Project Title	Dogger Bank Offshore Wind Farm
Date:	05/08/2024

Dogger Bank C

Safety Zone Application

Rev	Prepared By	Sign Off	Checked By	Sign Off	Approved By	Sign Off	Date of Issue
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Abbreviations

Abbreviation	Definition
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
CLV	Cable Lay Vessel
COLREGS	International Regulations for Preventing Collisions at Sea
DBA	Dogger Bank A
DBB	Dogger Bank B
DBC	Dogger Bank C
DBWF	Dogger Bank Wind Farm
DECC	Department for Energy and Climate Change
DESNZ	Department for Energy Security and Net Zero
DP	Dynamic Positioning
ECC	Export Cable Corridor
FIR	Project Fishing Industry Representative
Fl	Flashing
FLO	Fishing Liaison Officer
GE	General Electric
GW	Gigawatt
HAT	Highest Astronomical Tide
IALA	International Association of Lighthouse Authorities
IMO	International Maritime Organization
km	Kilometre
LAT	Lowest Astronomical Tide

Abbreviation	Definition
LMP	Lighting and Marking Plan
LOA	Length Overall
m	Metre
MCA	Maritime and Coastguard Agency
MCG	Motion Compensate Gripper
MP	Monopile
MW	Megawatt
nm	Nautical Mile
NtM	Notice to Mariners
NUC	Not Under Command
OSP	Offshore Substation Platform
PLGR	Pre-Lay Grapnel Run
RAM	Restricted in Ability to Manoeuvre
s	Second
SAR	Search and Rescue
SOLAS	International Convention for the Safety of Life at Sea
SOV	Service Operations Vessel
SPS	Significant Peripheral Structure
TP	Transition Piece
UKHO	United Kingdom Hydrographic Office
VHF	Very High Frequency
VTMS	Vessel Traffic Monitoring System
WTG	Wind Turbine Generator

Abbreviation	Definition
WtW	Walk to Work
Y	Yellow

1 Introduction

1.1 Background

Doggerbank Offshore Wind Farm Project 3 Projco Limited is a joint venture between SSE, Equinor and Vårgrønn (40%:40%:20% respectively) (herein referred to as the Developer). Consent was granted for the Dogger Bank C (DBC) Project (formally Dogger Bank Teesside A) in 2015 under the Dogger Bank Teesside A and B Offshore Wind Farm Order 2015 (as amended) (the Development Consent Order). The Sofia Offshore Wind Farm (formally Dogger Bank Teesside B) is being taken forward by RWE and not covered by this application.

1.2 Consultation

Interested parties have been invited to make representations to the Secretary of State about this application by email to the Secretary of State, Energy Infrastructure Planning team, Department for Energy Security and Net Zero (DESNZ) at **energyinfrastructureplanning@energysecurity.gov.uk**. Representations should be made stating the name of the proposal and nature of the representation between 6th August and 3rd September 2024.

1.3 Scope of the Safety Zone Application

This document represents the primary supporting document to Dogger Bank Offshore Wind Farm's (DBWF) application for safety zones to be implemented for DBC, noting separate applications for Dogger Bank A (DBA) and Dogger Bank B (DBB) have already been submitted and accepted previously by DESNZ in its previous structure as the Department for Business, Energy and Industrial Strategy (BEIS). The approach taken to this application for DBC is aligned with the approach taken for DBA (Anatec, 2022) and DBB (Anatec, 2023).

The purpose of the proposed safety zones is to manage potential interactions between vessels and offshore wind farm construction and maintenance activities, with a view to minimising the risk of an incident which may threaten primarily life, or the environment, as well as the DBC assets.

1.3.1 *Construction Phase*

During the construction phase, the following safety zones are applied for:

- 'Rolling' 500 metre (m) safety zones established around each wind farm structure, and/or their foundations, whilst construction is being performed, as indicated by the presence of construction vessels; and
- Pre-commissioning 50m safety zones established around any wind farm structure which is either partially completed or constructed but not yet commissioned where a construction vessel is not present.

Further details as to what will trigger these safety zones are provided in Section 8.

1.3.2 *Operation and Maintenance Phase – Major Maintenance*

During any periods of major maintenance (see Section 5) within the operation and maintenance phase, the following safety zones are applied for:

- 500m safety zones around all 'major maintenance' being undertaken around a wind

farm structure, as denoted by the presence of a major maintenance vessel.

For reference, the definition of 'major maintenance' given within the Electricity Regulations 2007 (which details regulations associated with application procedures and control of access related to safety zones) is as follows:

"Works relating to any renewable energy installation which has become operational, requiring the attachment to, or anchoring next to, such an installation of a self-elevating platform, jack-up barge, crane barge or other maintenance vessel."

Further details as to what will trigger these safety zones are provided in Section 8. It is noted that safety zones triggered by Service Operation Vessel (SOV) Walk to Work (WtW) systems during the operation and maintenance phase are not being included within this application. The Developer will continue to risk assess, including monitoring of, ongoing activities and traffic patterns and may apply for additional safety zones at a later date.

1.3.3 *Operation and Maintenance Phase – Normal Operations*

No permanent safety zones are applied for during normal operations (i.e., activities not classed under the definition of major maintenance given in Section 1.3.2).

1.3.4 *Decommissioning Phase*

Safety zones for the decommissioning phase of DBC will be applied for prior to such operations taking place once associated requirements are known.

1.4 Legislation Compliance

This document has been drafted in compliance with the following legislation and guidance to ensure all necessary information required is included within this safety zone application:

- Section 95 and Schedule 16 of the Energy Act 2004;
- Electricity (Offshore Generation Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007; and
- Guidance Notes: Applying for Safety Zones around Offshore Renewable Energy Installations (Department of Energy and Climate Change (DECC), 2011).

2 Project Overview

2.1 Layout

The DBC site is located in the southern North Sea, approximately 105 nautical miles (nm) northeast of the Yorkshire coast, as shown in Figure 2.1. The DBA and DBB sites are also shown in Figure 2.1 noting that the Sofia Offshore Wind Farm can be seen on the Admiralty Charts background. All surface piercing structures associated with DBC will be located within the DBC array area. The approved layout is shown in Figure 2.2.

In summary, the DBC design consists of:

- Up to 87 Wind Turbine Generators (WTGs), with a total generating capacity of 1.2 gigawatts (GW);
- WTGs constructed on monopile (MP) foundations;
- One Offshore Substation Platform (OSP) installed on a jacket foundation fixed via four pin piles to collect the generated electricity for transmission to shore;
- A network of inter-array cables to connect strings of WTGs together and connect WTGs to the OSP; and
- An export cable of approximately 260 kilometres (km) to transmit the electricity from OSP to the landfall location between Redcar and Marske-by-the-Sea on the Yorkshire coast.

The WTG hub height will be 138m above Lowest Astronomical Tide (LAT), whilst the maximum blade tip height will be 315m above LAT.

It is noted that the approved layout includes five spare locations which may be used in the event that a preferred location is not viable for installation. These locations are also shown in Figure 2.2.

Micrositing of the WTGs of up to 50m may occur based on the locations presented in Figure 2.2, dependent on the relevant pre-construction surveys and ground conditions.

Minimum spacing between the periphery WTGs is approximately 1,100m. The internal grid is spaced with a minimum of approximately 1,300m between WTGs.

