of this scenario arising, with the potential for SAR responders to navigate through the gap between the Array Areas. Access issues are more likely to be a concern in adverse weather conditions. The Applicants would work within the parameters of MGN 654 to minimise effects.

225. From recent SAR helicopter taskings data, the frequency of UK SAR operations in proximity to the Array Areas is moderate, with incidents reported primarily occurring related to the Cygnus platforms. Due to the Cygnus platforms being further offshore, it is likely that SAR access may be hindered by the Array Areas due to the necessity of a longer flight path. However, the possibility remains of a SAR responder being able to fly over the Array Areas altogether, particularly in suitable weather conditions. Consideration of third-party helicopter access to / from oil and gas platforms is given in **Volume 7, Chapter 15 Aviation and Radar (application ref: 7.15)**.

226. The total area covered by the Array Areas is approximately 205nm$^2$, which represents a relatively moderate area to search compared to other offshore wind farms. It is unlikely that a SAR operation would require the full extent of both Array Areas to be searched; it is much more likely that a search could be restricted to a specific portion of the Array Areas depending upon the information available regarding the casualty location (inclusive of any assumptions on the drift of the casualty).

227. When considering the non-full build out array layout (Layout B), the minimum spacing between all structures of 830m is similar to many other consented offshore wind farms in the UK (Dogger Bank A and Dogger Bank B were consented with a minimum spacing of 700m (Forewind, 2013)). The array layout includes a SLoO and a safety justification for a SLoO layout would be completed should this be taken forward, including consideration of accessibility for SAR operations.

228. More fully, a layout plan would 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. However, the final array layout would 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;
- Completion of a SAR Checklist;
- Completion of an ERCoP; and
- Application of unique identification marking of structures in an easily identifiable pattern.

229. The SAR Checklist and ERCoP would remain live documents throughout the operation and maintenance phase.

230. 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.

##### *14.6.6.1.3 Existing Aids to Navigation*

231. An indirect pathway to increasing the likelihood of an incident occurring which requires an emergency response is an impact upon use of existing aids to navigation due to the presence of the Projects.

232. There are no existing aids to navigation located within the Array Areas or Offshore Export Cable Corridor. Additionally, the closest aids to navigation to the Array Areas are the construction buoyage for Dogger Bank A which is expected to be removed by the operations and maintenance phase. Therefore, this element of the impact is not considered notable.

##### *14.6.6.1.4 Frequency of Occurrence*

233. The frequency of occurrence of effects due reduction of emergency response capability is extremely unlikely for the operations and maintenance phase.

##### *14.6.6.1.5 Severity of Consequence*

234. The severity of consequence of effects due reduction of emergency response capability is moderate for the operations and maintenance phase.

#### 14.6.6.2 DBS East and DBS West In Isolation – All Receptors

235. Should only one Array Area in isolation be constructed, this may assist SAR access to the Cygnus field, particularly if it is DBS West. In this case a direct flight path would still be able to be maintained - construction of solely DBS East in isolation would still result in a direct flight path being obstructed by the array. Fewer wind turbines would also allow for emergency responders to locate incidents more efficiently within the array and create more unoccupied sea room. In addition, construction of one array would lead to fewer on-site project vessels, reducing the likelihood that an incident would occur requiring emergency response. Nevertheless, the frequency of occurrence remains within extremely unlikely parameters.

#### 14.6.6.3 Export Cable Platform Search Area – All Receptors

236. Given that the ESP would be a solitary structure, it is not anticipated that it would provide material concerns regarding obstruction of SAR access to the immediate area. The ESP would likely not lead to obscuration of incidents, and the presence of project vessels would be minimal, leading to lower likelihood of an accident. However, this would also mean the likelihood of a project vessel serving as the first responder is lower. Given the distance offshore, the likelihood of a dedicated SAR asset providing the initial response would be greater than at the Array Areas.

#### 14.6.6.4 Significance of Effect – DBS East and DBS West Together

237. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from reduction of emergency response capability for DBS East and DBS West together, is presented in **Table 14-25**.

##### *14.6.6.4.1 Mitigation and residual significance of effect*

238. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.6.5 Significance of Effect – DBS East and DBS West in Isolation

239. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from reduction of emergency response capability for DBS East and DBS West in isolation, is presented in **Table 14-26**.

