Cambois Connection – Marine Scheme

Environmental Statement – Volume 3

Appendix 13.1: Navigational Risk Assessment

sse Renewables

Revision Information					
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Cambois Connection
Marine Scheme
Navigational Risk Assessment

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Abbreviation	Definition
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
ALB	All-Weather Lifeboat
AtoN	Aid to Navigation
BBWF	Berwick Bank Wind Farm
CBA	Cost Benefit Analysis
CBRA	Cable Burial Risk Assessment
CD	Chart Datum
CEA	Cumulative Effects Assessment
CLV	Cable lay vessels
COLREGs	International Regulations for Preventing Collisions at Sea
CoS	Chamber of Shipping
DC	Direct Current
DfT	Department for Transport
DP	Dynamic Positioning
DSC	Digital Selective Calling
DWT	Deadweight Tonnage
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	EIA Report
EMF	Electromagnetic Field
ERCoP	Emergency Response Cooperation Plan
ES	Environmental Statement
EU	European Union
FLO	Fisheries Liaison Officer
FMMS	Fisheries Management and Mitigation Strategy
FSA	Formal Safety Assessment
GLA	General Lighthouse Authority

Abbreviation	Definition
GT	Gross Tonnes
HDD	Horizontal Directional Drilling
HMCG	His Majesty's Coastguard
HVDC	High-Voltage Direct Current
IHO	International Hydrographic Organisation
ILB	Inshore Lifeboat
IMO	International Maritime Organization
JRCC	Joint Rescue Coordination Centre
KIS-ORCA	Kingfisher Information Service – Offshore Renewable & Cables Awareness
km	Kilometre(s)
kV	Kilovolt(s)
m	Metre(s)
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MDS	Maximum Design Scenario
MEAC	Marine Emergency Action Card
MEPC	Marine Environment Protection Committee
MFE	Mass Flow Excavator
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MOD	Ministry of Defence
MRCC	Maritime Rescue Coordination Centre
MD-LOT	Marine Directorate Licensing Operations Team
NAVTEX	Navigational Telex
NIFCA	Northumberland Inshore Fisheries and Conservation Authority
NLB	Northern Lighthouse Board
nm	Nautical Mile(s)

Abbreviation	Definition
NMP	National Marine Plan
NNG	Neart Na Gaoithe
NPS	National Policy Statement
NRA	Navigational Risk Assessment
NSIP	Nationally Significant Infrastructure Projects
NtM	Notices to Mariners
OCSP	Offshore Converter Station Platform
OCV	Offshore Construction Vessel(s)
OFTO	Offshore Electricity Transmission
OREI	Offshore Renewable Energy Installations
OWF	Offshore Wind Farm
PDE	Project Design Envelope
PEXA	Practice Exercise Area
PLGR	Pre-lay Grapnel Run
PLL	Potential Loss of Life
RAM	Restricted in their Ability to Manoeuvre
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
EGL1	Eastern Green Link 1
EGL2	Eastern Green Link 2
SOLAS	Safety of Life at Sea
TCE	The Crown Estate
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
UXO	Unexploded Ordnance
VHF	Very High Frequency
VMS	Vessel Monitoring System

Abbreviation	Definition
VTS	Vessel Traffic Service
WTG	Wind Turbine Generator

1 Introduction

1.1 Background

Anatec was commissioned by Xodus Group on behalf of Berwick Bank Wind Farm Limited (BBWFL)[1] (hereafter referred to as 'the Applicant') to undertake a Navigational Risk Assessment (NRA) for the proposed 'Cambois Connection' (hereafter referred to as the 'Project') Marine Scheme associated with the Berwick Bank Wind Farm (BBWF).

The Marine Scheme consists of an Offshore Export Cable Corridor between BBWF and the Landfall at Cambois seaward of Mean High Water Springs (MHWS).

This NRA presents information on the Marine Scheme relative to the existing and estimated future navigational activity and forms the technical Appendix to **Volume 2, Chapter 13: Shipping and Navigation** of the Environmental Statement (ES).

1.2 Navigational Risk Assessment

An Environmental Impact Assessment (EIA) is a process which identifies the environmental effects of a proposed development, both negative and positive. An important requirement of the EIA for offshore projects is the NRA. The NRA methodology follows the Marine Guidance Note (MGN) 654 (Ref. i), but takes into consideration that the Marine Scheme consists of subsea cables only, and there is no surface infrastructure, this NRA includes:

- Outline of methodology applied in the NRA;
- Summary of consultation undertaken with shipping and navigation stakeholders to date;
- Lessons learnt from previous offshore wind farm developments;
- Summary of the project description relevant to shipping and navigation;
- Baseline characterisation of the existing environment;
- Discussion of potential impacts on navigation, communication and position fixing equipment;
- Cumulative and transboundary overview;
- Future case marine traffic characterisation;
- Assessment of navigational risk (following the Formal Safety Assessment (FSA) process);
- Outline of embedded mitigation measures; and
- Completion of MGN 654 Checklist.

Potential hazards are considered for each phase of development as follows:

- Construction;
- Operation and maintenance; and
- Decommissioning.

[1] BBWFL is a wholly owned subsidiary of SSE Renewables (SSER)

The assessment of the Marine Scheme is based on a parameter-based Project Design Envelope (PDE) approach, which is recognised in the Overarching National Policy Statement (NPS)[2][3] for Energy (EN-1) (Ref. ii), the NPS for Renewable Energy Infrastructure (EN-3) (Ref. iii) and Planning Inspectorate Advice Note Nine: Rochdale Envelope (Ref. iv). The PDE includes conservative assumptions to form a Maximum Design Scenario (MDS) which is considered and assessed for all risks. Further details on the design envelope are provided in **Volume 2, Chapter 5: Project Description,** and further detail on the PDE / MDS approach and how this is implemented within the ES is provided in **Volume 2, Chapter 3: EIA Methodology**.

The shipping and navigation baseline and risk assessment has been undertaken based upon the information available and responses received at the time of preparation, including the MDS as discussed above.

[2] Whilst it is acknowledged that neither BBWF nor the Marine Scheme comprise or form part of an NSIP (please see Volume 2: Chapter 2: Policy and Legislative Context), NPS' are however a statement of government intention relating, in this case, to renewable energy projects, therefore can be taken into consideration during the preparation of the Marine Scheme ES.

[3] A suite of draft revised Energy NPSs were published and consulted on by the UK Government in March 2023, and consultation closed on 23rd June. The consultation responses will be subject to consideration and the draft revised NPSs may now be revised before the NPSs are formally adopted. There is currently no date for the next stage of the review process and therefore this ES presents the current adopted NPSs which have been considered during the preparation of this ES. It is however noted by the Applicant that the new draft NPSs state that they may be material considerations in other applications which are not considered under the Planning Act (2008), this includes the Marine Scheme. Further detail on the consideration of the draft NPSs in this ES is provided in Volume 2 Chapter 2 Policy and Legislation.

2 Guidance and Legislation

2.1 Policy and Legislative Context

A summary of the policy and legislative provisions relevant to shipping and navigation are provided in **Volume 2, Chapter 13: Shipping and Navigation.**

2.2 Primary Guidance

The primary guidance documents used during the assessment are the following:

- *MGN 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response* and its annexes (Ref. i);
- *Revised Guidelines for FSA for Use in the IMO (International Maritime Organization) Rule-Making Process* (Ref. v)

MGN 654 highlights issues that shall be considered when assessing the effect on navigational safety from offshore renewable energy developments proposed in United Kingdom (UK) internal waters, UK territorial sea or the UK Exclusive Economic Zone (EEZ), including any offshore transmission infrastructure, i.e. subsea cables.

The MCA require that their methodology is used as a template for preparing NRAs. It is centred on risk management and requires a submission that shows that sufficient controls are, or will be, in place for the assessed risk to be judged as broadly acceptable or tolerable with mitigation (see section 3.2). Across **Volume 2, Chapter 13: Shipping and Navigation** and the NRA both base and future case levels of risk have been identified and what measures are required to ensure the future case remains broadly acceptable or tolerable with mitigation.

2.3 Other Guidance

Other guidance documents used during the assessment are as follows:

- MGN 661 (Merchant and Fishing) Navigation – Safe and Responsible Anchoring and Fishing Practices (Ref. vi)
- The Royal Yachting Association's (RYA) Position on Offshore Renewable Energy Developments: Paper 1 (of 4) – Wind Energy (Ref. vii);
- UK Marine Policy Statement (Ref. viii);
- Scotland's National Marine Plan (NMP) (Ref. ix); and
- North East Inshore and North East Offshore Marine Plan (Ref. x).

2.4 Lessons Learnt

There is considerable benefit for the Applicant in the sharing of lessons learnt within the offshore industry. The NRA, and in particular the risk assessment undertaken in **Volume 2, Chapter 13: Shipping and Navigation**, includes general consideration for lessons learnt and expert opinion

from previous subsea cable developments and other sea users, capitalising upon the UK's position as a leading generator of offshore wind power.

Data sources for lessons learnt include the following:

- *Sharing the Wind – Recreational Boating in the Offshore Wind Strategic Areas* (Ref. xi);
- *Results of the Electromagnetic Investigations* (Ref. xii);
- *Navigational Risk Assessment for Berwick Bank Wind Farm* (Ref. xiii); and
- *Strategic Assessment of Impacts on Navigation of Shipping and Related Effects on Other Marine Activities Arising from the Development of Offshore Wind Farms in the UK Renewable Energy Zone (REZ)* (Ref. xiv).

3 Navigational Risk Assessment Methodology

3.1 Formal Safety Assessment Methodology

A shipping and navigation user can only be exposed to a risk caused by a hazard if there is a pathway through which a risk can be transmitted between the source activity and the user. In cases where a user is exposed to a risk, the overall significance of risk to the user is determined. This process incorporates a degree of subjectivity. The assessments presented herein for shipping and navigation users have considered the following criteria:

- Baseline data and assessment;
- Expert opinion;
- Level of stakeholder concern;
- Time and/or distance of any deviation;
- Number of transits of specific vessels and/or vessel types; and
- Lessons learnt from existing offshore developments.

3.2 Formal Safety Assessment Process

The IMO FSA process as approved by the IMO in 2018 under Maritime Safety Committee – Marine Environment Protection Committee (MEPC).2/circ. 12/Rev.2 will be applied to the risk assessment within this NRA, and informs **Volume 2, Chapter 13: Shipping and Navigation.**

The FSA process is a structured and systematic methodology based upon risk analysis and Cost Benefit Analysis (CBA) (if applicable) to reduce impacts to As Low as Reasonably Practicable (ALARP). There are five basic steps within this process as illustrated by Figure 3.1 and summarised in the following list:

- **Step 1** – Identification of hazards (a list is produced of hazards prioritised by risk level specific to the project under review);
- **Step 2** – Risk assessment (investigation of the causes and initiating events and risks of the more important hazards identified in step 1);
- **Step 3** – Risk control options (identification of measures to control and reduce the identified risks);
- **Step 4** – CBA (identification and comparison of the benefits and costs associated with the risk control options identified in step 3); and
- **Step 5** – Recommendations for decision-making (defining of recommendations based upon the outputs of steps 1 to 4).

Figure 3.1 Flow chart of the FSA methodology

It is noted that hazards of a commercial nature are considered outside the remit of the NRA but have been assessed using the FSA process in **Volume 2, Chapter 12: Commercial Fisheries and Chapter 13: Shipping and Navigation,** where appropriate.

The FSA assigns each impact a "severity of consequence" and "frequency of occurrence" to evaluate the significance during the construction, operation and maintenance and decommissioning phases of the proposed development.

Table 3.1 and Table 3.2 identify how the severity of consequence, and the frequency of occurrence has been defined, respectively.

Table 3.1 Severity of Consequence Ranking Definitions

Rank	Description	Definition			
		People	Property	Environment	Business
1	Negligible	No perceptible risk	No perceptible risk	No perceptible risk	No perceptible risk
2	Minor	Slight injury(ies)	Minor damage to property, i.e. superficial damage	Tier 1[4] local assistance required	Minor reputational risks – limited to users
3	Moderate	Multiple minor or single serious injury	Damage not critical to operations	Tier 2[5] limited external assistance required	Local reputational risks
4	Serious	Multiple serious injuries or single fatality	Damage resulting in critical risk to operations	Tier 2 regional assistance required	National reputational risks
5	Major	More than one fatality	Total loss of property	Tier 3[6] national assistance required	International reputational risks

Table 3.2 Frequency of Occurrence Ranking Definitions

Rank	Description	Definition
1	Negligible	Less than 1 occurrence per 10,000 years
2	Extremely unlikely	1 per 100 to 10,000 years
3	Remote	1 per 10 to 100 years
4	Reasonably probable	1 per 1 to 10 years
5	Frequent	Yearly

The severity of consequence and frequency of occurrence are then used to define the significance of risk via a tolerability matrix approach as shown in Table 3.3. The significance of risk is defined as Broadly Acceptable (low risk), Tolerable (intermediate risk) or Unacceptable (high risk).

[4] Tier 1 – Local (within the capability of one local authority, offshore installation operator or harbour authority
[5] Tier 2 – Regional (beyond the capability of one local authority or requires additional contracted response from offshore operator or from ports or harbours
[6] Tier 3 – National (requires national resources coordinated by the MCA for a shipping incident and the operator for an offshore installation incident)

Table 3.3 Tolerability Matrix and Risk Rankings

Severity of Consequence						
	5					
	4					
	3					
	2					
	1					
		1	2	3	4	5
		Frequency of occurrence				

	Unacceptable (high risk)
	Tolerable (intermediate risk)
	Broadly Acceptable (low risk)

Once identified, the significance of risk will be assessed to ensure it is ALARP. Further risk control measures may be required to further mitigate a hazard in accordance with the ALARP principles. Unacceptable risks are not considered to be ALARP.

3.3 Cumulative Impact Assessment Methodology

The hazards identified in the FSA are also assessed for cumulative risks with the inclusion of other projects and proposed developments. The developments selected as relevant to the cumulative impact assessment are based upon the results of a screening exercise and the development of a 'long list' of cumulative developments relevant to the Marine Scheme. Each development has been considered on a case-by-case basis for screening in or out of the assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved, to create a 'short list'. The cumulative impact assessment is presented in Section 12 and the cumulative long list for the Marine Scheme is provided in **Volume 3, Appendix 3.4: Long-list of Cumulative Developments**.

3.4 Study Area

The Offshore Export Cable Corridor of the Marine Scheme will run from within the BBWF Array Area to the identified Landfall at Cambois. The Offshore Export Cables will be up to 180 km in length (40 km in Scottish waters, and 140km in English waters) and will connect to Offshore Converter Station Platforms (OCSPs) within the BBWF array area. The OCSPs will be subject to detailed design and so will not be finally determined at the point of application of the Marine Scheme in Scottish Waters.

For the baseline vessel traffic analysis, a Shipping and Navigation Study Area was defined to cover an area of 5 nm around the Marine Scheme, cropped to Mean High Water Springs (MHWS). The

Shipping and Navigation Study Area is presented in Figure 3.2 alongside the Marine Scheme boundary.

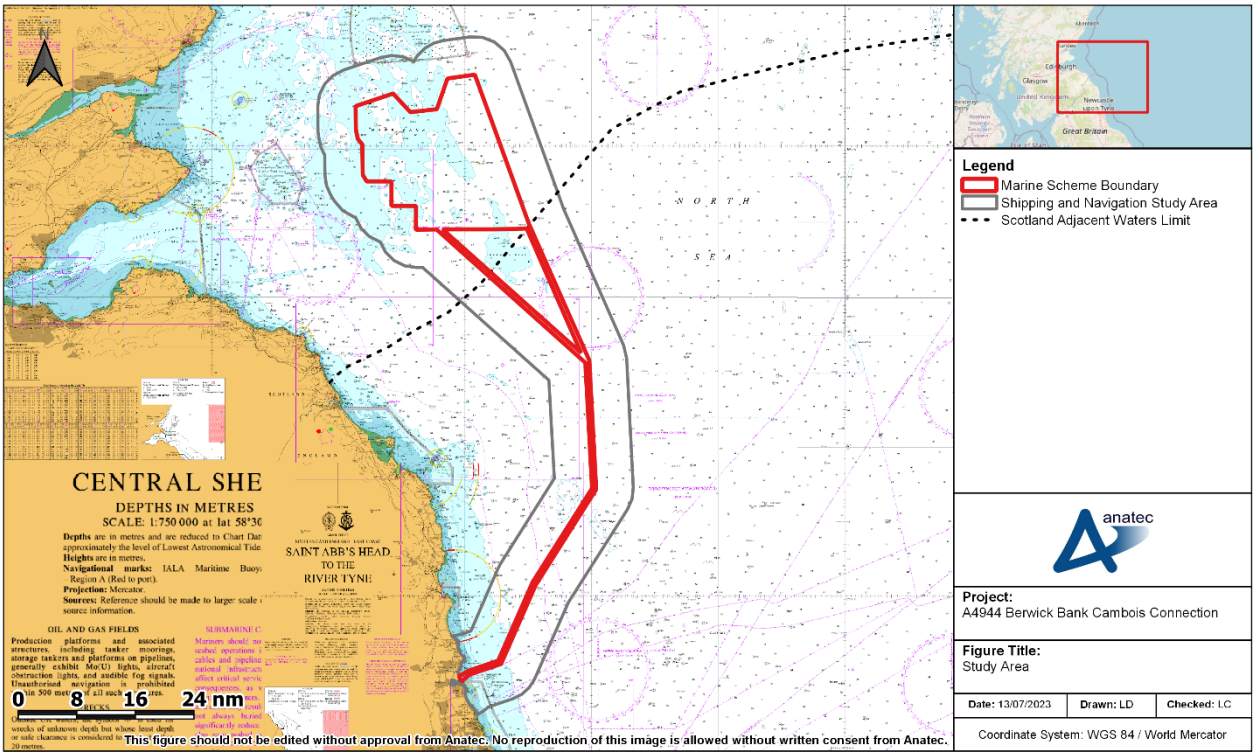

Figure 3.2 Shipping and Navigation Study Area

The 5 nm buffer is considered sufficient to characterise the shipping activity and navigational features close to the Marine Scheme and to encompass any vessel traffic that may be impacted by the cable and associated operations.

The Shipping and Navigation Study Area was presented to key stakeholders, including the MCA, Trinity House and Northern Lighthouse Board (NLB), as part of discussions on NRA approach, and was considered appropriate (see section 4).

4 Consultation

4.1 Stakeholders

The following shipping and navigation stakeholders have been consulted as part of the NRA process:

- MCA;
- Trinity House;
- NLB;
- RYA;
- Cruising Association;
- UK Chamber of Shipping;
- Port of Blyth; and
- Ministry of Defence (MOD).

In addition, Forth Ports were consulted by the Marine Directorate Licencing Operations Team (MD-LOT) through the Scoping process.

4.2 Consultation Responses

Responses were received from stakeholders during consultation undertaken in the NRA process, either during conference calls, email correspondence or through the Scoping Opinions (Ref. xv, xvi). The key points and where they have been addressed in the NRA or **Volume 2, Chapter 13: Shipping and Navigation** are summarised in **Volume 2, Chapter 13: Shipping and Navigation**.

5 Project Description Relevant to Shipping and Navigation

The NRA reflects the design envelope which is detailed in full in **Volume 2, Chapter 5: Project Description.** The following subsections outline a summary of the relevant information.

5.1 Cable Design and Protection

The Marine Scheme Offshore Export Cables will be HVDC, rated at up to 525 kilovolts (kV). There will be a maximum of four cables, each of which will be up to 180 km in length. The Offshore Export Cable Corridor length will be up to 40 km in Scottish waters and up to 140 km in English waters.

The target burial depths for the cables will be 0.5 m to 3 m (informed by an Indicative Cable Burial Appraisal), excluding any sand waves or sediment mobility, where burial is possible. Where minimum target burial depths cannot be achieved (due to ground conditions, or at crossings) surface lay and protection techniques will be employed such as rock placement. Final target burial depths or additional protection methods to protect against external hazards will be informed by a Cable Burial Risk Assessment (CBRA).

External cable protection may be required at cable crossings or areas where seabed conditions prevent burial. Up to five cable crossings will require external cable protection. Detail on specific areas where cable protection may be required is not currently known, however as a worst case it is assumed that up to 21% of the total cable length may require additional protection. Cable protection is expected to have a maximum height of up to 1.5 m, and up to 2 m at crossings.

5.2 Cable Construction

Cable construction is expected to involve some or all of the following activities:

- Pre-construction surveys;
- Cable route clearance activities and seabed levelling;
- Cable laying;
- Cable crossings; and
- Landfall works.

Site preparation works are expected to take place between Q4 2026 and Q4 2029, with the overall timescale for Landfall construction 15 months between Q4 2027 and Q4 2028, and Offshore Export Cable construction is expected to be carried out between Q3 2028 and Q4 2029 (an 18-month period).

5.2.1 Pre-construction surveys

Some pre-construction surveys may be required ahead of the cable construction process, for example geophysical and/or benthic surveys, geotechnical surveys, archaeological surveys, and Unexploded Ordnance (UXO) surveys[7].

5.2.2 Cable Route Clearance Activities / Seabed Levelling

Prior to the construction of the Offshore Export Cables, obstacles will need to be cleared from the Offshore Export Cable Corridor. The following activities may be required as part of the cable route clearance works:

- Route preparation, including boulder clearance and Pre-lay Grapnel Run (PLGR);
- Sea trials i.e., contractor trialling of construction techniques (if required);
- Seabed levelling; and
- Pre-construction trenching through harder seabed.

5.2.3 Cable Laying

The approach to cable laying could be one of the following:

- Separate cable lay and burial campaigns - cable is pre-laid (placed on the seabed in advance of trenching and burial);
- Simultaneous cable lay and burial – cable is laid at the same time as cable trenching; and
- Pre-lay trench and burial campaigns – cable is laid directly into pre-cut cable trenches.

Potential cable construction methods may include:

- Jet trenching: water is injected at high pressure in the area surrounding the cable using a jetting tool. The cable sinks to the required burial depth and sediment reconstitutes above the cable achieving simultaneous burial;
- Mass Flow Excavator (MFE): A method of trenching which can be used to excavate material without direct interaction with the seabed by using a specialist MFE tool;
- Mechanical trenching: a trench is excavated in the seabed into which the cable is laid. This is generally used for hard/stiff sediments; and
- Cable plough: a towed plough is used to create a trench, into which the cable is simultaneously inserted. These can also be used to pre-cut trenches, and backfill trenches post cable construction.

Figure 5.1 and Figure 5.2 present typical examples of cable construction tools.

[7] The width of the Offshore Export Cable Corridor (up to 1 km) potential UXO will be avoided via micro-routeing. It is therefore assumed that UXO will be avoidable and no clearance of UXO is included within the scope of this Marine Licence Application. Please see section 5.5.1.1 of Volume 2, Chapter 5: Project Description for full detail on the approach to UXO.

Figure 5.1 Example Plough

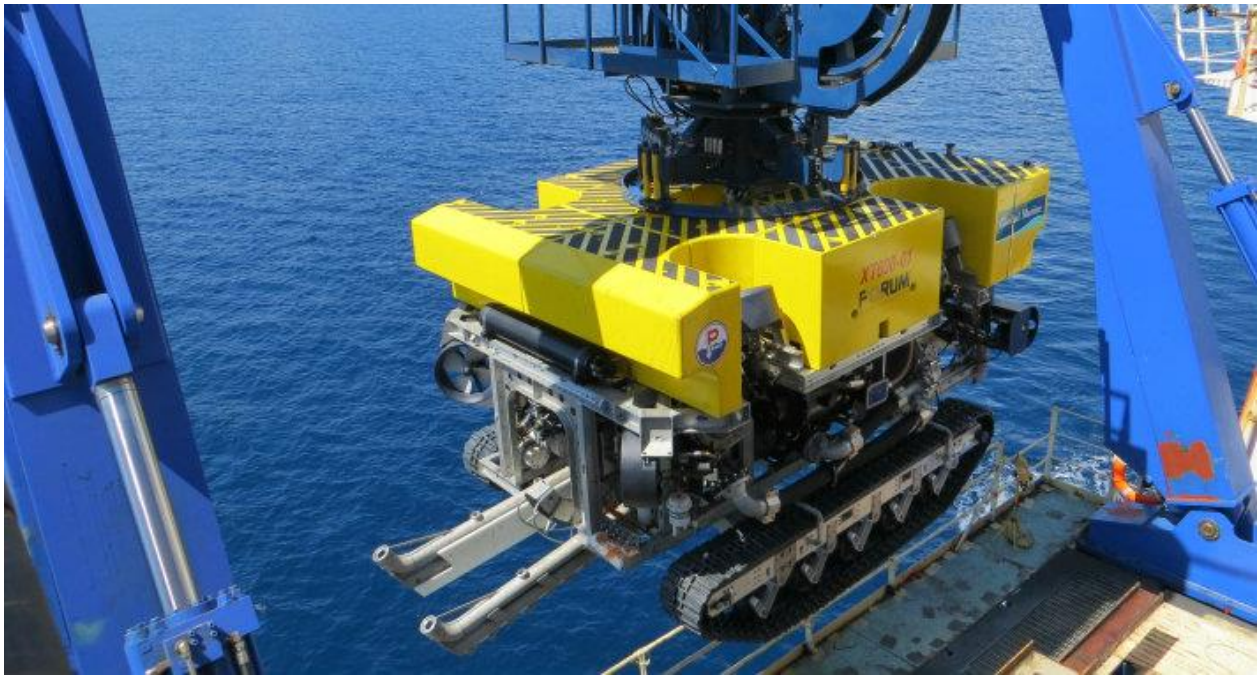

Figure 5.2 Example Jet Trencher

5.2.4 Cable crossings

Up to five cable crossings are anticipated along the Offshore Export Cable Route; two existing and three planned cables:

- North Sea Link – existing;
- Eastern Green Link 1 (EGL1) – planned;

- Blyth Offshore Demonstrator Project Array 2 (Phase 1) Export Cable – existing;
- Blyth Offshore Demonstrator Project Array 4 (Phases 2) Export Cable – consented; and
- Blyth Offshore Demonstrator Project Array 3a Export Cable – consented.

Eastern Green Link 2 (EGL2): Peterhead to Drax (in planning) is located approximately 3.25 km east of the Marine Scheme at the nearest point. Whilst a cable crossing is not considered likely to be required based on the current indicative location of EGL2, a proximity agreement may be required between the Applicant and the operator to ensure construction works in proximity to the cable route are undertaken at a sufficient distance so as to not impact operation.

External protection will be required at the crossings, potential materials include rock placement, rock bags, concrete mattresses, or tubular Crossing Protection System (CPS). The maximum height of the crossing is expected to be 2 m.

5.2.5 Landfall works

The preferred Landfall option has not yet been selected but will be within the cable corridor along the Cambois coastline, as presented in Figure 5.3.

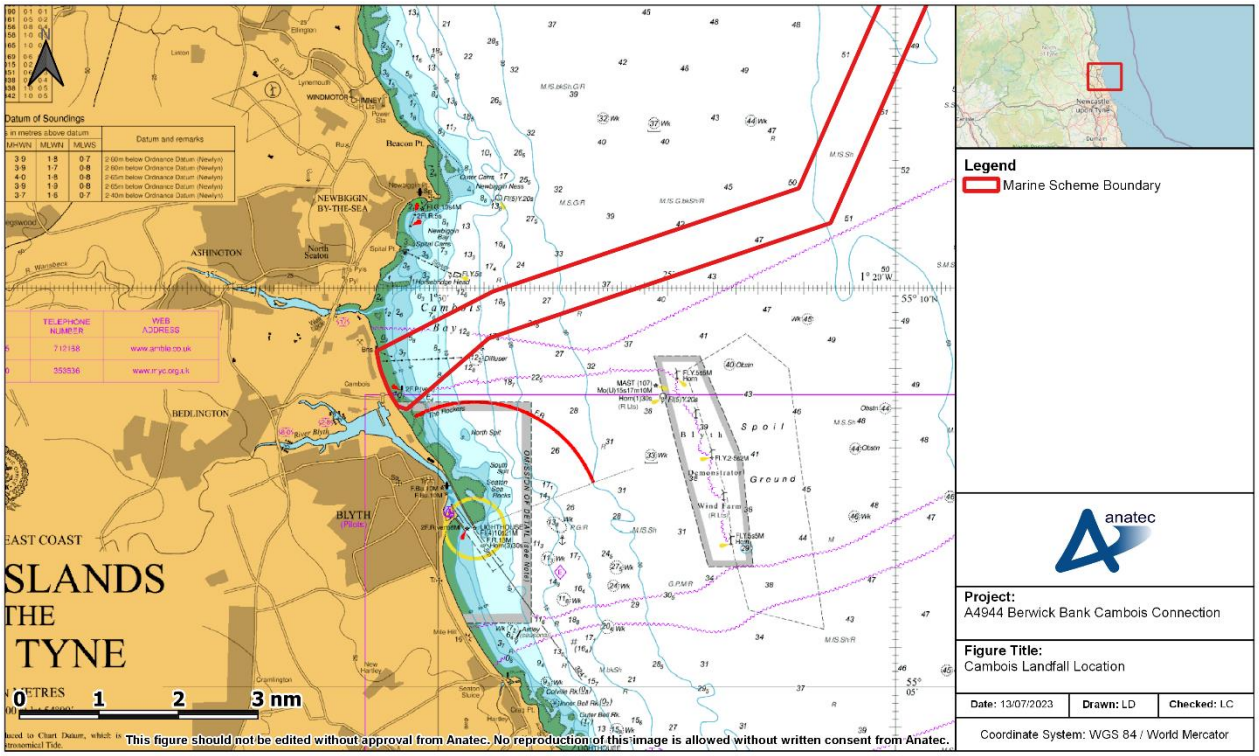

Figure 5.3 Cambois Landfall Location

The Offshore Export Cables will be installed using a trenchless technique. This involves installing an underground cable duct by drilling a hole (or holes) from one point to another. The Offshore Export Cables are then installed through the duct(s). It is likely that the holes will be drilled from a trenchless technology compound which will be located above MHWS (onshore) to an agreed 'punch out' location in the nearshore marine area (below Mean Low Water Springs (MLWS)), therefore completely bypassing the intertidal zone.

5.2.6 Vessels Involved

The following information presents the number of vessels expected to be on site at any one time during the construction works:

- Up to two pre-construction boulder removal / clearance vessels
- Up to two cable construction vessels
- Up to 10 guard vessels
- Up to two survey vessels / Offshore Construction Vessels (OCV)
- Up to two crew transfer vessels
- Up to two cable protection construction vessels
- One jack up barge

5.3 Maximum Design Scenario

The MDS for each shipping and navigation hazard is provided in Table 5.1 and based on parameters described in the previous subsections.

Site preparation works, in advance of construction, are predicted to commence in Q4 of 2026 and will continue until all installation activities have ceased. Landfall construction is expected to occur between Q4 of 2027 until Q4 of 2028. Export cable installation is expected to begin in Q3 2028 and is expected to last until Q4 of 2029. All activities associated with the Marine Scheme are predicted to conclude by the end of 2029. Until detailed design of the Marine Scheme is progressed and further refined pre-construction, this programme for the Marine Scheme as a whole is indicative and is subject to further refinement, but is used to inform assessment of construction phase impacts for the Marine Scheme.