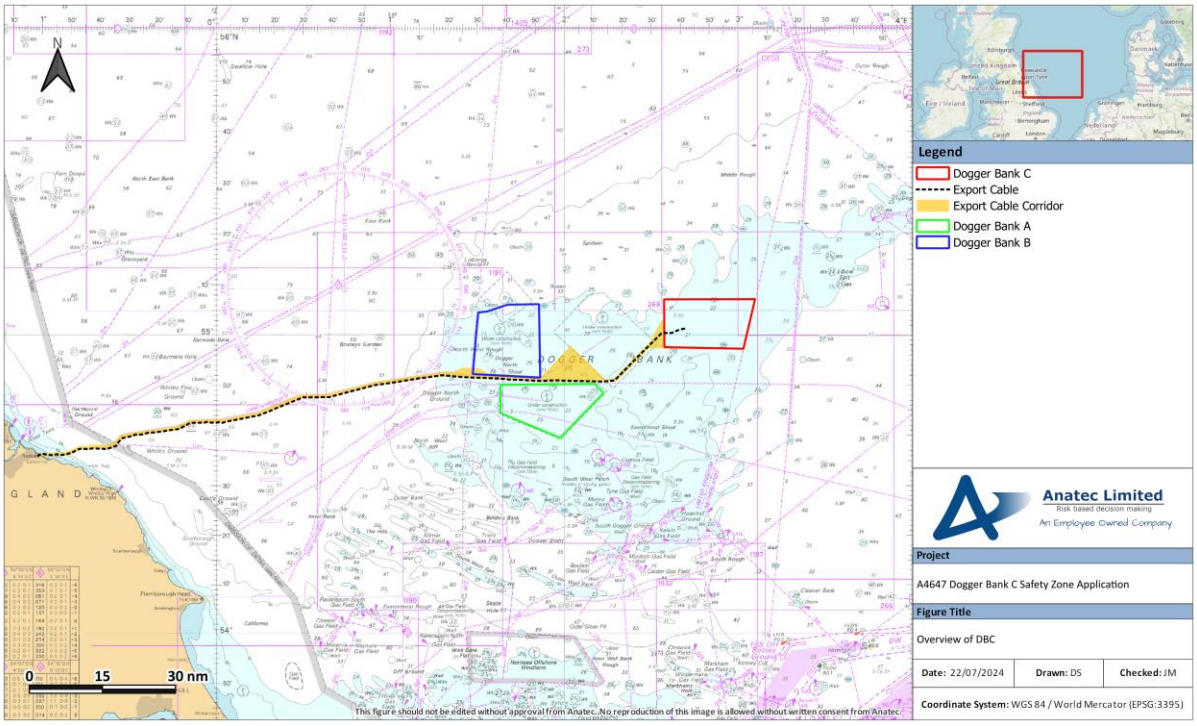

Figure 2.1: Overview of DBC

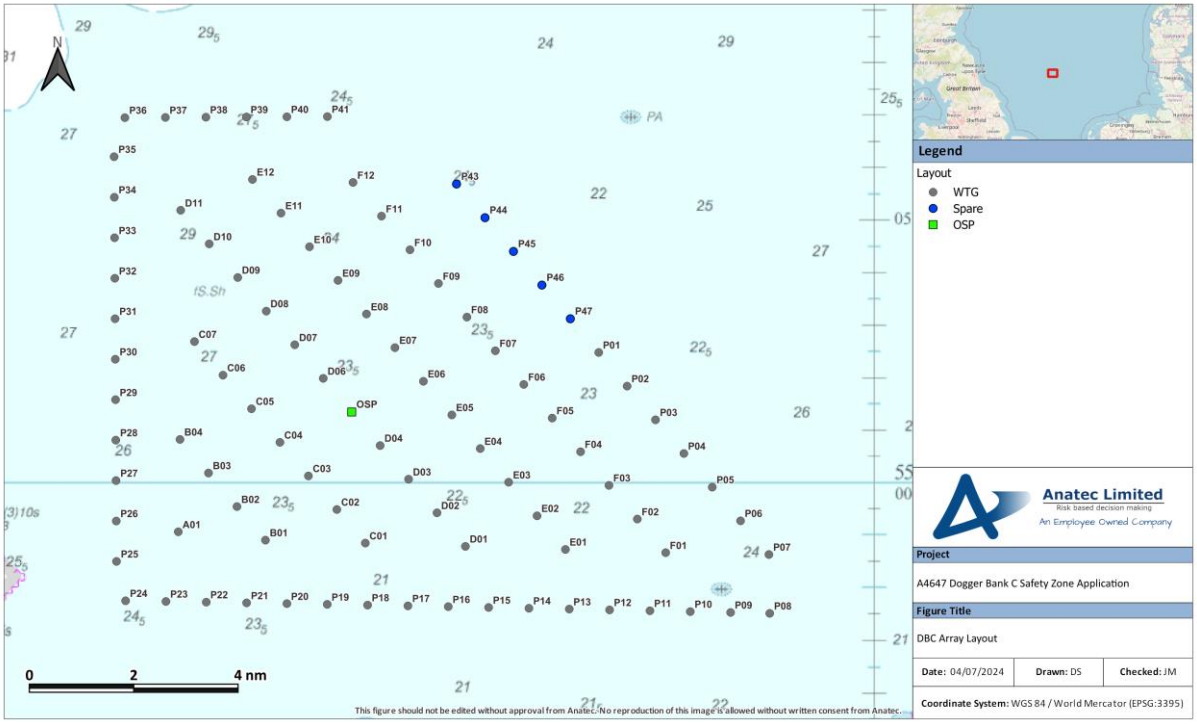

Figure 2.2: DBC Array Layout

2.2 Project Schedule

Offshore construction activities are scheduled to commence in Q3 2024, with completion and final commissioning expected between Q2 2026 and Q2 2027. The provisional construction schedule for components of DBC is summarised in Table 2.1. It should be noted that the schedule below is based on a number of assumptions (e.g., weather, delivery, and installation plans etc.) and therefore the stated dates are subject to change.

Table 2.1: Indicative Project Schedule

Milestone	**Indicative Dates**
Export Cable Installation (offshore)	Q1 2024 to Q2 2025
Inter-Array Cables	Q3/4 2025
Substructures (Jackets)	Q2 2025
Substructures (Topside)	Q2 2025
Scour Protection	Q3 2024 to Q1 2026
Foundation Installation	Q3 2024 to Q4 2025
WTGs	Q1 2026 to Q2 2027

3 Project Components

3.1 Wind Turbine Generators

The 87 WTGs are to be installed via Transition Piece (TP) on to MP foundations. Key parameters of the WTGs are detailed in Table 3.1. Following this, an indicative schematic of the WTG substructure relative to the waterline is shown in Figure 3.1.

Table 3.1: WTG Parameters

Parameter	Value
Manufacturer	General Electric (GE)
Capacity	14.7 Mega Watts (MW)
Rotor Diameter	220m
Blade Length	107m
Hub Height (above LAT)	138m
Maximum Tip Height (above LAT)	315m
Interface Height (Foundation to TP) (above LAT)	22.4m
Blade Clearance (above Highest Astronomical Tide (HAT))	26m

3.2 Offshore Substation

As detailed in Section 2.1, the DBC layout includes one OSP.

Key parameters of the OSP are detailed in Table 3.2, with a schematic then shown in Figure 3.2.

Table 3.2: OSP Topside Parameters

Parameter	Value
Length	69.8m
Width	50.6m
Maximum Height above LAT	59.1m

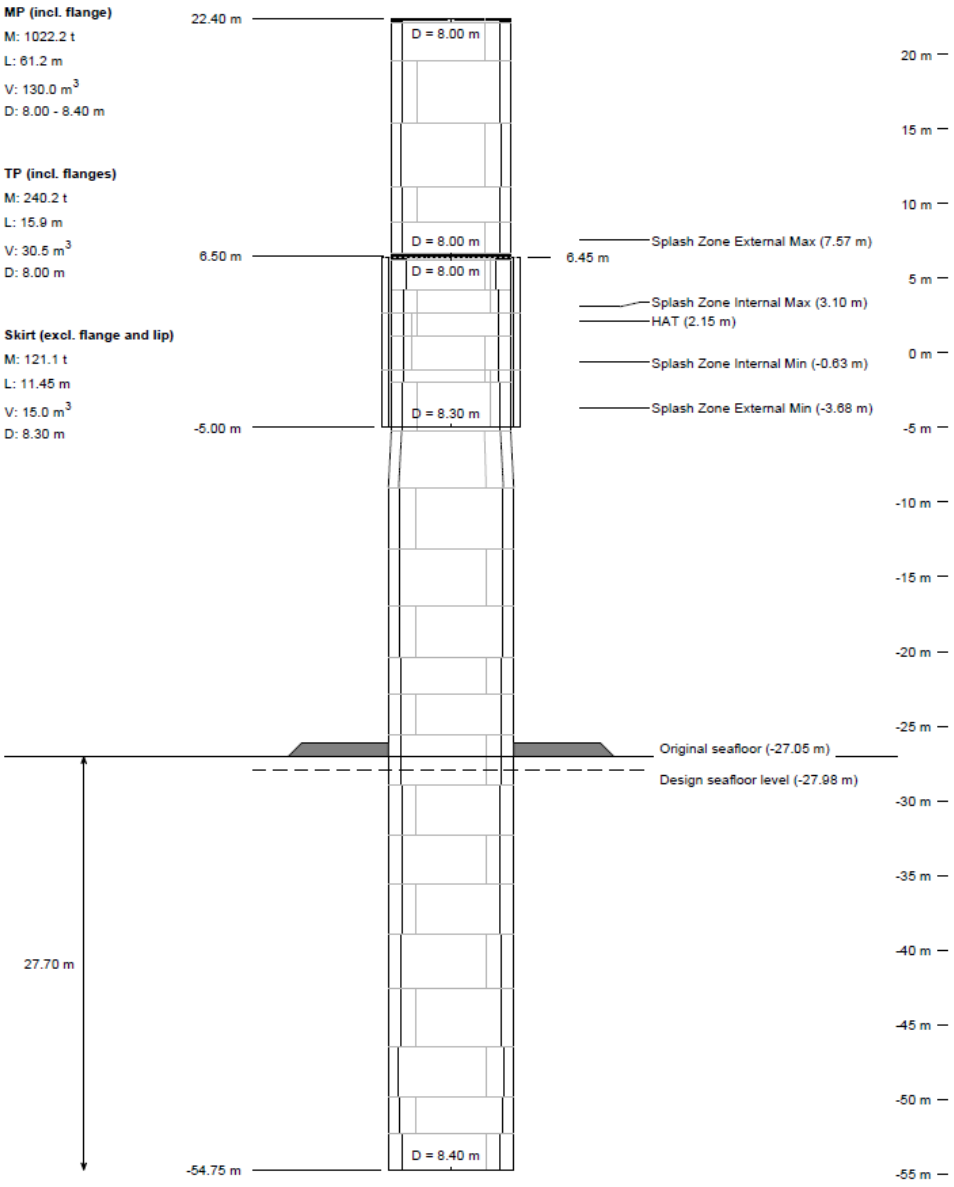

Figure 3.1: WTG Foundation Schematic (Indicative)

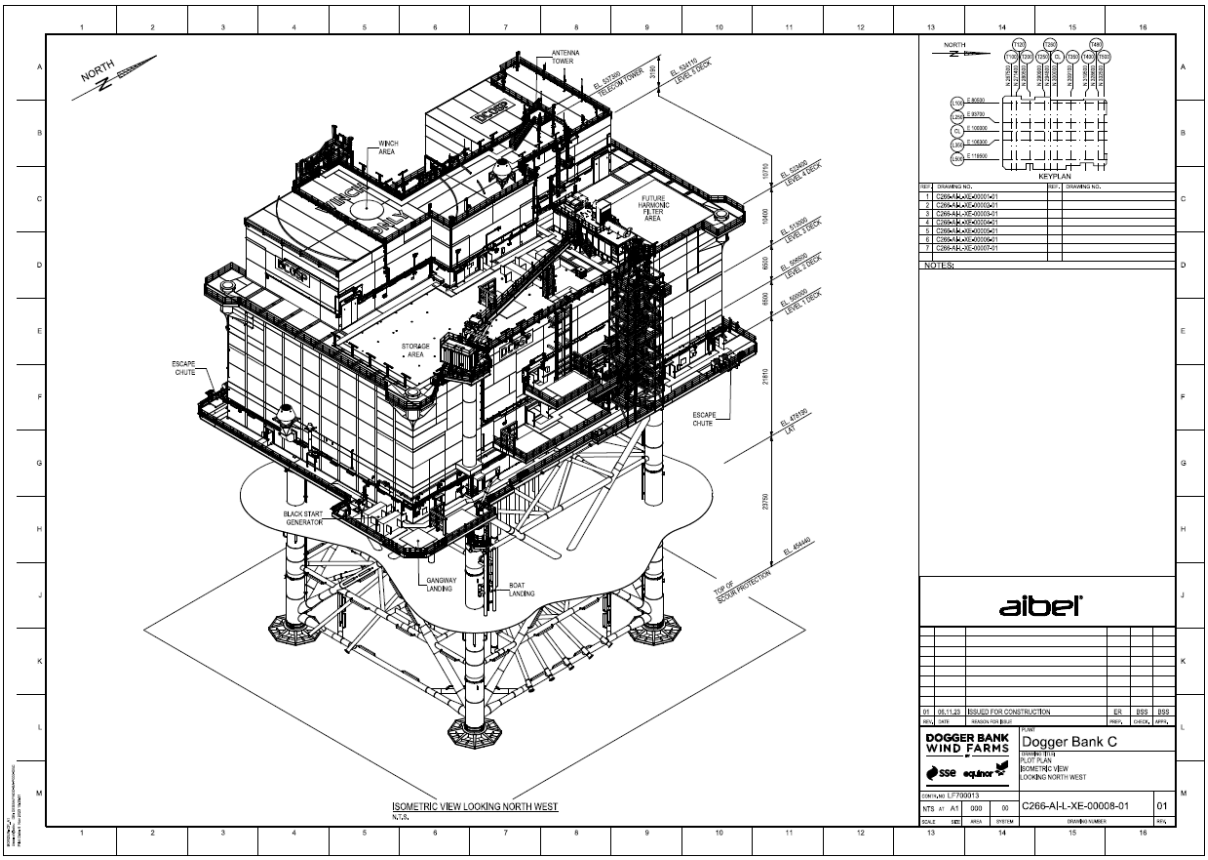

Figure 3.2: OSP Schematic (Indicative)

3.3 Cables

The OSP will connect to the onshore grid via offshore export cables making landfall between Redcar and Marske-by-the-Sea on the Yorkshire coast.