##### *14.6.6.5.1 Mitigation and residual significance of effect*

240. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

#### 14.6.6.6 Significance of Effect – Export Cable Platform Search Area

241. The frequency of occurrence, severity of consequence, and resulting significance of effect resulting from reduction of emergency response capability for the Export Cable Platform Search Area, is presented in **Table 14-27**.

##### *14.6.6.6.1 Mitigation and residual significance of effect*

242. No additional mitigation is proposed for this impact and therefore the residual significance of effect remains **Broadly Acceptable**.

*Table 14-25 Significance of Effect for Reduction of Emergency Response Capability of DBS East and West Together*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West together | Operations and maintenance | Delay to a response request and inability to undertake an effective search leading to vessel damage, PLL, and pollution. | Extremely unlikely | Moderate | Broadly Acceptable |

*Table 14-26 Significance of Effect for Reduction of Emergency Response Capability of DBS East and West in Isolation*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| DBS East and West in isolation | Operations and maintenance | Delay to a response request and inability to undertake an effective search leading to vessel damage, PLL, and pollution. | Extremely unlikely | Moderate | Broadly Acceptable |

*Table 14-27 Significance of Effect for the Export Cable Platform Search Area*

| Scenario | Phase | Worst Case Consequences | Frequency of Occurrence | Severity of Consequence | Significance of Effect |
|---|---|---|---|---|---|
| Export Cable Platform Search Area | Operations and maintenance | Delay to a response request and inability to undertake an effective search leading to vessel damage, PLL, and pollution. | Negligible | Moderate | Broadly Acceptable |

## 14.7 Potential Monitoring Requirements

243. Monitoring requirements are described in **Volume 8, In Principle Monitoring Plan (IPMP) (Application ref: 8.23)** submitted alongside the DCO application and further developed and agreed with stakeholders prior to construction based on the IPMP and taking account of the final detailed design of the Projects.

244. The DCO would require vessel traffic monitoring to be undertaken. This would be undertaken for the duration of the construction phase and during the first three years of the operation and maintenance phase.

## 14.8 Assessment of Cumulative Effects

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

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

247. The CEA has followed a four-stage approach developed from the Planning Inspectorate Advice Note Seventeen. These stages are set out in Table 1-1 of Volume 7, Appendix 6-2 Offshore Cumulative Assessment (application ref: 7.6.6.2). Stage four of this process, the CEA assessment is undertaken in two phases. The first step in the CEA is the identification of which residual impacts assessed for the Projects on their own have the potential for a cumulative impact with other plans, projects and activities. This information is set out in Table 14-28 which sets out the potential impacts assessed in this chapter and identifies the potential for cumulative effects to arise, providing a rationale for such determinations. Only potential impacts assessed in section 14.6 where the potential for cumulative effects has been identified (minor, moderate or major), have been taken forward to the final CEA (i.e. those assessed as 'negligible' or 'no change' are not taken forward, as there is no potential for them to contribute to a cumulative effect). Each project has been considered on a case by case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial / temporal scales involved.

### 14.8.1 Screening for Cumulative Effects

248. **Table 14-28** details the potential Cumulative Effects that may occur between the Projects and other plans, projects and activities.

*Table 14-28 Potential Cumulative Effects*

| Impact | Potential for Cumulative Effects | Data Confidence | Rationale |
|---|---|---|---|
| **Construction** | | | |
| Impact 1: Vessel displacement and increased vessel to vessel collision risk between third-party vessels | Yes | High | Presence of other plans, projects and activities may further reduce available sea room, increasing displacement and potentially increasing subsequent collision risk. |
| Impact 2: Increased vessel to vessel collision risk between a third-party vessel and a Project vessel | Yes | High | Presence of Project vessels associated with other plans, projects and activities may result in additional collision risk. |