Table 5.1 MDS for Shipping and Navigation

Potential Impact	Maximum Design Scenario (Marine Scheme whole)	Maximum Design Scenario – Scottish water and English waters	Justification
Construction			
Increased vessel to vessel collision risk between a third-party vessel and a project vessel	▪ Construction of the Offshore Export Cable Corridor is expected to take up to 18 months with an overall programme of up to 39 months, including site preparation ▪ Up to two pre-construction boulder removal / clearance vessels on site at any one time ▪ Up to two cable construction vessels on site at any one time ▪ Up to 10 guard vessels on site at any one time ▪ Up to two survey vessels / OCV on site at any one time ▪ Up to two cable protection construction vessels on site at any one time	**English waters** ▪ In addition to MDS presented for whole Marine Scheme, Jack up vessel may be used to support Landfall works **Scottish waters** As presented for whole Marine Scheme	Greatest number of vessels associated with the Marine Scheme and greatest duration resulting in the maximum temporal effect on vessel to vessel collision risk involving a third-party vessel and a project vessel.
Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels	▪ Construction of the Offshore Export Cable Corridor is expected to take up to 18 months with an overall programme of up to 39 months, including site preparation ▪ Up to two pre-construction boulder removal / clearance vessels on site at any one time ▪ Up to two cable construction vessels on site at any one time ▪ Up to 10 guard vessels on site at any one time ▪ Up to two survey / OCV vessels on site at any one time ▪ Up to two cable protection construction vessels on site at any one time ▪ 500 m advisory clearance zone around cable construction vessels	**English waters** ▪ In addition to MDS presented for whole Marine Scheme, Jack up vessel may be used to support Landfall works **Scottish waters** As presented for whole Marine Scheme	Greatest number of vessel movements and activities associated with the Marine Scheme and greatest duration resulting in the maximum temporal effect on vessel to vessel collision risk between third-party vessels

Potential Impact	Maximum Design Scenario (Marine Scheme whole)	Maximum Design Scenario – Scottish water and English waters	Justification
Reduced access to local ports	▪ Construction of the Offshore Export Cable Corridor is expected to take up to 18 months with an overall programme of up to 39 months, including site preparation ▪ Up to two pre-construction boulder removal / clearance vessels on site at any one time ▪ Up to two cable construction vessels on site at any one time ▪ Up to 10 guard vessels on site at any one time ▪ Up to two survey / OCV vessels on site at any one time ▪ Up to two cable protection construction vessels on site at any one time ▪ 500 m advisory clearance zone around cable construction vessels	**English waters** ▪ In addition to MDS presented for whole Marine Scheme, Jack up vessel may be used to support Landfall works **Scottish waters** As presented for whole Marine Scheme	Greatest number of vessel movements and activities associated with the Marine Scheme and greatest duration resulting in the maximum temporal effect on reduced access to local ports
Anchor interaction with exposed subsea cable between cable laying and protection campaigns	▪ Maximum of four cables ▪ Cable corridor length up to 180 km ▪ Potential for surface lay and post-lay burial construction method	**Scottish waters** ▪ Maximum of four cables ▪ Cable corridor length up to 40 km in Scottish waters ▪ Potential for surface lay and post-lay burial construction method **English waters** ▪ Maximum of four cables ▪ Cable corridor length up to 140 km in English waters ▪ Potential for surface lay and post-lay burial construction method	Greatest length of Offshore Export Cable, Offshore Export Cable construction method could leave surface-laid Offshore Export Cable for certain length of time
Fishing gear interaction with exposed subsea cable between laying and protection campaigns	▪ Maximum of four cables ▪ Cable corridor length up to 180 km ▪ Potential for surface lay and post-lay burial construction method	**Scottish waters** ▪ Maximum of four cables ▪ Cable corridor length up to 40 km in Scottish waters ▪ Potential for surface lay and post-lay burial construction method **English waters** ▪ Maximum of four cables ▪ Cable corridor length up to 140 km in English waters ▪ Potential for surface lay and post-lay burial construction method	Greatest length of Offshore Export Cable, Offshore Export Cable construction method could leave surface-laid Offshore Export Cable for certain length of time
Operation and Maintenance			

Potential Impact	Maximum Design Scenario (Marine Scheme whole)	Maximum Design Scenario – Scottish water and English waters	Justification
Increased vessel to vessel collision risk between a third-party vessel and a project vessel	▪ Operation and maintenance phase of up to 35 years ▪ Annual routine inspection survey ▪ Annual geophysical survey ▪ Up to four repair events and four reburial events of up to 1000m each over lifetime	Applies to the whole Marine Scheme	Greatest number of activities associated with the Marine Scheme resulting in the maximum temporal effect on vessel-to-vessel collision risk involving a third-party vessel and a project vessel.
Anchor interaction with subsea cable	▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 180 km ▪ Target burial between 0.5 m and 3 m, informed by CBRA to be completed at a later date[8] ▪ External cable protection required for up to 37 km per cable (up to 21%) ▪ Up to five cable crossings requiring external cable protection (assumed up to 200 m per crossing, per cable)	**Scottish waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 40 km in Scottish waters ▪ Target burial between 0.5 m and 3 m, informed by CBRA ▪ External cable protection required for up to 6 km per cable in Scottish waters ▪ No crossings in Scottish waters **English *w*aters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 140 km in English waters ▪ Target burial between 0.5 m and 3 m, informed by CBRA ▪ External cable protection required for up to 31 km per cable in English waters ▪ Up to five cable crossings in English waters requiring external cable protection (assumed up to 200 m per crossing, per cable)	Largest possible extent of Offshore Export Cable and greatest duration resulting in the maximum spatial and temporal effect. Minimum burial depth resulting in maximum potential interaction with anchors.

[8] For areas where burial can be achieved. Where burial cannot be achieved (due to ground conditions) surface lay and protection techniques will be employed.

Potential Impact	Maximum Design Scenario (Marine Scheme whole)	Maximum Design Scenario – Scottish water and English waters	Justification
Fishing gear interaction with subsea cable	▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 180 km ▪ Target burial between 0.5 m and 3 m, informed by CBRA to be completed at a later date[8] ▪ External cable protection required for up to 37 km per cable (up to 21%) ▪ Up to five cable crossings requiring external cable protection (assumed up to 200 m per crossing, per cable)	**Scottish waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 40 km in Scottish waters ▪ Target burial between 0.5 m and 3 m, informed by CBRA ▪ External cable protection required for up to 6 km per cable in Scottish waters ▪ No crossings in Scottish waters **English waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 140 km in English waters ▪ Target burial between 0.5 m and 3 m, informed by CBRA ▪ External cable protection required for up to 31 km per cable in English waters ▪ Up to five cable crossings in English waters requiring external cable protection (assumed up to 200 m per crossing, per cable)	Largest possible extent of Offshore Export Cable and greatest duration resulting in the maximum spatial and temporal effect. Minimum burial depth resulting in maximum interaction with fishing gear.
Vessel grounding due to reduced under keel clearance	▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 180 km ▪ External cable protection required for up to 37 km per cable (up to 21%) informed by CBRA to be completed at a later date ▪ Up to five cable crossings requiring external cable protection (assumed up to 200 m per crossing, per cable)	**Scottish waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 40 km in Scottish waters ▪ External cable protection required for up to 6 km per cable in Scottish waters ▪ No crossings in Scottish waters ▪ Maximum height of cable protection 1.5 m	Largest possible extent of external cable protection and greatest duration resulting in the maximum spatial and temporal effect on under keel clearance.

Potential Impact	Maximum Design Scenario (Marine Scheme whole)	Maximum Design Scenario – Scottish water and English waters	Justification
	▪ Maximum height of cable protection 1.5 m (2 m at crossings)	**English waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 140 km in English waters ▪ External cable protection required for up to 31 km per cable in English waters ▪ Up to five cable crossings in English waters requiring external cable protection (assumed up to 200 m per crossing, per cable) ▪ Maximum height of cable protection 1.5 m (2 m at crossings).	
Interference with magnetic compasses	▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 180 km ▪ Target burial between 0.5 m and 3 m, informed by CBRA to be completed at a later date[9].	**Scottish waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 40 km in Scottish waters ▪ Target burial between 0.5 m and 3 m, informed by CBRA **English waters** ▪ Operation and maintenance phase of up to 35 years ▪ Maximum of four cables ▪ Cable corridor length up to 140 km in English waters ▪ Target burial between 0.5 m and 3 m, informed by CBRA	Largest possible extent of Offshore Export Cable and greatest duration resulting in the maximum spatial and temporal effect on magnetic compasses.
Decommissioning			
Increased vessel to vessel collision risk between a third-party vessel and a project vessel	At the end of the operational lifetime of the Marine Scheme, the operator of the Marine Scheme will develop and agree a solution for the onward handling of the Offshore Export Cables with the regulator. This decision will be	Applies to the whole Marine Scheme	Removal of all cables presents the MDS for these impacts in terms of greatest number of vessels / temporal

[9] For areas where burial can be achieved. Where burial cannot be achieved (due to ground conditions) surface lay and protection techniques will be employed.

Potential Impact	Maximum Design Scenario (Marine Scheme whole)	Maximum Design Scenario – Scottish water and English waters	Justification
Vessel displacement leading to Increased vessel to vessel collision risk between third-party vessels	based on the advice from the marine regulators and informed by the prevailing environmental regulatory requirements at that time, and relevant best-practice. An assessment has been undertaken on a maximum design scenario of removing all Offshore Export Cables. The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vessels and equipment.		effect on vessel-to-vessel collision risk.

6 Data Sources

The main data sources used to characterise the shipping and navigation baseline relative to the Marine Scheme are outlined in Table 6.1.

Table 6.1 Data Sources used to inform the Shipping and Navigation Baseline

Title	Source	Purpose
Vessel traffic	Six months (three months summer and three months winter) of Automatic Identification System (AIS) Data – November 2021 to January 2022 and May to July 2022	Characterising vessel traffic movements within and in proximity to the Marine Scheme
	28 days (summer and winter) vessel traffic data from BBWF EIAR shipping and navigation chapter (Ref. xvii) – January 2021 and August 2022	Characterising vessel traffic movements within and in proximity to the BBWF array area
Navigational features	Admiralty nautical charts 1407, 273, 1192, 2182B (Ref. xviii)	Characterising other navigational features in proximity to the Marine Scheme
	Admiralty Sailing Directions North Sea (West) Pilot NP54 (Ref. xix)	
Wind farm boundaries and agreements	GIS for wind farms within England, The Crown Estate (TCE) 2022	Characterising wind farm boundaries and agreements within and in proximity to the Marine Scheme
	GIS for wind farms within Scotland, Crown Estate Scotland 2022	
Maritime incidents	Marine Accident and Investigation Branch (MAIB) incident data, 2010-2019	Review of maritime incidents within and in proximity to the Marine Scheme
	Royal National Lifeboat Institution (RNLI) incident data, 2010-2019	
	DfT UK civilian Search and Rescue (SAR) helicopter taskings (April 2015 to March 2022).	
Recreational traffic density and features	UK Coastal Atlas of Recreational Boating (Ref. xx), 2019	Characterising recreational activity within and in proximity to the Marine Scheme
UK ports: ship arrivals	UK ports: ship arrivals, Department for Transport (DfT) 2017-2021	Understanding recent trends in shipping activity
Additional Fishing Data	Vessel Monitoring System (VMS) satellite fishing data 2019 and 2020, MMO	Provide further information on fishing activities within and in proximity to the Marine Scheme
	Anonymised Fishing Sightings Data, Northumberland Inshore Fisheries and Conservation Authority (NIFCA), 2012-2021	
Vessel Traffic	Blyth Demonstrator Project Phase 2 – Supporting Environmental Information, EDF Renewables, 2020 (Ref. xxii)	To review any additional small vessel activity near the Landfall
	Blyth Demonstrator Project Environmental Statement, Natural Power, 2012 (Ref. xxi)	

6.1 Automatic Identification System Data

The baseline shipping analysis is based on an up-to-date data set consisting of six months of AIS data collected for the Shipping and Navigation Study Area. This is broken into two distinct three month periods in order to cover seasonal variation (i.e. summer and winter). The chosen periods (detailed below) ensure that the data for the area is recent:

- 1st November 2021 – 31st January 2022; and
- 1st May 2022 – 31st July 2022.

AIS equipment is required to be fitted on all vessels of 300 gross tonnes (GT) and upwards engaged on international voyages, cargo vessels of 500 GT and upwards not engaged on international voyages, and passenger vessels irrespective of size, built on or after 1st July 2002. Under the Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) Regulations 2004 (as amended in 2011), fishing vessels of 15 m or more in length overall, UK registered or operating in UK waters, must be fitted with an approved (Class A) AIS (regulation 8A). In addition, all UK and European Union (EU) registered fishing vessels of length 15 m and above are required to carry AIS equipment. Smaller fishing vessels (below 15 m) as well as recreational craft are not required to carry AIS but a proportion does so voluntarily. It is also noted that military and law enforcement vessels are not obligated to broadcast on AIS at all times. Therefore, these vessels (e.g. small fishing, recreational, law enforcement and military vessels) will be under-reported within the AIS data.

The reporting interval between position reports for a given vessel typically ranges between a few seconds and up to three minutes, depending on its speed and navigational status (less frequent for anchored and moored vessels).

In addition to the six months' AIS data collected for the Offshore Export Cable Corridor, 28 days of AIS and Radar vessel traffic data from the BBWF EIAR shipping and navigation chapter (Ref. xvii) have been used to inform the shipping and navigation baseline for the array area.

6.2 Data Limitations

6.2.1 Automatic Identification System Data

It is assumed that vessels under an obligation to broadcast information via AIS have done so, across all vessel traffic datasets. It has also been assumed that the details broadcast via AIS (such as vessel type and dimensions) are accurate unless clear evidence to the contrary was identified. There may be occasional range limitations in tracking certain vessels, especially smaller (Class B AIS) vessels in winter. However, it is not considered that the comprehensiveness of the AIS data compromises confidence in the assessment.

Since the vessel traffic data for the Marine Scheme consists of AIS only, the data has limitations associated with non-AIS targets. However, the MCA, NLB and Trinity House were content with the methodology for vessel traffic data collection for the Marine Scheme which includes consideration of additional data sources such as VMS data, the UK Coastal Atlas of Recreational

Boating (Ref. xx) and consultation feedback. AIS and Radar data from the BBWF EIAR shipping and navigation chapter and Blyth Demonstrator Offshore Wind Farm (Phases 1 and 2) were also reviewed. With these additional datasets incorporated, the characterisation of vessel traffic movements for the Shipping and Navigation Study Area is considered to be suitably comprehensive and adequate for the assessment.

Military vessels are not required to broadcast on AIS and may therefore be under-represented. Consultation with the Ministry of Defence was undertaken to establish any potential data gaps, which were not considered to be a concern.

6.2.2 COVID-19 Pandemic

It is widely accepted that the COVID-19 pandemic had a substantial effect on shipping movements globally during 2020 and early 2021. Therefore, any datasets containing these periods, including additional fishing data sources, port arrivals statistics and the winter 2021 survey data from the BBWF EIAR shipping and navigation chapter, may be influenced by the pandemic, e.g., show a lower number of vessels during these periods. The main AIS data set, spanning November 2021 to January 2022 and May to July 2022, is not expected to be impacted by the COVID-19 pandemic.

6.2.3 Historical Incident Data

Although all UK commercial vessels are required to report incidents to the MAIB, this is not mandatory for non-UK vessels unless they are in a UK port, within territorial waters or carrying passengers to a UK port. There are also no requirements for non-commercial recreational craft to report incidents to the MAIB. Nevertheless, the MAIB incident database is considered to be a suitable source for the characterisation of historical incidents and adequate for the assessment.

The RNLI incident data cannot be considered comprehensive of all incidents in the Shipping and Navigation Study Area. Although hoax and false alarms are excluded, any incident to which an RNLI resource was not mobilised has not been accounted for in this dataset. Nevertheless, the RNLI incident data is considered to be a suitable source for the characterisation of historical incidents and adequate for the assessment.

6.2.4 Admiralty Charts

The Admiralty Charts published by the UKHO are updated periodically, and therefore the information shown may not reflect the real-time features within the region with total accuracy. Taking into account the consultation undertaken, the characterisation of navigational features is considered to be suitably comprehensive and adequate for the assessment. For aids to navigation, only those charted and considered key to establishing the shipping and navigation baseline are shown.

7 Navigational Features

7.1 Overview

A plot of navigational features in proximity to the Marine Scheme is presented in Figure 7.1. Each of the features shown is discussed in the following subsections and has been identified using the most detailed UKHO Admiralty Charts available and/or downloaded from publicly available sources.

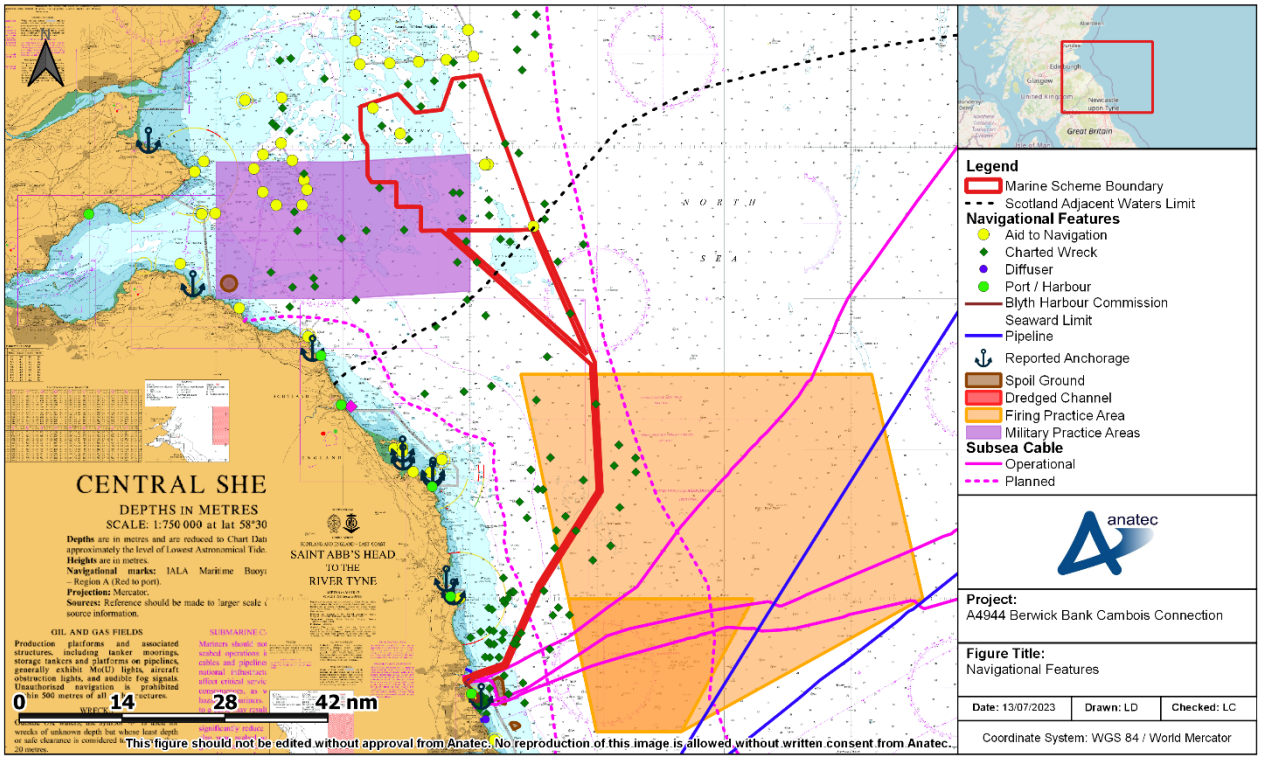

Figure 7.1 Navigational Features

7.2 Ports and Anchorage Areas

Figure 7.2 presents the ports and anchorage areas in close proximity to the Marine Scheme.

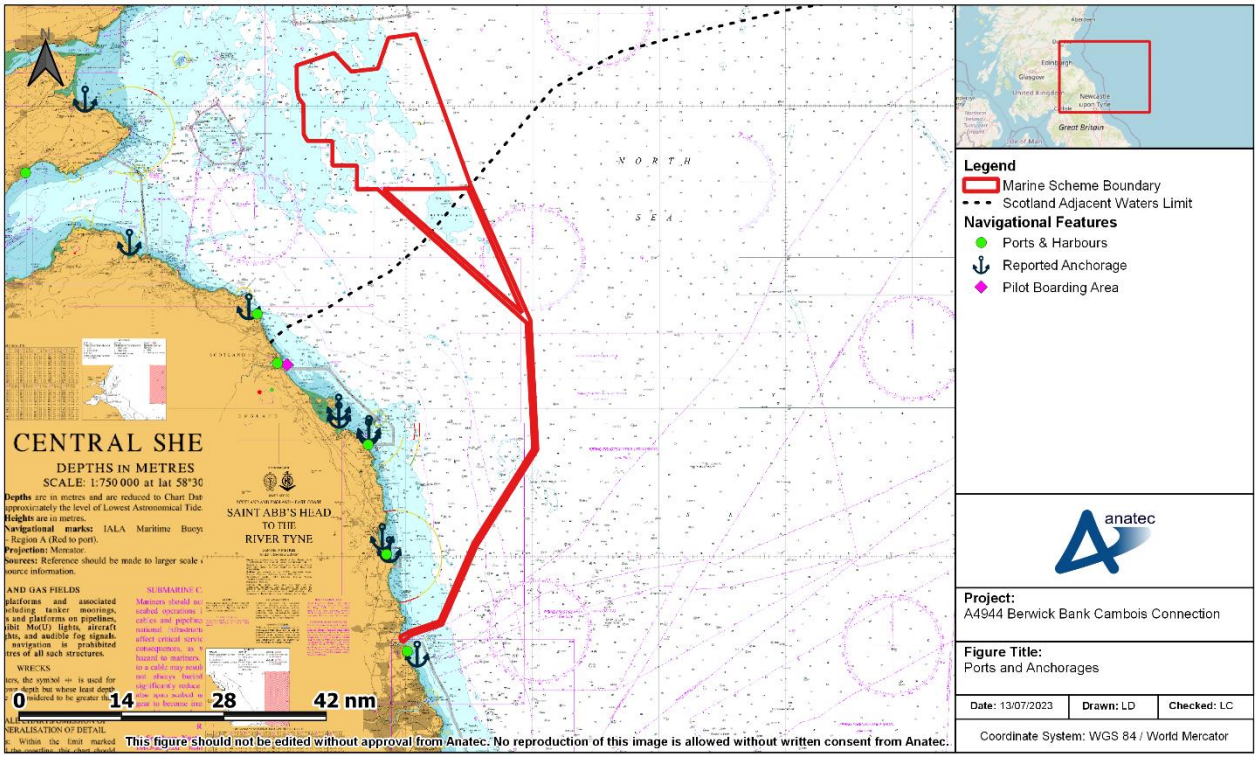

Figure 7.2 Ports and Anchorage Areas

The closest port to the Marine Scheme is the Port of Blyth in English waters, the entrance of which is located 1.4 nm south of the Landfall. The Marine Scheme Boundary lies just outside of the Seaward Limit of Blyth Harbour Commission at the Landfall of the Offshore Export Cable Corridor. A dredged channel leads into Blyth with a depth of 8.5 m, although it is noted that the dredged depths presented on charts are liable to change.

The Port of Blyth is the port operating division of Blyth Harbour Commission, an independent statutory trust established in 1882. Pilotage at Blyth is compulsory for vessels over 50 m length overall, and for vessels with tows when the combined length of tow exceeds 50 m. The pilot boarding area for Blyth is not charted, however Admiralty Sailing Directions state that the pilot normally boards within 2 miles of the harbour entrance. In worse weather, the pilots board in the vicinity of the pierheads.

From north to south, concluding with Blyth, the other ports and harbours in proximity to the Marine Scheme Boundary are Methil (within the Forth Ports limits), Eyemouth, Berwick Upon Tweed, Seahouses Harbour and Amble Marina. The pilot boarding area for Berwick Upon Tweed is located approximately 1.3 nm east of the port.

The Offshore Export Cable Corridor is located approximately 33 nm to the east of the entrance to the Firth of Forth, with the Firth of Forth approximately 24 nm west of the Marine Scheme boundary in Scottish waters. Vessels visiting Forth Ports (e.g. Leith, Rosyth, Grangemouth) are expected to contribute a significant proportion of shipping crossing the Marine Scheme Boundary, in both Scottish and English waters. Forth Ports operates the Forth Navigation Service, which operates west of the Isle of May, approximately 23 nm west of the Marine Scheme

Boundary. The vessel traffic service (VTS) operates full AIS and radar surveillance. Vessels of greater than 50 GT are required to report in when passing the eastern limit of the VTS (Ref. xix).

Several anchorages are charted along the coastline in both Scottish and English waters. The closest to the Marine Scheme Boundary is located 2.5 nm south, outside the Port of Blyth in English waters. The anchorage is located east of the East Pierhead and has a depth of approximately 17 m. In Scottish waters, the closest anchorage is located approximately 21 nm to the south east of the Marine Scheme Boundary, at Eyemouth.

7.3 Military Practice Areas

Approximately 26 nm of the mid-section of the Offshore Export Cable Corridor crosses one firing practice area. No restrictions are placed on the right to transit the firing practice areas at any time. The firing practice area are operated using a clear range procedure; exercises and firing only take place when the areas are considered to be clear of all shipping. Two submarine practice areas (X5641 and X5642) are located at the entrance to the Firth of Forth, with the Marine Scheme Boundary overlapping the eastern extent of these. The boundary of the exercise areas is not charted.

7.4 Offshore Wind Farms

Figure 7.3 presents the locations of offshore wind farms relative to the Marine Scheme Boundary.

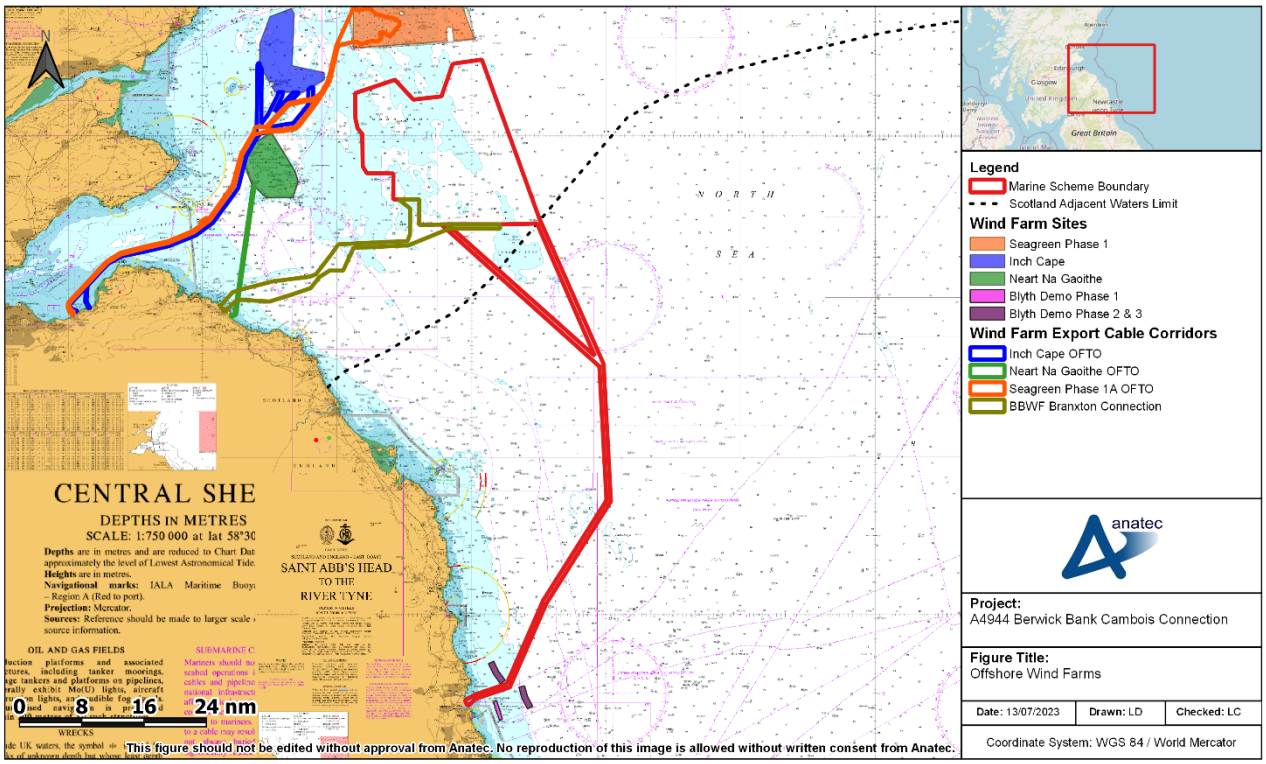

Figure 7.3 Offshore Wind Farms

The Marine Scheme Boundary encompasses the BBWF array area and overlaps with the BBWF Branxton Connection in Scottish waters. The BBWF is currently being determined separately.[10]

The closest operational offshore wind farm to the Marine Scheme Boundary is the Blyth Demonstrator Offshore Wind Farm Phase 1 (Blyth Demo Phase 1), in English waters. Blyth Demo Phase 1, consisting of five turbines, is located 1.1 nm south of the Marine Scheme Boundary, close to its Landfall, and was fully commissioned in June 2018. Phase 2 of the Blyth Demonstrator Offshore Wind Farm (Blyth Demo Phase 2) has now been consented and site boundaries are located 0.3 nm north and 1.1 nm south of the Marine Scheme Boundary. In addition, an offshore wind robotics test site is located within the River Blyth, inshore of the decommissioned Blyth Wind Farm.

In Scottish waters, Neart Na Gaoithe (NNG) offshore wind farm is located approximately 8.4 nm west of the Marine Scheme and is currently under construction. Inch Cape offshore wind farm lies to the north of NNG, 4.2 nm to the northwest of the Marine Scheme and has received consent, with construction yet to commence. To the north, approximately 2.9 nm from the Marine Scheme, the Seagreen Phase 1 offshore wind farm is currently under construction and is set to be completed in 2023. In addition to the cable corridor consented alongside the Seagreen wind farm, an additional export cable, named Seagreen 1A has since been consented, connecting the Seagreen OWF to a landfall at Cockenzie. The Seagreen 1A boundary does not intersect the Marine Scheme.

7.5 Cables & Pipelines

Figure 7.4 presents the cables and pipelines in proximity to the Marine Scheme.

[10] BBWF is subject to a separate consenting process. An application for consent under Section 36 of the Electricity Act 1989 (as amended) was submitted to MD-LOT and accepted in December 2022. It is currently being determined.

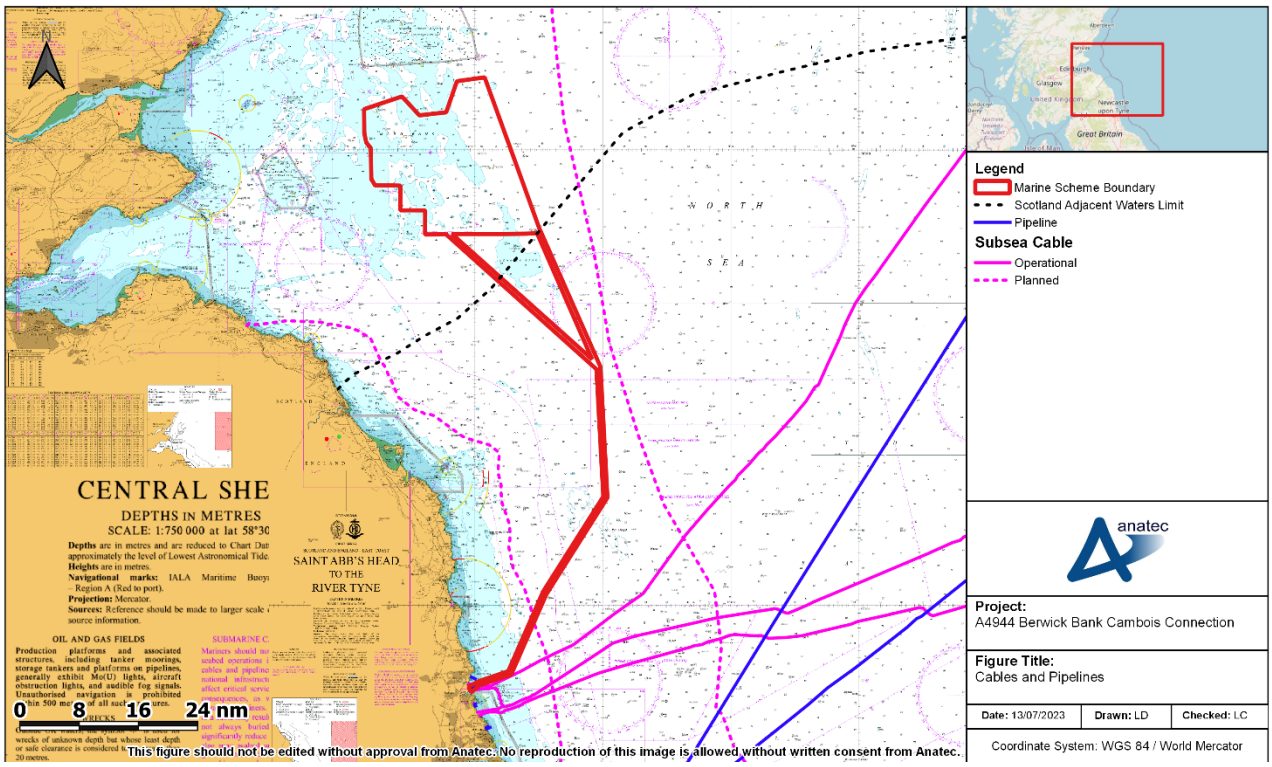

Figure 7.4 Cables and Pipelines

The Marine Scheme overlaps with two operational power cables close to the Landfall in English waters: the North Sea Link interconnector which runs between Cambois and Kvilldal, Norway and the Blyth Demo Phase 1 export cable. Both these cables are crossed by the Marine Scheme in English waters.

The NO-UK and Havhingsten telecommunication cables also overlap the Shipping and Navigation Study Area but are outside the Marine Scheme in both Scottish and English waters.

EGL1 and EGL2 transmission cables are currently in planning and if consented, will overlap with the Shipping and Navigation Study Area, with the EGL1 cable crossing the Offshore Export Cable Corridor within English waters. EGL2 does not cross the Marine Scheme Boundary, passing approximately 2.2 nm to the east at the closest approach within Scottish waters. EGL1 runs from Torness in East Lothian, Scotland to Hawthorn Pit in Durham, England, while EGL2 runs from Peterhead in Aberdeenshire, Scotland to Bridlington in North Yorkshire, England.