WTGs and the OSP will be connected by a network of 87 inter-array cables. The final configuration of the inter-array cables may only be confirmed following the WTG foundation installation (which are subject to micro-siting and use of spare locations); however, indicative routeing is shown in Figure 3.3.

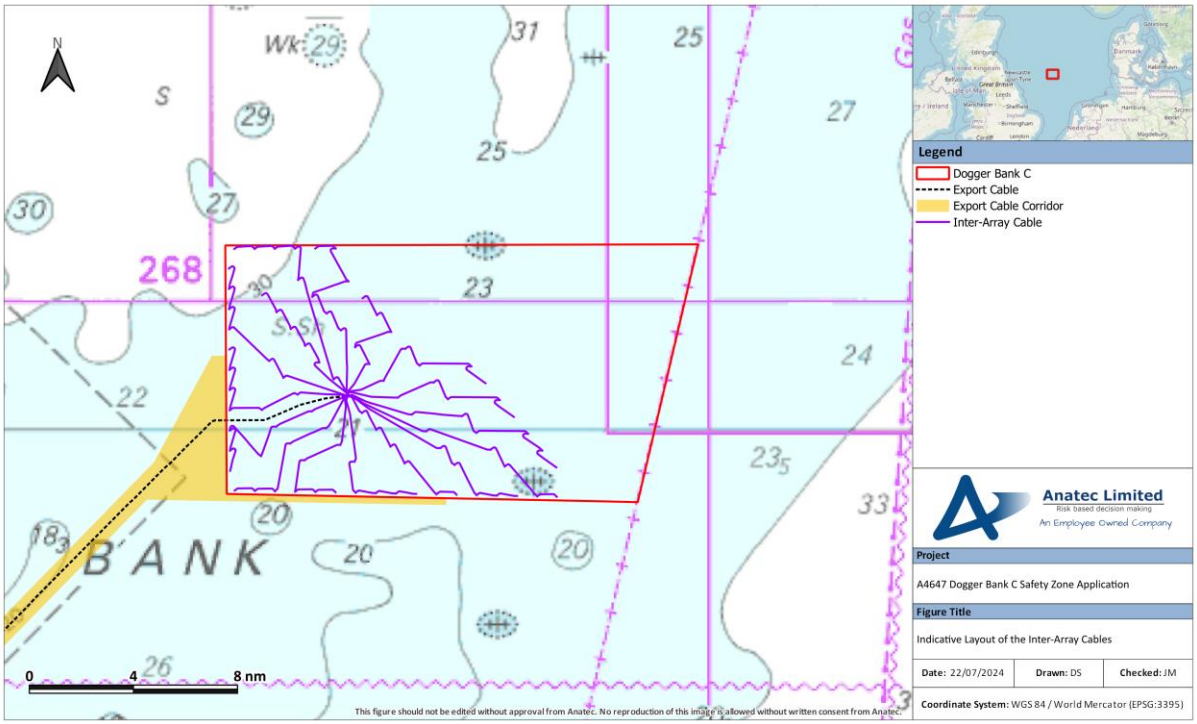

Figure 3.3: Indicative Layout of the Inter-Array Cables

4 Construction Overview

This section summarises the activities that will be undertaken as part of the construction phase. The details provided are based on current understanding and are therefore subject to change.

Promulgation of information will be undertaken in advance of and during construction including details of safety zones to maximise third party awareness of the activities. This will include Notice to Mariners (NtM), the Kingfisher Bulletin, and liaison with the fishing industry via the Fishing Liaison Officer (FLO) and project Fisheries Industry Representatives (FIRs).

4.1 Scour Protection

It is anticipated that each of the WTGs and the OSP will require scour protection, with varying extents and dimensions, consisting of a filter layer and an armour layer.

The scour installation is anticipated to occur between August 2024 and January 2026.

4.2 Wind Turbine Generators

Installation of the WTG foundations is anticipated to commence in September 2024 and installation of the WTGs onto the foundations is expected to commence in January 2026.

4.2.1 *WTG Foundations and Transition Pieces*

The foundations of the WTGs will be delivered directly to the DBC site by sea transport from the site of fabrication.

Once the construction vessel arrives on site, it will position itself ready for the installation of the MPs. The crane will upend the MP and the pile gripper frame (Motion Compensate Gripper (MCG)) will take control of the lower end. Once an individual pile is upended and is within the MCG, it will be lowered to the seabed to the planned location of each foundation.

Each MP will be driven through the filter layer of the scour protection. In the event of pile refusal, the vessel will leave the location and the Project will determine the best course of action to either install or remove the pile.

The maximum piling duration for each pile is estimated at 3.3 hours, which includes a soft-start and ramp-up for the MPs.

Once the MPs are successfully installed, the TPs (one per MP) will be installed. The TP will be lifted from the storage deck of the installation vessel and secured on top of the MP.

4.2.2 *WTG Tower, Nacelle and Blades*

Prior to the installation of the remaining structures after the MPs are installed, the TPs of the foundations will be surveyed, checked and cleaned, ready to accept the tower sections and turbines.

At the lay-down construction port, the WTG components will be prepared for loading and installation. Five WTGs are anticipated to be loaded at a time (i.e., tower sections, nacelles and blades for five complete WTGs). A total of 18 load outs are anticipated to be made.

Once the WTG components are loaded, the jack-up vessel will transit to site, and position at the first WTG location adjacent to the pre-installed MP foundation.

Once the jack-up has arrived at the first MP foundation, the jack-up will lower its legs to the seabed prior to jacking up to the required level. The vessel will then prepare to lift the WTG tower, which will have been pre-assembled at the construction port.

After the WTG tower is installed, the jack-up vessel will lift the WTG nacelle, followed by the WTG blades.

After completion of WTG installation, the jack-up hull is jacked down to sea level and the legs jacked up and will then move to the next MP foundation to repeat the preceding WTG installation sequence.

Once all of the WTGs on board have been installed, the jack-up will be prepared for the return to port (stowing equipment etc.) and return to the construction laydown port to load the next set of WTGs.

4.3 Offshore Substation Platform

The installation of the OSP is intended to commence in March 2025. The jacket foundations will be installed via a semisubmersible crane vessel and fixed to the seabed via piles, noting the Heavy Lift Crane Vessel will be working via Dynamic Positioning (DP) during jacket installation.

Topside installation will be carried out following completion of OSP foundation installation. During topside installation the Heavy Lift Crane Vessel will be operating on anchors and supported by anchor handling tugs.

The hook up and commissioning of the OSP will then be undertaken, noting this will include use of a jack up at the OSP.

4.4 Commissioning

WTG commissioning will involve an SOV stationed at each structure for an estimated five days per structure, noting daughter craft deployment will also be required. The OSP commissioning process will include use of a jack-up.

4.5 Cables

The installation of export cables commenced in March 2024 and inter-array cables is anticipated to commence in July 2025. Works involve the following key activities:

- Pre-lay survey of selected site;
- Pre-Lay Grapnel Run (PLGR);
- Boulder clearance;
- Cable laying;
- Trenching offshore/nearshore;
- Rock placement;
- Guard vessels; and
- Pull-in to offshore platform.

5 Operations and Maintenance

The definition of 'major maintenance' given within the Electricity Regulations 2007 (which details regulations associated with application procedures and control of access related to safety zones) is as follows:

"Works relating to any renewable energy installation which has become operational, requiring the attachment to, or anchoring next to, such an installation of a self-elevating platform, jack-up barge, crane barge or other maintenance vessel."

Under this definition, only vessels that "*anchor next to*" or require "*attachment to*" the operational structures can trigger a 500m major maintenance safety zone during the operation and maintenance phase. On this basis, vessel types that could trigger a major maintenance safety zone include (but are not necessarily limited to):

- WTG installation vessels;
- Jack-ups;
- Floating barges; and
- Heavy lift vessels / semi-submersible crane vessels.

Full details of major maintenance activities that will occur as part of the operation of DBC are unable to be confirmed at the time of writing based on the information available given this will include unexpected / unplanned operations. However, it is likely that the removal / replacement of components will be required and as such certain activities will be similar to those undertaken in the construction phase (see Section 4).

Additional details as to specific activities that could trigger a safety zone are provided in Section 8. However, throughout any periods of major maintenance, details of the work being carried out shall be promulgated through NtM, radio warnings as designated by the United Kingdom Hydrographic Office (UKHO), the Kingfisher Bulletin, and liaison with the fishing industry via the FLO and project FIRs.

6 Lighting and Marking

This section summarises the marine lighting and marking of DBC which has been agreed in consultation with Trinity House and the MCA via the Lighting and Marking Plan (LMP) (Document No: LF700013-CST-DOG-PLN-0033). Aviation lighting (including Search and Rescue (SAR) lighting) is not considered pertinent to this safety zone application and has therefore not been included.

6.1 Construction Phase

6.1.1 *Lighting*

During construction all fixed structures, including partially constructed such as WTG foundations, will be mounted and marked with a Flashing (Fl) Yellow (Y) 2.5 second (s) light (Fl Y 2.5s) visible through 360° with a 2nm range.

These lights should meet International Association of Lighthouse Authorities (IALA) Availability Category 2 (>99.0%) and will remain in place until the operational lighting has been commissioned and has been accepted as such by Trinity House.