| Impact | Potential for Cumulative Effects | Data Confidence | Rationale |
|---|---|---|---|
| **Operation & Maintenance** | | | |
| Impact 1: Vessel displacement and increased vessel to vessel collision risk between third-party vessels | Yes | High | Presence of other plans, projects and activities may further reduce available sea room, increasing displacement and potentially increasing subsequent collision risk. |
| Impact 2: Increased vessel to vessel collision risk between a third-party vessel and a Project vessel | Yes | High | Presence of project vessels associated with other plans, projects and activities may result in additional collision risk. |
| Impact 3: Creation of vessel to structure allision risk | Yes | High | Localised impact which requires other plans, projects and activities to be located in proximity to the Projects (noting that Dogger Bank A is considered as part of the Projects only assessment – see section 14.6). However, consideration has been given to the navigation corridors associated with the Hornsea developments. |
| Impact 4: Reduction of under-keel clearance due to cable protection | No | High | Localised impact which requires other plans, projects and activities to be located in proximity to the Projects. |
| Impact 5: Anchor interaction with sub-sea cables | No | High | Localised impact which requires other plans, projects and activities to be located in proximity to the Projects. |

| Impact | Potential for Cumulative Effects | Data Confidence | Rationale |
|---|---|---|---|
| Impact 6: Reduction of emergency response capability (including SAR access) | Yes | High | Presence of other plans, projects and activities may further reduce emergency response capability. |
| **Decommissioning** | | | |
| Impact 1: Vessel displacement and increased vessel to vessel collision risk between third-party vessels | Yes | High | Presence of other plans, projects and activities may further reduce available sea room, increasing displacement and potentially increasing subsequent collision risk. |
| Impact 2: Increased vessel to vessel collision risk between a third-party vessel and a Project vessel | Yes | High | Presence of project vessels associated with other plans, projects and activities may result in additional collision risk. |

### 14.8.2 Schemes Considered for Cumulative Impacts

249. A list of schemes that may result in Cumulative Effects with the Projects is detailed in **Table 14-29**. For shipping and navigation, a search distance of up to 50nm from the Offshore Development Area has been used to determine the initial list of projects considered for the CEA.

250. The types of schemes and distances considered are as follows:

- Offshore wind farms:
  - Up to 50nm from the Array Areas;
  - Up to 2nm from the Offshore Export Cable Corridor; and
  - Up to 10nm from the Export Cable Platform Search Area.
- Oil and gas infrastructure:
  - Up to 10nm from the Array Areas;
  - Up to 5nm from the Offshore Export Cable Corridor; and
  - Up to 5nm from the Export Cable Platform Search Area.
- Marine aggregate dredging areas

  - Up to 30nm from the Array Areas;
  - Up to 5nm from the Offshore Export Cable Corridor; and
  - Up to 5nm from the Export Cable Platform Search Area.
- Sub-sea cables:
  - Up to 2nm from the Array Areas;
  - Up to 2nm from the Offshore Export Cable Corridor; and
  - Up to 2nm from the Export Cable Platform Search Area.

251. Schemes have been assigned a tier level between 1 and 3, based on status, distance from the Offshore Development Area, interaction with Main Commercial Routes passing within 1nm of the Array Areas, consultation, and data confidence.

252. Where a scheme is already *in situ* (including offshore wind farms under construction [5]) the cumulative assessment considers them to be part of the baseline conditions for the surrounding area. As such, it is not expected that the Projects would contribute to Cumulative Effects with such schemes, and therefore these have not been the subject of further assessment. These include Dogger Bank A, Dogger Bank B, and Sofia offshore wind farms and the Cavendish and Cygnus oil and gas platforms, all of which are accounted for in the baseline assessment of effects.

*Table 14-29 List of Schemes Screened For Further Assessment in the Full CEA*

| Tier | Scheme | Distance to Array Areas (nm) | Distance to Offshore Export Cable Corridor (nm) | Distance to Export Cable Platform Search Area (nm) |
|---|---|---|---|---|
| **Offshore Wind Farms** | | | | |
| 1 | Dogger Bank C | 31 | 39 | 75 |
| 1 | Hornsea Project Three | 24 | 33 | 58 |
| 2 | Hornsea Project Four | 13 | 22 | 13 |
| 3 | Dogger Bank D | 40 | 49 | 86 |
| 3 | Outer Dowsing | 44 | 43 | 43 |

[5] For shipping and navigation assessment, an offshore wind farm is deemed to be under construction where offshore works are ongoing and a buoyed construction area is in situ for the array.