7.6 Aids to Navigation (AtoN)

The key Aids to Navigation (AtoN) in proximity to the Marine Scheme are presented in Figure 7.5.

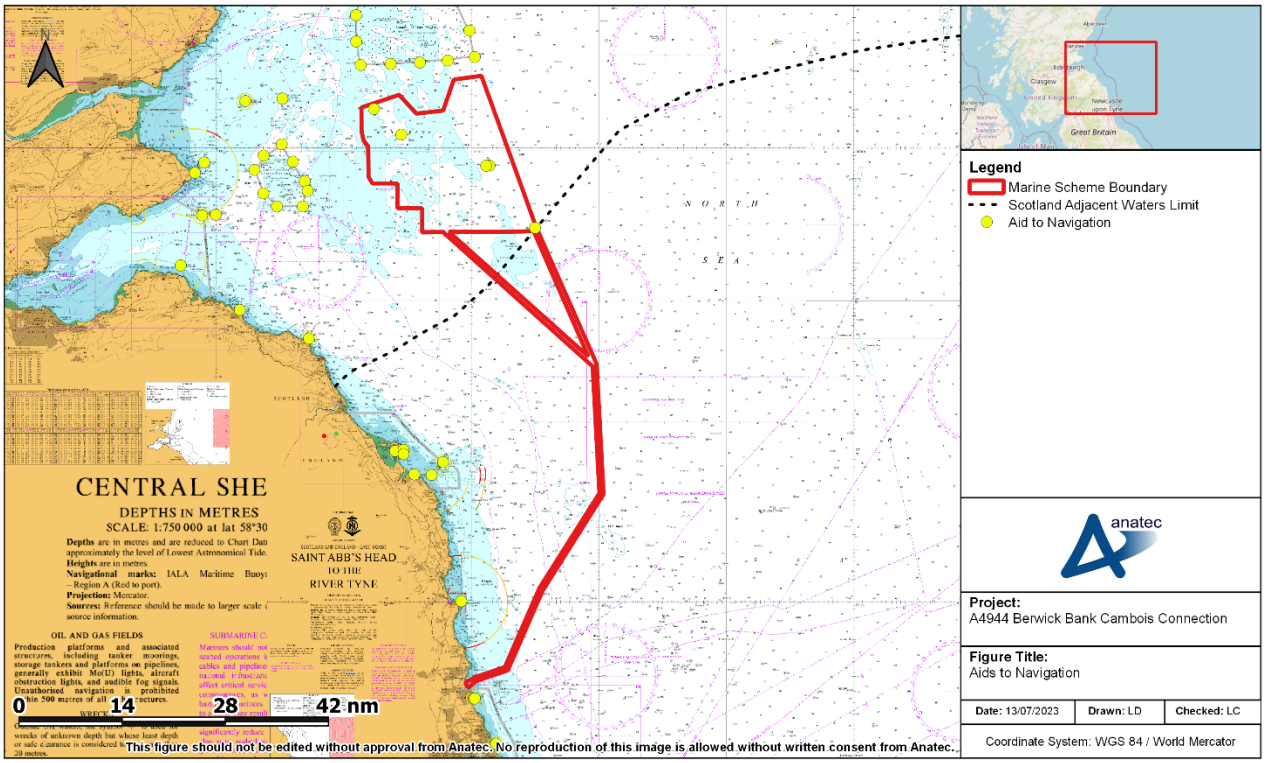

Figure 7.5 Aids to Navigation

There are five buoys located within the Marine Scheme boundary, with four scientific buoys located within the BBWF array area, and a further buoy situated in the north of the Offshore Export Cable Corridor, to the east of the Berwick Bank.

In addition, there are a number of AtoN inshore of the Marine Scheme, located along the coast. The Seagreen OWF and NNG OWF construction areas are also marked with buoyage.

Within English waters, the closest AtoN to the Marine Scheme in English waters is the Blyth Harbour Lighthouse, located 1.8 nm to the south of the Marine Scheme, close to the Landfall.

7.7 Other Areas

A spoil ground is located 0.9 nm south of the Offshore Export Cable Corridor, just east of the Blyth offshore wind farm in English waters. 14 charted wrecks are present within Marine Scheme Boundary, with six of these within the Offshore Export Cable Corridor. The shallowest of these was recorded in a water depth of 41 m.

7.8 Cable Landfall (English Waters)

An overview of all navigational features in proximity to the Marine Scheme Landfall is presented in Figure 7.6.

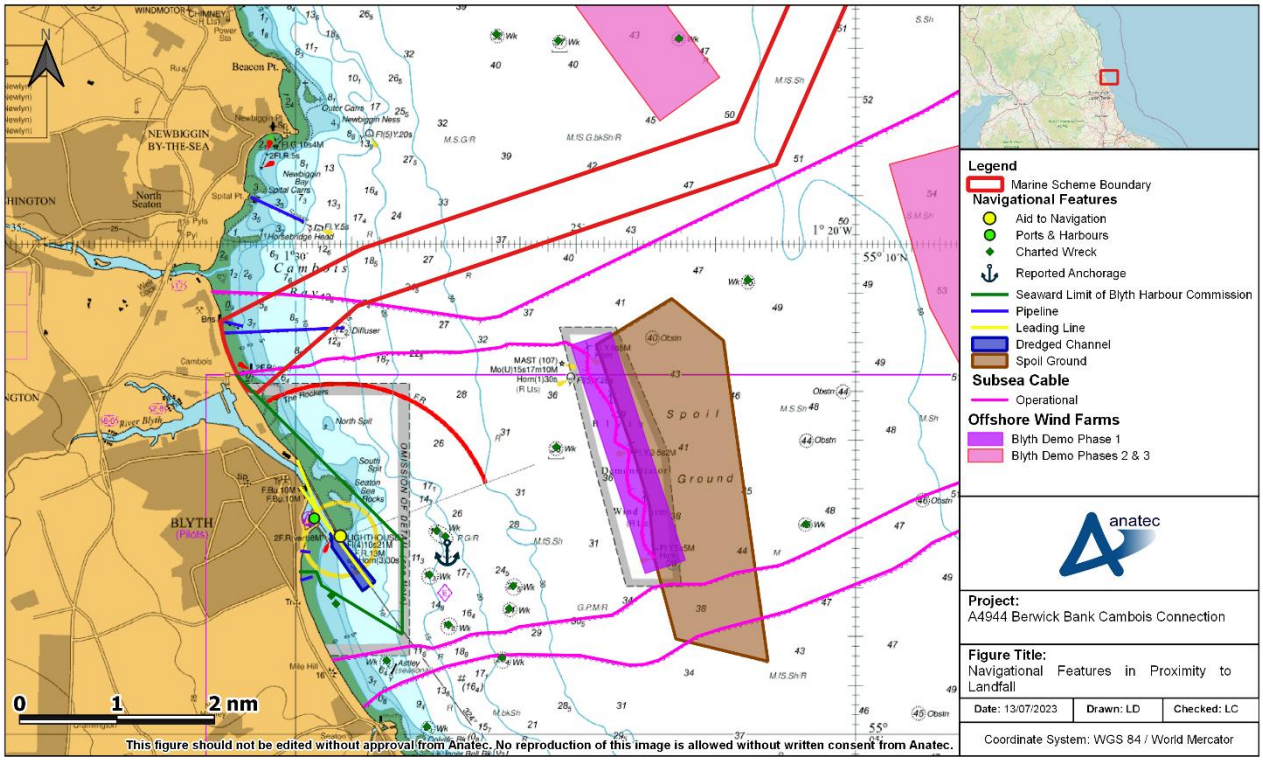

Figure 7.6 Navigational Features in Proximity to Landfall

The cable corridor lies just outside of the Seaward Limit of Blyth Harbour Commission at its landfall. A dredged channel leads into Blyth with a depth of 8.5 m, although it is noted that the dredged depths presented on charts are liable to change. The harbour has two leading lines for guiding vessels, one at 324 degrees and one at 338 degrees. A lighthouse marks the north breakwater.

A spoil ground partially overlaps the Blyth Demo Phase 1, and is 1.0 nm from the cable corridor at its nearest point.

Two pipelines (waste water outfalls) are located within the Offshore Export Cable Corridor near the Landfall in addition to two subsea cables, the Blyth Demo Phase 1 export cable and the North Sea Link interconnector.

8 Emergency Response Overview

This section summarises the existing emergency response resources (including SAR) and review historical maritime incident data to assess baseline incident rates in proximity to the Offshore Export Cable Corridor.

8.1 Search And Rescue Helicopters

In July 2022, the Bristow Group were awarded a new 10-year contract by the MCA (as an executive agency of the Department for Transport) commencing in September 2024, to provide helicopter SAR operations in the UK. Bristow have been operating the service since April 2015.

There are currently ten base locations for the SAR helicopter service. The most relevant SAR helicopter bases to the Marine Scheme are Prestwick (107 nm to the west) and Humberside (101 nm to the south) (see Figure 8.1). The Prestwick base operates Agusta Westland AW189 helicopters whilst the Humberside base operates Sikorsky S92 helicopters. The Inverness base is located approximately 97 nm to the north of the BBWF array area which forms part of the Marine Scheme, so may also respond in some cases. Inverness houses two Agusta Westland AW189 helicopters.

The SAR helicopter taskings undertaken between April 2015 and March 2022 within the Shipping and Navigation Study Area are presented in Figure 8.1, colour-coded by tasking type.

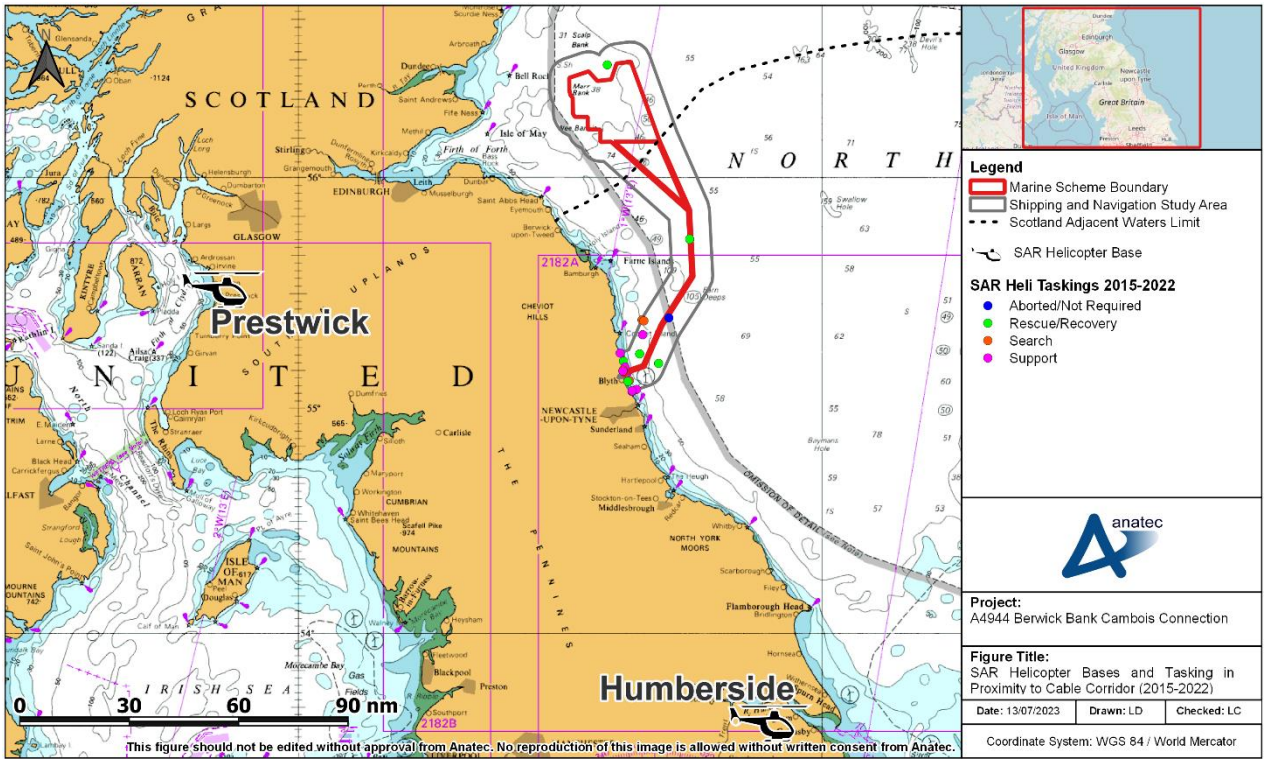

Figure 8.1 SAR Helicopter Bases and Taskings in proximity to Cable Corridor (2015 to 2022)

There were 18 taskings within the Shipping and Navigation Study Area, mostly concentrated at the Landfall. Taskings were most commonly support operations (39%), rescue/recovery

operations (33%) and searches (22%), with one tasking stood down as it was not required. Of the taskings, 11 came from the Humberside base, 5 from Prestwick, with the two northernmost taskings coming from the Inverness base.

8.2 Royal National Lifeboat Institution

The RNLI is organised into six divisions, with the relevant region for the Marine Scheme being the East division. Based out of more than 230 stations, there are more than 350 lifeboats across the RNLI fleet, including both all-weather lifeboats (ALBs) and inshore lifeboats (ILBs). There are numerous RNLI stations within proximity of the Marine Scheme which are presented in Figure 8.2.

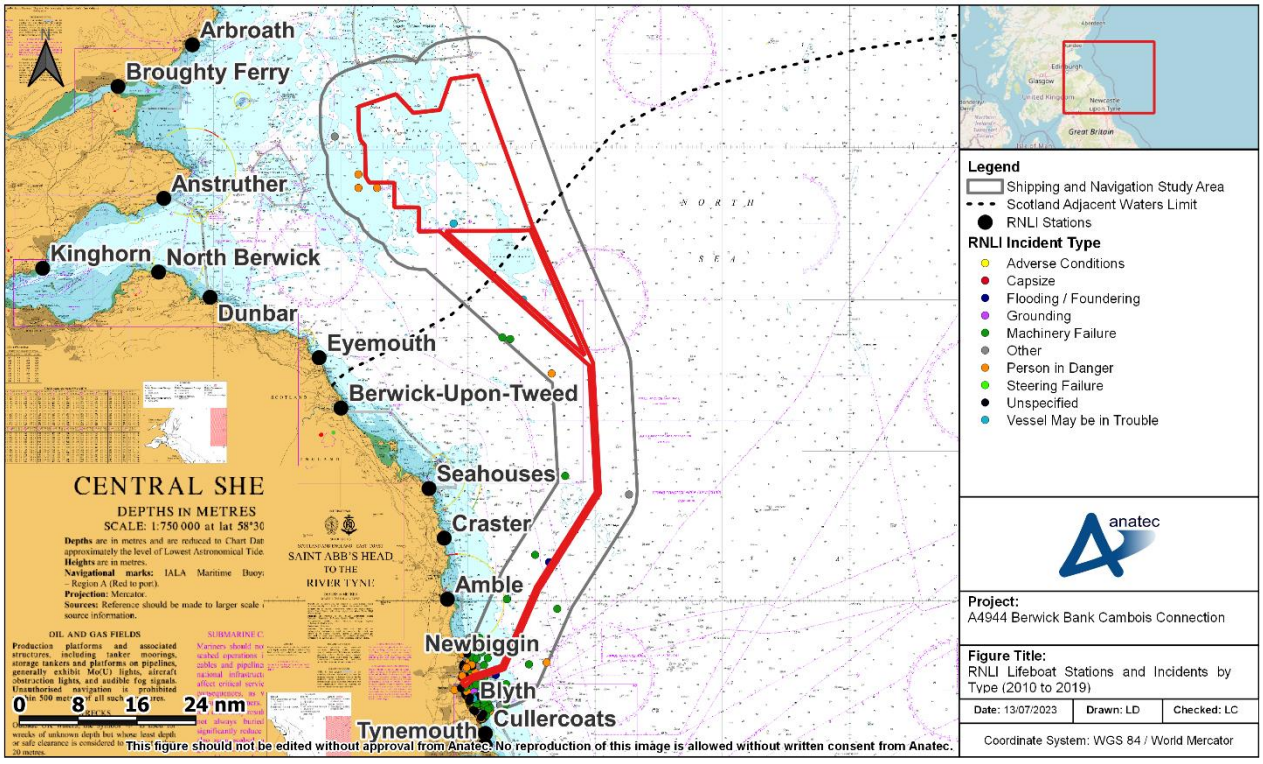

Figure 8.2 RNLI Lifeboat Stations and Incidents by Type (2010 to 2019)

The closest RNLI station to the Offshore Export Cable Landfall is Blyth, approximately 1 nm to the south, where ILBs are used. The Newbiggin station also operates using ILBs. Given that the RNLI have an operational limit of 100 nm, it is anticipated that an incident occurring in proximity to the Offshore Export Cable Corridor would likely result in a response from an RNLI asset. Nearby RNLI stations housing all-weather lifeboats, which are likely to be tasked to incidents further offshore, include Arbroath, Anstruther, Dunbar, Eyemouth, Seahouses, Amble and Tynemouth.

There was a total of 311 unique incidents recorded by the RNLI within the Shipping and Navigation Study Area during the ten year study period (2010 to 2019), giving an average of 31 per year, the majority of which were within 3 nm of the coast. Figure 8.3 presents the incident type distribution for all incidents recorded.

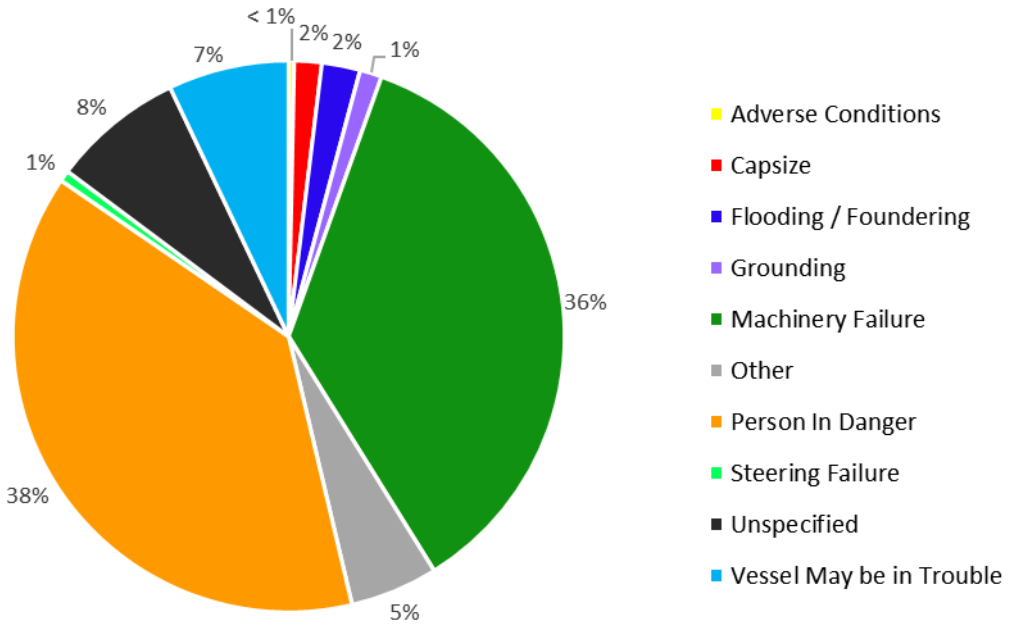

Figure 8.3 RNLI Incident Type Distribution (2010-2019)

Person in danger (38%) was the most frequently recoded incident type in the Shipping and Navigation Study Area, followed by machinery failure (36%). After incidents involving a person in danger, the most common vessel types involved in incidents were recreational vessels (24%), fishing vessels (17%), with other non-vessel-based incidents (such as animals in danger or debris in the sea) accounting for a further 11% of callouts.

11 incidents took place within the Marine Scheme, with majority close to the Landfall in English waters. The majority of RNLI responses within the Shipping and Navigation Study Area came from Blyth, Cullercoats and Newbiggin, in the vicinity of the Landfall.

8.3 Maritime Rescue Coordination Centres and Joint Rescue Coordination Centres

His Majesty's Coastguard (HMCG), a division of the MCA, is responsible for requesting and tasking SAR resources made available to other authorities and for coordinating the subsequent SAR operations (unless they fall within military jurisdiction).

The HMCG coordinates SAR operations through a network of 11 Maritime Rescue Coordination Centres (MRCC), including a Joint Rescue Coordination Centre (JRCC) based in Hampshire.

All of the MCA's operations, including SAR, are divided into 18 geographical regions. Area 4 – "*Inner Clyde to River Tay and East Scottish Border*" and Area 5 – *"North East England"* cover the area encompassing the proposed Offshore Export Cable Corridor. The closest MRCCs to the Offshore Export Cable Corridor are located at Aberdeen (54 nm to the north) and at Humber (78 nm to the south-east).

8.4 Marine Accident Investigation Branch

All UK flagged vessels and non-UK flagged vessels in UK territorial waters (12 nm), a UK port or carrying passengers to a UK port are required to report incidents to the MAIB. Data arising from these reports are assessed within this section, covering the ten-year period between 2010 and 2019.

Figure 8.4 presents all MAIB incidents recorded within the Shipping and Navigation Study Area between 2010 and 2019, colour-coded by incident type.

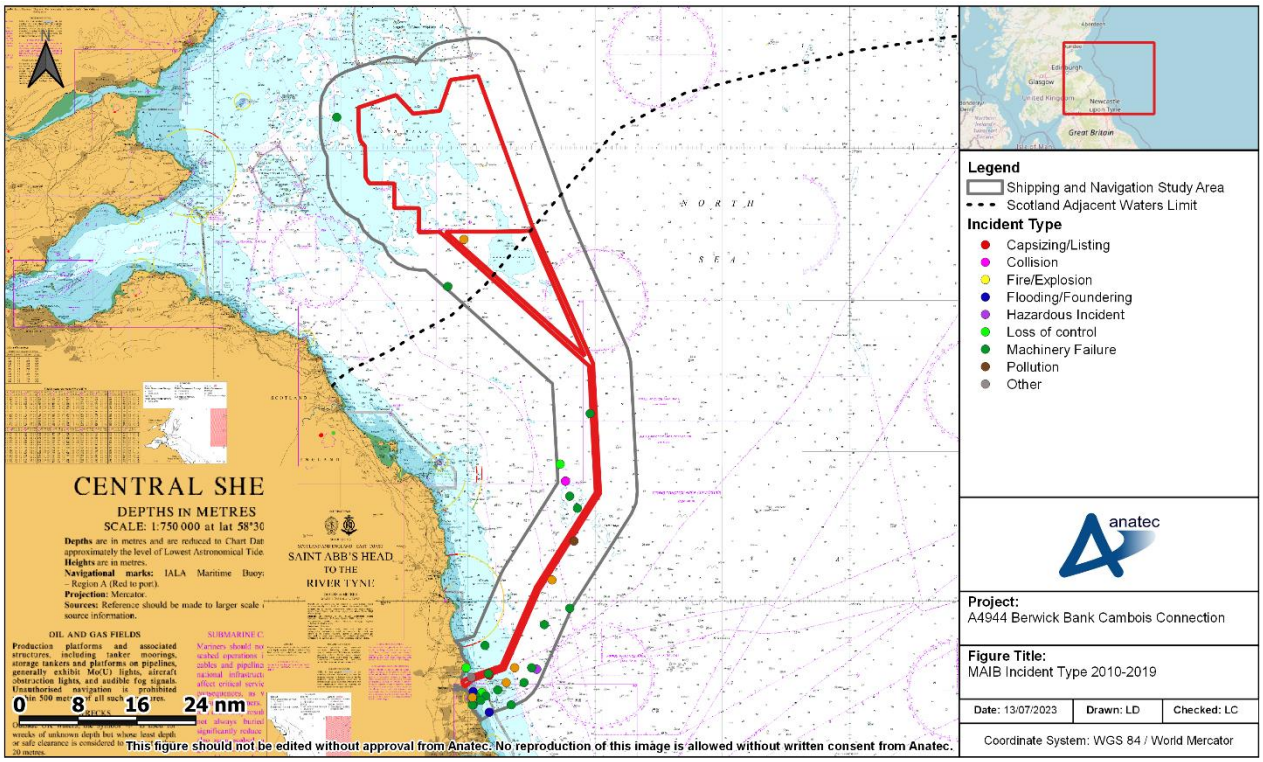

Figure 8.4 MAIB Incidents by Incident Type (2010-2019)

A total of 39 unique incidents were recorded within the Shipping and Navigation Study Area between 2010 and 2019, which corresponds to an average of approximately four per year. Incidents were mainly recorded close to shore. The distribution of all incidents by type is presented in Figure 8.5.

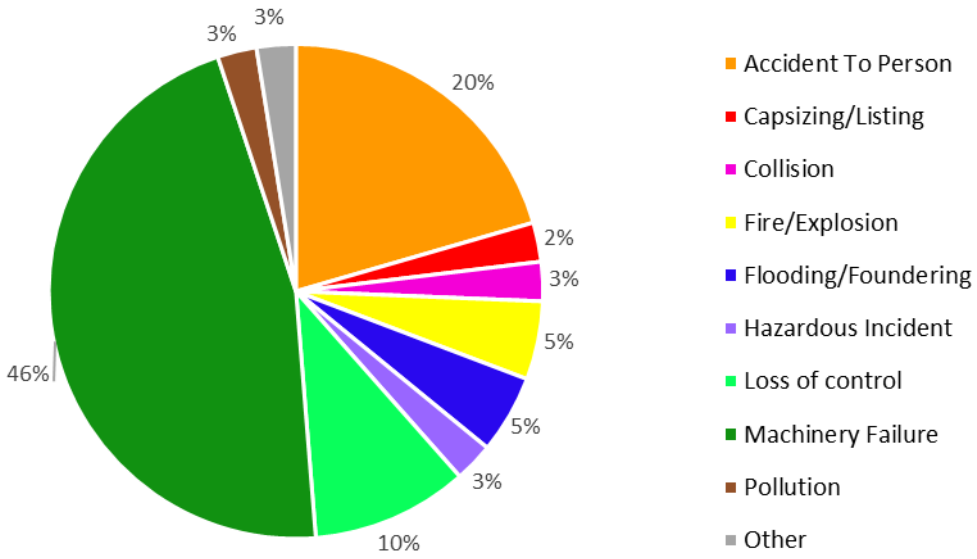

Figure 8.5 MAIB Incident Type Distribution (2010-2019)

The most frequently recorded incident types were machinery failure (46%) followed by accident to person (20%). Vessels frequently involved in maritime incidents were fishing vessels (54%) and 'other commercial' vessels (18%). Two incidents took place within the Marine Scheme, both within the Offshore Export Cable Corridor close to the Landfall. One incident involved a fishing vessel suffering machinery failure and one was an 'other' incident. The 'other' incident was a minor contact between a SAR vessel and the quay during berthing, which did not result in significant damage. Incidents further offshore were typically machinery failures, with accidents to person and a pollution incident also recorded close to the Offshore Export Cable Corridor.

9 Vessel Traffic Movements

9.1 Introduction

This section presents an overview of vessel traffic movements within the Shipping and Navigation Study Area, identified from the six months AIS data, covering the following two periods:

- 1st November 2021 to 31st January 2022 (winter 2021/22 period)
- 1st May to 31st July 2022 (summer 2022 period)

A number of the vessel tracks recorded were classified as temporary (non-routine), such as the tracks of vessel undertaking surveys. These have therefore been excluded to ensure the analysis is not skewed and gives a fair representation of normal vessel traffic movements in the area.

9.2 Vessel Numbers

Figure 9.1 presents the number of vessels within the Shipping and Navigation Study Area and crossing the proposed Marine Scheme Boundary per month, based on unique vessels per day.

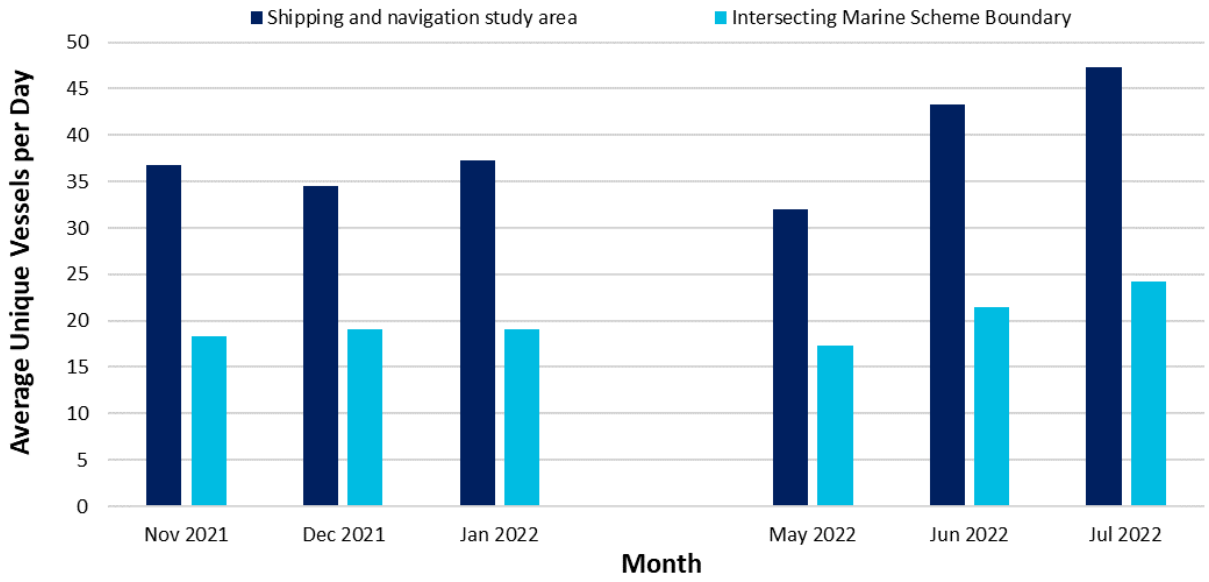

Figure 9.1 Average Daily Vessel Count per Month (Six Months)

There was an average of 38 unique vessels per day[11] within the Shipping and Navigation Study Area during the three month winter period and 41 per day during the three month summer period. July 2022 was the busiest month with an average of 47 unique vessels per day. During the three month winter period an average of 19 unique vessels per day crossed the proposed Offshore Export Cable Corridor, compared to an average of 21 unique vessels per day in summer.

[11] Vessels are only counted once per day in order to avoid over-counting of vessels due to exiting and re-entering the Shipping and Navigation Study Area or broken AIS tracks

The slight difference overall between summer and winter can be accounted for by the higher recreational vessel activity in the summer months.

9.3 Vessel Density

Figure 9.2 and Figure 9.3 presents the vessel density for all AIS vessel tracks during winter and summer, respectively, based on the number of tracks intersecting the cells of a 1 km x 1 km grid covering the Shipping and Navigation Study Area. The same vessel density colour ramps have been used in each figure in order to provide a comparison between the two periods.