6.1.2 *Buoyage*

All required construction phase buoyage was established at least eight weeks prior to the commencement of construction works and will remain in place until the operational marking requirements have been inspected and passed by Trinity House. The DBC array area is marked with 17 buoys during the construction phase, noting that the positions have been agreed with Trinity House:

- 2 x north cardinal;
- 2 x east cardinal;
- 2 x south cardinal;
- 1 x west cardinal; and
- 10 x special marks.

It is noted that the construction schedules for DBA, DBB and DBC are such that there will be some overlap i.e., periods when all three sites are concurrently under construction. Each will need to have its operational lighting and marking commissioned by Trinity House before any buoys can be removed. It has been agreed with Trinity House that this will be discussed and confirmed at the time that any project reaches its next phase.

6.2 Operation and Maintenance Phase

6.2.1 *Lighting*

During the operation and maintenance phase, in line with requirements under IALA G1162/O-139 (IALA, 2021), certain peripheral structures will be marked as Significant Peripheral Structures (SPS). Each SPS will be fitted with three marine lights (spaced at 120° intervals), with criteria of each depending on whether Trinity House has designated it as a Primary or Secondary SPS:

- Primary: 5nm light Fl (4) Y 12s, 360° visibility, flashing in synchronicity, IALA Category

2 (>99.0% availability).

- Secondary: 5nm light Fl Y 5s, 360° visibility, flashing in synchronicity, IALA Category 2 (>99.0% availability).

6.2.2 *Sound Signals*

Each SPS will be fitted with sound signals, which will activate whenever visibility is less than 2nm. When activated, the signals will sound a blast lasting 2s every 30s. They will meet IALA Category 3 availability requirements (>97.0%).

6.2.3 *Buoyage*

Assuming that no spares are utilised, then no operational buoyage will be implemented.

7 Vessel Traffic Survey Data

7.1 Introduction

In line with DESNZ guidance (DECC, 2011), this safety zone application includes assessment of up-to-date vessel traffic data collected during 2024. Vessel traffic assessment has primarily been based on 28 days of Automatic Identification System (AIS) data collected during May and June of 2024. The 28-day period was chosen such that any activity before (and during) the installation of the construction buoyage for DBC was not considered, and that downtime was minimal.

A 10nm buffer around DBC has been defined (hereby referred to as the 'study area') to capture vessel traffic relevant to the development.

Any traffic deemed to be temporary has been removed from further analysis (e.g., survey vessels, vessels associated with OWF construction, and vessels associated with temporary drilling operations).

Noting the offshore location of the site, it should be considered that data coverage is not necessarily comprehensive of the entire study area. Further, the assessment may be unrepresentative of certain vessel types not required to transit via AIS (i.e., fishing vessels less than 15m length and recreational vessels).

Therefore, due consideration has also been given to the following data sources to validate the findings of the AIS assessment:

- Non-AIS survey data collected via Radar as part of the NRA (Anatec, 2014); and
- Anatec's internal ShipRoutes database (Anatec, 2024).

Reference to these additional data sources has been made where appropriate, noting that the assessment is primarily based on the up-to-date AIS data.

7.2 AIS Assessment

7.2.1 *Vessel Type*

A plot of the vessel tracks recorded within the study area, during the 28-day period, is colour-coded by vessel type and presented in Figure 7.1. Following this, the distribution of these vessel types is presented in Figure 7.2.

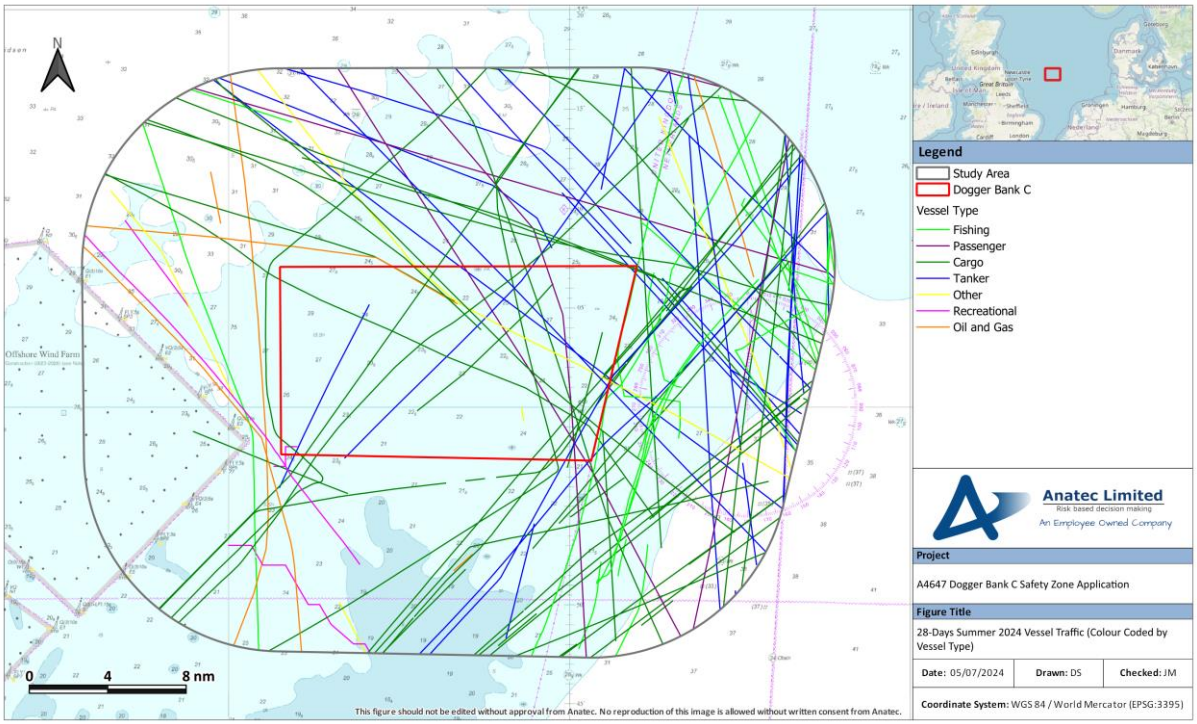

Figure 7.1: 28-Days Summer 2024 Vessel Traffic (Colour Coded by Vessel Type)

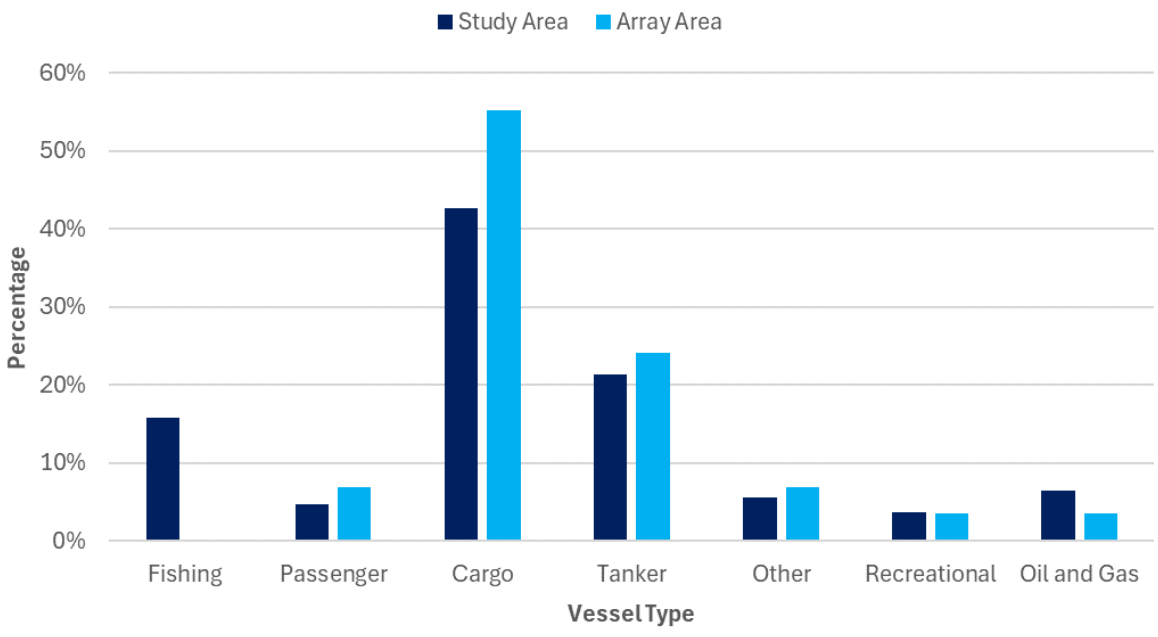

Figure 7.2: Vessel Type Distribution

The main vessel types within the study area, during the 28-day period, were cargo (43%), tanker (21%) and fishing (16%).

The distribution of vessel types intersecting the DBC array area were similar to that seen within the study area, with the main vessel types being cargo (55%) and tanker (24%).

7.2.2 *Vessel Count*

An average of between three and four unique vessels per day was recorded within the study area during the 28-day period, of which an average of one per day also intersected the DBC array area.

Based on Anatec's ShipRoutes database (Anatec, 2024), an average of between two and three routed commercial vessels per day would be expected to pass through the study area, with between one and two per day expected through the DBC array area. Given that this only accounts for routed commercial traffic, it is considered as broadly correlating with the AIS data.

7.2.3 *Cargo Vessels*

The tracks of the cargo vessels recorded within the study area during the 28-day period are presented in Figure 7.3.