### 14.8.3 Vessel Displacement and Increased Third-Party Vessel to Vessel Collision Risk (All Phases)

253. Activities associated with the installation, maintenance and decommissioning of structures and 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.

#### 14.8.3.1 Tier 1/2

254. Based on the cumulative assessment of vessel routeing (see section 15.5 of **Volume 7, Appendix 14-2 Navigational Risk Assessment (application ref: 7.14.14.2)**), a deviation would be required for seven of the ten Main Commercial Routes identified. It is anticipated that three of these routes would deviate around Hornsea Project Four (one of which also intersects with Dogger Bank C), with three also deviating around Hornsea ProjectThree. The largest deviation is anticipated to be 7.3nm, associated with Route 9 (Rotterdam to Icelandic ports and used by an average of one to two vessels per week). This increase equates to a 0.6% increase in route length.

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

256. The navigation corridors between the Hornsea developments are of particular note – it is important that affected routes are able to safely approach and utilise these in the presence of the Projects.

257. There is approximately 45nm between the south-western corner of the DBS West Array Area and the corridor between Hornsea Project One, Hornsea Project Two and Hornsea Project Three. The only existing navigational feature within this sea area is the Trent platform (noting that the Schooner platform close to the corridor has been removed). There is sea room available for vessels to pass east or west of the Trent platform, thus allowing flexibility for vessels when determining a suitable passage between the Array Areas and Hornsea developments.

258. There is approximately 30nm between the eastern corner of the DBS East Array Area and the corridor between Hornsea Project Two and Hornsea Project Four. There are no existing navigational features within this sea area, and there is existing routeing through the future location of this corridor which passes well south of the DBS East Array Area (Route 1). Therefore, the ability for vessels to make passage utilising this corridor would not be impacted by the presence of the Array Areas.

#### 14.8.3.2 Tier 3

259. Of the Tier 3 developments, only Dogger Bank D may influence routeing in the area if built out in full. This may further impact on Route 10, which would be required to deviate due to Dogger Bank C. However, any deviation would be small and vessels may already pass at a suitable distance following deviations due to the presence of Dogger Bank C.

#### 14.8.3.3 Significance of Effect

260. For all phases the frequency of occurrence in relation to cumulative vessel displacement and increased third-party vessel to vessel collision risk is considered frequent and the severity of consequence is considered moderate.

261. Overall, for all phases it is predicted that the significance of effect due to cumulative vessel displacement and increased third-party vessel to vessel collision risk is **Tolerable with Mitigation**.

### 14.8.4 Increased Third-Party to Project Vessel Collision Risk (All Phases)

262. 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.

#### 14.8.4.1 Tier 1/2/3

263. Construction activities for the Projects are not expected to commence until after construction activities have been completed for the consented Dogger Bank developments. Therefore, limited increases in Project vessel movements across cumulative developments are expected in relation to construction activities.

264. There is potential for Dogger Bank D construction activities to overlap with that of the Projects. In such circumstances the marine coordination applicable to Project vessels associated with the Projects would be extended as appropriate across both developments, thus ensuring that disruption to third-party vessel movements is minimised. This would also apply for operations 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 Projects only impact would be applied across all projects 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.

265. For other cumulative developments, the distance between them and the Projects is such that no cumulative overlap in activities is anticipated.

#### 14.8.4.2 Significance of Effect

266. For the construction and decommissioning phases, the frequency of occurrence in relation to cumulative third-party to Project vessel collision risk is considered to be extremely unlikely. For the operation and maintenance phase, the frequency of occurrence is considered to be remote. For all phases the severity of consequence in relation to cumulative third-party to Project vessel collision risk is considered to be serious.

267. Overall, for all phases it is predicted that the significance of effect due to cumulative third-party to Project vessel collision risk is **Tolerable with Mitigation**.

### 14.8.5 Creation of Vessel to Structure Allision Risk (Operations and Maintenance Phase)

268. 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.

#### 14.8.5.1 Tier 1/2/3

269. Given the localised nature of vessel to structure allision risk, cumulative risk for this impact is limited noting that Hornsea Project Four is the closest cumulative development, located approximately 22nm south-west of the DBS East Array Area.