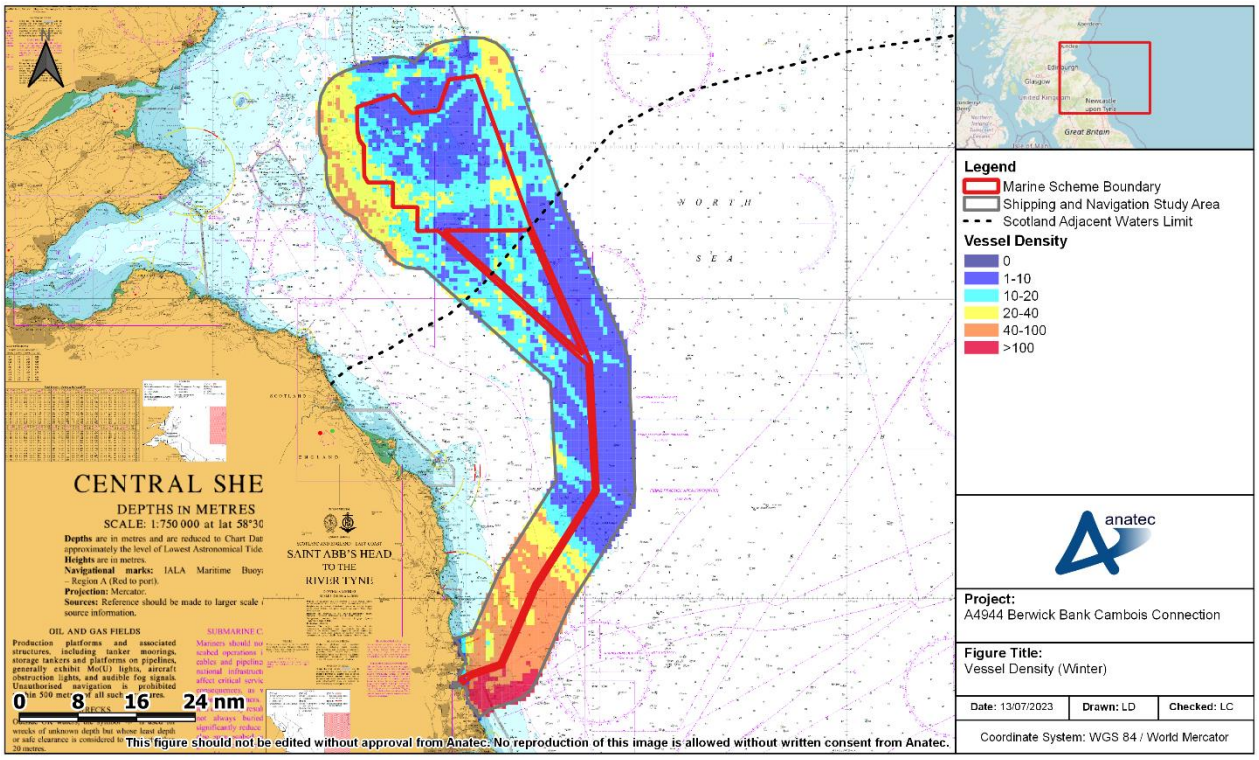

Figure 9.2 Vessel Density (Winter)

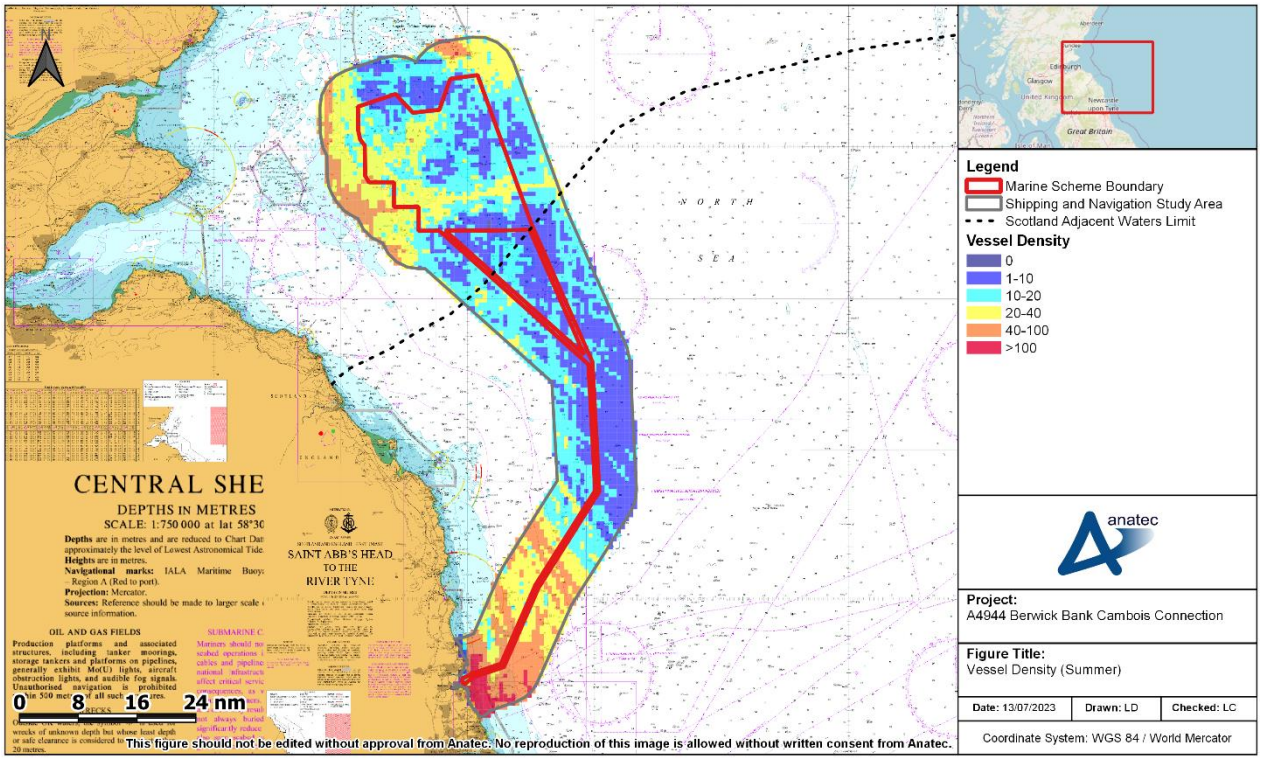

Figure 9.3 Vessel Density (Summer)

Within Scottish waters, the higher density areas are recorded to the west of the Marine Scheme boundary, associated with tankers and cargo vessels on north/south transits. Routes used by cargo vessels and tankers visiting Grangemouth and other ports within the Firth of Forth are also relatively high density. Further south, within English waters, higher density is again recorded where north/south routes used by cargo vessels and tankers cross the Marine Scheme Boundary close to Blyth. Nearshore fishing activity close to the Landfall also contributes to the high-density region near Blyth. Lower density areas can be seen further offshore, particularly in the eastern extent of the Marine Scheme in both Scottish and English waters. It is likely that the higher density close to the Landfall in winter is due to increased fishing activity. Further details on commercial fishing activity are provided in **Volume 2, Chapter 12: Commercial Fisheries**.

9.4 Vessel Type

Figure 9.4 and Figure 9.5 present the AIS tracks colour-coded by vessel type during the winter period and summer period, respectively. Following this, Figure 9.6 presents the vessel type distribution, based on unique vessels per day.

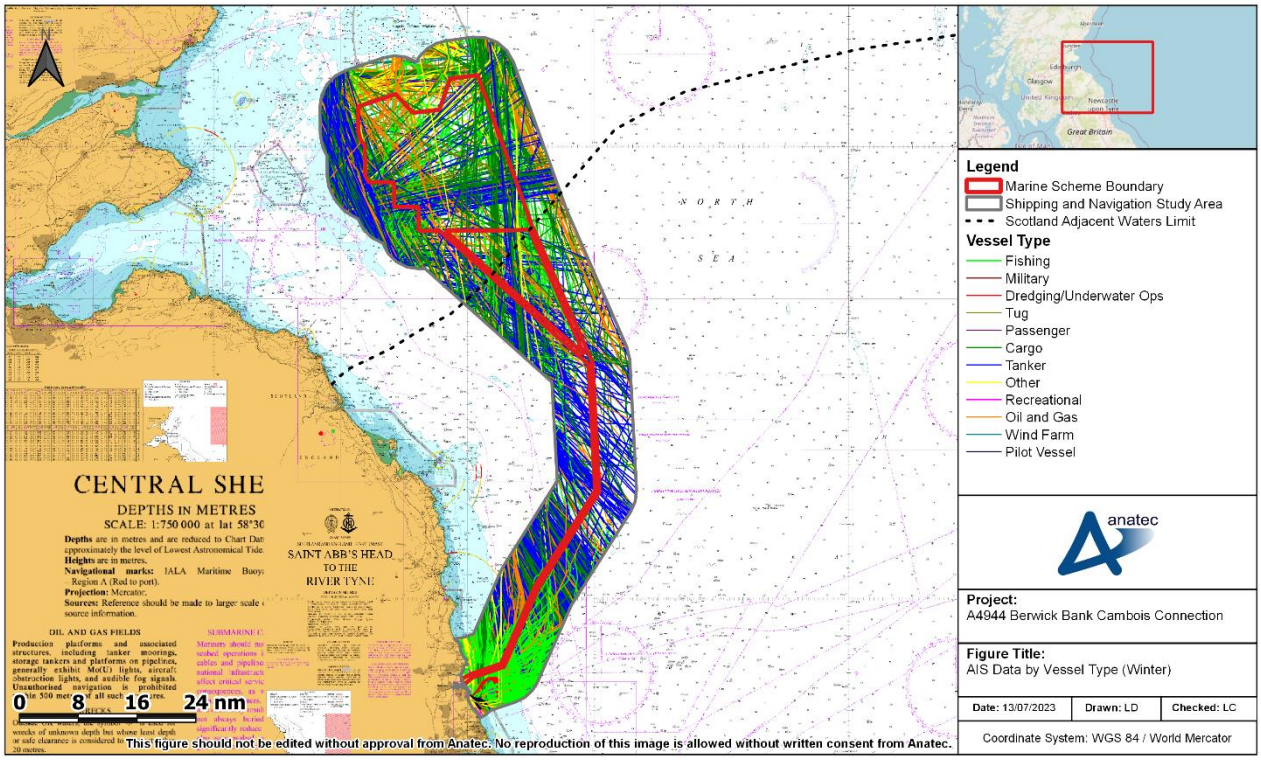

Figure 9.4 AIS Data by Vessel Type (Winter)

Cargo vessel and tanker routes to/from the Firth of Forth were observed throughout the Shipping and Navigation Study Area. Cargo vessels were recorded in a north/south direction transiting past Blyth. Fishing activity was observed close to the Landfall location.

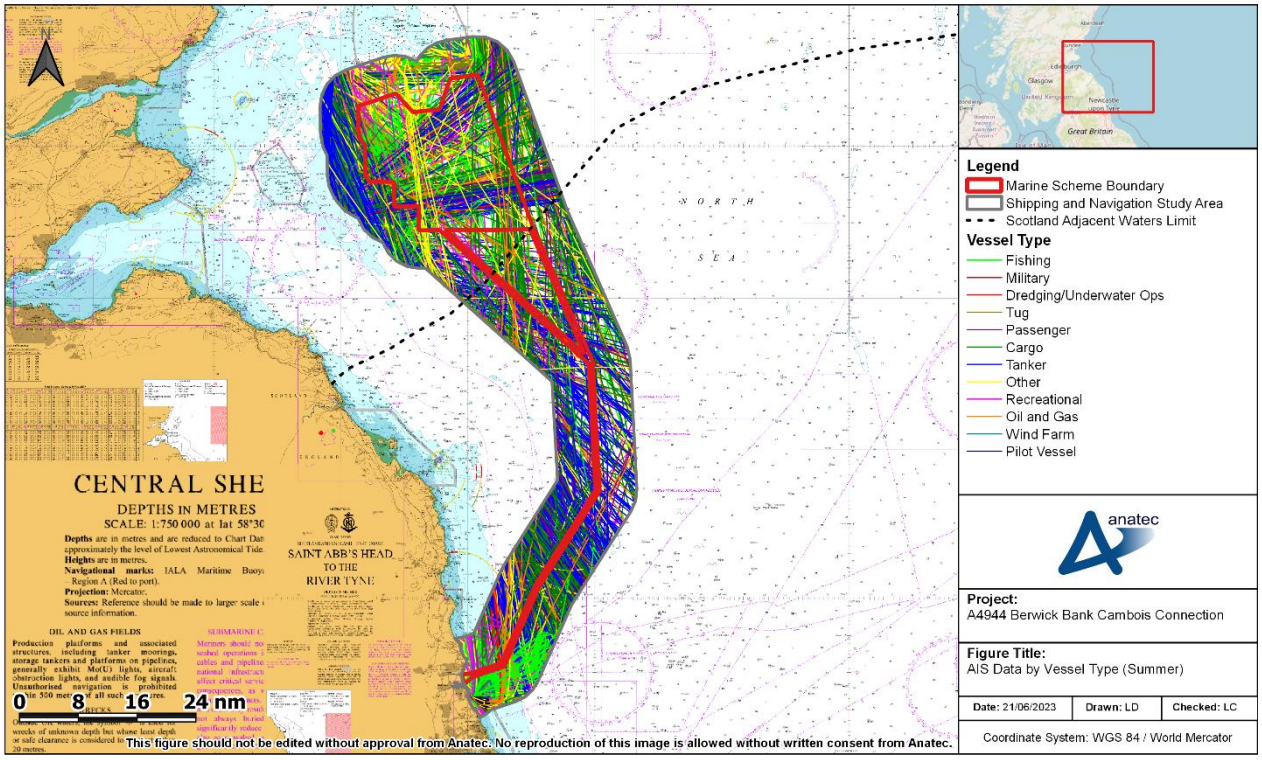

Figure 9.5 AIS Data by Vessel Type (Summer)

There were lower levels of fishing activity in summer than in winter, however during summer there was increased recreational activity recorded close to the Landfall. The commercial vessels followed similar patterns to the ones observed in winter. Common destinations for commercial vessels included Blyth, Grangemouth, Immingham and Aberdeen as well as mainland Europe such as Rotterdam, Netherlands and Antwerp, Belgium.

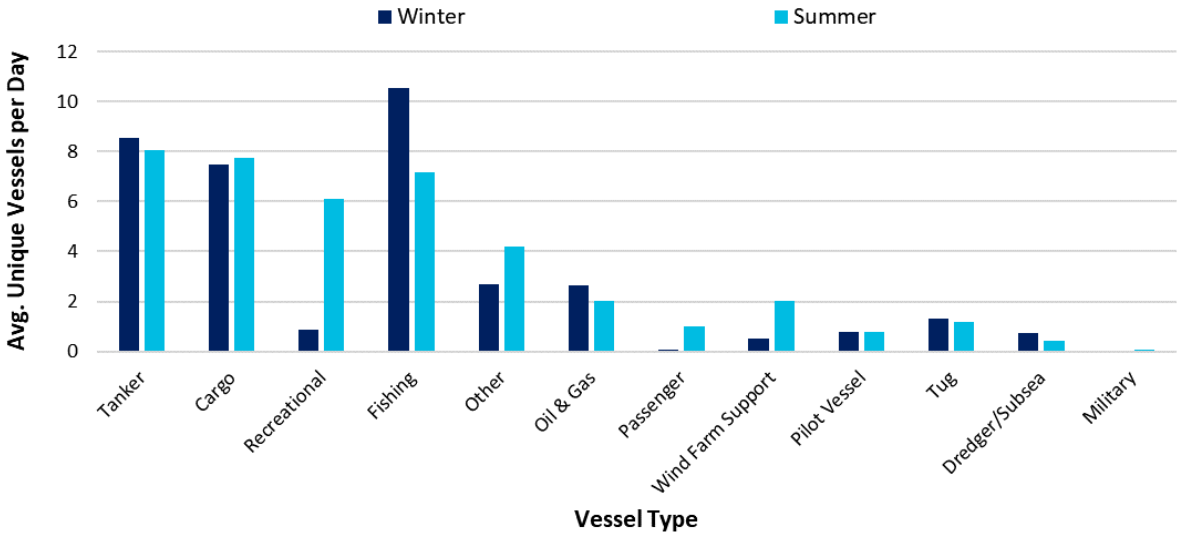

Figure 9.6 Vessel Type Distribution (Six Months)

The most common vessel type recorded within the Shipping and Navigation Study Area was fishing vessels which accounted for 23% of the overall distribution, followed by tankers (22%)

and cargo vessels (20%). These vessels were common in both Scottish and English waters. The remainder of the traffic included recreational vessels, pilot vessels, dredgers and tugs. Dredgers were mostly recorded in the vicinity of Blyth in English waters, however were also recorded in the north of the Shipping and Navigation Study Area in Scottish waters. Vessels in the 'other' category included RNLI lifeboats, buoy laying vessels, research vessels, etc.

It is again noted that recreational craft and small fishing vessels less than 15 m in length will be under-represented due to AIS carriage requirements. In addition there may be some loss of coverage further offshore, especially in the winter period, due to the range from the AIS receivers.

9.4.1 Cargo Vessels and Tankers

The tracks of cargo vessels and tankers recorded in the Shipping and Navigation Study Area are presented in Figure 9.7 to provide a clearer visual of the positions of these vessels.

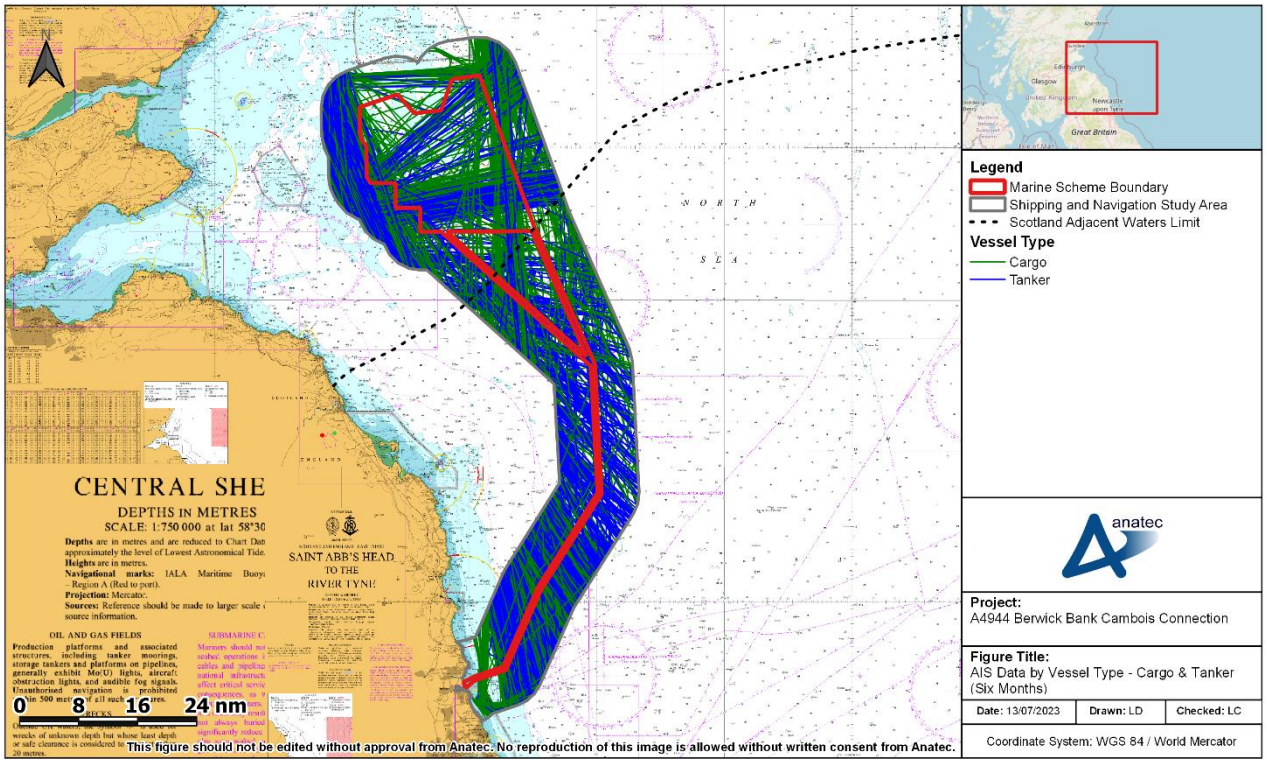

Figure 9.7 AIS Data by Vessel Type - Cargo & Tanker (Six Months)

It can be seen that cargo vessels and tankers were transiting throughout the entire Shipping and Navigation Study Area, with the exception of very shallow waters nearshore. An average of seven to eight cargo vessels per day and eight tankers per day were recorded during the six month period. A high volume of cargo and tanker traffic in the Shipping and Navigation Study Area was observed particularly transiting north/south past Blyth to destinations including Aberdeen, Grangemouth, Immingham, as well as mainland European destinations such as Rotterdam, Netherlands and Antwerp, Belgium. Cargo vessels and tankers was also seen within the north of the Shipping and Navigation Study Area travelling to/from the Firth of Forth, with routes

recorded passing through the BBWF Array Area. Vessels visiting the Forth Ports also cross the Marine Scheme further south, within English waters.

9.4.2 Fishing Vessels

This section presents analysis of fishing vessel activity within the Shipping and Navigation Study Area.

Given AIS carriage requirements, it is likely that smaller fishing vessels (those under 15 m in length) are under-represented on AIS. Therefore Vessel Monitoring System (VMS) data has been reviewed and consultation undertaken to supplement AIS coverage of fishing activity. Under-representation is particularly likely within the 6 nm fisheries limit, with it noted during consultation with the Port of Blyth that approximately 33 fishing vessels are based at Blyth, with a minority of these on AIS.

9.4.2.1 AIS Analysis

Figure 9.8 presents the fishing vessel count per month throughout the study period.

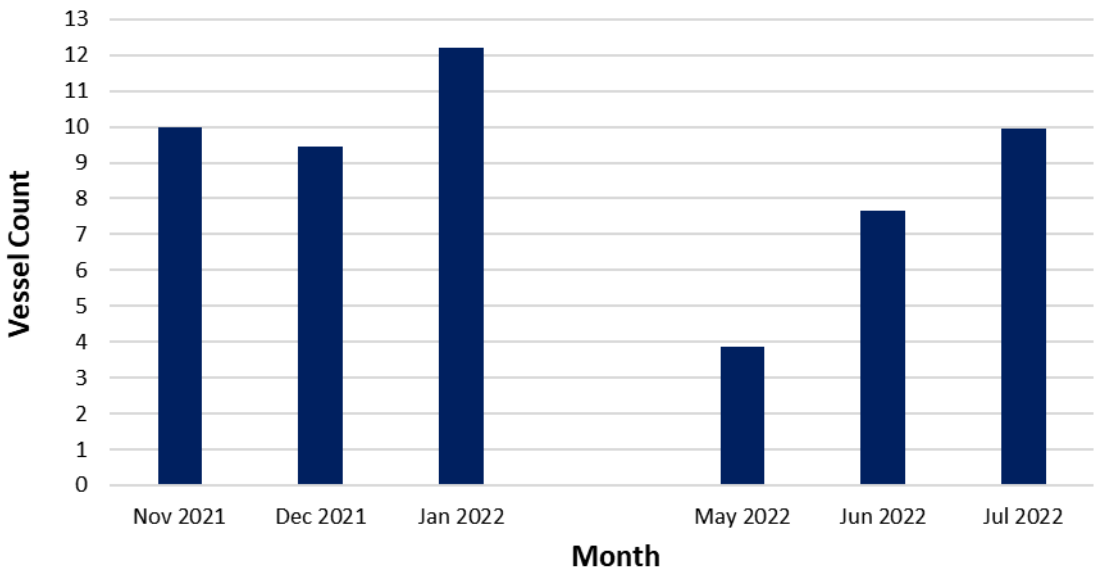

Figure 9.8 Unique Fishing Vessel Count per Month

An average of 11 fishing vessels per day was recorded in winter, compared to 7 per day in summer. The busiest month was January 2022 with an average of 12 unique vessels per day. The quietest month was May 2022 with an average of four unique vessels per day.

Figure 9.9 presents the AIS fishing tracks recorded in the Shipping and Navigation Study Area, colour-coded by gear type. Following this, Figure 9.10 presents the gear type distribution based on unique vessels per day. Gear type information is not included in the AIS data and has been researched separately using Anatec's in-house databases. It is again noted that fishing vessels under 15 m will be under-represented in the AIS data.

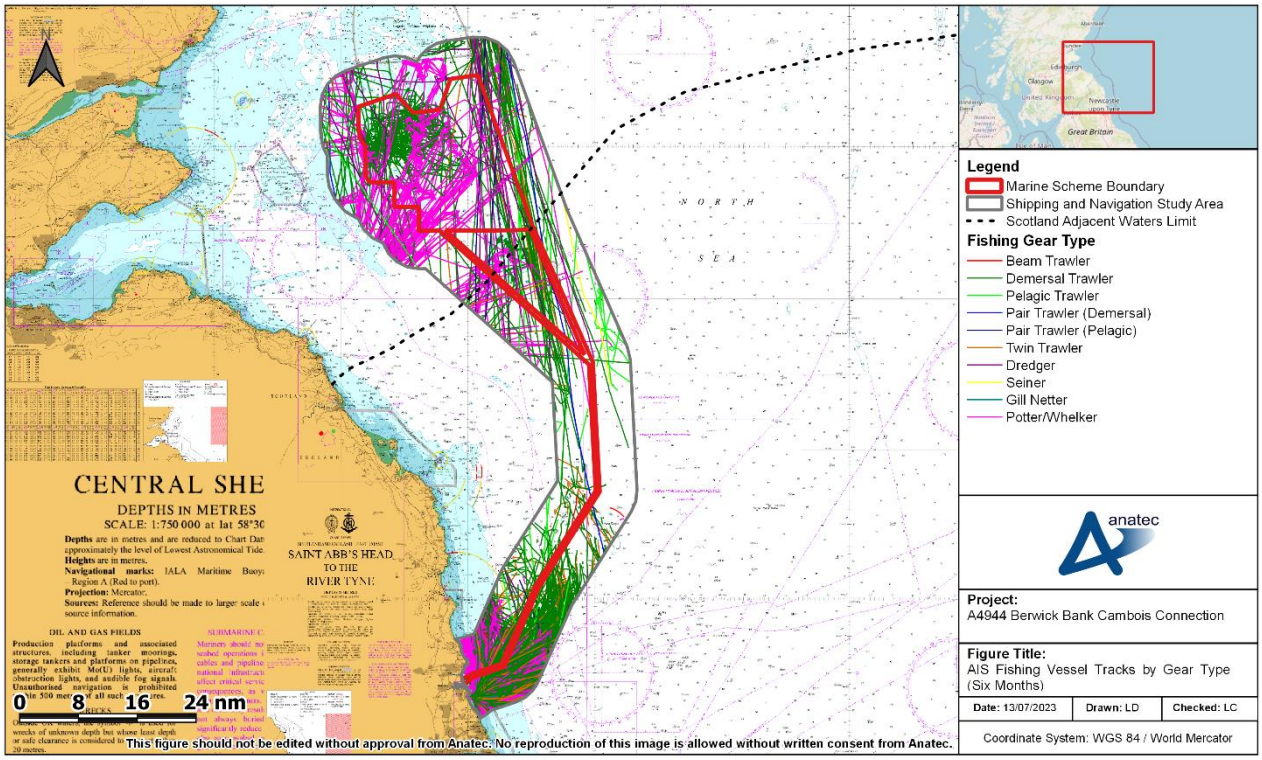

Figure 9.9 AIS Fishing Vessel Tracks by Gear Type (Six Months)

It can be seen that high levels of fishing activity were recorded throughout the south of the Shipping and Navigation Study Area, largely by demersal (otter) trawlers. Potters / whelkers accounted for the majority of the fishing activity recorded in the north of the Shipping and Navigation Study Area.

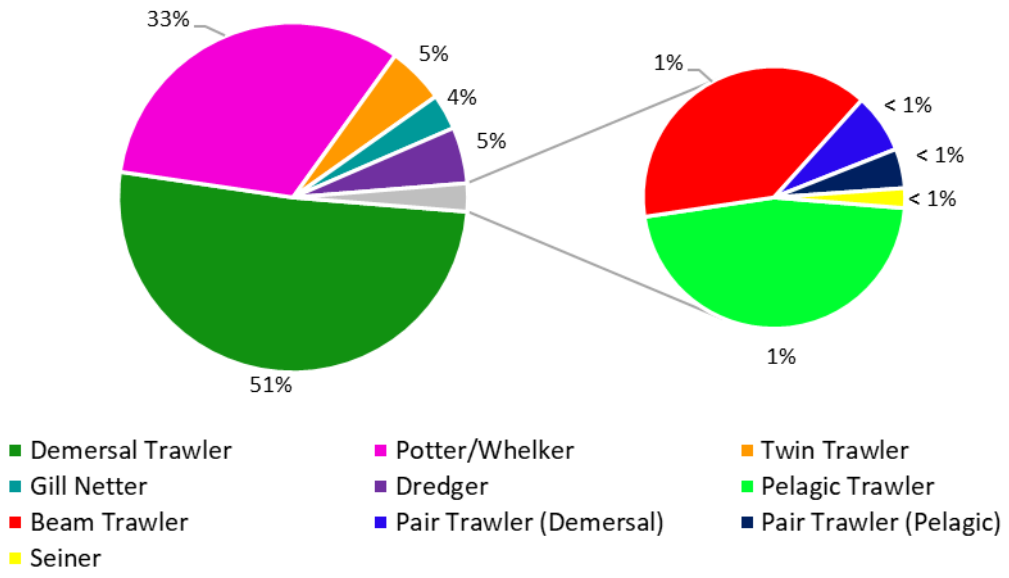

Figure 9.10 Fishing Gear Type Distribution

The most frequently recorded gear type in the Shipping and Navigation Study Area was demersal trawler (51%), followed by potter / whelker (33%). This is in agreement with the baseline environment presented in **Volume 2, Chapter 12: Commercial Fisheries**, which reports that the main fishing types in Scottish Waters are scallop dredging, lobster/crab creeling and demersal trawling, while in English waters the main types are demersal *Nephrops* trawling, lobster/crab potting and scallop dredging.

The average fishing vessel length recorded in winter was 17.7 m, and 14.7 m in summer. The longest vessel recorded was a 119 m pelagic trawler. Approximately 49% of vessels with known length were less than 15 m in length and hence carrying AIS voluntarily. It is again noted that vessels less than 15 m are likely under-represented, particularly within territorial waters.

Over 99% of the vessels recorded during the six month period were UK registered fishing vessels. German, Polish and Danish vessels each accounted for less than 1%.

The average fishing vessel speed recorded in the area was 4.9 knots in winter and summer. Overall, 69% of vessel speeds were below six knots. Vessels with average speeds less than six knots generally are more likely to be engaged in fishing activities whilst those with higher speeds (i.e. greater than six knots) are likely transiting through the area. Vessels engaged in fishing activities will be more greatly impacted by the cable construction works than those transiting through the area.

Figure 9.11 presents the AIS fishing tracks recorded by vessels with demersal gear in the Shipping and Navigation Study Area considered to be potentially actively fishing.

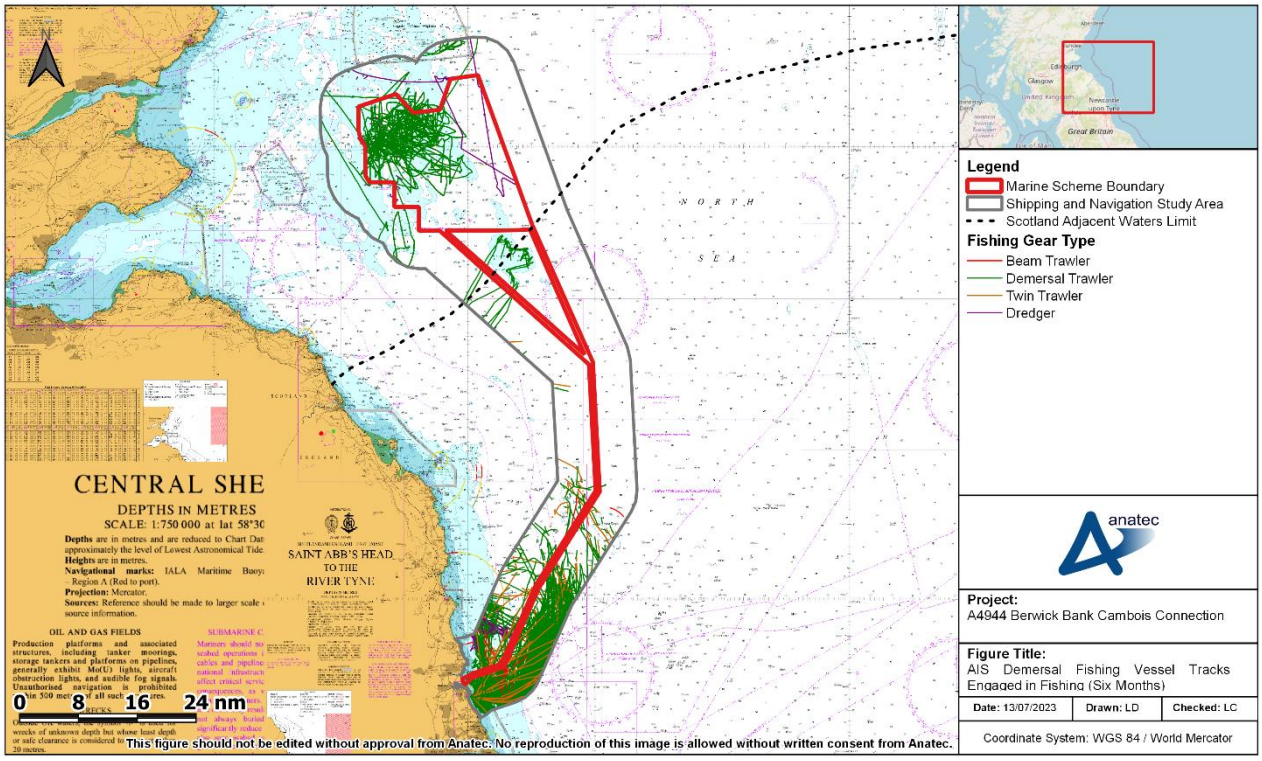

Figure 9.11 AIS Demersal Fishing Vessel Tracks Engaged in Fishing (Six Months)

The majority of demersal fishing activity was carried out by demersal trawlers in the south of the Shipping and Navigation Study Area, particularly close to the Offshore Export Cable Corridor Landfall at Blyth. Low levels of demersal fishing were observed in the north of the Shipping and Navigation Study Area, including within the BBWF Array Area. Based on unique vessels per day, demersal fishing activity accounted for approximately 43% of fishing vessels present within the area.

9.4.2.2 VMS Analysis

The VMS satellite tracking data was obtained from the MMO in the form of a density grid. Vessel positions within VMS data are received approximately once every 1 to 2 hours for vessels of 15 m in length and above. It is noted that fishing vessels reporting their positions on VMS may be transiting or carrying out guard duties, so the data is not exclusively representative of active fishing.