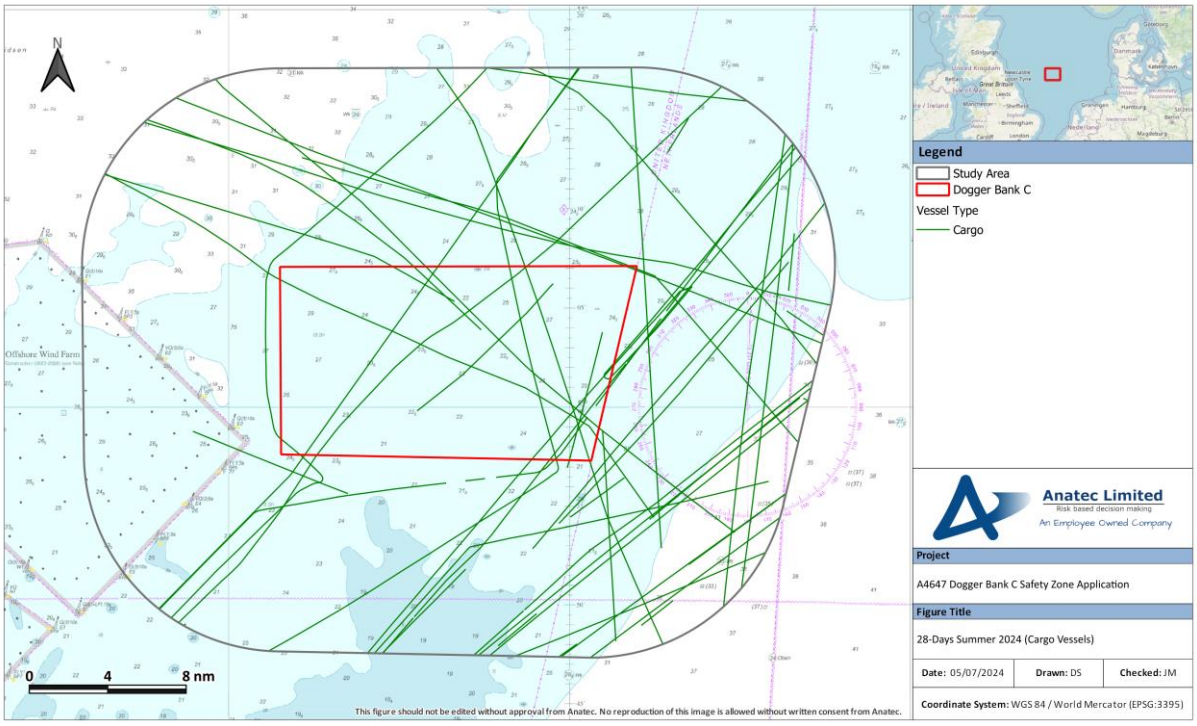

Figure 7.3: 28-Days Summer 2024 (Cargo Vessels)

Cargo vessels were seen transiting throughout the study area, typically in a northeast/southwest direction or northwest/southeast direction.

There was an average of between one and two cargo vessels per day recorded within the study area during the 28-day period, with an average of one cargo vessel every two days recorded intersecting the DBC array area.

This broadly aligns with Anatec's ShipRoutes database (Anatec, 2024), which indicates an average of between one and two cargo vessels per day intersecting the study area, and one

per day intersecting the DBC array area. Anatec's ShipRoutes database also indicated that routeing is most prominent to the southeast of the array, which aligns with the data.

7.2.4 *Tankers*

The tracks of tankers recorded within the study area during the 28-day period are presented in Figure 7.4.

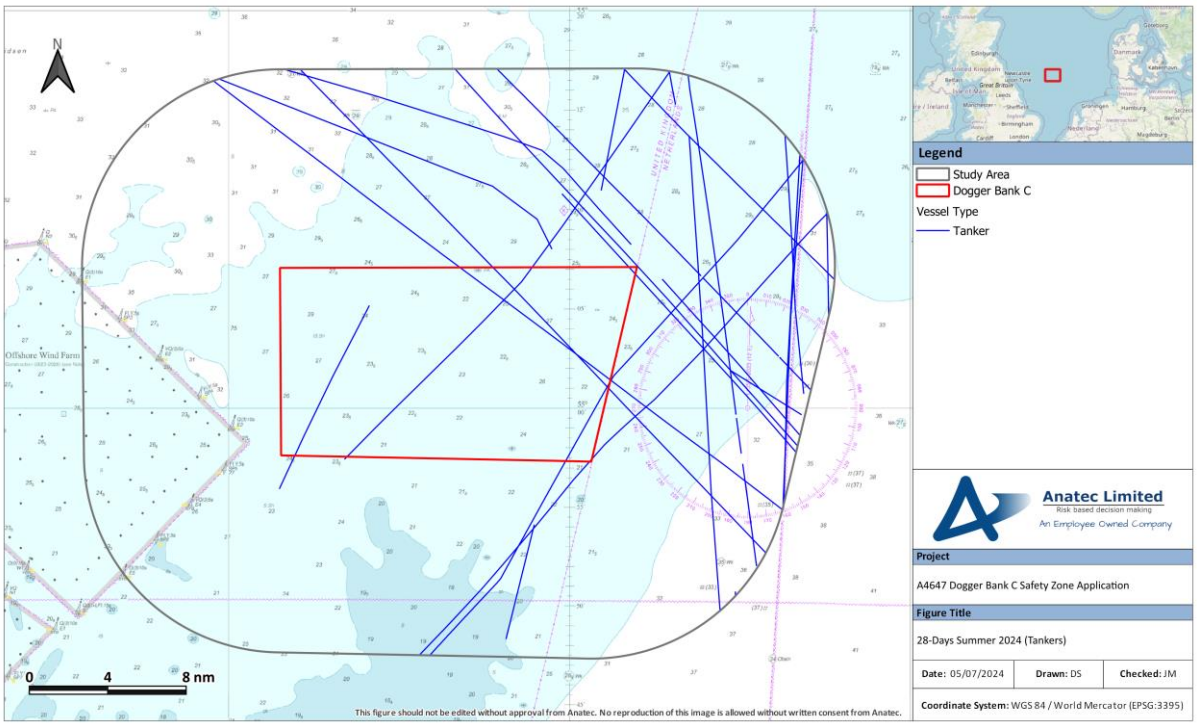

Figure 7.4: 28-Days Summer 2024 (Tankers)

There was an average of one tanker per day recorded within the study area during the 28-day period, with limited tanker traffic intersecting the DBC array area.

This broadly aligns with Anatec's ShipRoutes database (Anatec, 2024) which indicates an average of one tanker vessel per day intersecting the study area and one tanker every one to two days intersecting the DBC array area itself. Anatec's ShipRoutes database also indicated that routeing is most prominent to the east of the array, which aligns with the data.

7.2.5 *Fishing Vessels*

The tracks of fishing vessels recorded within the study area during the 28-day period are presented in Figure 7.5.

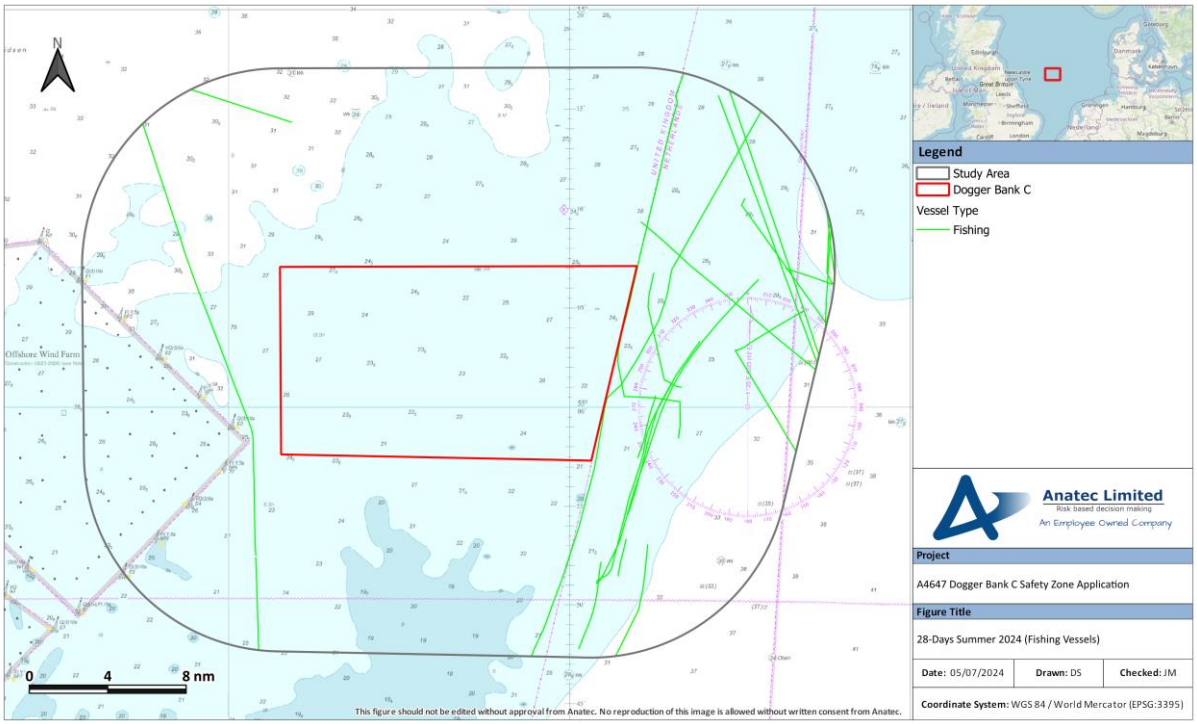

Figure 7.5: 28-Days Summer 2024 (Fishing Vessels)

There was an average of one fishing vessel every two days recorded within the study area during the 28-day period, with these vessels not typically seen intersecting the DBC array area. Based on vessel speeds and behaviours this includes active fishing activity (i.e., potential that gear was deployed).

Given the distance offshore, it is expected that the majority of fishing vessels would be in excess of 15m Length Overall (LOA), and hence be required to broadcast via AIS. Review of the Radar-only survey data from the NRA (Anatec, 2014) indicated non-AIS fishing vessels were recorded within the study area. However, it should be considered that AIS carriage requirements at the time (2010) were significantly less stringent. Length is not able to be derived from the Radar data unless the vessel was able to be identified visually.

Therefore, based on the available data, for the purposes of this safety zone application it has been assumed that fishing vessels may seek to transit through or fish within the DBC array area. The AIS data is assumed as providing good overall indication of activity, however smaller non-AIS vessels may also be present (noting these are not likely to be in significant numbers given the distance offshore).

7.2.6 *Recreational Vessels*

The tracks of recreational vessels recorded within the study area during the 28-day period are presented in Figure 7.6.