270. The navigation corridors associated with the Hornsea developments are acknowledged and in particular the potential allision risk which may arise for vessels utilising these. However, as acknowledged with regard to vessel displacement, the distance between the Array Areas and the Hornsea developments is sufficient to allow vessels to approach these corridors safely and avoid additional allision risk beyond that associated with the corridors in isolation.

#### 14.8.5.2 Significance of Effect

271. For the operations and maintenance phase, the frequency of occurrence in relation to cumulative vessel to structure allision risk is considered to be extremely unlikely and the severity of consequence is considered to be moderate.

272. Overall, for the operations and maintenance phase it is predicted that the significance of effect due to cumulative vessel to structure allision risk is **Broadly Acceptable**.

### 14.8.6 Reduction of Emergency Response Capability Including SAR (Operations and Maintenance Phase)

273. Presence of structures, increased vessel activity, and personnel numbers on a cumulative level may reduce emergency response capability by increasing the number of incidents, increase consequences or reducing access for the responders.

#### 14.8.6.1 Tier 1/2/3

274. As with the Projects, it is assumed that cumulative developments would have mitigation 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 would 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 Projects, or vice-versa. Nevertheless, the presence of structures and associated activities across multiple developments would increase the likelihood of an incident occurring that requires an emergency response.

275. Given that the Array Areas are not immediately adjacent to any other cumulative development, there is not considered to be any cumulative risk associated with SAR access, noting that a 1nm separation is required by MGN 654.

#### 14.8.6.2 Significance of Effect

276. The frequency of occurrence in relation to cumulative reduction of emergency response capability including SAR is considered to be remote and the severity of consequence is considered to be serious.

277. Overall, it is predicted that the significance of effect due to cumulative reduction of emergency response capability including SAR is **Tolerable with Mitigation**.

## 14.9 Transboundary Effects

278. Given the international nature of routeing by commercial vessels – particularly in the region containing the Projects given the central position within the North Sea – the potential for a transboundary effect relating to the displacement of commercial vessels undertaking international voyages has been identified.

279. Since the use of AIS transceivers (the primary data source for characterisation of commercial vessel movements) is international, the characterisation of the existing environment in section 14.5 is suitable for identifying relevant other EEAs. Other EEAs with port(s) which feature in the Main Commercial Routes include the Netherlands, Sweden, Poland, Denmark, Iceland, and the Faroe Islands.

280. Since such international commercial routeing is captured in the existing environment, the environmental assessment for the Projects 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.

## 14.10Interactions

281. The effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects are presented in **Table 14-30**.

282. The worst case impacts assessed for shipping and navigation account for these potential interactions for each phase, where appropriate. Therefore, the assessment of significance is considered conservative and robust the levels of significance of effect identified in section 14.6 are not further increased.

*Table 14-30 Interactions Between Impacts - Screening*

| **Potential Interactions between Impacts** | | |
|---|---|---|
| **Construction** | | |
| | Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels | Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel |
| Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels | | Yes |
| Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel | Yes | |

| **Operation** | | | | | | |
|---|---|---|---|---|---|---|
| | Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels | Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel | Impact 3 Creation of Vessel to Structure Allision Risk | Impact 4 Reduction of Under-Keel Clearance due to Cable Protection | Impact 5 Anchor Interaction with Sub-sea Cables | Impact 6 Reduction of Emergency Response Capability (Including SAR Access) |
| Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels | | Yes | Yes | No | No | Yes |
| Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel | Yes | | Yes | No | No | Yes |
| Impact 3 Creation of Vessel to Structure Allision Risk | Yes | Yes | | No | Yes | Yes |
| Impact 4 Reduction of Under-Keel Clearance due to Cable Protection | No | No | No | | No | No |
| Impact 5 Anchor Interaction with Sub-sea Cables | No | No | Yes | No | | Yes |
| Impact 6 Reduction of Emergency Response Capability (Including SAR Access) | Yes | Yes | Yes | No | Yes | |

| Potential Interactions between Impacts | | |
|---|---|---|
| **Decommissioning** | | |
| | Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels | Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel |
| Impact 1 Vessel Displacement and Increased Vessel to Vessel Collision Risk Between Third-Party Vessels | | Yes |
| Impact 2 Increased Vessel to Vessel Collision Risk Between a Third-Party Vessel and a Project Vessel | Yes | |

## 14.11 Inter-relationships

283. For shipping and navigation, potential inter-relationships between other topics are assessed within this ES including commercial fisheries and other users (oil and gas). A summary of the potential inter-relationships between shipping and navigation and other topics is provided in **Table 14-31**.