Figure 9.12 and Figure 9.13 present a plot of the fishing vessel density in 2019 and 2020, respectively.

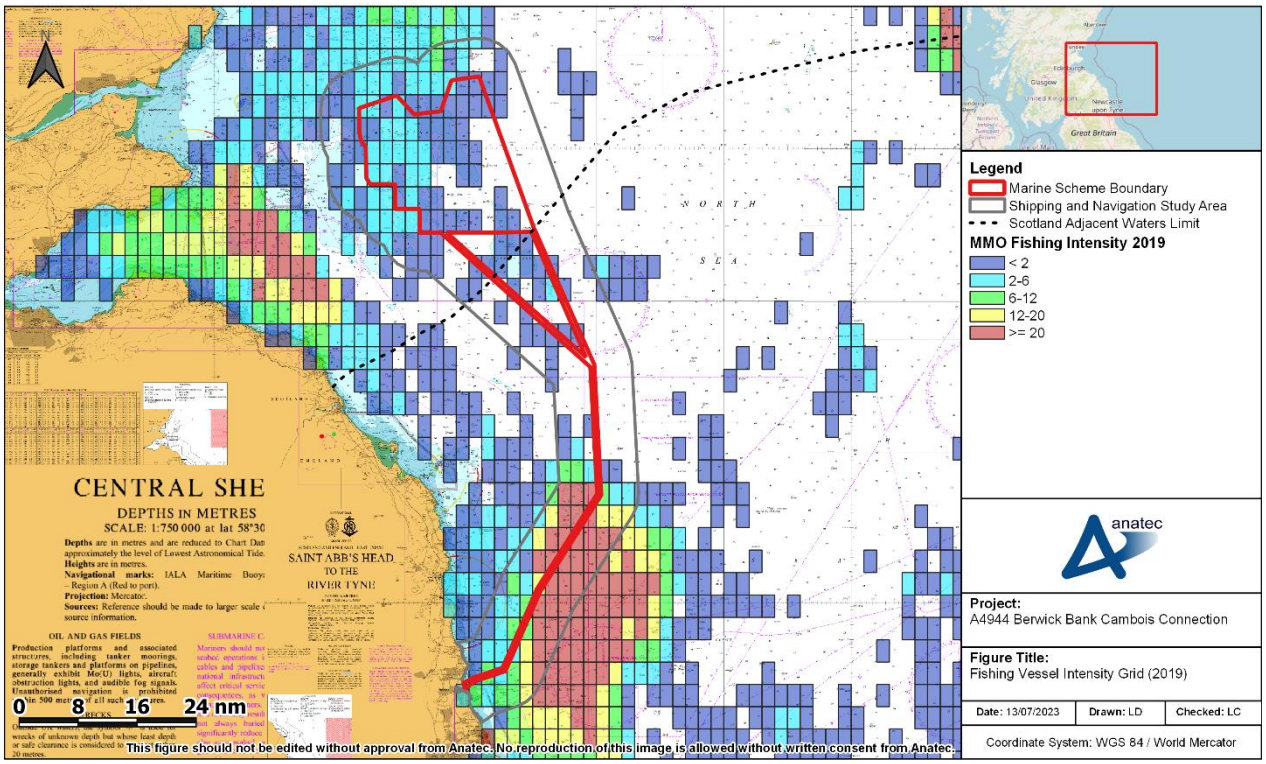

Figure 9.12 Fishing Vessel Intensity Grid (2019)

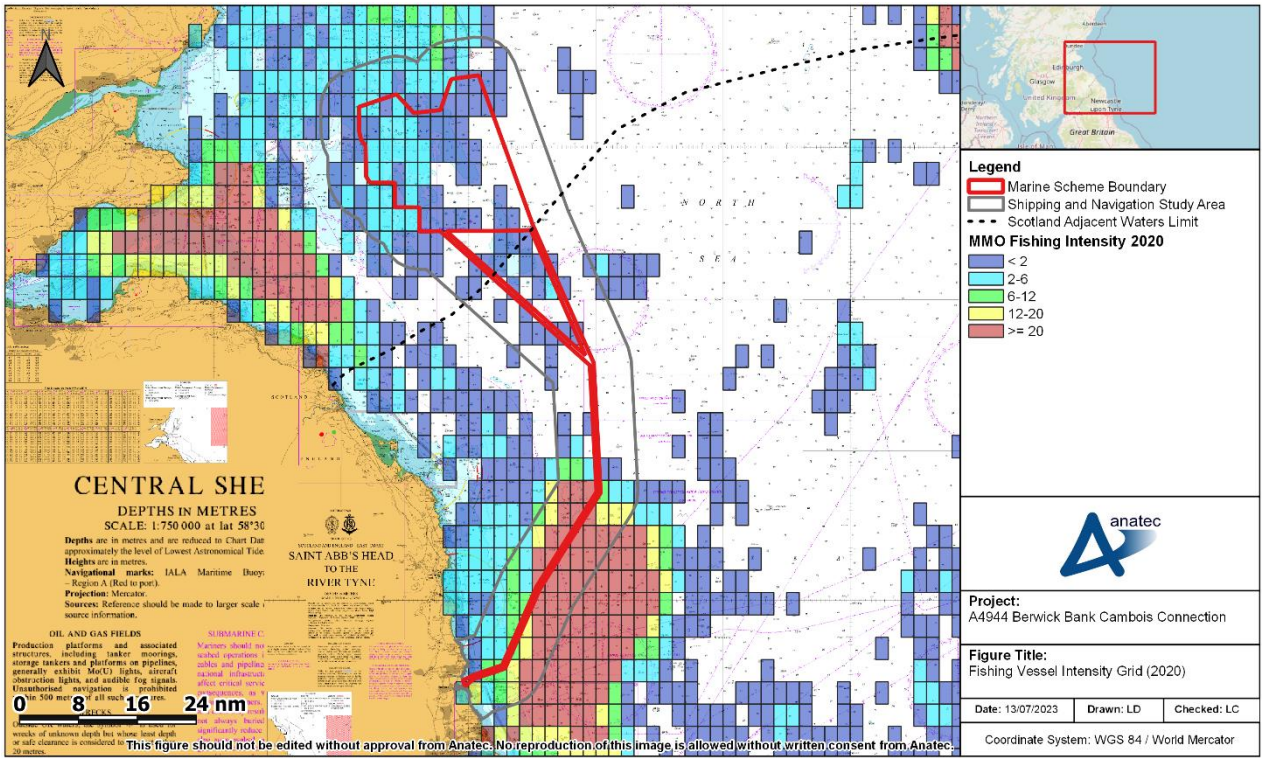

Figure 9.13 Fishing Vessel Intensity Grid (2020)

It can be seen that the figures above correlate well with the AIS data (see Figure 9.9) in terms of overall fishing activity over the six month period, with the main area of fishing activity observed in the south of the cable corridor approximately 8 nm from the Landfall. Very low levels of activity were recorded within the north of the Shipping and Navigation Study Area.

9.4.2.3 Fishing Vessel Sightings

In addition to AIS and VMS data, anonymised fishing vessel sightings data from the NIFCA was provided, offering supplementary data for all fishing vessels within line of sight, regardless of size. The data is recorded by a number of fisheries patrol vessels in the area between 2012 and 2021, and is presented in Figure 9.14.

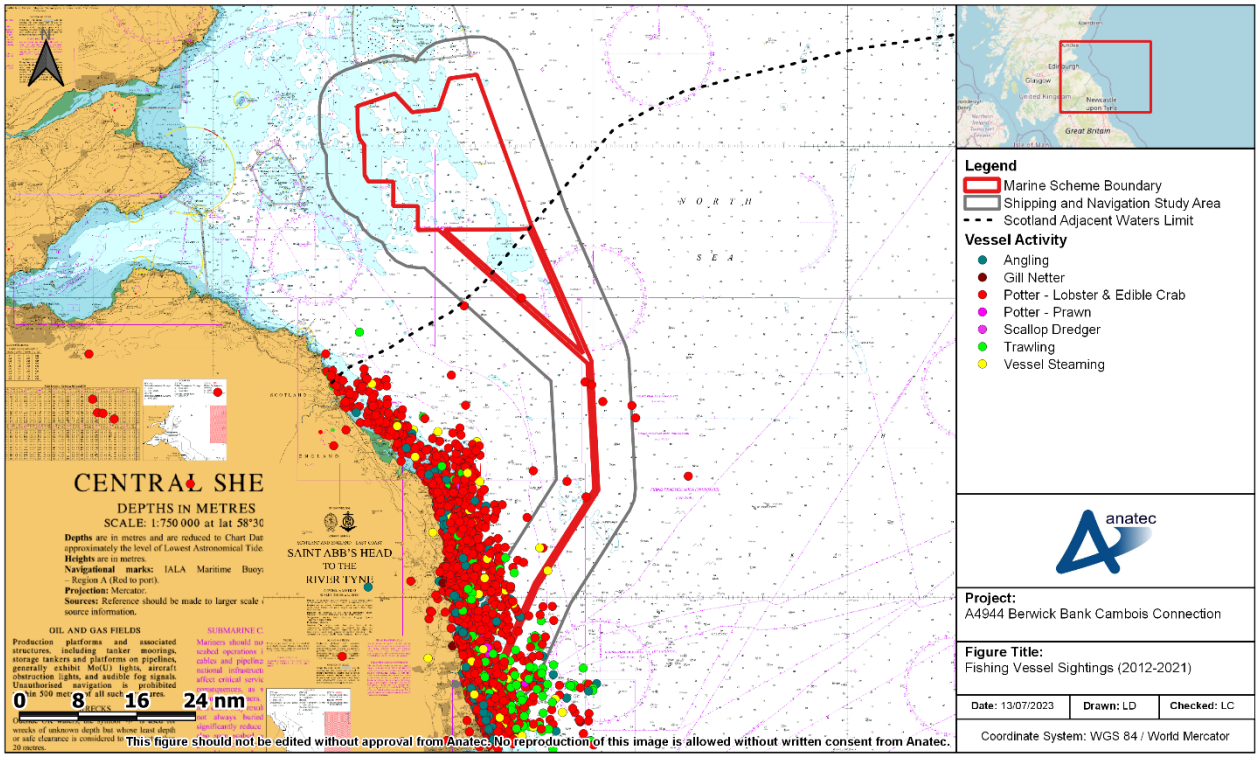

Figure 9.14 Fishing Vessel Sightings (2012 – 2021)

The sightings data reveals that the majority of fishing in the inshore area were of potters fishing for lobster and edible crab. Trawling was also frequently recorded, particularly in the south of the Shipping and Navigation Study Area, south of the Offshore Export Cable Landfall at Blyth. Between 2012 and 2021, 25 sightings were reported within the Marine Scheme Boundary, with 18 of these being lobster/crab potting, 4 trawlers and 3 recreational angling boats. The sightings data is primarily concentrated along the shore, with 95% of the sighting recorded within 6 nm of land, and only 1% further than 12 nm offshore.

9.4.3 Recreational Vessels

9.4.3.1 AIS Data

Figure 9.15 presents the AIS tracks of all recreational vessels recorded on AIS within the Shipping and Navigation Study Area, colour-coded by vessel length. It is noted that recreational activity is likely to be under-represented as recreational craft are not required to broadcast on AIS.

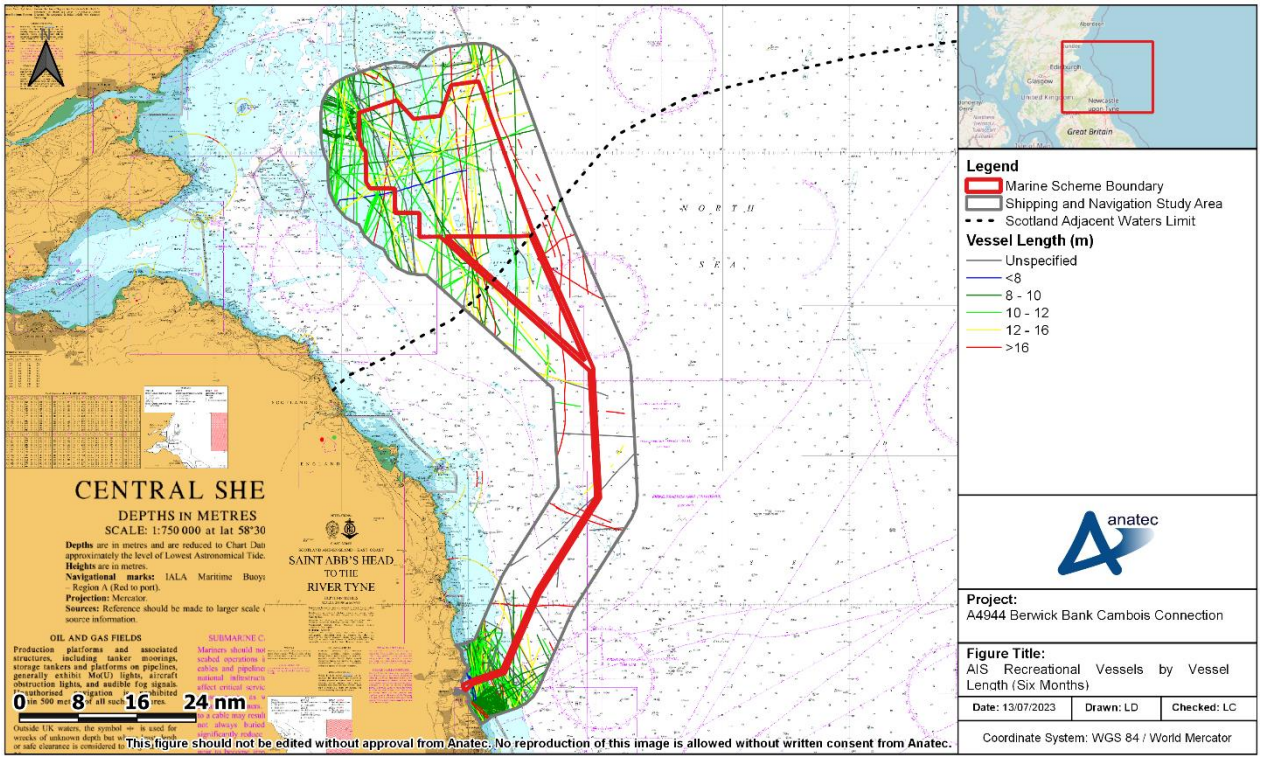

Figure 9.15 AIS Recreational Vessels by Vessel Length (Six Months)

Excluding vessels with unspecified lengths, the average length of recreational vessels within the Shipping and Navigation Study Area was 11.3 m. The majority of recreational traffic was recorded in proximity to the coast, with vessels recorded transiting to/from Blyth Harbour, as well as vessels transiting north/south within the Shipping and Navigation Study Area. These north/south routes cross the Marine Scheme generally within English waters, with some vessels also recorded on the western edge of the Marine Scheme in Scottish Waters. A significant number of recreational vessels were recorded within the north of the Shipping and Navigation Study Area, within the part of the Marine Scheme which overlaps the BBWF array area in Scottish waters.

Figure 9.16 presents the number of unique recreational vessels recorded in the Shipping and Navigation Study Area per day for each month of the study period.

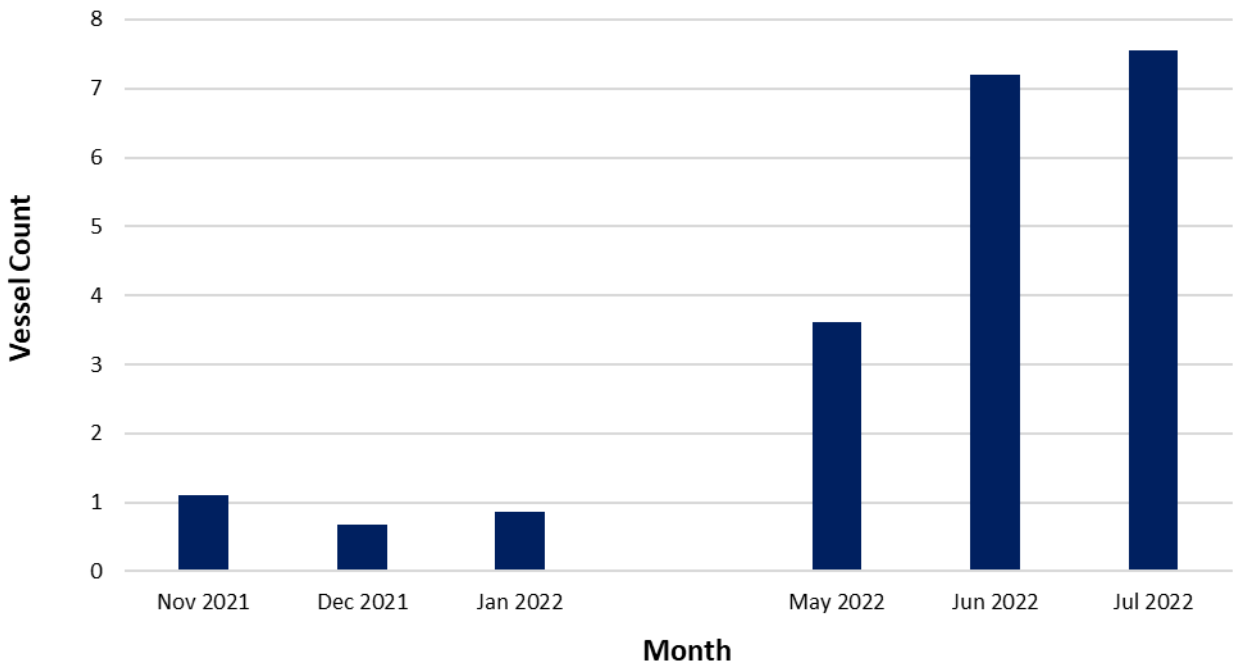

Figure 9.16 Daily Recreational Vessel Count per Month

There was an average of one unique vessel per day recorded over the winter period and an average of six vessels per day during the summer period. The busiest month was July with an average of seven to eight unique vessels per day.

A notable proportion of the recreational traffic was associated with the Port of Blyth, with vessels recorded going in and out of the harbour. The Royal Northumberland Yacht Club is located at Blyth South Harbour, and can be seen in Figure 9.17. Other sailing clubs in the area include the Coquet Yacht Club at Amble Marina, located 10.8 nm north of the cable corridor Landfall and the Sunderland Yacht Club located 14 nm south of the cable corridor Landfall.

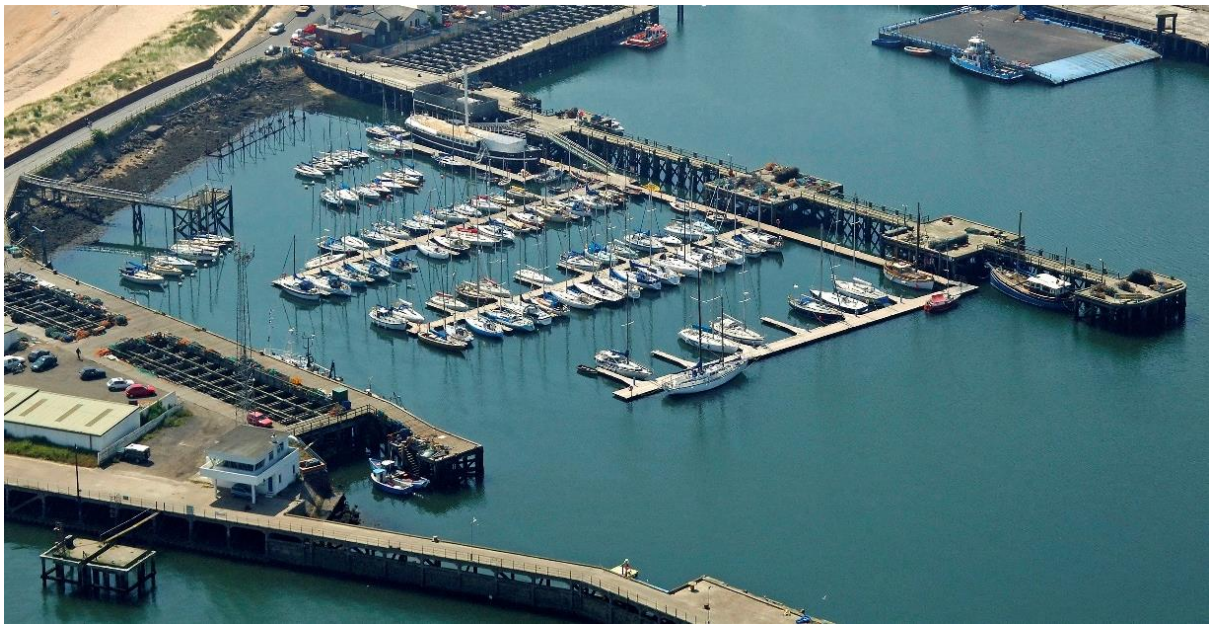

Figure 9.17 Royal Northumberland Yacht Club

9.4.3.2 RYA Coastal Atlas

The RYA Coastal Atlas may be used to "help identify and protect areas of importance to recreational boaters, to advise on new development proposals and in discussions over navigational safety" (Ref. xx). The RYA Coastal Atlas includes a heat map indicating the density of recreational activity around the UK coast.

Figure 9.18 presents a plot of the RYA Coastal Atlas heat map relative to the Marine Scheme Boundary. It is noted that the RYA Coastal Atlas heat map is based on AIS data, so may not comprehensively represent the movements of recreational vessels which are not under obligation to carry AIS.

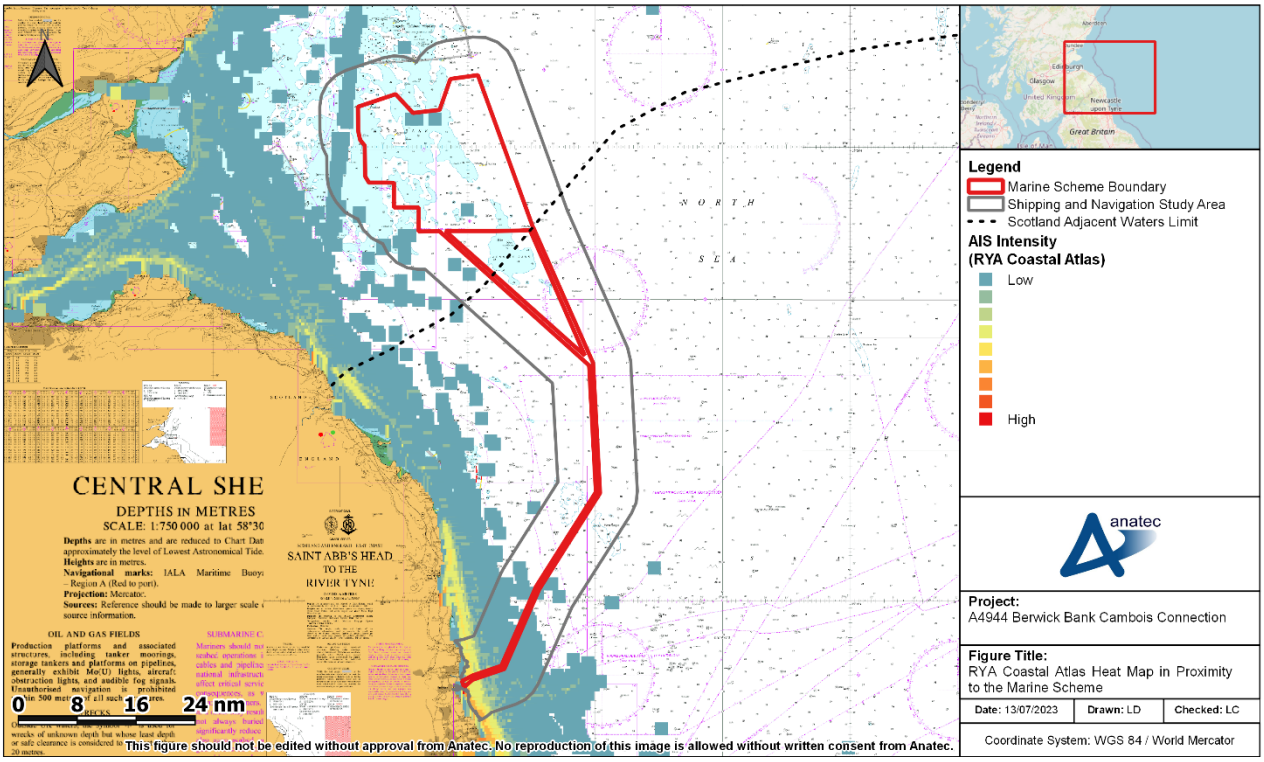

Figure 9.18 RYA Coastal Atlas Heat Map in Proximity to the Marine Scheme

The RYA Coastal Atlas shows that there is a generally low level of recreational activity along the section of coastline close to the proposed Offshore Export Cable Corridor, with higher levels of activity concentrated at the ports and harbours in the area. There is a higher level of recreational activity close to the cable Landfall north of Blyth in English waters. RYA recreational facilities in proximity to the Marine Scheme are presented in Figure 9.19.

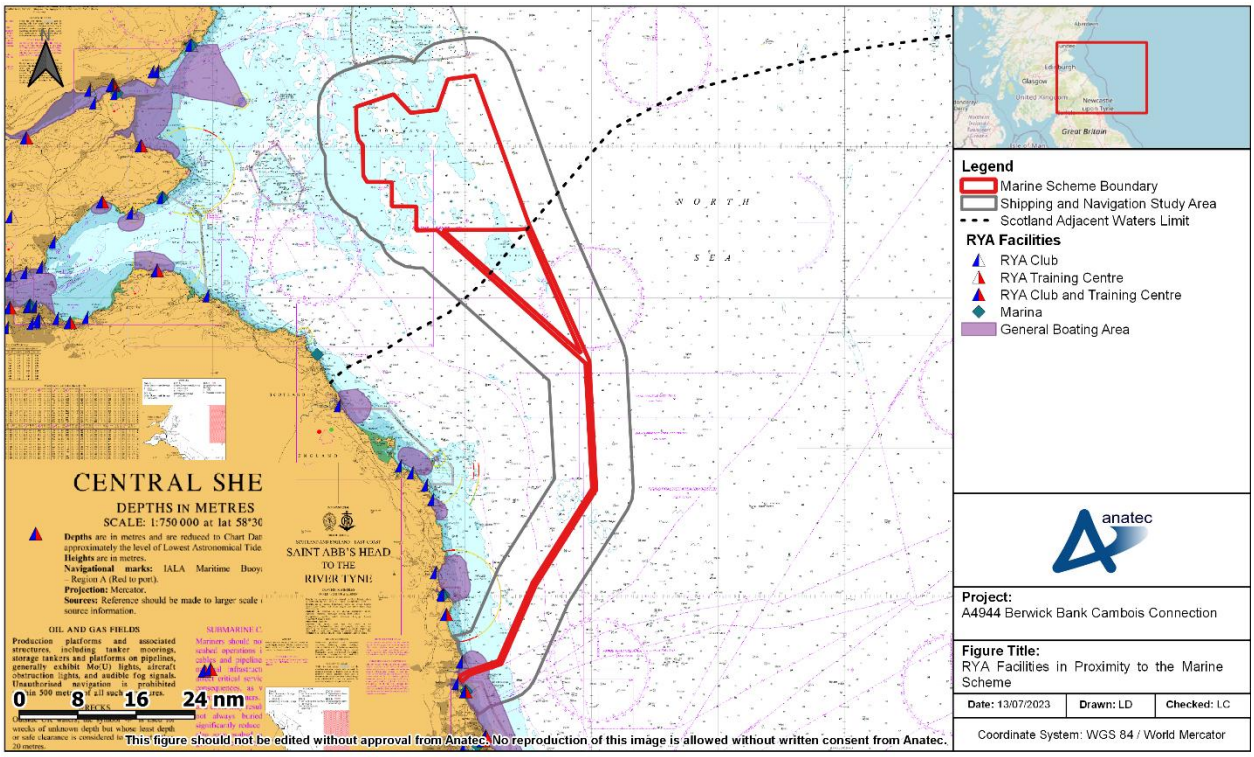

Figure 9.19 RYA Facilities in Proximity to the Marine Scheme

There are RYA facilities including both clubs and training centres along the coast, along the length of the Marine Scheme. There are also a number of marinas in the area, including two within the Shipping and Navigation Study Area at Blyth. There are three RYA clubs within the Shipping and Navigation Study Area, one of which also houses an RYA training centre. Two of these are located at Blyth, with a further RYA club located at Newbiggin-by-the-Sea, 1.4 nm north of the Offshore Export Cable Landfall.

Consultation with recreational user groups indicated that quite a few recreational craft on east coast trips would cross over the Marine Scheme. Most recreational craft on north-south transits are expected to pass slightly inshore of the BBWF array area section of the Marine Scheme in Scottish waters. Recreational vessels may therefore cross the Marine Scheme boundary within English waters close to the Landfall, as recreational vessels tend to stay close to shore. Some vessels were noted to transit to/from the Firth of Forth across the North Sea in Scottish waters, but in limited numbers.

9.4.4 Anchored Vessels

Figure 9.20 presents the tracks of vessels deemed to be at anchor within the Shipping and Navigation Study Area close to shore, over the entire six month study period. Vessels deemed to be at anchor were identified via a combination of navigation status, speed and behaviour. Following this, Figure 9.21 presents a detailed overview of anchored vessels within the Shipping and Navigation Study Area further offshore.

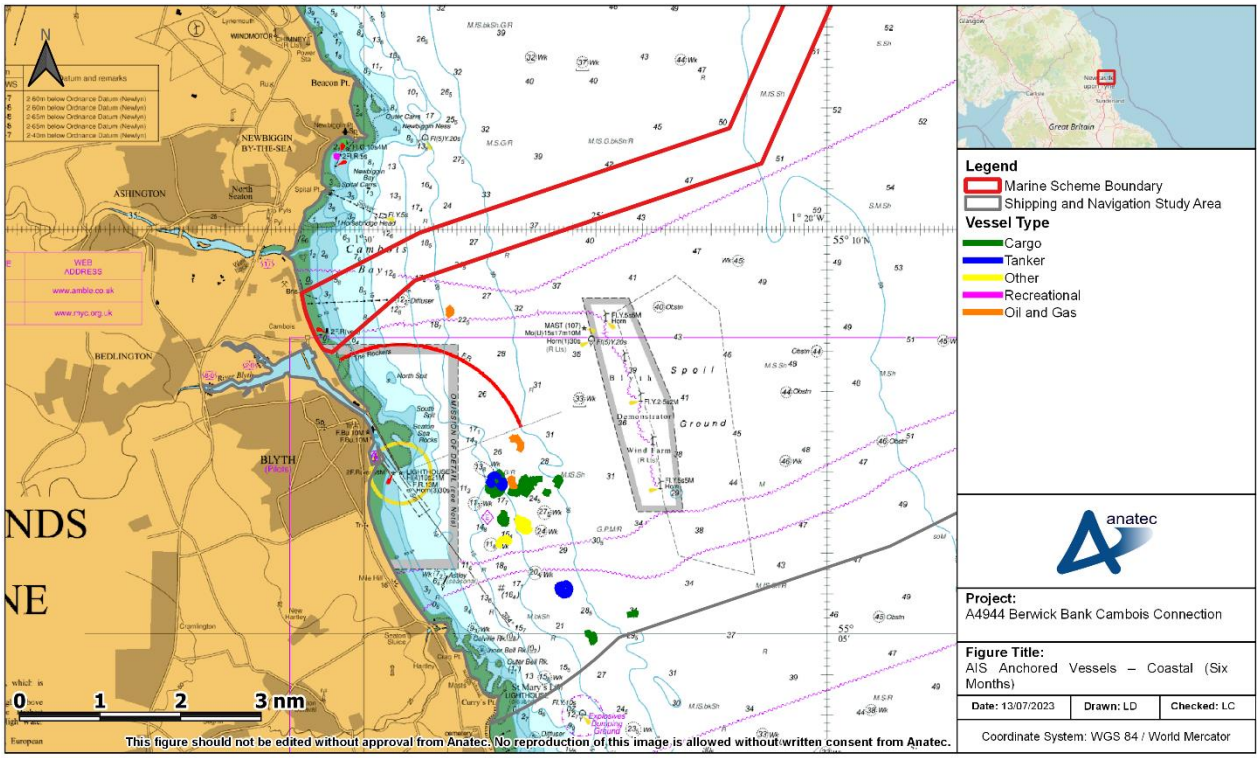

Figure 9.20 AIS Anchored Vessels – Coastal (Six Months)

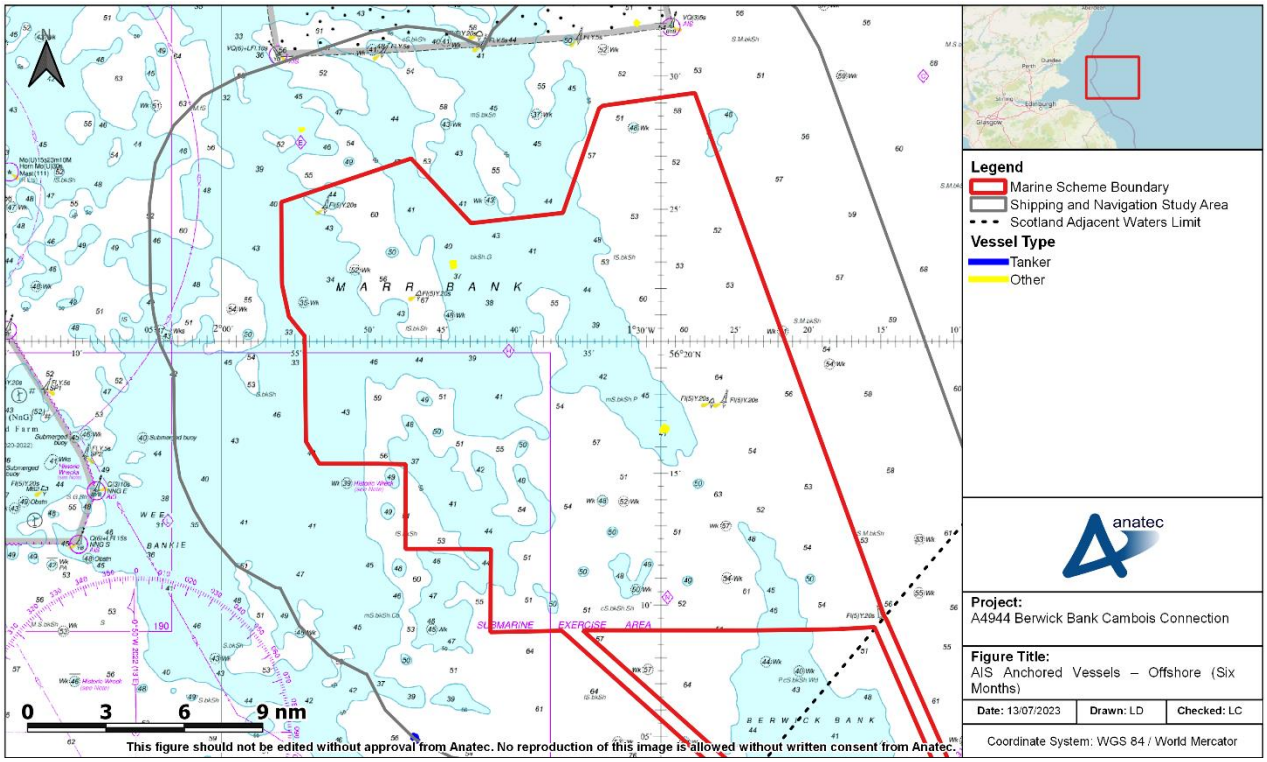

Figure 9.21 AIS Anchored Vessels – Offshore (Six Months)

It can be seen that the majority of anchored vessels recorded in the Shipping and Navigation Study Area were associated with the charted anchorage area close to the Port of Blyth in English

waters, although a few vessels were noted to anchor in the BBWF array area section of the Marine Scheme in Scottish waters. The majority of anchored vessels were cargo vessels (45%), 'other' vessels (23%), tankers (13%) and oil & gas vessels (11%). Consultation with the Port of Blyth indicated that usually only a few vessels per month are recorded at anchor and that only vessels with draughts exceeding 6.5 m – 7.0 m are required to wait on tide. These vessels were generally recorded at anchor close to shore at Blyth, to the south of the Marine Scheme Landfall in English waters. Based on the vessel traffic data, there were 26 anchoring events in six months, with some vessels remaining at anchor over several days.