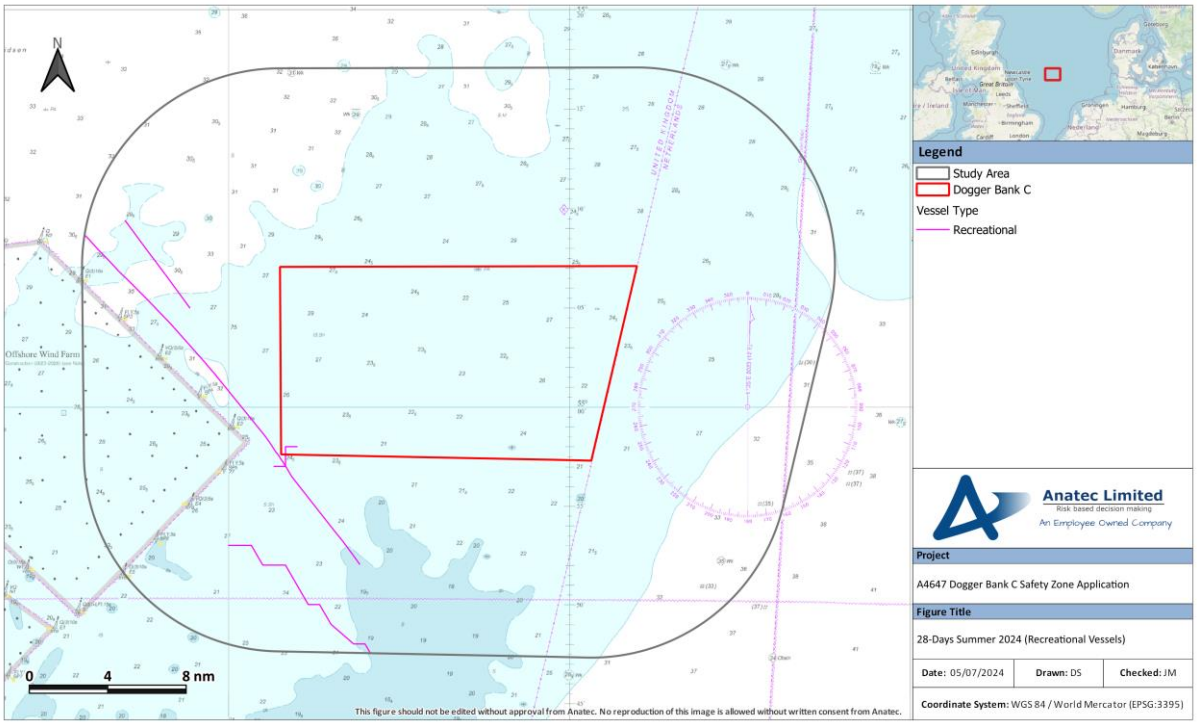

Figure 7.6: 28-Days Summer 2024 (Recreational Vessels)

There was limited recreational vessel activity recorded within the study area during the 28-day period, which is expected due to the distance of the site offshore. One recreational vessel was recorded intersecting the southwest extent of the DBC array area.

Given the distance offshore, it is considered unlikely that recreational vessels would regularly transit in or in proximity to the DBC array area and this aligns with the available data. However, for the purposes of the safety zone application is has been assumed that recreational transits may occur, noting these are likely to be from experienced users running between the UK and the continent.

7.2.7 *Anchored Vessels*

Assessment of the information transmitted via AIS and an additional behavioural assessment was undertaken to identify any potential instances of vessel anchoring within the study area. No anchoring activity was identified on this basis, noting this is to be expected given the distance offshore.

8 Safety Zone Overview

For the purpose of clarity, this section provides an indication as to what vessel scenarios are considered as triggering a safety zone during the construction and operation and maintenance phases of DBC. The list of scenarios presented is not considered as being exhaustive however provides an indication of the types of activities that may require a safety zone.

The activities listed have been identified on the basis that they satisfy the following criteria:

- The activities are considered as being allowed safety zones under the relevant guidance and legislation as listed in Section 1.4; and
- Risk assessment has identified that where safety zones are able to be deployed under the legislative framework, such safety zones are a relevant mitigation measure to bring relevant risks (as per Section 9) to within As Low As Reasonably Practicable (ALARP) parameters.

The identified scenarios are listed below:

- Any construction operation involving a vessel Restricted in Ability to Manoeuvre (RAM) stationed at a structure (within 500m) noting this includes Service Operations Vessel (SOV) operations;
- Any construction or major maintenance operation involving any kind of attachment to a structure (e.g., goods transfer, power cabling); and
- Any construction or major maintenance operation involving a vessel that is required to be anchored to the seabed next to the structure for the purposes of that operation (e.g., heavy lift operations).

It is noted that during the operation and maintenance phase, WtW operations will not trigger a safety zone under this application. However, the Developer will continue to risk assess including via monitoring of ongoing activities and traffic patterns and may apply for additional safety zones for SOVs at a later date.

9 Justifications for Safety Zones

Application for safety zones was identified as a mitigation measure within the NRA (Anatec, 2014). This section summarises the need for the safety zones based on:

- Vessel traffic analysis undertaken for this application as per Section 7;
- Experience of other similar operational or constructing projects; and
- Findings of the NRA.

9.1 Reductions in Collision Risk

Throughout the construction of DBC, various vessels will be located within the buoyed construction area engaged in the installation of the WTGs, foundations, the OSP, and cables. Given the scale of the components, and the sensitive nature of the associated installation works, the vessels on site will include those that are RAM, with the potential for multiple such vessels to be on site simultaneously.

Vessel numbers during operation are anticipated to be significantly less than during construction. However, there may still be a requirement for RAM vessels, including those engaged in activities that fall under the definition of major maintenance given in the Electricity Regulations 2007 (see Section 5).

The vessel traffic data studied indicates that routeing cargo vessels and tankers do transit the DBC array area. However, transits are primarily towards the eastern extent of the array area, i.e., outside the area where the structures are located and surrounded by the construction buoys. Based on typical activity observed at other offshore wind farms, it is likely that with the buoyed construction area established (see Section 6.1.2) and as familiarity increases, commercial vessels will adapt and deviate around the DBC array area. The 500m rolling construction safety zones would make it clear to any such vessels areas where sensitive operations are ongoing (i.e., those involving a RAM vessel), and as such which areas should be avoided to reduce any potential collision risk to within ALARP parameters.

Experience of constructing offshore wind farms indicates smaller vessels (e.g., fishing and recreational vessels) are more likely to transit through the buoyed construction area than commercial vessels and may also be more comfortable passing close to sensitive operations. The findings of the vessel traffic assessment indicates that fishing and recreational vessels (see Sections 7.2.5 and 7.2.6 respectively) do transit in the area in general, albeit less frequently than commercial vessels. The 500m rolling construction safety zones are therefore necessary to make it clear to any such vessels the areas where such operations are being undertaken (i.e., those involving a RAM vessel), and as such which areas should be avoided to reduce collision risk to within ALARP parameters.

During operation, it is considered likely that commercial vessel deviations would be firmly established, and as such associated traffic would already be avoiding the structures, noting that based on experience at other operational wind farm projects, such vessels (i.e., large commercial vessels) will continue to utilise the deviated routes even after the construction buoys have been removed. However, smaller vessels may choose to enter into the site (again based on operational experience). It is therefore necessary to protect any major maintenance activities via the proposed 500m safety zones to ensure collision risk to the maintenance vessels is within ALARP parameters.

9.2 Reductions in Allision Risk

The installation of structures within the DBC array area will create an allision risk to passing traffic, particularly during the construction phase when third party vessels may still be unfamiliar with DBC, partial structures will be present, and operational mitigations not yet active (in particular lighting and marking).

As noted in Section 9.1, based on experience at other wind farms, it is likely that during the construction phase the majority of commercial vessels will adapt to avoid the site altogether with the buoyed construction area in place. Smaller vessels (e.g., fishing and recreation) are more likely to transit the DBC array area during construction than commercial vessels.

Therefore, the implementation of 50m safety zones around any pre-commissioned (including partial) structures would make it clear to passing vessels that the installations represent an allision risk and should be avoided. This will reinforce the need for all vessels to passage plan to take account of DBC. The lack of ongoing construction activity (in the form of construction vessel presence) at such structures may result in third party vessels passing closer than they would to structures where RAM vessels were present, and the 50m safety zones therefore ensure safe passing distances are maintained until the operation and maintenance phase mitigations (most notably lighting and marking as per Section 6.2) are implemented.

Active safety zones would be monitored and policed as set out in Section 11. The formal approval of the safety zones provides the legislative framework to warn passing third party vessels that entry into active safety zones is prohibited. It should also be considered that details of the safety zones will be promulgated in advance to relevant marine users, and this will increase general awareness of DBC, which will further reduce allision risk.

The use of safety zones will therefore reduce the allision risk to ALARP parameters in combination with the other mitigations implemented.

9.3 Protecting Project Personnel

During the construction phase there will be a significant increase in the total number of persons within the DBC array area (i.e., crew members and wind farm technicians). This includes personnel on RAM vessels which are at particular risk of collision as per Section 9.1, or any vessel engaged in a sensitive operation. There will also be periods where technicians are stationed on the structures themselves, which are at risk of allision as per Section 9.2.

The implementation of mandatory 500m safety zones provides an alert to vessels transiting within the area that a sensitive operation is underway and allows them to passage plan to maintain a safe passing distance for any activity within the DBC array area and as such ensures the safety of the crew and personnel to within ALARP parameters. During the construction phase, in the event that personnel are left on a structure without construction vessel presence, the pre-commissioning 50m safety zones would allow for additional allision protection as per Section 9.2.

9.4 Prevention of Dangerous Behaviour

Feedback from other offshore wind farms has indicated that third party vessels can pass sensitive operations at distances which are of concern to the construction or maintenance vessels engaged in those operations (including SOVs). During any such operations at DBC, the project vessels will be fully compliant with the International Regulations for Preventing Collisions at Sea (COLREGS) (International Maritime Organization (IMO), 1972), including

watch keeping requirements.

Experience from these other offshore wind farms shows that COLREGS does not fully provide the required level of mitigation to ensure that the safety of sensitive operations is not impacted by passing vessels. Although COLREGS provides responsibilities for vessels at sea, a clear demarcation of areas to be avoided for the safety of the project vessel, personnel, and third party vessels and crew due to the risks of the operations occurring is required. By promulgating safety zones both in advance and at the time of operation, vessels can effectively passage plan to ensure they stay clear of any sensitive or dangerous operations, as identified by risk assessment. A 500m safety zone radius is well known as a safe passing distance in the offshore wind industry, and prevents the ambiguity often presented in the wording of COLREGS. For example, Rule 18 states that:

A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:

i. a vessel not under command (NUC);

ii. a vessel restricted in her ability to manoeuvre (RAM).

“So far as is possible” is not defined, which often leads to confusion. The intention of safety zones is not to over-regulate traffic or prosecute the third party mariner, but to ensure that those mariners are aware that entering active safety zones could lead to dangerous occurrences.

9.5 Assistance in Passage Planning

As per the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974), all vessels are required to passage plan before proceeding to sea, taking all known and relevant factors into consideration. The implementation of safety zones will make it clear to all vessels the areas which should be avoided within the DBC array area while constructing or once operational (where maintenance is underway). This facilitates effective passage planning and removes any ambiguity as to what warrants a safe passing distance (see Section 9.4).