*Table 14-31 Shipping and Navigation Inter-relationships*

| Topic and Description | Related Chapter | Where Addressed in this Chapter | Rationale |
|---|---|---|---|
| **Construction** | | | |
| Commercial Fisheries | **Volume 7, Chapter 13 Commercial Fisheries (application ref: 7.13)** | Section 14.6.1 considers displacement for all receptors including commercial fishing vessels, noting that the assessment is limited to commercial fishing vessels in transit (rather than engaged in fishing). | Displacement from fishing grounds for commercial fishing vessels due to the presence of the buoyed construction area. |
| Infrastructure and Other Users (oil and gas facilities) | **Volume 7, Chapter 16 Infrastructure and Other Users (application ref: 7.16)** | Section 14.6.1 considers displacement for all receptors including oil and gas vessels, noting that the assessment is limited to oil and gas vessels in transit (rather than activities at assets). | Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of partially constructed arrays. |
| **Operation** | | | |

| Topic and Description | Related Chapter | Where Addressed in this Chapter | Rationale |
|---|---|---|---|
| Infrastructure and Other Users (oil and gas facilities) | **Volume 7, Chapter 16 Infrastructure and Other Users (application ref: 7.16)** | Section 14.6.1 considers displacement for all receptors including oil and gas vessels, noting that the assessment is limited to oil and gas vessels in transit (rather than activities at assets). | Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of the arrays. |
| **Decommissioning** | | | |
| Commercial Fisheries | **Volume 7, Chapter 13 Commercial Fisheries (application ref: 7.13)** | Section 14.6.1 considers displacement for all receptors including commercial fishing vessels, noting that the assessment is limited to commercial fishing vessels in transit (rather than engaged in fishing). | Displacement from fishing grounds for commercial fishing vessels due to the presence of the buoyed decommissioning area. |
| Infrastructure and Other Users (oil and gas facilities) | **Volume 7, Chapter 16 Infrastructure and Other Users (application ref: 7.16)** | Section 14.6.1 considers displacement for all receptors including oil and gas vessels, noting that the assessment is limited to oil and gas vessels in transit (rather than activities at assets). | Reduction in localised marine access to existing and licenced oil and gas facilities due to the presence of partially decommissioned arrays. |

## 14.12 Summary

284. This chapter has provided a characterisation of the existing environment for shipping and navigation based on both existing and site specific survey data. It has been established that the significance of effect is **Broadly Acceptable** or **Tolerable with Mitigation** for all impacts at the ES stage, which is not significant in EIA terms.

285. The effects of a potential impact relating to vessel displacement and increased vessel to vessel collision risk between third-party vessels has been assessed as **Tolerable with Mitigation** for all scenarios and phases.

286. The effects of a potential impact relating to increased vessel to vessel collision risk between a third-party vessel and a Project vessel has been assessed as **Broadly Acceptable** for all scenarios and phases.

287. The effects of a potential impact relating to the creation of vessel to structure allision risk has been assessed as **Broadly Acceptable** for all scenarios.

288. The effects of a potential impact relating to the reduction of under-keel clearance due to cable protection has been assessed as **Broadly Acceptable** for all scenarios.

289. The effects of a potential impact relating to anchor interaction with sub-sea cables has been assessed as **Broadly Acceptable** for all scenarios.

290. The effects of a potential impact relating to the reduction of emergency response capability (including SAR access) has been assessed as **Broadly Acceptable** for all scenarios.