9.5 Vessel Sizes

9.5.1 Vessel Length

Figure 9.22 presents the AIS vessel tracks recorded in the Shipping and Navigation Study Area, colour-coded by vessel length. The vessel length distribution (excluding 7% unspecified) is then presented in Figure 9.23, based on unique vessels per day.

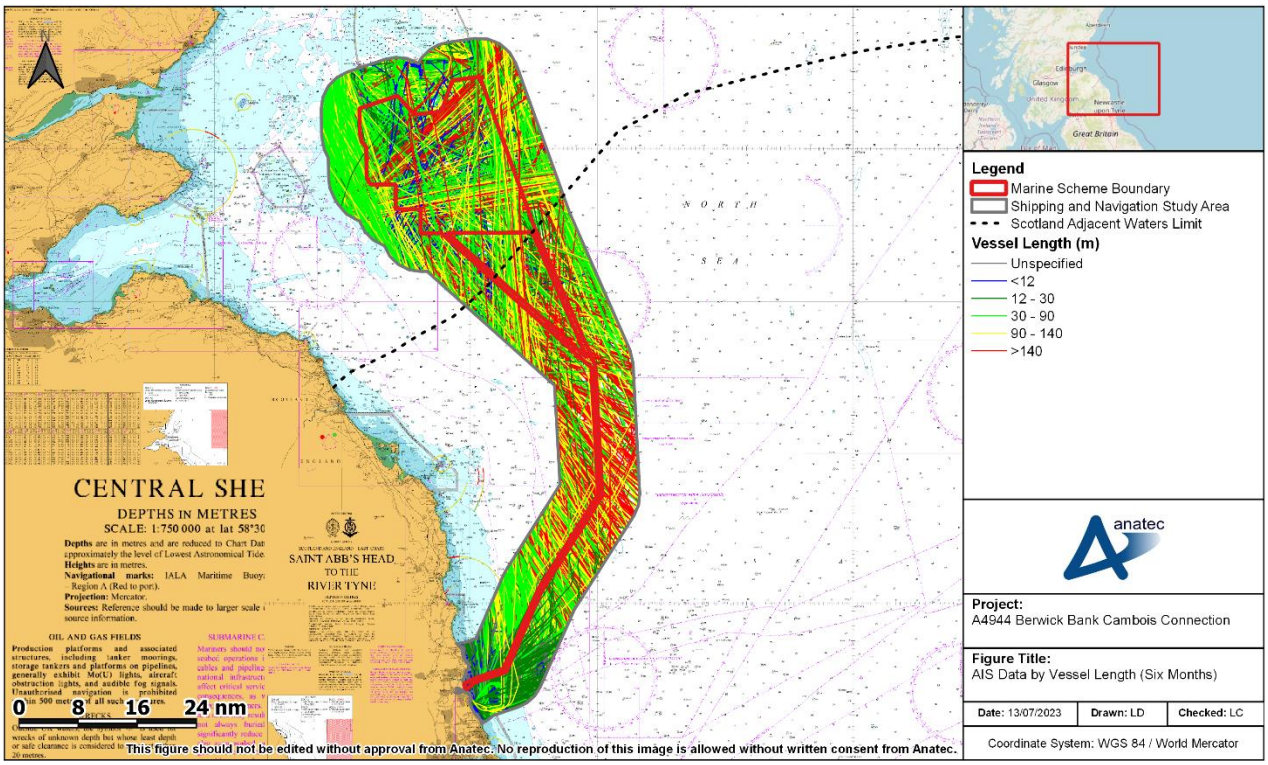

Figure 9.22 AIS Vessel Tracks by Vessel Length (Six Months)

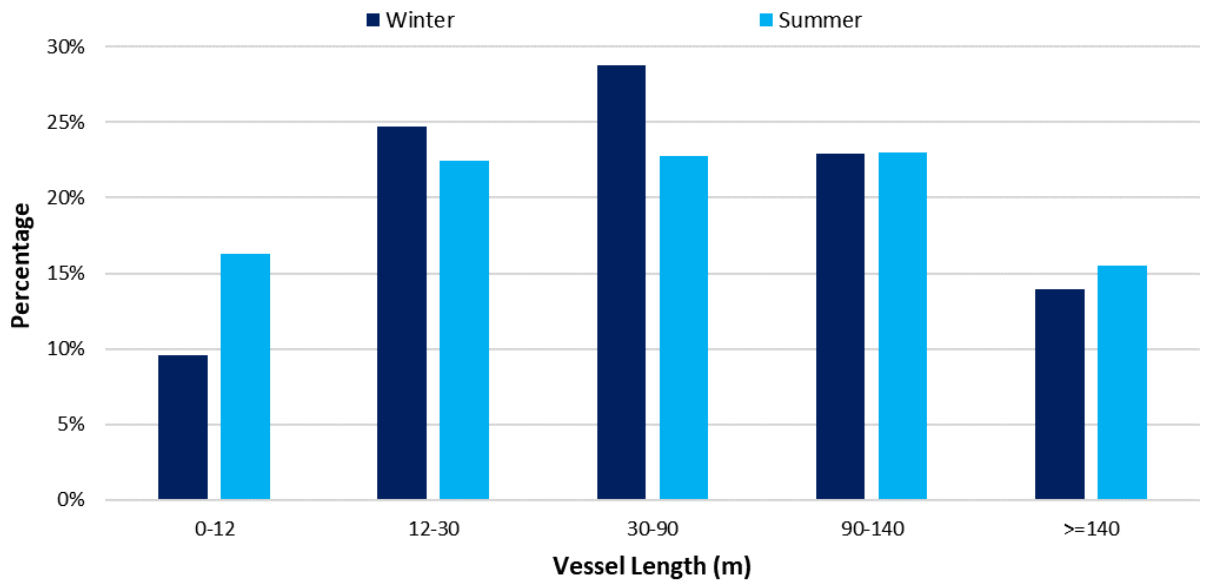

Figure 9.23 AIS Vessel Length Distribution

The average vessel length recorded in the Shipping and Navigation Study Area was 76 m during both summer and winter. Smaller vessels under 30 m in length were recorded closer to the coast, particularly in proximity to the Landfall. Larger vessels over 140 m were seen transiting to/from the Firth of Forth. Vessels between 30 m and 90 m were seen throughout all of the Shipping and Navigation Study Area. The largest vessel recorded during either period was a 336 m crude oil tanker.

9.5.2 Vessel Draught

Figure 9.24 presents the AIS vessel tracks recorded in the Shipping and Navigation Study Area, colour-coded by vessel draught. The vessel draught distribution is then presented in Figure 9.25. It is noted 38% of vessels did not broadcast a draught. These have been excluded from the distribution however, as the vast majority of these are fishing vessels or small recreational craft, it is expected that these would have small draughts (e.g. less than 5 m).

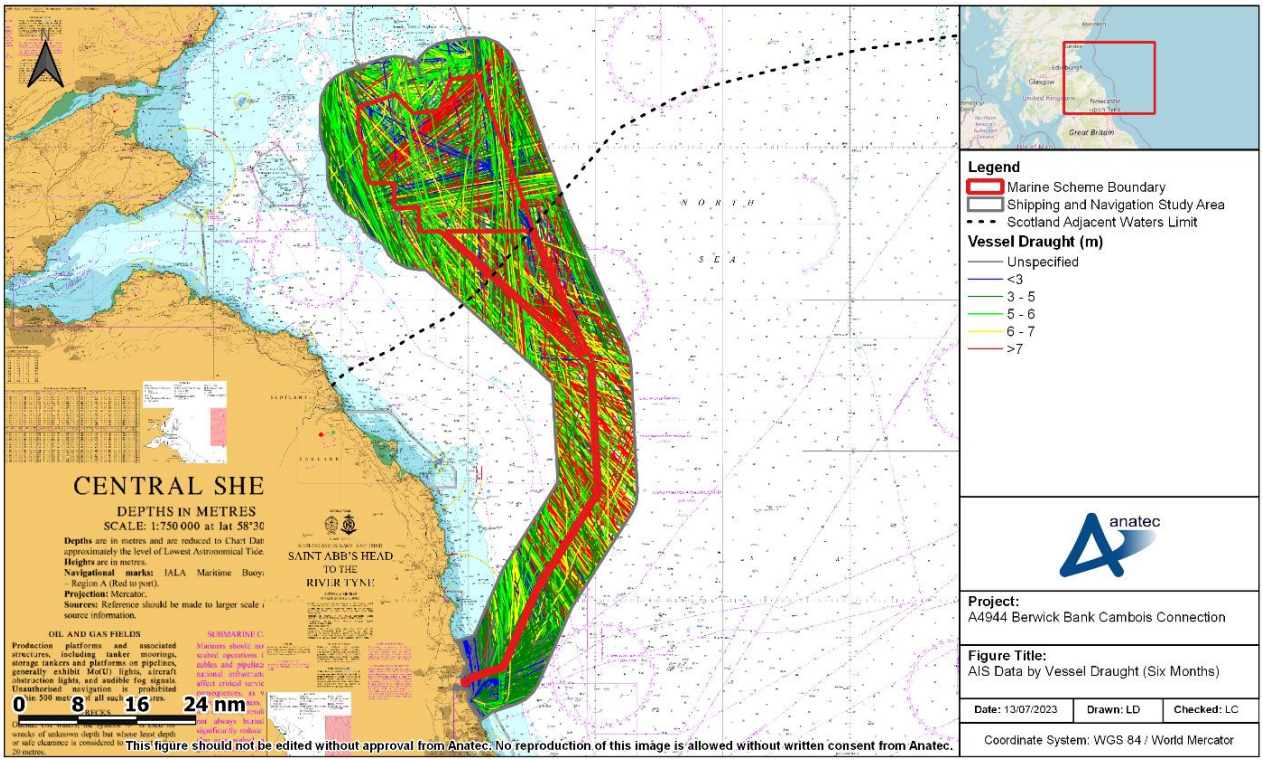

Figure 9.24 AIS Vessel Tracks by Vessel Draught (Six Months)

Vessels with a smaller draught (under 3 m) were recorded mainly close to the coast at the Landfall. The vessels with largest draughts over 7 m were mainly recorded travelling to/from ports at the Firth of Forth. Some vessels with unspecified draught were observed close to the landfall. Vessels with deep draught were also recorded in the vicinity of the Landfall in English waters, recorded entering and exiting Blyth. These included cargo vessels of approximately 9 m draught, and a crane ship working on the NNG OWF with a draught of approximately 11 m.

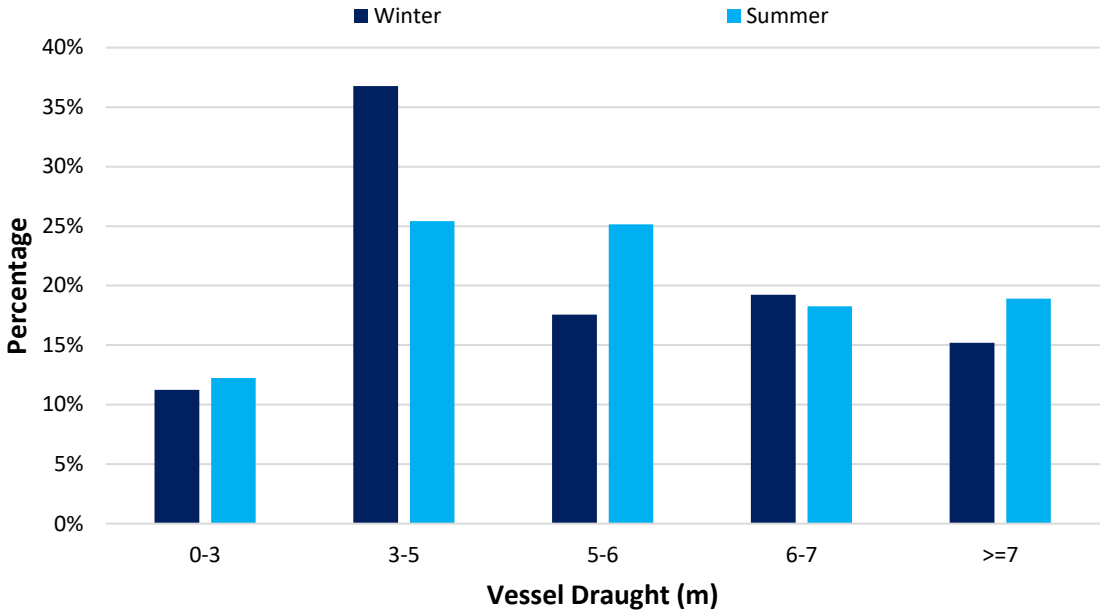

Figure 9.25 AIS Vessel Draught Distribution

The average vessel draught recorded in the Shipping and Navigation Study Area during winter was 5.4 m, and in summer 5.6 m. As noted above, smaller draught vessels (recreational craft and fishing vessels) are likely under-represented in the above graph, and the average draught is therefore likely to be smaller.

9.5.3 Vessel Deadweight Tonnage

Figure 9.26 presents the AIS vessel tracks in the Shipping and Navigation Study Area, colour-coded by vessel Deadweight Tonnage (DWT). This information is not broadcast on AIS and, where possible, has been researched separately by Anatec based on the ship identity information. In some cases, approximations were based on the vessel type and dimensions (mainly for small fishing vessels and recreational craft estimated to be less than 500 DWT).

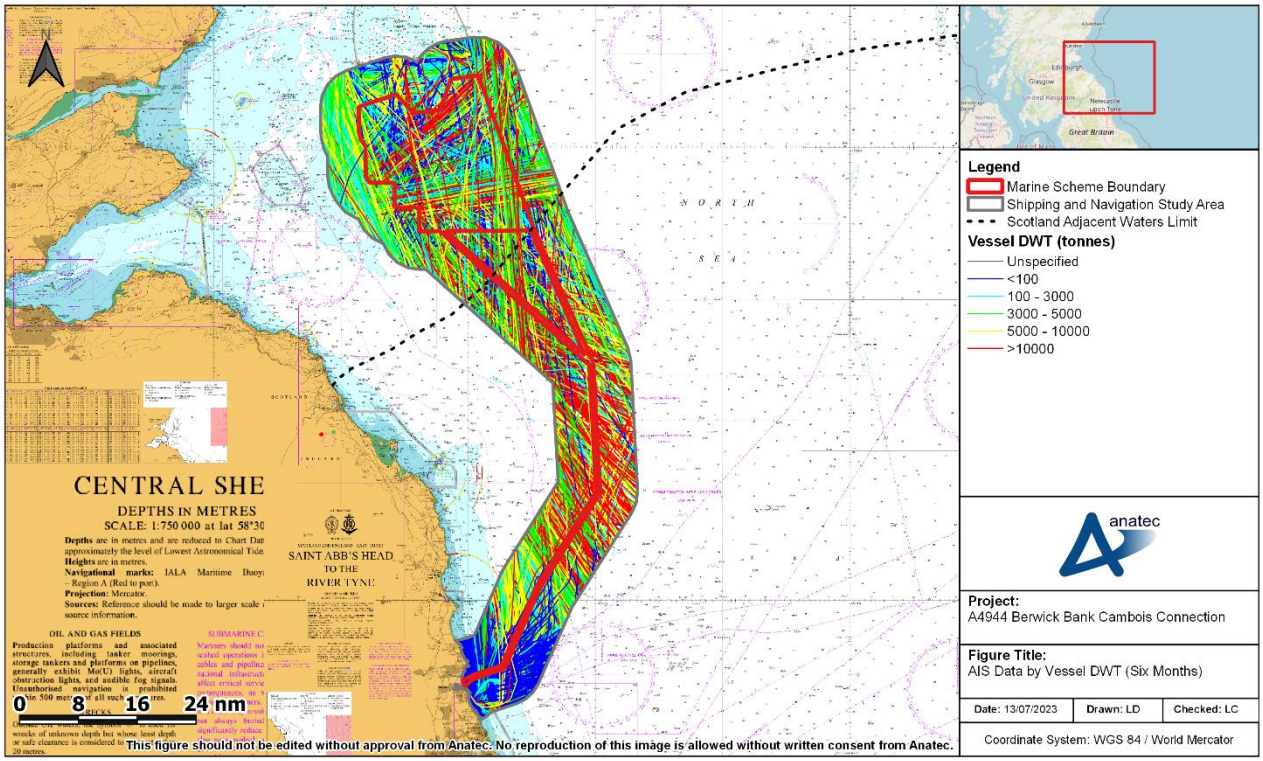

Figure 9.26 AIS Vessel Tracks by Vessel DWT (Six Months)

The vessel DWT distribution, based on unique vessels per day, is presented in Figure 9.27, excluding < 1% unspecified vessels whose DWT could not be estimated due to limited information.

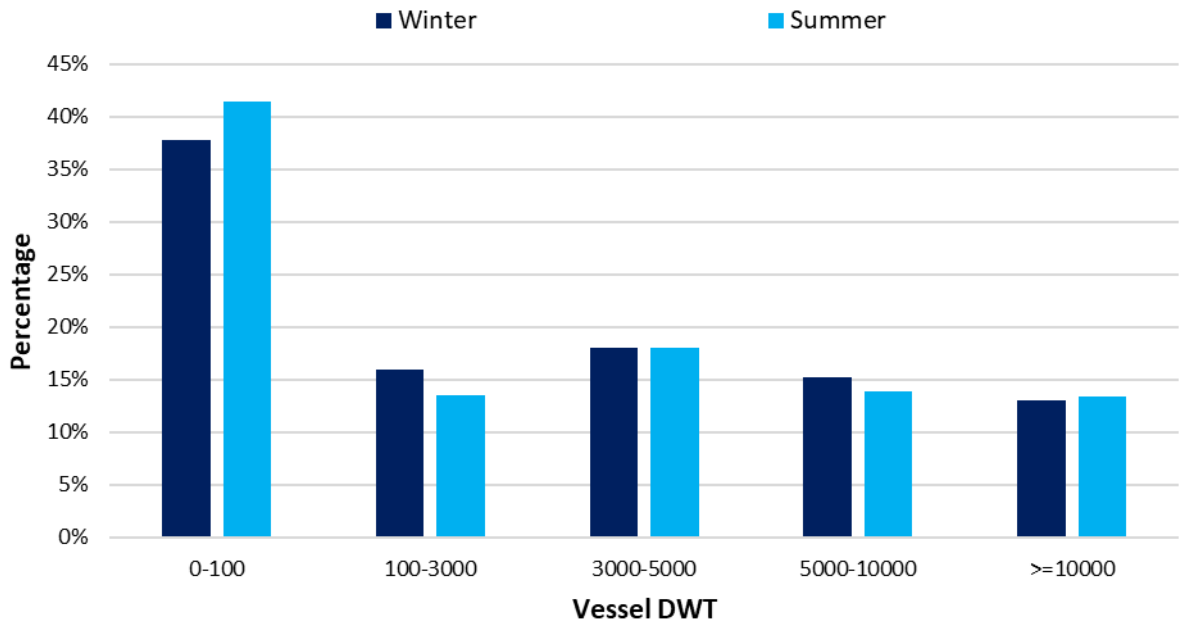

Figure 9.27 AIS Vessel DWT Distribution

An average DWT of 7,970 tonnes was recorded in winter and an average DWT of 6,240 tonnes was recorded in summer. A significant proportion (38% in winter and 41% in summer) were identified or estimated to have a DWT less than 100 tonnes. The largest vessel was a crude oil tanker with a DWT of 320,785 tonnes.

9.6 Additional Data Sources

9.6.1 BBWF NRA

Vessel traffic survey data (AIS, RADAR and virtual observations) was collected to inform the BBWF EIAR shipping and navigation chapter (Ref XIII, Anatec (2022), with 14 days in Winter 2021 and a further 14 days in Summer 2022 collected to capture seasonal traffic variations. The data from the combined 28 days of surveying is presented in Figure 9.28, colour-coded by vessel type. During the 28 days of data, an average of 14 vessels per day were recorded within a 10 nm buffer of the BBWF array area, with the main vessel types being tankers (31%), cargo vessels (30%) and fishing vessels (12%). Fishing vessel activity was recorded within the BBWF array area, with one to two fishing vessels recorded within a 10 nm buffer of the BBWF array area. The majority of this fishing activity was made up of potters/whelkers and demersal trawlers, with the majority of vessels recorded being less than 15 m in length. Based on the average speeds of the vessels recorded, much of the fishing vessel activity is characteristic of active fishing rather than transiting.

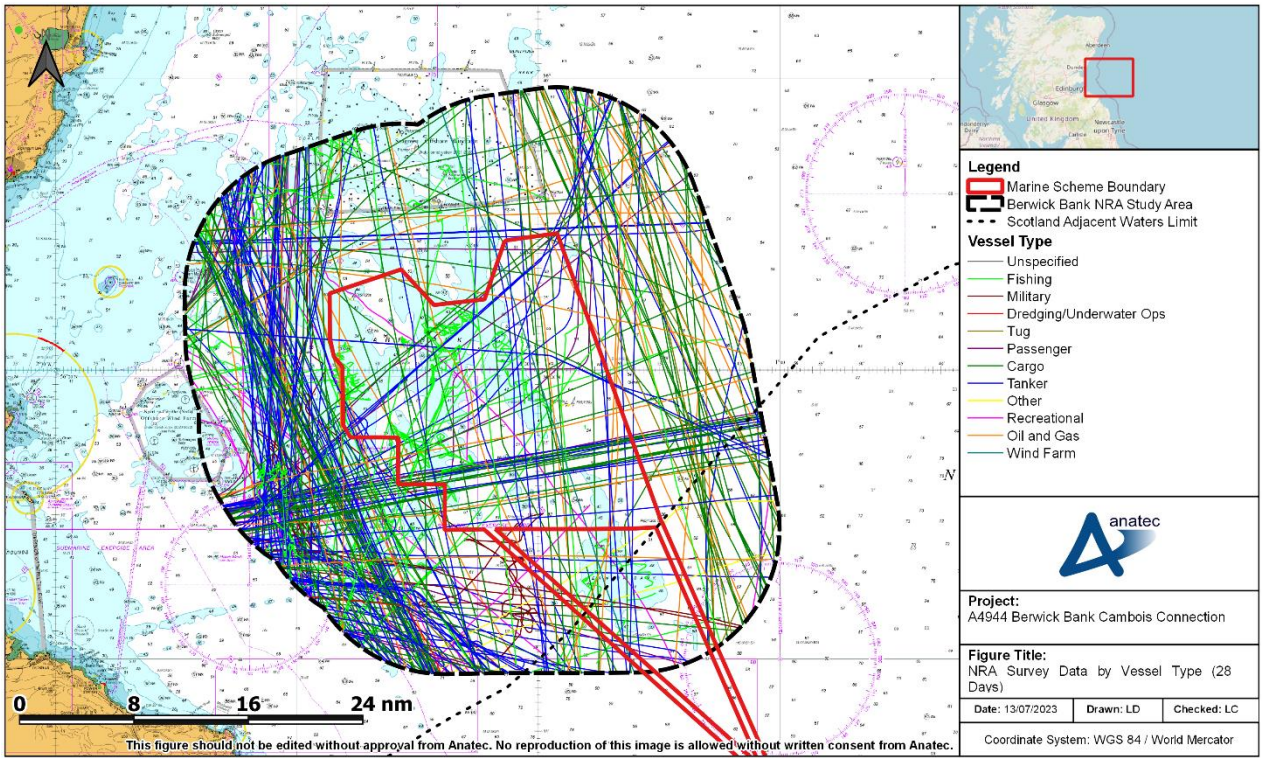

Figure 9.28 NRA Survey Data by Vessel Type (28 Days)

9.6.2 Blyth Demonstrator Offshore Wind Farm

In addition to project specific vessel traffic data, survey data collected to inform the Blyth Demo Phase 1 wind farm project is publicly available (Ref. xxi). The data encompasses AIS, RADAR and visual observation data collected from 9th – 23rd January and 29th June – 14th July 2011, with the area covered by the survey lying close to the Landfall for the Marine Scheme. The survey data did not provide any further information on small vessel activity close to the Landfall of the Marine Scheme. More recent AIS data used to inform the Blyth Demo Phase 2 has also been reviewed (Ref. xxii), covering 1st – 14th August 2018 and 1st – 14th January 2019. The report notes that in addition to the fishing vessels based in Blyth, additional *Nephrops* fishing boats also typically land their catch in Blyth from November to February each year, during the peak season for *Nephrops* fishing.

9.7 Future Baseline

In relation to the current baseline, it is anticipated that commercial vessel traffic will navigate around the Blyth Demo Phase 2, which could impact vessel routeing near the Landfall. In addition, the construction of the BBWF could alter vessel routeing at the northern section of the Offshore Export Cable Corridor, as commercial vessels are expected to navigate around the wind farm. In line with industry experience, vessels will typically maintain a minimum mean distance of 1 nm from future wind farm structures, and therefore vessels currently transiting east/west through the southern extent of the BBWF array area are anticipated to cross the Offshore Export Cable Corridor at a mean position of approximately 1 nm to the south of the most southerly Wind Turbine Generators (WTGs).

In order to inform any likely future changes in shipping, a brief review of vessel traffic calling at major ports relevant to the area was carried out to determine the trends in shipping in the past years. Typical destinations broadcast by commercial vessels within the Shipping and Navigation Study Area include Blyth and Immingham in English waters, and Grangemouth and Aberdeen in Scottish waters. The port arrival statistics from 2017 – 2021 (Ref. xxiii) are displayed in Figure 9.29. It is noted that Grangemouth is part of Forth Ports, who are the harbour authority for ports within the Firth of Forth, while Immingham statistics are also combined with the nearby Port of Grimsby.

Any changes that may occur during the design life span of the Marine Scheme should be considered in the context of both greater variability and sustained trends occurring on national and international scales in the marine environment.

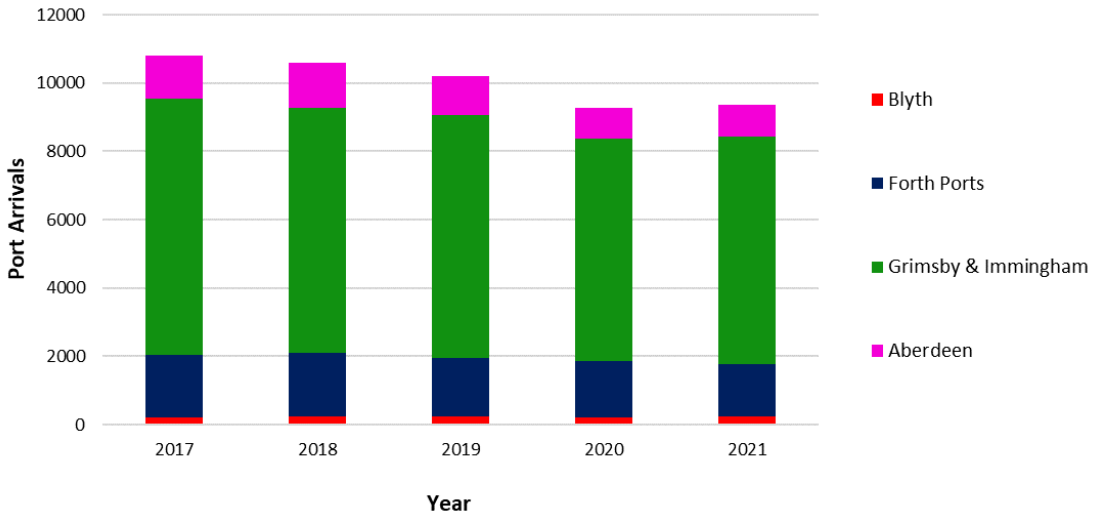

Figure 9.29 Port Arrivals 2017 - 2021

From 2017 to 2019 (pre-COVID-19 pandemic) the port arrivals remained constant for the Port of Blyth and Forth Ports. A slight decrease was observed for the ports of Grimsby and Immingham, as well as Aberdeen. Blyth and Aberdeen had the biggest reductions in 2020 (likely due to Brexit and/or the COVID-19 pandemic), with a 23% decline in arrivals for Aberdeen and 14% for Blyth.

The most common commercial vessel destination within the Shipping and Navigation Study Area was the Port of Blyth, which is currently undergoing major redevelopment works at one of its terminals, the Bates Clean Energy Terminal. The Battleship Wharf Terminal at the Port of Blyth is increasingly used for wind farm mobilisations and project cargos, as well as handling dry bulk and breakbulk cargoes. Vessel traffic at the Port of Aberdeen has recently increased, with the new South Harbour accepting its first ferry visit in May 2023. The South Harbour will be a multipurpose harbour and will accommodate various vessel types including oil and gas support, wind farm support, cargo, passenger and tankers. No terminal or berth changes, or additional commercial ferry routes, related to Forth Ports are planned. It is noted that in January 2023, the Firth of Forth, including Forth Ports, was selected to become one of Scotland's first Green Freeports.

Other common destinations of commercial vessels were ports in mainland Europe such as Rotterdam, Netherlands and Antwerp, Belgium. Rotterdam is undergoing development to increase container capacity, expected to be completed by 2030. No major redevelopments which would be expected to impact the Shipping and Navigation Study Area are anticipated at Antwerp. Port arrivals at Rotterdam and Antwerp have returned to pre-COVID levels, though container throughput dropped from 2021 to 2022 due to the war in Ukraine. It is noted that developments at such distant ports may not influence traffic patterns in the Shipping and Navigation Study Area, as these are major international ports with routes to destinations around the world, only a few of which pass through the Shipping and Navigation Study Area.