9.6 Reduction in Fishing Gear Snagging

As per Section 7.2.5, fishing vessels do transit and actively fish (i.e., gear deployed) in the study area in general.

On this basis it should be considered that any anchor spreads used by construction / maintenance vessels, any partially completed structures, and inter-array cables in proximity to structures all pose a potential snagging risk to deployed fishing gear. The implementation of 500m safety zones around active structures where construction or major maintenance works are ongoing and 50m safety zones around pre-commissioned structures will therefore reduce the likelihood of an associated snagging incident.

Further, as the presence of safety zones shall be broadcast to the fishing community, in addition to more general information surrounding the construction / maintenance works of DBC, the likelihood of a fishing vessel being made aware of the ongoing works increases, and this will further reduce the overall potential for interaction and snagging risk.

9.7 Reduction in Interaction with Anchor Spread

During construction of DBC, it may be necessary for certain vessels to utilise an anchor spread, with the potential for similar activity to also be required during periods of major maintenance. These subsea anchors and lines / chains create potential interaction risk with

vessel anchors and fishing gear. This could lead to severe consequences for the construction / maintenance vessel and / or the passing vessel, with the potential for injury or loss of life as a worst case.

The implementation of mandatory 500m safety zones provides a buffer from passing traffic and thus reduces the likelihood of an anchor spread interaction. The safety zones would be monitored and policed as per Section 11, and the formal approval of the safety zones provides DBC with the legislative framework to warn passing vessels that entry into active safety zones is prohibited, ensuring the risk to and from sensitive operations requiring anchor spreads is minimised.

It should be noted that anchor spreads are likely to exceed the 500m radius of the safety zones, however the sections posing most under keel risk to passing vessels will likely be within the 500m confines (i.e., the area where the chains / lines are nearest the surface). Other forms of mitigation (e.g., marker buoys) may be utilised to alert passing vessels to the full extent of any anchor spreads.

9.8 Accounting for Inexperienced Mariners

As detailed in Section 7.2.6, low levels of recreational activity were observed in the available data. Given the distance offshore, it is likely that any recreational users in the area would be experienced, however it should be considered that transits from inexperienced mariners, or mariners with few formal qualifications may occur. Furthermore, recreational vessels do not carry as high a standard of navigational equipment as commercial vessels, as there is no requirement for them to do so.

Therefore, there is a need to mitigate against the potential for lack of experience and / or reduced navigational equipment on board recreational vessels. Implementation of mandatory safety zones in conjunction with other embedded mitigation measures (e.g., guard vessel used where identified as necessary, construction site marking and charting) is required.

As previously detailed, if a vessel were identified as infringing or potentially infringing a safety zone (thus becoming at risk of an allision / collision), the monitoring and policing procedures as detailed in Section 11 would be implemented. Any infringements to these safety zones shall be noted and recorded where possible, and efforts would be made to contact the vessel using standard marine procedures, alerting it to the safety zone infringement. Furthermore, on site vessels would be contactable (via Very High Frequency (VHF)) and be able to provide information to recreational vessels navigating in proximity to the DBC array area.

Therefore, the implementation of safety zones in tandem with other relevant mitigation measures shall bring the risk to inexperienced mariners to within ALARP parameters.

9.9 Accounting for Unforeseen Risk

Throughout the construction phase and during periods of major maintenance, there is the potential for a number of events to occur which may result in previously unforeseen risk, for example:

- Fire / Explosion on board construction / maintenance vessel;
- Machinery failure (including steering) on board construction / maintenance vessel;
- Cargo (e.g. WTG components) shifting on board construction / maintenance vessel;
- Structural failure of wind farm component;

- Dropped object;
- Accidental interaction with unexploded ordnance / wreck; or
- Accident associated with adverse weather.

If any of these incidents were to occur during the construction phase or during periods of major maintenance, there is potential for loss of life and serious environmental damage. It is therefore important to sterilise the immediate working area of existing vessel traffic. The presence of active safety zones allows third party traffic to passage plan and pass at a safe distance, and therefore reduces the risk of a third party vessel becoming involved in any of the aforementioned unforeseen risk scenarios.

It is noted that safety zones may not directly mitigate against the listed scenarios; however, they are likely to greatly reduce the overall severity of consequence to third party users should such incidents occur.

The safety zones will be implemented in tandem with other mitigation measures (e.g. dedicated on-site vessel(s), construction site marking and charting) and therefore bringing the risk to within ALARP parameters.

10 Impact of Safety Zones

This section considers the potential impact of safety zones on relevant traffic, which has been identified based on the vessel traffic assessment undertaken (see Section 7).

10.1 Commercial Vessel Routeing (Including Commercial Ferries)

Based on experience of other offshore wind farms, commercial vessels will typically avoid sites once construction is underway (i.e., from the point at which the site is marked as a buoyed construction area). This may involve deviations of baseline vessel routeing whereby the vessels will passage plan to pass around the buoyed construction area.

As can be seen in Sections 7.2.3 and 7.2.4, cargo vessel and tanker routes generally pass close to the portion of the array area containing structures. Some displacement of these vessels is anticipated to have occurred and may become more pronounced as familiarity with the buoyed construction area increases. The presence of active safety zones is not expected to influence this displacement, and this is evidenced in operational experience at other offshore wind farms. Similarly, experience shows that once offshore wind farms become operational, commercial vessels will generally continue to avoid the commissioned structures even after construction buoyage is removed, and consequently any major maintenance works and associated safety zones.

It is noted that early on in the construction phase, some commercial vessels may still enter into the buoyed construction area (as seen in Sections 7.2.3 and 7.2.4), however this would likely be into areas where construction works were not yet commenced and hence avoiding active safety zones.

On this basis, the safety zones are not considered as having any additional impact on commercial vessels over that of the structures themselves.

10.2 Fishing Vessels

As per Section 7.2.5, based on the available vessel traffic data and general site understanding, fishing vessels currently transit and actively fish (i.e., deploy gear) within the area. It is possible that fishing vessels may seek to transit and/or fish within the DBC array area during the construction and operation and maintenance phases.

As per Section 2.1, WTG spacing in the internal grid is approximately 1,300m, and therefore even with the implementation of 500m safety zones there is still considered to be sufficient space internally to accommodate fishing vessels. WTG spacing on the periphery is approximately 1,100m, which again leaves sufficient space for fishing vessels to enter into the DBC array area and navigate internally, noting the decision as to whether to transit through and/or actively fish would be at the discretion of individual vessel masters.

Further, during the construction phase the 500m safety zones would only apply where construction works were ongoing (i.e., a construction vessel was present), and as such affected areas will be limited in spatial terms when considered against the DBC array area as a whole. The 50m pre-commissioning safety zones are considered unlikely to have any notable impact given the minimum spacing of approximately 1,100m.

During the operation and maintenance phase, safety zones would only be active during periods of major maintenance and as such will only be present for limited periods of time, and will be lower in terms of frequency than during the construction phase.

It should also be considered that as per Section 4 and 5, promulgation of information will be undertaken in advance of and during construction and major maintenance activities including in relation to associated safety zones. This will include via the Kingfisher Bulletin, the FLO and the project FIRs.

Therefore, any impact from safety zones on fishing vessels is anticipated to be minimal.

10.3 Recreational Vessels

As per Section 7.2.6, the available data indicates that recreational activity within the DBC array area is low in volume. However, transits may still occur noting these are likely to be from experienced recreational users. The decision as to whether to transit through would be at the discretion of each individual vessel.

Regardless, the minimum periphery spacing of approximately 1,100m and internal grid spacing of approximately 1,300m is considered sufficient to facilitate recreational vessel transits including with the implementation of 50m pre-commissioning safety zones and 500m construction / major maintenance safety zones. This, in addition to low expected numbers of recreational vessels indicates that any impact from safety zones on recreational users is likely to be minimal.

10.4 Anchored Vessels

No vessels were identified at anchor within the available vessel traffic data, which would be expected given the location of the DBC array area. Regardless, it is considered unlikely that a vessel would deliberately choose to anchor within the site once construction was underway or operational (except in an emergency).

On this basis any impact from safety zones on anchoring activity is likely to be minimal.

11 Monitoring and Policing

11.1 Monitoring

Typically, safety zones are most effectively monitored through use of a guard vessel, or other mobile vessel on-site which is not critical to ongoing construction or operational activities. However, such a vessel may not always be available (e.g., during any periods of adverse weather). Therefore, it is necessary to have monitoring means and procedures in place to cover all eventualities in terms of vessel presence on-site. On this basis, the following approach is to be undertaken with regards to monitoring of safety zones:

- Where available/feasible, a guard vessel or other dedicated monitoring vessel will be designated primary responsibility for monitoring active safety zones. It is noted that the vessel may also undertake other work scopes, but a dedicated watchkeeper must be available on the bridge to undertake visual, Radar, and AIS monitoring.
- Any installation vessels operating within a safety zone will also be required to maintain an independent bridge watch during operations to include the use of visual lookout and Radar and AIS monitoring. The designated watchkeeper must not be engaged in the work routines, and must be dedicated to watchkeeping.
- The Marine Coordination Centre will maintain a 24hr AIS surveillance of the construction site using the Vissim Vessel Traffic Monitoring System (VTMS). During any periods where there are no vessels on-site this will be the primary monitoring means.

Where a vessel is monitoring the safety zone (via AIS, Radar, and visual watch), VHF communications shall be utilised to make early contact with any third party vessels in the area identified as approaching the site. Such third party vessels will be alerted to the presence of any currently active (or soon to be active) safety zones. Any vessels observed to enter into a safety zone (or pass in close proximity) will be contacted again by the monitoring vessel (using standard marine procedures), and informed that they have or are close to infringing the safety zone. The vessel will be instructed to increase their minimum passing distance from the safety zone and to avoid or refrain from entering them in the future.

Where no monitoring vessel is available, the DBC array area will be monitored via the VTMS to identify (where practicable) any vessels approaching or infringing the active safety zones. Where feasible, contact will be made with the associated vessels at the earliest opportunity, and details of any incidents will be logged, with any evidence retained for submission to DESNZ where appropriate as discussed in Section 11.2.

It is noted that direct navigational advice will not be given to any vessel. Standard marine terminology will be used to warn any relevant vessels in instances where action to avoid active safety zone is required.