291. A summary of the assessment of significance at the ES stage is provided in **Table 14-32**.

*Table 14-32 Summary of Potential Likely Significant Effects on Shipping and Navigation*

| Potential Impact | Area | Receptor | Frequency of Occurrence | Severity of Consequence | Pre-Additional Mitigation Effect | Additional Mitigation Measures Proposed | Residual Effect |
|---|---|---|---|---|---|---|---|
| **Construction** | | | | | | | |
| Vessel displacement and increased vessel to vessel collision risk between third-party vessels | Array Areas | All vessels | Reasonably probable | Moderate | Tolerable with Mitigation | None | - |
| | Export Cable Platform Search Area | | Reasonably probable | Moderate | Tolerable with Mitigation | None | - |
| Increased vessel to vessel collision risk between a third-party vessel and a Project vessel | Array Areas | All vessels | Negligible | Moderate | Broadly Acceptable | None | – |
| | Export Cable Platform Search Area | | Negligible | Moderate | Broadly Acceptable | None | – |
| **Operation** | | | | | | | |
| Vessel displacement and increased vessel to vessel collision risk between third-party vessels | Array Areas | All vessels | Reasonably probable | Moderate | Tolerable with Mitigation | None | - |
| | Export Cable Platform Search Area | | Reasonably probable | Moderate | Tolerable with Mitigation | None | - |
| Increased vessel to vessel collision risk between a third-party vessel and a Project vessel | Array Areas | All vessels | Negligible | Moderate | Broadly Acceptable | None | – |
| | Export Cable Platform Search Area | | Negligible | Moderate | Broadly Acceptable | None | – |
| Creation of vessel to structure allision risk | Array Areas | All vessels | Extremely Unlikely | Moderate | Broadly Acceptable | None | – |
| | Export Cable Platform Search Area | | Negligible | Serious | Broadly Acceptable | None | – |
| Reduction of under-keel clearance due to cable protection | Array Areas | All vessels | Extremely Unlikely | Minor | Broadly Acceptable | None | – |
| Anchor interaction with sub-sea cables | Array Areas | All vessels | Extremely Unlikely | Minor | Broadly Acceptable | None | – |
| Reduction of emergency response capability (including SAR access) | Array Areas | Emergency responders | Extremely Unlikely | Moderate | Broadly Acceptable | None | – |
| | Export Cable Platform Search Area | | Negligible | Moderate | Broadly Acceptable | None | – |

| Potential Impact | Area | Receptor | Frequency of Occurrence | Severity of Consequence | Pre-Additional Mitigation Effect | Additional Mitigation Measures Proposed | Residual Effect |
|---|---|---|---|---|---|---|---|
| **Decommissioning** | | | | | | | |
| Vessel displacement and increased vessel to vessel collision risk between third-party vessels | Array Areas | All vessels | Remote | Moderate | Tolerable with Mitigation | None | - |
| | Export Cable Platform Search Area | | Reasonably probable | Moderate | Tolerable with Mitigation | None | - |
| Increased vessel to vessel collision risk between a third-party vessel and a Project vessel | Array Areas | All vessels | Negligible | Serious | Broadly Acceptable | None | – |
| | Export Cable Platform Search Area | | Negligible | Moderate | Broadly Acceptable | None | - |
| **CEA - Construction** | | | | | | | |
| Vessel displacement and increased third-party vessel to vessel collision risk | Array Areas | All vessels | Frequent | Moderate | Tolerable with Mitigation | None | - |
| Increased third-party to project vessel collision risk | Array Areas | All vessels | Extremely unlikely | Serious | Tolerable with Mitigation | None | - |
| **CEA – Operation** | | | | | | | |
| Vessel displacement and increased third-party vessel to vessel collision risk | Array Areas | All vessels | Frequent | Moderate | Tolerable with Mitigation | None | |
| Increased third-party to project vessel collision risk | Array Areas | All vessels | Remote | Serious | Tolerable with Mitigation | None | |
| Creation of vessel to structure allision risk | Array Areas | All vessels | Extremely unlikely | Moderate | Broadly Acceptable | None | - |
| Reduction of emergency response capability including SAR | Array Areas | Emergency responders | Remote | Serious | Tolerable with Mitigation | None | - |
| **CEA – Decommissioning** | | | | | | | |
| Vessel displacement and increased third-party vessel to vessel collision risk | Array Areas | All vessels | Frequent | Moderate | Tolerable with Mitigation | None | |
| Increased third-party to project vessel collision risk | Array Areas | All vessels | Extremely unlikely | Serious | Tolerable with Mitigation | None | |

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