Fishing activity was significant within 3 nm of the coast, with a lower level of activity recorded further offshore. Fishing trends are difficult to predict and can depend on various influencing factors such as fish stocks, quotas, and any continuing changes in legislation post-Brexit, as

detailed further in **Volume 2, Chapter 12: Commercial Fisheries**. It is expected that fishing by EU vessels within UK waters will reduce, with fishing rights being transferred to UK vessels.

Recreational activity may remain similar or increase slightly in future years, due to population growth and longer life expectancies, which means people have more leisure time. However, this can also be impacted by factors such as weather and the economy.

10 Measures Adopted as Part of the Marine Scheme

As part of the Marine Scheme design process, a number of measures have been proposed to reduce the potential for impacts on shipping and navigation. These include measures which have been incorporated as part of the Marine Scheme's design (referred to as 'designed in measures') and measures which will be implemented regardless of the impact assessment (referred to as 'tertiary mitigation'). As there is a commitment to implementing these measures, they are considered inherently part of the design of the Marine Scheme and have therefore been considered in the impact assessment (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These measures are considered standard industry practice for this type of development.

The designed in measures relevant to shipping and navigation are outlined in Table 10.1. It is noted that all mitigation measures outlined below are applicable to both Scottish and English waters.

Table 10.1 Measures adopted as part of the Marine Scheme (designed in measures & tertiary mitigation)

Embedded Mitigation Measure	Justification
Promulgation of information (such as, position and nature of works, vessel routes, Safety Zones, advisory safe passing distances, navigational warnings) as required via Kingfisher Bulletins.	The construction of infrastructure and implementation of safety distances around construction vessels may displace recreation vessels. Likewise, maintenance and decommissioning activities may also displace recreation vessels. Circulation of information via Notices to Mariners (NtM), Kingfisher, Radio Navigational Warnings, Navigational Telex (NAVTEX), and/or broadcast warnings as soon as reasonably practicable in advance of and during the offshore works to inform the commercial fishing industry of vessels routes, timing and locations of construction works, and relevant details the construction activities. These will be augmented with NAVTEX and Radio Navigation Warning broadcasts as appropriate. Maximises awareness of the Marine Scheme allowing vessels to passage plan in advance, in the interests of safety to infrastructure and other users receptors.
Vessel marks and lighting, and AIS.	In order to maximises awareness of temporary hazards, Cable Lay Vessels (CLVs) and other vessels involved in cable construction will display appropriate marks and lights, and broadcast their status on AIS at all times, to indicate the nature of the work in progress, and highlight their restricted manoeuvrability.
Temporary aids to navigation may be deployed (if required) to guide vessels around any areas of construction activity	Temporary aids to navigation maximises awareness of temporary hazards
Guard vessels and clearance distances	Project vessels will implement a 500 m advisory safe passing distance with third party vessels during periods of construction or major repair or maintenance. During operation, where cable exposures exist that would result in significant risk, guard vessels will be used where

Embedded Mitigation Measure	Justification
	appropriate until the risk has been mitigated by burial and/or other protection methods. Guard vessels will use Automatic RADAR Plotting Aid (ARPA) to monitor vessel activity and predict possible interactions whilst alongside the construction vessel(s). This facilitates engagement with fisheries stakeholders during specific project works reduces potential for interactions between the Marine Scheme and fishing activities, as well as maximising awareness of temporary hazards.
Marine coordination and communication to manage project vessel movements.	Ensures project vessels are suitably managed to reduce the likelihood of involvement in incidents and maximise the ability to assist in the event of a third-party incident.
Compliance of all project vessels with international marine regulations as adopted by the Flag State, notably the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) (IMO, 1972/77) and Safety of Life at Sea (SOLAS) (IMO, 1974)	Reduces the risk introduced due to the presence of project vessels.
Liaison with local ports and harbours, particularly the Port of Blyth, during the construction phase.	Liaison with local ports and harbours during the construction phase maximises awareness of the Marine Scheme allowing vessels to passage plan in advance
Appointment of a Company Fisheries Liaison Officer (CFLO)	A CFLO is already in place and will continue to act as a specific point of contact to engage with and liaise with the fishing industry. A CFLO will be in place throughout the lifespan of the Marine Scheme.
Use of Offshore Fisheries Liaison Officers (OFLOs) where required and appropriate	The use of OFLOs facilitates engagement with fisheries stakeholders during specific Project works and minimises potential for conflict between the Marine Scheme and fishing activities.
Development of a Fisheries Management and Mitigation Strategy (FMMS) / Fisheries Liaison and Co-existence Plan (FLCP) for Marine Directorate Licencing and Operations Team (MD-LOT) and Marine Management Organisation (MMO) approval, and in consultation with fisheries stakeholders.	The FMMS/ FLCP details the Applicant's proposed approach to fisheries liaison and to facilitating co-existence, including details on the measures which are proposed to be implemented to reduce impacts on commercial fishing as far as practicable. An outline FMMS / FLCP has been provided as part of this application (Volume 5, Appendix 12.2) and will be updated for submission to MMO and MD-LOT prior to construction.
As-Built Information	The location, extent and nature of the cable protection measures use will be communicated to the relevant stakeholders including the UK Hydrographic Office (UKHO), relevant fishing industry representatives and Kingfisher Information Service. Provides information so all other legitimate users of the sea are aware of the location, extent and nature of cable protection..

Embedded Mitigation Measure	Justification
Cable plan (CaP)	Suitable implementation and monitoring of cable protection through the Marine Scheme and adherence to a CaP. This will be produced an consulted on (in line with consent conditions) prior to installation and will include a detailed cable laying plan including geotechnical data, cable laying techniques and informed by a Cable Burial Risk Assessment (CBRA) which will include details on minimum target burial depths.
Cable burial depth	Cables will be buried to a minimum target depth of 0.5 m and only protected using external protection (e.g., rock berms) where minimum target burial depth is not achieved or at third-party crossings. Application of target cable burial depth will reduce the potential for cable exposure from interactions between metocean regimes (e.g. wave, sand, and currents) and will reduce interaction with fishing gear. Cable burial also reduces risk of interference with magnetic position fixing equipment.
Cable protection	The use of cable protection will be minimised as far as practicable, an only used where required. Additional external cable protection (e.g. rock placement) will only be used where the minimum target burial depth cannot be achieved, for example in areas of hard ground or at third-party crossings. This will be informed by outputs from the Cable Burial Risk Assessment completed by the installation contractor(s) prior to the commencement of installation. Rock utilised in berms wil be clean with low fines. Use of graded rock and 1:3 profile berms at areas of rock protection will reduce potential fishing gear snagging risk.
Monitoring of cable burial and protection	Infrastructure will be monitored through post lay and burial inspectio surveys to identify exposures and any requirements for repair and reburial, with remedial action taken as appropriate and as soon as practicable. Findings will be shared with the fishing industry in order to facilitate co-existence, prevent potential damage to and from fishing gear, and minimise potential safety risks.
Location specific review of impacts to shipping and consultation with the MCA for instances of >5% reduction in water depth.	Following further survey and detailed engineering, if areas are identified where external protection is required and the Maritime and Coastguard Agency (MCA) condition of no more than 5% reduction in water depth is not achievable, a location specific review of impacts to shipping and consultation with the MCA will be carried out and additional mitigations agreed as required in order to minimise the ris of vessel collision due to reduced under keel clearance.
Compass deviation effects.	Compass deviation effects will be minimised through cable design and separation distance, informed by compass deviation studies (post consent) to comply with MCA requirements. If the requirements cannot be confirmed pre-construction, a post construction deviation survey of the cable route will be undertaken, data provided to the MCA and UKHO, and a precautionary notation

Embedded Mitigation Measure	Justification
	may be required on the appropriate Admiralty Charts regarding possible magnetic anomalies along the cable route.

11 Impact Assessment

11.1 Introduction

This section provides a qualitative and quantitative risk assessment (using FSA) for the hazards identified due to the Marine Scheme, based on baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments.

For each hazard, various subsections are provided as appropriate to consider each component of the hazard, both qualitative and quantitatively.

Within each component of an overarching hazard, embedded mitigation measures which have been identified as relevant to reducing risk are listed, with full descriptions provided in section 10. This is followed by statements defining the frequency of occurrence and severity of consequence for each component of the hazard in **bold** text, as defined in section 3.2.

At the end of the assessment of each hazard, these frequency of occurrence and severity of consequence rankings are summarised in tabular form (if there are multiple components), with the resulting significance of risk given in **highlighted bold** text, as defined in section 3.2.

The risk control log (see section 13) summarises the risk assessment and a concluding risk statement is provided (see section 15.4).

11.2 Impacts Scoped into the Assessment

The following impact pathways have been scoped into the assessment, as agreed through the Scoping process and follow up consultation with stakeholders and consultees[12]:

- Increased vessel to vessel collision risk between a third-party vessel and a project vessel (C, O&M, D);
- Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels (C, O&M, D);
- Reduced access to local ports (C, O&M, D);
- Anchor interaction with exposed subsea cable between cable laying and protection campaigns (C);
- Fishing gear interaction with exposed subsea cable between laying and protection campaigns (C);
- Anchor interaction with subsea cable (O&M);
- Fishing gear interaction with subsea cable (O&M);
- Vessel grounding due to reduced under keel clearance (O&M); and
- Interference with magnetic compasses (O&M)

[12] C = Construction, O&M = Operation and maintenance, D = Decommissioning

11.3 Impacts Scoped Out of the Assessment

Impacts scoped out of the assessment were agreed with key stakeholders through consultation following receipt of the Scoping Opinion from MD-LOT and MMO in February and March 2023 respectively. These are summarised below for completeness:

- Vessel displacement due to project infrastructure (C, O&M, D);
  - *As the Marine Scheme relates to the construction of subsea export cables, vessel traffic will not be displaced as a result of project infrastructure*
- Increased risk of vessel to structure allision (C, O&M, D); and
  - *As the Marine Scheme relates to the construction of subsea export cables, there is no potential for allision between vessels and any aspects of the Marine Scheme*
- Vessel displacement due to cable maintenance leading to increased vessel to vessel collision risk between third-party vessels (O&M)
  - *Cable maintenance expected to be localised and short term with no significant vessel displacement impact*.

11.4 Construction Phase Risk Assessment

11.4.1 Increased vessel to vessel collision risk between a third-party vessel and a project vessel

There is an increased collision risk created during the construction phase for all passing traffic due to the presence of vessels associated with the construction of the Offshore Export Cables, including vessels involved in surveys, seabed levelling, cable construction, cable burial and Landfall works. The nature of cable construction, and other activities, requires large, slow-moving vessels which will be Restricted in their Ability to Manoeuvre (RAM). Therefore, these vessels may have limited capability in taking avoidance action from a passing vessel on a collision course, should such a situation arise. In addition, there may be an increased collision risk between third-party vessels and jack ups used during Landfall works in English waters. Due to their reduced size and increased mobility in comparison, smaller vessels associated with the construction phase, e.g. tugs, guard vessels, support vessels, are considered to pose a lesser risk of collision than that of the larger cable construction vessels.

The collision risk is likely to be greater in higher density shipping areas. Passing vessel activity was significant across the whole Marine Scheme, with higher density approximately 3 nm from the Landfall in English waters, associated with cargo vessels and tankers transiting north/south past Blyth, heading to and from ports such as Aberdeen, Grangemouth, Immingham, Rotterdam and Antwerp. Fishing vessels were most active within 3 nm of the coast in English waters, with some activity also recorded within the BBWF array area section of the Marine Scheme in Scottish waters. It is likely there are other non-AIS vessels operating nearshore in English waters.

Up to two cable lay vessels which are RAM will be on site at any one time and a jack up vessel is expected to be used for Landfall works. In addition, there may be up to two pre-construction boulder removal / clearing vessels, 10 guard vessels, two survey vessels and two cable protection vessels on site at any one time. Site preparation works are expected to take place between over 39 months between Q4 2026 and Q4 2029, with the overall timescale for Landfall works to be 15

months between Q4 2027 and Q4 2028 and for Offshore Export Cable construction expected to be 18 months between Q3 2028 and Q4 2029.

Project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS (where appropriate) and will be compliant with relevant Flag State regulations including the COLREGs and SOLAS.

Details of construction activities, including any advisory safe passing distances, as defined by risk assessment, will be suitably promulgated via NtM, Kingfisher, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing construction activities. Communication with the Port of Blyth about the construction work activities and appointment of an FLO will also help to raise awareness of the works and minimise collision risk. Guard vessels will be used to raise awareness of construction work to passing vessels and temporary aids to navigation may be deployed (if required) to guide vessels around any areas of construction activities.

11.4.1.1 Severity of Consequence

The most likely consequences in the event of a collision incident between a project vessel and third-party vessel are minor contact between the vessels resulting in minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario could involve one of the vessels foundering resulting in Potential Loss of Life (PLL) and the environmental consequence of pollution. Such a scenario would be more likely if the third-party vessel involved was a small craft which may have weaker structural integrity than a commercial vessel.

The severity of consequence is therefore considered to be **moderate**.

11.4.1.2 Frequency of Occurrence

The impact will be present throughout the construction phase which will last for up to 18 months (39 months including site preparation works). With the mitigation measures noted above implemented, it is considered unlikely that a close encounter between a third-party vessel and a project vessel will occur. In the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per the COLREGs, including Rule 18 which governs responsibilities between vessels if one is RAM, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The frequency of occurrence is therefore considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.4.1.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.4.2 Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels

Construction of the Offshore Export Cables may cause displacement of vessels around the areas of construction, which could lead to an increased risk of a collision between two third-party vessels during the construction phase. In particular vessels may be required to deviate around cable construction vessels, which are large, slow-moving vessels which will be RAM. In addition, jack up vessels used for Landfall works may also lead to vessel displacement close to the shore in English waters.

This will most likely affect busier areas of shipping. From the baseline assessment, passing vessel activity was evident across the whole Marine Scheme, with higher vessel numbers closer to the Landfall, within approximately 3 nm of the coast, in English waters. Cargo vessels and tankers transiting north/south past Blyth, heading to and from ports such as Aberdeen, Grangemouth, Immingham, Rotterdam and Antwerp were notable in this area.

Regular fishing and recreational activity was observed throughout the Marine Scheme. This was mainly concentrated closer to shore (within approximately 3 nm of the Landfall in English waters), however some fishing activity was also observed in the part of the Marine Scheme which overlaps BBWF array area in Scottish waters. Construction vessels, and vessels associated with Landfall works, may therefore cause a disruption to both local fishers and recreational boaters. It is noted that recreational craft and small fishing vessels close to shore will be under-represented by the AIS data.

Site preparation works are expected to take place over 39 months between Q4 2026 and Q4 2029, with the overall timescale for Landfall works to be 15 months between Q4 2027 and Q4 2028 and for Offshore Export Cable construction expected to be 18 months between Q3 2028 and Q4 2029. However, the spatial extent of construction areas where vessels may be required to deviate around vessels which are RAM is expected to be small at any given time. Additionally, outside of the nearshore area, there is adequate available sea room for vessels to safely alter their passage.

Details of construction activities, including any advisory safe passing distances, as defined by risk assessment, will be suitably promulgated via NtMs, Kingfisher, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing construction activities. Guard vessels will be used to raise awareness of construction works to passing vessels and communication with the Port of Blyth will help to minimise collision risk associated with vessels using the port.

The appointment of an FLO will aid in ensuring local fishers are made aware of construction works. Local Notices to Mariners as well as notifying local marinas and sailing clubs of the works will help to inform recreational users. All vessels will be expected to comply with international marine legislation, including the COLREGs and SOLAS.

11.4.2.1 Severity of Consequence

In the event of a collision incident between third-party vessels, the most likely consequences are minor contact between the vessels resulting in minor damage to property and minor reputational

effects on business but no perceptible effect on people. The maximum adverse scenario could involve one of the vessels foundering resulting in PLL and the environmental consequence of pollution. Such a scenario would be more likely if one of the vessels involved was a small craft which may have weaker structural integrity than a commercial vessel.

The severity of consequence is therefore considered to be **moderate**.

11.4.2.2 Frequency of Occurrence

The impact will be present throughout the construction phase which will last for up to 18 months (39 months including site preparation works). Given that third-party vessels are expected to be compliant with relevant Flag State regulations including the COLREGs, collision avoidance action ensure that the likelihood of an encounter developing into a collision incident is low. This is furthered by the promulgation of information which will maximise awareness of ongoing construction activities, thus allowing third-party vessels to passage plan in advance, if considered appropriate.

The frequency of occurrence is therefore considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.4.2.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.4.3 Reduced access to local ports

There is the potential for reduced access to local ports due to surveys, seabed preparation and construction of the Offshore Export Cables associated with the Marine Scheme. The closest port or harbour to the Marine Scheme is the Port of Blyth, located 1.4 nm south of the Landfall in English waters. Therefore construction works in English waters may cause reduced access to the Port.

Any requirement to wait on tidal windows to access the Port of Blyth would increase the impact of reduced access due to construction works, however the majority of vessels entering the Port of Blyth do not have to wait on tidal windows as the channel is dredged, and can therefore enter the port at any time. Vessels exceeding 6.5 m to 7.0 m vessel draught may have to wait. There may also be some disruption to dredgers accessing the port if dredging campaigns were to overlap temporally with the construction period, however these tend to be short term.

In addition, any survey or repair works required on the North Sea Link (NSL) interconnector, NO-UK or Havhingsten telecommunication cables near the Landfall areas could lead to increased disruption to Port of Blyth access in English waters.

The Marine Scheme is located 33 nm to the east of the entrance to the Firth of Forth in Scottish waters. Vessels visiting Forth Ports (e.g. Leith, Rosyth, Grangemouth) contribute a significant proportion of shipping crossing the Marine Scheme in Scottish waters. There may therefore be a

disruption to vessels on route towards the Forth Ports, however it is considered that there is sufficient sea room available for vessels to plan their passages accordingly.

Site preparation works are expected to take place over 39 months between Q4 2026 and Q4 2029, with the overall timescale for Landfall works to be 15 months between Q4 2027 and Q4 2028 and for Offshore Export Cable construction expected to be 18 months between Q3 2028 and Q4 2029. Project vessels will be managed by marine coordination, will display appropriate marks and lights, broadcast on AIS (where available) and will be compliant with relevant Flag State regulations including the COLREGs, including rule 18 which applies to vessels which are RAM. Liaison with local ports and FLO will help to manage disruption.

11.4.3.1 Severity of Consequence

Surveys, seabed preparation and construction of the Offshore Export Cables may result in some disruption to vessels crossing the Marine Scheme in and out of the Port of Blyth in English waters and to vessels crossing the Marine Scheme in the outer Firth of Forth, on route to Forth Ports in Scottish waters, due to the presence of vessels which may be RAM, such as a cable laying vessel. However, construction of the Offshore Export Cables will be limited to a small area at a time (in the immediate vicinity of the construction vessels), which will restrict any disruption to only a small portion of the Marine Scheme as a whole.

Given the distance between the Landfall area and the Port of Blyth, and the close proximity of Landfall works to the coastline, reduced access during Landfall works (e.g. due to a jack up vessel) is not anticipated. No effect is anticipated on port related services such as pilotage.

The severity of consequence is therefore considered to be **minor**.

11.4.3.2 Frequency of Occurrence

The impact will be present throughout the construction phase for Landfall which will last for up to 18 months (39 months including site preparation works). An average of nine vessels per day accessed the Port of Blyth based on the AIS data, the majority of which were fishing vessels (31%), recreational craft (14%) and offshore support vessels (11%) visiting oil and gas fields, and offshore wind farms. It is noted that there will be additional small craft not broadcasting on AIS also requiring access to the Port of Blyth.

However, due to the distance between the Port of Blyth and the Marine Scheme, and the localised and temporary nature of cable construction works, the disruption to port access is reduced. This impact will be mitigated by good communication with the Port of Blyth during the construction phase.

For the Marine Scheme in English waters, the frequency of occurrence is therefore considered to be **remote**.

In Scottish waters, the Marine Scheme lies 33 nm to the east of the entrance to the Firth of Forth and therefore the frequency of occurrence is considered to be **extremely unlikely**.

11.4.3.3 Significance of Risk

The severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in Scottish waters is considered to be extremely unlikely. The effect in Scottish waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

The severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in English waters is considered to be remote. The effect in English waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

11.4.4 Anchor interaction with exposed subsea cable between cable laying and protection campaigns

The preferred approach for cable burial has not yet been confirmed and there is a possibility the cable burial will be a post-lay operation as detailed in **Volume 2, Chapter 5: Project Description**. Therefore, there may be a period of time (estimated to be up to two months) after laying when the Offshore Export Cables are exposed and not protected through burial or other means such as rock placement. This period represents a potentially higher risk of interaction from vessel anchors with the surface-laid cables. In addition, there may be temporarily exposed cables on the seabed between construction campaigns before cable jointing has been completed.

There is a risk that a nearby anchored vessel could lose its holding ground and subsequently drag anchor over the cables. Vessels at anchor were mainly located around the charted anchorage associated with the Port of Blyth, approximately 2.5 nm south of the Marine Scheme in English waters.

If a passing vessel suffers engine failure, there is a possibility that it may drop anchor to avoid drifting into an emergency situation such as a collision, allision or grounding. This is more likely to occur in areas closer to the coast or to other hazards (e.g. offshore developments). In open waters where depths are deeper and anchoring may not be feasible, the vessel is more likely to attempt to either fix the problem or await assistance.

11.4.4.1 Severity of Consequence

Any vessel anchor could interact with the exposed cables. If an anchor becomes snagged on the cables, there could be a risk of injury in trying to free it. If the anchor cannot be freed the safest action is to slip it, and not attempt to raise or cut the cable.

The most likely consequences are limited damage to property (anchoring vessel or subsea cable). The maximum adverse scenario may include damage to property including to the vessel's anchor or subsea cable.

The severity of consequence is therefore considered to be **moderate**.

11.4.4.2 Frequency of Occurrence

From the vessel traffic survey data, the majority of anchoring activity took place close to shore approximately 2.5 nm to the south of the Marine Scheme in English waters. Given the

predominant wind direction from the south-west, vessels are likely to drag towards the cable in an anchor dragging incident. The closest anchored vessel to the Marine Scheme in English waters was an oil and gas vessel recorded 0.5 nm to the south. Vessels were also noted to anchor within the Marine Scheme in the BBWF array area in Scottish waters.

Areas where emergency anchoring risk is expected to be higher are within 30 nm of the coast in English waters associated with cargo vessels and tankers transiting north/south past the Port of Blyth, further offshore associated with vessel routes to/from the Firth of Forth in Scottish waters, and fishing activity close to the Landfall in English waters. The maritime incident data showed that the most frequent incident type to be recorded was machinery failure, which could lead to emergency anchoring.

Mitigation includes circulation of information to make mariners aware of the exposed cable and use of guard vessels where cable exposures are considered to present significant risk to navigation.

The frequency of occurrence is considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.4.4.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.4.5 Fishing gear interaction with exposed subsea cable between laying and protection campaigns

Similar to the impact associated with vessel anchors, there is the potential for risk of interaction from fishing gear with surface-laid cables if post-lay burial is used, as this may result in a period of time (estimated to be up to two months) during which the cables are exposed (prior to burial or placement of external protection), or between construction campaigns before cable jointing has been completed.

11.4.5.1 Severity of Consequence

Although fishers are advised to follow the current maritime industry guidance (MGN 661, the Mariner's and all Admiralty charts) and avoid demersal trawling (and anchoring) in the immediate vicinity of the cables, it is acknowledged that fishing may still occur over the cables either inadvertently, or at the discretion of fishing vessel operators. Fishing activity is considered further in **Volume 2, Chapter 12: Commercial Fisheries**.

There is higher risk of snagging from demersal gear if the cable is exposed. The response from the crew includes reducing / reversing the propulsive force, attempting to unfasten the equipment, or releasing the gear and therefore in the majority of snagging incidents, it should be possible to recover the situation without any serious consequences (e.g. injury or fatality to crew members). However, accident data from the MAIB indicates that safe recovery from a snagging incident is not always the outcome. Consequences of snagging therefore range from damage to

gear and the cable, loss of stability due to lines being put under strain and in the worst case, capsize of the vessel, persons overboard and risk of injury or fatality. For example, a risk of capsize could occur if the vessel attempted to free its gear by raising the cable rather than releasing the gear.

The severity of consequence is therefore considered to be **serious**.

11.4.5.2 Frequency of Occurrence

Fishing vessels carrying demersal gear that interacts with the seabed when deployed present the greatest risk of snagging on subsea cables. Static gear types (e.g. potters/whelkers and gill netters) are not considered to present a safety risk from snagging as they are able to carefully select the position of their gear, avoiding any subsea cables. Demersal gear types identified in the baseline assessment include demersal otter trawlers (single, twin and pair), dredgers, beam trawlers and seiners, which together contributed 66% of gear types recorded on AIS in the area. The highest risk area of snagging is where vessels engaged in fishing with demersal gears are most active. Based on the AIS data, the most demersal fishing activity occurs along the first 6 nm of the Marine Scheme from the Landfall in English waters, although demersal fishing activity is evident along the whole Marine Scheme, albeit at relatively low intensities. It is also noted that there is likely to be significant activity from small fishing vessels in coastal waters, which may be under-represented in the AIS data, although these are most likely to be using static gear which has lower snagging risk.

It is expected that mitigation including having a FLO in place and circulation of information (e.g. via Kingfisher and local communications) will help ensure fishers are aware of the exposed cable and avoid fishing directly over it. In addition, guard vessels will be used in any areas where cable exposures are considered to present significant risk to fishing gear snagging.

The frequency of occurrence during the period that the cables are surface-laid is considered to be **remote** for the Marine Scheme as a whole.

11.4.5.3 Significance of Risk

Overall, the severity of consequence is deemed to be serious, and the frequency of occurrence is considered to be remote. The effect will, therefore, be of **tolerable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

A secondary shipping and navigation mitigation has been identified for the impact. The period during which the subsea cables are surface laid and not yet buried or protected – and thus exposed to the impact – should be reduced so far as practicable.

Overall, following mitigation, the severity of consequence is deemed to be serious, and the frequency of occurrence is considered to be extremely unlikely. The residual effect will, therefore, be of **tolerable (ALARP)**, which is not significant in EIA terms.

The additional mitigation to reduce this impact to ALARP is further described in section 14.1.

11.5 Operation and Maintenance Phase Risk Assessment

11.5.1 Increased vessel to vessel collision risk between a third-party vessel and a project vessel

There will be a requirement to undertake inspection surveys as well as the potential for unplanned repair works on, or reburials of, the Offshore Export Cables as a result of cable failure/damage or cable exposure / creation of freespans respectively, which could result in an increased collision risk between a third-party vessel and a survey / maintenance vessel.

This risk is described under the construction phase; however maintenance/monitoring work is expected to be less disruptive and span a shorter period than cable construction works.

The planned protection for the cable should reduce the likelihood of cable damage and thereby requirement for repairs. Where cable repairs or reburials are required, they will be highly localised to one specific location along the Marine Scheme.

Based on the MDS, there may be up to two survey vessels per year required for the maintenance and monitoring works, and up to four cable repairs and up to four cable reburials over the lifetime of the Marine Scheme, although specific locations for repairs and reburials are unknown. Cable repairs / reburials may include vessels which are RAM. As per the construction phase, project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS and be compliant with relevant Flag State and international regulations including the COLREGs and SOLAS.

Similarly to the construction phase, details of major maintenance activities including any advisory safe passing distances, as defined by risk assessment, will be suitably promulgated via NtM, Kingfisher, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing major maintenance activities.

11.5.1.1 Severity of Consequence

The most likely consequences in the event of a collision incident between a project vessel and third-party vessel are as per the equivalent construction phase impact, namely minor contact and damage to property and minor reputational effects on business, but no perceptible effect on people. The maximum adverse scenario could involve one of the vessels foundering resulting in PLL and the environmental consequence of pollution. Such a scenario would be more likely if the third-party vessel involved was a small craft which may have weaker structural integrity than a commercial vessel.

The severity of consequence is therefore considered to be **moderate**.

11.5.1.2 Frequency of Occurrence

The impact will be present throughout the operation and maintenance phase which will last for up to 35 years. With implementation of the embedded mitigation measures outlined in section 10, it is considered unlikely that an encounter between a third-party vessel and a project vessel will occur. In the event that such an encounter does occur, collision avoidance action would be

implemented by the vessels as per COLREGs, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The likelihood of an encounter is decreased compared to the construction phase given the smaller scale of maintenance activities, although this is somewhat balanced by the much longer duration of the operation and maintenance phase.

The frequency of occurrence is therefore considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.5.1.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.5.2 Reduced access to local ports

There is the potential for reduced access to local ports due to maintenance and monitoring of the Offshore Export Cables and potential cable repair / reburial works.

11.5.2.1 Severity of Consequence

The overall timescale for any maintenance / repair works is expected to be less than for construction works. Similarly to the construction phase, details of major maintenance activities including any advisory safe passing distances, as defined by risk assessment, will be suitably promulgated to maximise awareness of ongoing major maintenance activities.

Such works may result in limited disruption to vessels crossing the Marine Scheme in English waters to access the Port of Blyth and crossing the Marine Scheme in Scottish waters to access ports in the Firth of Forth. However, any required maintenance is expected to be localised in one area of the Offshore Export Cable Corridor and temporary in nature.

In addition, maintenance vessels will be managed by marine coordination, will display appropriate marks and lights, broadcast on AIS (where available) and will be compliant with relevant Flag State regulations including the COLREGs, including rule 18 which applies to vessels which are RAM. Liaison with local ports and FLO will help to manage disruption.

The severity of consequence is therefore considered to be **negligible**.

11.5.2.2 Frequency of Occurrence

The reduction in access is decreased compared to the construction phase given the smaller scale of maintenance activities, although this is somewhat balanced by the much longer duration of the operation and maintenance phase.

In English waters, the frequency of occurrence is therefore considered to be **extremely unlikely**.

In Scottish waters, the frequency of occurrence is considered to be **negligible** due to the small footprint of the works and ample sea room available.

11.5.2.3 Significance of Risk

Overall, the severity of consequence is deemed to be negligible and the frequency of occurrence for the Marine Scheme in Scottish waters is considered to be negligible. The effect in Scottish waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

Overall, the severity of consequence is deemed to be negligible and the frequency of occurrence for the Marine Scheme in English waters is considered to be extremely unlikely. The effect in English waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

11.5.3 Anchor interaction with subsea cable

There is a risk that a vessel anchor interacts with the Offshore Export Cables due to an anchor dragging or emergency anchoring incident, which has been described previously under the description of this impact during the construction phase.

High risk areas for an anchor dragging incident are where vessels routinely anchor close to the Offshore Export Cables, e.g. near the charted anchorage associated with the Port of Blyth, approximately 2.5 nm south of the Landfall at the southern end of the Marine Scheme in English waters.

For emergency anchoring, higher risk areas include areas where the density of vessels crossing the Marine Scheme in Scottish and English waters is higher (taking into consideration future changes in shipping due to the BBWF and areas closer to the coast or to other hazards (e.g. offshore developments), which increases the likelihood of dropping anchor in an emergency.

During the operation and maintenance phase the Offshore Export Cables will be marked on UKHO Admiralty Charts with associated note/warning about anchoring, trawling or seabed operations.

A CBRA will be undertaken post-consent to identify high risk areas from third party hazards including vessel anchor strike along the whole Marine Scheme and to determine suitable burial depths for the Offshore Export Cables during the operation and maintenance phase. Burial is the preferred method for protecting the Offshore Export Cables from vessel anchors. Based on the initial appraisal of cable burial which has been undertaken, the Offshore Export Cables are anticipated to be buried for at least 79% of the route and protected by external protection (e.g. rock placement) for the remainder of the route. Burial depths are expected to be between 0.5 m and 3 m. Any external protection used will be designed to ensure the Offshore Export Cables are suitably protected from vessel anchors. Cable protection will be regularly monitored to confirm its integrity.

11.5.3.1 Severity of Consequence

Once the Offshore Export Cables are protected, either through burial and/or other protection measures, larger vessels (e.g. cargo vessels and tankers) are more likely to threaten the Offshore Export Cables as their anchors are able to penetrate deeper into the seabed and can cause greater damage than smaller anchors (fishing and recreational vessels) if contact is made. The

anchors of smaller vessels (e.g. fishing and recreational craft) are unlikely to penetrate as deeply. Suitable target burial depths, defined in a CBRA, will mitigate the risk from vessel anchors. Periodic monitoring will be undertaken to confirm cable protection remains suitable as detailed in **Volume 2, Chapter 5: Project Description**.

The most likely consequences are limited damage to property (anchoring vessel or Offshore Export Cables). The maximum adverse scenario may include damage to property including to the vessel's anchor or subsea cable.

The severity of consequence is therefore considered to be **minor**.

11.5.3.2 Frequency of Occurrence

Protection of the Offshore Export Cables via burial and/or external protection will reduce the frequency of occurrence of anchor interaction.

Although there may be limited decision-making time if a vessel is drifting towards a hazard, it is anticipated that the charting of infrastructure including all subsea cables will inform any decision to anchor, as per Regulation 34 of SOLAS (see section 10).