11.2 Policing

The details of any vessels which consistently ignore the warnings issued by the designated monitoring vessel (see Section 11.1) with regards to safety zones will be noted and reported to DESNZ (as the licensing authority) noting that the MCA will also be notified. Details of any incidents where a vessel is considered to be causing a potential danger to other vessels and/or assets within the area will also be logged and provided. Reporting will include any supporting evidence collected (e.g., AIS recording, photographs or video, witness statements). Where

infringements occur when no monitoring vessel was available, reports may still be made to DESNZ where the associated activity was considered dangerous based on the available evidence, or where the infringement was made by a vessel which has previously infringed a safety zone.

DESNZ will then decide what action, in consultation with other stakeholders notably the MCA, is required. Prosecutions are only likely to be sought where infringements are deliberate and malicious, causing damage, nuisance or endangering lives. Due regard will be given to the relevant exceptions to infringement detailed in the legislation (see Section 1.3), in particular prosecution would not be sought in the event of a third party vessel entering into a safety zone to fulfil obligations under SOLAS (IMO, 1974) to render assistance to persons in danger.

11.3 Existing Experience

It is noted that due to the development of other existing wind farms including large scale projects throughout the North Sea area (e.g., DBA, DBB, Hornsea Project One, Hornsea Project Two), the majority of regular operators will be familiar with the implementation and operation of construction/ major maintenance safety zones, and the associated procedures around how they are monitored and policed. In particular, it is noted that construction phase safety zones have been implemented at DBA and DBB since each began construction in 2022 and 2023, respectively.

12 Summary

This document provides a safety case which demonstrates the need for safety zones to be implemented at DBC during the construction phase, and during periods of major maintenance in the operation and maintenance phase. Based on the safety case which is supported by the NRA (Anatec, 2014), the following safety zones are being applied for to ensure relevant risks are ALARP:

- 'Rolling' 500m safety zones established around each wind farm structure (WTG or OSP), and/or their foundations, whilst construction is being performed, as indicated by the presence of construction vessels.
- Pre-commissioning 50m safety zones established around any wind farm structure (WTG or OSP) which is either partially completed or constructed but not yet commissioned where a construction vessel is not present.
- 500m safety zones around all 'major maintenance' being undertaken around a wind farm structure (WTG or OSP), as denoted by the presence of a major maintenance vessel.

The findings of the safety case have shown the safety zones are necessary to bring the following potential risks to within ALARP parameters:

- Collision risk between a project vessel and third party vessel;
- Allision risk between vessels and WTGs / OSPs;
- Interaction with the anchor spread of construction / maintenance vessels;
- Risks to persons involved in the construction / maintenance process; and
- Fishing gear snagging.

The safety zones will also assist third party vessels in passage planning, provide additional mitigation to account for inexperienced mariners, and reduce consequences in the event of an unforeseen incident. On this basis the implementation of mandatory safety zones in conjunction with other relevant mitigation measures will ensure that the risks to passing traffic, construction vessels, crews and personnel are within ALARP parameters.

Assessment of up to date vessel traffic data and consideration of the vessel traffic assessment within the NRA (Anatec, 2014) shows that no significant impacts on third party vessels are expected from the safety zones. On this basis they are considered a proportionate mitigation measure noting the benefit they bring in terms of risk reduction.

The safety zones shall primarily be monitored for infringements by a guard vessel or other nominated vessel where available / feasible, noting site monitoring via the VTMS will also be undertaken from the Marine Coordination Centre including when no vessels are on-site. The primary response will be to warn passing traffic of the ongoing works and any active safety zones, and to alert any vessels where an infringement may occur or has occurred.

Details of all infringements and/or near misses shall be recorded. Where necessary (i.e., where a vessel has infringed safety zones on multiple occasions or where a vessel has behaved dangerously), details and relevant evidence shall be passed to DESNZ as the licensing authority and the MCA will also be notified.

13 References

Anatec, 2014. Navigational Risk Assessment – Dogger Bank Teesside A and B. Aberdeen: Anatec

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Anatec, 2023. Dogger Bank B Safety Zone Application. Aberdeen: Anatec.

DECC, 2011. Guidance Notes: Applying for Safety Zones around Offshore Renewable Energy Installations. London: DECC (now DESNZ)

IALA, 2021. G1162/O-139 the Marking of Man-Made Offshore Structures. Saint Germaine en Laye, France: IALA.

Royal HaskoningDHV, 2024. Dogger Bank D - Scoping Report. https://www.doggerbankd.com/DoggerBankDScopingReportPart1-weboptimised.pdf. Amersfoort, Netherlands: Royal HaskoningDHV

Appendix 1 Structure Coordinates

ID	Structure	Lat	Lon
A01	Turbine	54° 59.053' N	002° 36.890' E
B01	Turbine	54° 58.894' N	002° 39.785' E
B02	Turbine	54° 59.534' N	002° 38.840' E
B03	Turbine	55° 00.174' N	002° 37.894' E
B04	Turbine	55° 00.814' N	002° 36.948' E
C01	Turbine	54° 58.837' N	002° 43.102' E
C02	Turbine	54° 59.478' N	002° 42.158' E
C03	Turbine	55° 00.119' N	002° 41.213' E
C04	Turbine	55° 00.759' N	002° 40.268' E
C05	Turbine	55° 01.399' N	002° 39.322' E
C06	Turbine	55° 02.039' N	002° 38.375' E
C07	Turbine	55° 02.679' N	002° 37.429' E
D01	Turbine	54° 58.774' N	002° 46.427' E
D02	Turbine	54° 59.415' N	002° 45.484' E
D03	Turbine	55° 00.056' N	002° 44.540' E
D04	Turbine	55° 00.697' N	002° 43.596' E
D06	Turbine	55° 01.978' N	002° 41.705' E
D07	Turbine	55° 02.619' N	002° 40.759' E
D08	Turbine	55° 03.259' N	002° 39.813' E

ID	Structure	Lat	Lon
D09	Turbine	55° 03.899' N	002° 38.866' E
D10	Turbine	55° 04.539' N	002° 37.919' E
D11	Turbine	55° 05.179' N	002° 36.971' E
E01	Turbine	54° 58.716' N	002° 49.75' E
E02	Turbine	54° 59.357' N	002° 48.807' E
E03	Turbine	54° 59.999' N	002° 47.864' E
E04	Turbine	55° 00.640' N	002° 46.921' E
E05	Turbine	55° 01.281' N	002° 45.977' E
E06	Turbine	55° 01.922' N	002° 45.032' E
E07	Turbine	55° 02.563' N	002° 44.087' E
E08	Turbine	55° 03.204' N	002° 43.142' E
E09	Turbine	55° 03.844' N	002° 42.195' E
E10	Turbine	55° 04.485' N	002° 41.249' E
E11	Turbine	55° 05.125' N	002° 40.302' E
E12	Turbine	55° 05.766' N	002° 39.354' E
F01	Turbine	54° 58.654' N	002° 53.079' E
F02	Turbine	54° 59.296' N	002° 52.138' E
F03	Turbine	54° 59.938' N	002° 51.196' E
F04	Turbine	55° 00.580' N	002° 50.253' E
F05	Turbine	55° 01.221' N	002° 49.310' E

ID	Structure	Lat	Lon
F06	Turbine	55° 01.863' N	002° 48.366' E
F07	Turbine	55° 02.504' N	002° 47.422' E
F08	Turbine	55° 03.145' N	002° 46.478' E
F09	Turbine	55° 03.786' N	002° 45.532' E
F10	Turbine	55° 04.427' N	002° 44.587' E
F11	Turbine	55° 05.068' N	002° 43.641' E
F12	Turbine	55° 05.709' N	002° 42.694' E
OSP	Substation	55° 01.338' N	002° 42.651' E
P01	Turbine	55° 02.472' N	002° 50.856' E
P02	Turbine	55° 01.830' N	002° 51.799' E
P03	Turbine	55° 01.188' N	002° 52.742' E
P04	Turbine	55° 00.546' N	002° 53.684' E
P05	Turbine	54° 59.904' N	002° 54.626' E
P06	Turbine	54° 59.262' N	002° 55.567' E
P07	Turbine	54° 58.620' N	002° 56.508' E
P08	Turbine	54° 57.497' N	002° 56.535' E
P09	Turbine	54° 57.513' N	002° 55.235' E
P10	Turbine	54° 57.530' N	002° 53.896' E
P11	Turbine	54° 57.546' N	002° 52.556' E
P12	Turbine	54° 57.562' N	002° 51.216' E

ID	Structure	Lat	Lon
P13	Turbine	54° 57.578' N	002° 49.877' E
P14	Turbine	54° 57.594' N	002° 48.537' E
P15	Turbine	54° 57.609' N	002° 47.198' E
P16	Turbine	54° 57.624' N	002° 45.858' E
P17	Turbine	54° 57.639' N	002° 44.518' E
P18	Turbine	54° 57.654' N	002° 43.179' E
P19	Turbine	54° 57.668' N	002° 41.839' E
P20	Turbine	54° 57.682' N	002° 40.499' E
P21	Turbine	54° 57.696' N	002° 39.160' E
P22	Turbine	54° 57.710' N	002° 37.819' E
P23	Turbine	54° 57.723' N	002° 36.480' E
P24	Turbine	54° 57.736' N	002° 35.140' E
P25	Turbine	54° 58.488' N	002° 34.839' E
P26	Turbine	54° 59.259' N	002° 34.831' E
P27	Turbine	55° 00.030' N	002° 34.823' E
P28	Turbine	55° 00.801' N	002° 34.815' E
P29	Turbine	55° 01.572' N	002° 34.807' E
P30	Turbine	55° 02.343' N	002° 34.799' E
P31	Turbine	55° 03.114' N	002° 34.791' E
P32	Turbine	55° 03.885' N	002° 34.783' E

ID	Structure	Lat	Lon
P33	Turbine	55° 04.656' N	002° 34.774' E
P34	Turbine	55° 05.427' N	002° 34.766' E
P35	Turbine	55° 06.198' N	002° 34.758' E
P36	Turbine	55° 06.941' N	002° 35.117' E
P37	Turbine	55° 06.945' N	002° 36.462' E
P38	Turbine	55° 06.950' N	002° 37.808' E
P39	Turbine	55° 06.954' N	002° 39.153' E
P40	Turbine	55° 06.957' N	002° 40.498' E
P41	Turbine	55° 06.961' N	002° 41.843' E
P43	Spare	55° 05.679' N	002° 46.132' E
P44	Spare	55° 05.038' N	002° 47.078' E
P45	Spare	55° 04.396' N	002° 48.023' E
P46	Spare	55° 03.755' N	002° 48.968' E
P47	Spare	55° 03.114' N	002° 49.912' E