The frequency of occurrence is considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.5.3.3 Significance of Risk

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.5.4 Fishing gear interaction with subsea cable

There is a risk of fishing gear interaction with the Offshore Export Cables due to fishing activity, which has been described previously under the description of this impact during the construction phase. High intensity areas for demersal fishing activity occurred along the first 6 nm of the Marine Scheme from the Landfall in English waters, although demersal fishing activity was evident along the whole Marine Scheme, albeit at relatively low intensities.

During the operation and maintenance phase the Offshore Export Cables will be marked on UKHO Admiralty Charts and KIS-ORCA charts with associated note/warning about anchoring, trawling or seabed operations.

A CBRA will be undertaken post-consent to provide a detailed assessment of fishing activity along the Offshore Export Cable Corridor and fishing gear penetration depths for the various soil conditions in order to determine suitable burial depths for the Offshore Export Cables during the operation and maintenance phase. Burial is the preferred method for protecting the Offshore Export Cables from fishing gear. Based on the initial appraisal of cable burial which has been undertaken, the Offshore Export Cables are anticipated to be buried between 0.5 m and 3 m for at least 79% of the length of each Offshore Export Cable and protected by external protection (e.g. rock placement) where burial is not achieved (up to 21% of the total length of each Offshore

Export Cable). In areas where external protection is required, they will be designed to reduce potential snagging risk with fishing gear as far as is practicable, in line with industry best practice guidance (i.e. use of graded rocks and berms designed with 1:3 gradients). Cable protection will be regularly monitored to confirm its integrity.

11.5.4.1 Severity of Consequence

The planned cable protection is assumed to provide effective mitigation from fishing gear snagging, reducing the risk of serious consequences such as snagging, capsize of the vessel and PLL.

The severity of consequence is therefore considered to be **minor**.

11.5.4.2 Frequency of Occurrence

Once the Offshore Export Cables are installed, their depiction on nautical and Kingfisher charts (designed in mitigation measures) may discourage fishing in the vicinity of the Offshore Export Cables; however evidence shows this is not always the case with installed cables as often it is assumed they are adequately protected against fishing gear interaction. The planned cable protection (through burial and rock placement) is assumed to provide effective mitigation against the risk or demersal gear making contact with the installed Offshore Export Cables. As discussed, it is the responsibility of the fishers to dynamically risk assess whether it is safe to undertake fishing activities in proximity to subsea cables and to make a decision as to whether or not to fish. Fishing activity is considered further in **Volume 2, Chapter 12: Commercial Fisheries**.

The frequency of occurrence is considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.5.4.3 Significance of Risk

163. Overall, the severity of consequence is deemed to be minor and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.5.5 Vessel grounding due to reduced under keel clearance

This impact refers to a vessel grounding due to reduced under keel clearance associated with external cable protection measures in areas where cable burial is not achievable (e.g. due to cable crossings or unfavourable seabed conditions). This could lead to subsequent capsize, injury, loss of life, oil spill, etc. In general, the higher risk areas are coastal waters where existing water depths are shallower.

Cable burial is the preferred option of safeguarding the Offshore Export Cables, however up to 21% of the length of each of the Offshore Export Cables may require alternative external protection. In addition, external protection will be required at five anticipated cable crossings in English waters, as outlined in section 7.5.

11.5.5.1 Severity of Consequence

Should a vessel grounding occur, the most likely consequences are minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario may include the vessel foundering resulting in PLL and the environmental consequence of pollution.

The severity of consequence is therefore considered to be **moderate**.

11.5.5.2 Frequency of Occurrence

The likelihood of a grounding is greater for large commercial vessels with deeper draughts, noting that only a minority of vessels recorded in the vessel traffic survey data were deep draught. Areas where water depth is shallower, e.g., close to the Landfall at the southern end of the Marine Scheme in English waters, also present a higher risk of vessels grounding.

The maximum height of cable protection will be 1.5 m (2 m at crossing locations in English waters). The average draught of vessels crossing the Marine Scheme was 5.6 m, with a maximum draught of 21 m, in approximately 60 m of water depth. Within shallower waters (less than 20 m depth) near the Landfall in English waters, the maximum draught was 11 m.

During consultation, the MCA raised that cable burial depth requires consideration and noted the requirements of MGN 654 (Ref. i). The Applicant intends to follow the guidance provided in MGN 654, and in particular cable protection will not change the charted water depth by more than 5% where practicable. Any reduction in navigable water depth greater than 5% will be discussed and agreed with the MCA, Trinity House and the NLB post consent and prior to cable construction.

When considered with the embedded mitigation of compliance with the requirements in MGN 654 and any change to water depth of more than 5% chart datum requiring further consultation and agreement with the MCA, the frequency is considered to be reduced to very low for all vessel types.

For the Marine Scheme in English waters, the frequency of occurrence is therefore considered to be **remote**.

For the Marine Scheme in Scottish waters, the frequency of occurrence is therefore considered to be **extremely unlikely.**

11.5.5.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be remote for the Marine Scheme in English waters. The effect in English waters will, therefore, be of **tolerable** adverse significance, which is not significant in EIA terms.

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely for the Marine Scheme in Scottish waters. The effect in Scottish waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

11.5.6 Interference with magnetic compasses

A magnetic compass is a navigational instrument for determining direction relative to the earth's magnetic poles. It consists of a magnetised pointer (usually marked on the north end) free to align itself with the earth's magnetic field. Like any magnetic device, compasses are affected by nearby ferrous materials as well as by local electromagnetic forces, such as magnetic fields emitted from power cables. The majority of commercial vessels use a non-magnetic gyrocompass as the primary means of navigation, which is unaffected by the earth's magnetic field. However, as the magnetic compass still serves as an essential means of navigation in the event of power loss or as a secondary source, it must not be affected to the extent that safe navigation is threatened.

The Offshore Export Cables for the Marine Scheme will be HVDC and may therefore result in localised static Electromagnetic Fields (EMF), with the potential to affect magnetic compasses. The important mitigating factors to reduce EMF effects on magnetic compasses are listed below:

- Cable spacing;
- Water depth; and
- Burial depth.

The cables will be installed in pairs (or a pair) of opposite poles (positive and negative), and as such the magnetic fields of each cable in a pair will be of opposite polarities. As outlined in **Volume 2, Chapter 5: Project Description,** it is assumed that the cables will be laid at approximately 25 m spacing, however a reduction in this distance between cables of opposite polarity would have an increasingly deleterious effect of the magnetic fields from each cable – effectively cancelling each other out, and reducing the resultant magnetic compass deviation.

The exact cable design and construction plan (and the location of the cables within the consented corridor) will be informed by further engineering design and outputs from pre-construction surveys. Similarly a Cable Plan (CaP) will be developed which will provide a more refined level of detail on the construction of the Offshore Export Cables.

Regarding water depth, approximately 98% of the Offshore Export Cable Corridor is in depths greater than 20 m below Chart Datum (CD). Therefore, there will be significant vertical distance between the Offshore Export Cables and surface vessels along the majority of the Offshore Export Cable Corridor. The strength of the magnetic fields decreases exponentially with distance from the cables, and as such compass deviation will reduce with increasing water depth. Similarly, increasing burial depth also increases the vertical separation between a surface vessel and the Offshore Export Cables in a given water depth, as such increasing burial depth further reduces compass deviation.

During consultation, the MCA stated that a deviation of three degrees will be accepted for 95% of the cable route and a five degree deviation accepted for the remaining 5%. Compass deviation effects will be minimised through Offshore Export Cable design and separation distance, informed by compass deviation studies (post consent) to comply with MCA requirements.

11.5.6.1 Severity of Consequence

The majority of commercial vessel traffic uses non-magnetic gyrocompasses as the primary means of navigation, which are unaffected by EMF. Therefore, in general it is considered unlikely that any EMF interference created by the Offshore Export Cables will have a significant impact on vessel navigation near the Marine Scheme. Nevertheless, since magnetic compasses can still serve as an essential means of navigation in the event of power loss, as a secondary source, or as some smaller craft (fishing or leisure) may rely on it as their sole means of navigation (noting that many smaller craft may use Global Positioning System (GPS), chart plotters, etc., as a further source), it has been assessed within this ES chapter. Vessels in shallower water should also be able to navigate visually using coastal features when conditions are suitable.

The most likely consequences associated with the maximum adverse scenario are anticipated to be limited, noting that 98% of the Offshore Export Cables are anticipated to be in water depths greater than 20 m and the Offshore Export Cable will be designed to ensure that the requirements of the MCA are fulfilled. If it cannot be demonstrated that MCA deviation requirements can be met pre-construction, a post construction compass deviation survey of the 'as laid' Offshore Export Cable Route will be undertaken. This data will be provided to the MCA and UKHO, and a precautionary notation may be required on the appropriate Admiralty Charts regarding possible magnetic anomalies along the 'as laid' Offshore Export Cable Route.

The severity of consequence is therefore considered to be **minor**.

11.5.6.2 Frequency of Occurrence

Along the Marine Scheme vessel traffic is assumed to mainly transit perpendicular to the direction of the Offshore Export Cables. For vessels transiting over the Offshore Export Cables, time spent directly above the Offshore Export Cables will be limited given the limited width of the Marine Scheme.

Given HVDC cables produce static magnetic fields which decrease with the horizontal distance from the cables, magnetic compass interference should only be experienced directly above or in direct proximity to the Offshore Export Cables, noting again that effects decrease quickly with horizontal distance as the vessel moves away from the Offshore Export Cables' location.

The frequency of occurrence is therefore considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.5.6.3 Significance of Risk

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.6 Decommissioning

11.6.1 Increased vessel to vessel collision risk between a third-party vessel and a project vessel

There may also be an increased collision risk created during the decommissioning phase for all passing traffic due to the presence of vessels associated with decommissioning works.

11.6.1.1 Severity of Consequence

Since the numbers and types of vessel used to remove the Offshore Export Cables are expected to be similar to those used for construction, this impact is expected to be similar in nature to the equivalent construction phase impact.

Therefore, the most likely consequences associated with the maximum adverse scenario are as per the equivalent construction phase impact.

The severity of consequence is therefore considered to be **moderate** within both Scottish and English waters.

11.6.1.2 Frequency of Occurrence

The impact will be present throughout the decommissioning phase which is assumed to last for a similar timeframe as the construction period. With the embedded mitigation measures previously noted implemented, it is considered unlikely that an encounter between a third-party vessel and a project vessel will occur. As per the equivalent construction phase impact, in the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per the COLREGs, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The frequency of occurrence is therefore considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.6.1.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.6.2 Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels

There may also be a risk of vessel displacement leading to increased vessel to vessel collision risk between third-party vessels created during the decommissioning phase.

11.6.2.1 Severity of Consequence

Since the numbers and types of vessel used to remove the Offshore Export Cables are expected to be similar to those used for construction, this impact is expected to be similar in nature to the equivalent construction phase impact.

Therefore, the most likely consequences associated with the maximum adverse scenario are as per the equivalent construction phase impact.

The severity of consequence is therefore considered to be **moderate**.

11.6.2.2 Frequency of Occurrence

The impact will be present throughout the decommissioning phase which is assumed to last for a similar timeframe as the construction period. Given that third-party vessels are expected to be compliant with Flag State regulations including the COLREGs, the likes of collision avoidance action ensure that the likelihood of an encounter developing into a collision incident is low. This is furthered by the promulgation of information which will maximise awareness of ongoing decommissioning activities, thus allowing third-party vessels to passage plan in advance.

The frequency of occurrence is therefore considered to be **extremely unlikely** for the Marine Scheme as a whole.

11.6.2.3 Significance of Risk

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole, which is not significant in EIA terms.

11.6.3 Reduced access to local ports

There may be potential for reduced access to local ports due to decommissioning works.

11.6.3.1 Severity of Consequence

Since the numbers and types of vessels used to remove the Offshore Export Cables are expected to be similar to those used for construction, this impact is expected to be similar in nature to the equivalent construction phase impact.

The severity of consequence is therefore considered to be **minor**.

11.6.3.2 Frequency of Occurrence

The impact will be present throughout the decommissioning phase which is assumed to last for a similar timeframe as the construction period. Since the anticipated reduction in access to local ports and the volumes of vessel traffic accessing the ports are assumed to be the same as for the equivalent construction phase impact, and the appropriate embedded mitigation measures are in place, it is anticipated that the frequency of occurrence is similar to the construction phase.

For the Marine Scheme in English waters, the frequency of occurrence is therefore considered to be **remote**.

For the Marine Scheme in Scottish waters, the frequency of occurrence is considered to be **extremely unlikely**.

11.6.3.3 Significance of Risk

The severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in Scottish waters is considered to be extremely unlikely. The effect in Scottish waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

The severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in English waters is considered to be remote. The effect in English waters will, therefore, be of **broadly acceptable** adverse significance, which is not significant in EIA terms.

12 Cumulative Impacts

12.1 Methodology

The Cumulative Effects Assessment (CEA) considers the risks associated with the Marine Scheme together with other relevant plans, developments and activities. Cumulative risks are therefore the complete set of effects arising from the Marine Scheme together with the effects from a number of different developments, on the same receptor or resource. Please see **Volume 2, Chapter 3: EIA Methodology** for detail on CEA methodology.

The developments selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise and the development of a 'long list' of cumulative developments relevant to the Marine Scheme (see **Volume 3, Appendix 3.4: Long-list of Cumulative Developments**). Each development 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, to create the 'short list' as summarised in Table 12.1. This approach was agreed during Scoping and further consultation and technical engagement undertaken with consultees, as detailed in section 4.

The specific projects scoped into the CEA for shipping and navigation, are outlined in Table 12.1. It should be noted that operational cumulative developments are not considered, as the baseline data and assessment takes these developments into consideration.

Table 12.1 List of other developments considered within the CEA for shipping and navigation

Development/Plan	Location	Status	Distance from Marine Scheme (km)	Description of Development /Plan	Dates of Construction (If Applicable)[13]	Dates of Operation (If Applicable)	Overlap with the Marine Scheme
Berwick Bank Wind Farm	Scottish waters	In Planning	0 – direct overlap with Marine Scheme	Offshore wind farm, in planning stage.	2025 to 2033	2033 to 2068	Development Construction / Operational Phases overlaps with Marine Scheme Construction / Operational Phases
Scotland to England Green Link 1 / Eastern Link 1 (Torness to Hawthorn Pit)	Scottish and English waters	In Planning	0 – direct overlap with Marine Scheme	Interconnector power cable from Torness to Hawthorn Pit in planning stage	2024 to 2027	2027 to 2077	Development Construction / Operational Phases overlaps with Marine Scheme Construction / Operational Phases
Eastern Green Link 2 (Peterhead to Drax)	Scottish and English waters	In Planning	3	Interconnector power cable from Peterhead to Drax in planning stage	2026 to 2029	2029 to 2079	Development Construction / Operational Phases overlaps with Marine Scheme Construction / Operational Phases
Blyth Demonstrator Offshore Wind Farm – Phase 2	English waters	Consented	1	Consented offshore wind farm with up to 10 wind turbines (across two array areas).	Unknown	Unknown	Development Construction / Operational Phases may overlap with Marine Scheme Construction / Operational Phases

[13] Construction programme for the Marine Scheme is anticipated to be from Q4 2026 to Q4 2029

Development/Plan	Location	Status	Distance from Marine Scheme (km)	Description of Development /Plan	Dates of Construction (If Applicable)[13]	Dates of Operation (If Applicable)	Overlap with the Marine Scheme
Blyth Demonstrator Phase 2 (&3) Cable Corridor	English waters	Consented	0 – potential for direct overlap at Landfall site	Export cable corridor from consented Blyth Demonstrator Offshore Wind Farm (Phase 2&3) to Landfall at Cambois Bay	Unknown	Unknown	Development Construction and Operational Phases may overlap with Marine Scheme Construction / Operational Phases
Inch Cape Offshore Wind Farm	Scottish waters	Consented	19	Consented offshore wind farm with up to 72 wind turbines, awarded a Contracts for Difference (CfD) in July 2022	2023 to 2025	2025 to 2075	Development Operational Phase overlaps with Marine Scheme Construction / Operational Phases
Neart Na Gaoithe Offshore Wind Farm	Scottish waters	Under Construction	17	Offshore wind farm with 56 wind turbines currently under construction including buoyed construction area	2022 to 2024	2024 to 2049	Development Operational Phase overlaps with Marine Scheme Construction / Operational Phases
Seagreen 1	Scottish waters	Under Construction	5	Offshore wind farm with 150 wind turbines currently under construction including buoyed construction area	2022 to 2023	2023 to 2048	Development Operational Phase overlaps with Marine Scheme Construction / Operational Phases

Development/Plan	Location	Status	Distance from Marine Scheme (km)	Description of Development /Plan	Dates of Construction (If Applicable)[13]	Dates of Operation (If Applicable)	Overlap with the Marine Scheme
Seagreen 1A Project	Scottish waters	Consented	23	Export cable corridor from consented Seagreen wind farm to Landfall at Cockenzie	2024 to 2026	Unknown	Development Operational Phase overlaps with Marine Scheme Construction / Operational Phases
Inch Cape OFTO	Inch Scottish waters	Consented – pending variation	10	Export cable corridor from consented Inch Cape offshore wind farm to Landfall at Cockenzie	2022 to 2025	2025 to 2075	Development Operational Phase overlaps with Marine Scheme Construction / Operational Phases
Neart Na Gaoithe OFTO	Scottish waters	Under Construction	22	Export cable corridor from consented Neart na Gaoithe offshore wind farm to Landfall at Thorntonloch Beach	2020 to 2024	2024 to 2047	Development Operational Phase overlaps with Marine Scheme Construction / Operational Phases

12.2 Cumulative Effects Assessment

An assessment of the likely significance of the cumulative effects of the Marine Scheme together with other relevant plans, projects , developments and activities upon shipping and navigation receptors arising from each identified impact is given below.

It should be noted that the Marine Scheme and BBWF overlap both spatially (within the BBWF array area) and temporally (with regards to construction, operation and maintenance and decommissioning). As the Marine Scheme and BBWF are both being progressed by the Applicant, it is expected that both developments will be jointly coordinated using the same Marine Coordination Centre for all phases of each development. Therefore, this allows potential cumulative effects between these developments to be managed through coordination.

12.2.1 Potential Effects During Construction

12.2.1.1 Increased vessel to vessel collision risk between a third-party vessel and a project vessel

There is the potential for increased collision risk if cumulative developments encourage third party vessels to deviate towards the project vessels. In particular, cumulative developments with overlapping construction phases, including BBWF in Scottish waters and the Eastern Green Link 1 and 2 transmission cables in both Scottish and English waters, could lead to increased collision risk if construction works were to take place in a similar geographical area at a similar time. There is also potential for the Blyth Demo Phase 2 to overlap temporally with the Marine Scheme in English waters although no construction dates are available.

In addition, the Inch Cape, Neart Na Gaoithe, Seagreen and Seagreen 1A OWFs will be operational before construction starts on the Marine Scheme and there may therefore be increased vessel numbers associated with these developments in Scottish waters. However, based on the locations of the operations and maintenance bases relative to the wind farms and to the Marine Scheme (Montrose Port for Inch Cape, Seagreen and Seagreen 1A, Eyemouth Harbour for Neart Na Gaoithe), vessel movements between the OWFs and the ports are not expected to interact with the Marine Scheme construction works in Scottish waters.

Project vessels, as managed by marine coordination, will display suitable marks and lights, will broadcast on AIS (where appropriate) and will be compliant with relevant Flag State regulations including the COLREGs and SOLAS.

Details of construction activities, including any advisory clearance zones, as defined by risk assessment, will be suitably promulgated via NtM, Kingfisher, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing construction activities. Communication with the Port of Blyth about the construction work activities in English waters and appointment of an FLO will also help to raise awareness of the works and minimise collision risk. Guard vessels will be used to raise awareness of construction work to

passing vessels and temporary aids to navigation will be deployed (if required) to guide vessels around any areas of construction activities.

Collision incidents are local in nature, occurring only when two (or more) vessels pass within a small distance of each other within the same sea area. Accounting for the distance between the Marine Scheme and the cumulative developments, the temporary nature of the construction works and noting that there is a low likelihood that construction works for the Marine Scheme and cumulative developments will be required within the same geographical area at the same time, the impact is as per the equivalent construction phase impact for the Marine Scheme in isolation.

Severity of Consequence

The most likely consequences in the event of a collision incident between a project vessel and third-party vessel are minor contact between the vessels resulting in minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario could involve one of the vessels foundering resulting in PLL and the environmental consequence of pollution. Such a scenario would be more likely if the third-party vessel involved was a small craft which may have weaker structural integrity than a commercial vessel.

The severity of consequence is therefore considered to be **moderate** in both Scottish and English waters.

Frequency of Occurrence

The impact will be present throughout the construction phase which will last for up to 18 months (39 months including site preparation works). With the designed-in measures noted above implemented, it is considered unlikely that an encounter between a third-party vessel and a project vessel will occur. In the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per the COLREGs, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance of the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.1.2 Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels

There is the potential for increased collision risk between third-party vessels if cumulative developments lead to further displacement of vessels around the developments. In particular, cumulative developments with overlapping construction phases, including BBWF in Scottish waters and the Eastern Green Link 1 and 2 transmission cables in both Scottish and English waters, could lead to increased collision risk if construction works were to take place in a similar geographical area at a similar time. There is also potential for the Blyth Demonstrator Offshore Wind Farm Phase 2 in English waters to overlap temporally although no construction dates are available.

In addition, the Inch Cape, Neart Na Gaoithe, Seagreen and Seagreen 1A OWFs will be operational before construction starts on the Marine Scheme and therefore there may be increased vessel numbers associated with these developments in Scottish waters. However, vessel movements between the OWFs and the ports are not expected to interact with the Marine Scheme construction works.

Details of construction activities, including any advisory clearance zones, as defined by risk assessment, will be suitably promulgated via NtMs, Kingfisher, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing construction activities. Guard vessels will be used to raise awareness of construction works to passing vessels and communication with the Port of Blyth will help to minimise collision risk associated with vessels using the port in English waters.

The appointment of an FLO will aid in ensuring local fishers are made aware of construction works. Local Notices to Mariners as well as notifying local marinas and sailing clubs of the works will help to inform recreational users. All vessels will be expected to comply with international marine legislation, including the COLREGs and SOLAS.

Collision incidents are local in nature, occurring only when two (or more) vessels pass within a small distance of each other within the same sea area. Accounting for the distance between the Marine Scheme and the cumulative developments, the temporary nature of the construction works and noting that there is a low likelihood that construction works for the Marine Scheme and cumulative developments will be required within the same geographical area at the same time, the impact is as per the equivalent construction phase impact for the Marine Scheme in isolation.

Severity of Consequence

In the event of a collision incident between third-party vessels, the most likely consequences are minor contact between the vessels resulting in minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario could involve one of the vessels foundering resulting in PLL and the environmental consequence of pollution. Such a scenario would be more likely if one of the vessels involved was a small craft which may have weaker structural integrity than a commercial vessel.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

The impact will be present throughout the construction phase which will last for up to 18 months (39 months including site preparation works). Given that third-party vessels are expected to be compliant with relevant Flag State regulations including the COLREGs, collision avoidance action ensure that the likelihood of an encounter developing into a collision incident is low. This is furthered by the promulgation of information which will maximise awareness of ongoing construction activities, thus allowing third-party vessels to passage plan in advance, if considered appropriate.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.1.3 Reduced access to local ports

There is the potential for increased disruption to port access due to cumulative developments, particularly if the Blyth Demonstrator Offshore Wind Farm Phase 2 construction works were to overlap temporally with the Marine Scheme construction works in English waters.

The Neart Na Gaoithe OWF is located between the Marine Scheme and entrance to the Firth of Forth, which could lead to increased disruption to access to Forth Ports in Scottish waters, however given the distance between the Marine Scheme and Forth Ports, there is considered to be sufficient sea room for vessels approaching the ports.

Increased risk from other cumulative developments is expected to be minimal due to the distance of these developments from the Port of Blyth or Forth Ports.

Project vessels will be managed by marine coordination, will display appropriate marks and lights, broadcast on AIS (where available) and will be compliant with relevant Flag State regulations including the COLREGs, including rule 18 which applies to vessels which are RAM. Liaison with local ports and FLO will help to manage disruption.

With the designed in measures listed above, the effect due to the presence of cumulative developments is anticipated to be manageable.

Severity of Consequence

Surveys, seabed preparation and construction of the Offshore Export Cables may result in some disruption to vessels crossing the Marine Scheme in and out of the Port of Blyth in English waters and to vessels crossing the Marine Scheme in the outer Firth of Forth, on route to Forth Ports, in Scottish waters, due to the presence of vessels which may be RAM, such as a cable laying vessel. However, construction of the Offshore Export Cables will be limited to a small area at a time, which will restrict any disruption to only a small portion of the total Marine Scheme.

Given the distance between the Landfall area and the Port of Blyth in English waters, and the close proximity of Landfall works to the coastline, reduced access during Landfall works is not anticipated.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The impact will be present throughout the construction phase which will last for up to 18 months (39 months including site preparation works). An average of 9 vessels per day accessed the Port of Blyth based on the AIS data. Cumulative developments may lead to an increase in the number of vessels accessing the Port in English waters.

However, due to the distance between the Port of Blyth and the Marine Scheme, and the localised and temporary nature of cable construction works, the disruption to port access is reduced. This impact can be mitigated by good communication with the Port of Blyth during the construction phase.

For the Marine Scheme in English waters, the frequency of occurrence is therefore considered to be **remote**.

In Scottish waters, the Marine Scheme lies 33 nm to the east of the entrance to the Firth of Forth and therefore the frequency of occurrence is considered to be **extremely unlikely.**

Significance of effect

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in Scottish waters is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme in Scottish waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in English waters is considered to be remote. The effect in English waters will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme in English waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.1.4 Anchor interaction with subsea cable

The risk of anchor interaction with the Offshore Export Cables during the construction phase could be increased if cumulative developments are expected to lead to increased traffic across the Marine Scheme. Any deviation in traffic associated with the BBWF has been taken into consideration in the assessment in isolation.

The Blyth Demo Phase 2 in particular may cause slight deviations in traffic across the Marine Scheme in English waters should this development be under construction or operational prior to the construction phase of the Marine Scheme, however given the nature of the vessel traffic crossing the Marine Scheme, deviated traffic is expected to follow similar routes to existing traffic.

Given the distance of the other cumulative developments relative to the Marine Scheme, there is limited additional effect due to the presence of these developments.

Therefore, the impact is as per the equivalent construction phase impact for the Marine Scheme in isolation.

Severity of Consequence

While exposed any vessel anchor could interact with the cables. If an anchor becomes snagged on the cables, there could be a risk of injury in trying to free it. If the anchor cannot be freed the safest action is to slip it, and not attempt to raise or cut the cable.

The most likely consequences are limited damage to property (anchoring vessel or subsea cable). The maximum adverse scenario may include damage to property including to the vessel's anchor or subsea cable.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

Mitigation includes circulation of information to make mariners aware of the exposed cable and use of guard vessels where cable exposures are considered to present significant risk to navigation.

The frequency of occurrence is considered to be **extremely unlikely**.

Significance of effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.1.5 Fishing gear interaction with subsea cable

The risk of fishing gear interaction with the Offshore Export Cables during the construction phase could be increased if cumulative developments are expected to lead to increased fishing activity across the Marine Scheme.

Any displacement of fishing vessels into the Marine Scheme is expected to be minimal. Therefore, the impact is as per the equivalent construction phase impact for the Marine Scheme in isolation.

Designed in measures including having an FLO in place and circulation of information (e.g. via Kingfisher and local communications) will help ensure any displaced fishers are aware of the exposed cable and avoid fishing directly over it. In addition, guard vessels will be used in any areas where cable exposures are considered to present significant risk to fishing gear snagging.

Severity of Consequence

The most likely consequences are as per the equivalent impact for the Marine Scheme in isolation.

The severity of consequence is therefore considered to be **serious**.

Frequency of Occurrence

The frequency of occurrence during the period that the cables are surface-laid is considered to be **remote**.

Significance of effect

Overall, the severity of consequence is deemed to be serious and the frequency of occurrence is considered to be remote. The cumulative effect will, therefore, be of **tolerable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

Additional mitigation to reduce this impact to ALARP is described in section 14.1.

12.2.2 Potential Effects during Operation and Maintenance

12.2.2.1 Increased vessel to vessel collision risk between a third-party vessel and a project vessel

As per the equivalent construction phase impact, there is the potential for increased collision risk if cumulative developments encourage third party vessels to deviate towards vessels involved in surveys or cable repairs. Maintenance/monitoring work is expected to be less disruptive and span a shorter period than cable construction works.

As per the construction phase, project vessels will be managed by marine coordination, will display suitable marks and lights, will broadcast on AIS and be compliant with relevant Flag State and international regulations including the COLREGs and SOLAS.

Similar to the construction phase, details of major maintenance activities including any advisory clearance zones, as defined by risk assessment, will be suitably promulgated via NtM, Kingfisher, Radio Navigational Warnings, NAVTEX and/or broadcast warnings to maximise awareness of ongoing major maintenance activities.

As per the equivalent construction phase impact, collision incidents are local in nature, occurring only when two (or more) vessels pass within a small distance of each other within the same sea area. Therefore, the impact is as per the equivalent operational phase impact for the Marine Scheme in isolation.

Severity of Consequence

The most likely consequences in the event of a collision incident between a project vessel and third-party vessel are minor contact between the vessels resulting in minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario could involve one of the vessels foundering resulting in Potential Loss of Life (PLL) and the environmental consequence of pollution. Such a scenario would be more likely if the third-party vessel involved was a small craft which may have weaker structural integrity than a commercial vessel.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

The impact will be present throughout the operation and maintenance phase which will last for up to 35 years. With implementation of the designed in measures noted above, it is considered unlikely that an encounter between a third-party vessel and a project vessel will occur. In the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per COLREGs, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The likelihood of an encounter is decreased compared to the construction phase given the smaller scale of maintenance activities, although this is somewhat balanced by the much longer duration of the operation and maintenance phase.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of

broadly acceptable adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.2 Reduced access to local ports

There is the potential for increased disruption to port access during the operational phase due to cumulative developments, for example if surveys or repairs close to the Landfall in English waters overlap temporally with other cumulative developments.

Similar to the construction phase, details of major maintenance activities including any advisory clearance zones, as defined by risk assessment, will be suitably promulgated to maximise awareness of ongoing major maintenance activities.

Maintenance / repair vessels will be managed by marine coordination, will display appropriate marks and lights, broadcast on AIS and will be compliant with relevant Flag State regulations including the COLREGs, including rule 18 which applies to vessels which are RAM. Liaison with local ports and FLO will help to manage disruption. Therefore the impact is as per the equivalent operation and maintenance phase impact for the Marine Scheme in isolation.

Severity of Consequence

The overall timescale for any maintenance / repair works is expected to be less than for construction works. Such works may result in limited disruption to vessels crossing the Marine Scheme in English waters to access the Port of Blyth and crossing the Marine Scheme in Scottish waters to access ports in the Firth of Forth. Any required maintenance is expected to be localised in one area of the Marine Scheme and temporary in nature.

The severity of consequence is therefore considered to be **negligible**.

Frequency of Occurrence

The reduction in access is decreased compared to the construction phase given the smaller scale of maintenance activities, although this is somewhat balanced by the much longer duration of the operation and maintenance phase.

In English waters, the frequency of occurrence is therefore considered to be **extremely unlikely**.

In Scottish waters, the frequency of occurrence is considered to be **negligible** due to the small footprint of the works and ample sea room.

Significance of the effect

Overall, the severity of consequence is deemed to be negligible and the frequency of occurrence for the Marine Scheme in English waters is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine

Scheme in English waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

Overall, the severity of consequence is deemed to be negligible and the frequency of occurrence for the Marine Scheme in Scottish waters is considered to be negligible. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme in Scottish waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.3 Anchor interaction with subsea cable

The risk of anchor interaction with the Offshore Export Cables during the operational phase could be increased if cumulative developments are expected to lead to increased traffic across the Marine Scheme. Any deviation in traffic associated with the BBWF has been taken into consideration in the assessment in isolation.

The Blyth Demo Phase 2 in particular may cause slight deviations in traffic across the Marine Scheme in English waters, although it is assumed that this will be taken into consideration in the CBRA when defining suitable cable protection.

Given the distance of the other cumulative developments relative to the Marine Scheme, there is limited additional effect due to the presence of these developments.

During the operation and maintenance phase the cables will be marked on UKHO Admiralty Charts with associated note/warning about anchoring, trawling or seabed operations.

Therefore, the impact is as per the equivalent operational phase impact for the Marine Scheme in isolation.

Severity of Consequence

Once the cables are protected, either through burial and/or other protection measures, larger vessels (e.g. cargo vessels and tankers) are more likely to threaten the cables as their anchors are able to penetrate deeper into the seabed and can cause greater damage than smaller anchors (fishing and recreational vessels) if contact is made. The anchors of smaller vessels (e.g. fishing and recreational craft) are unlikely to penetrate as deeply. Suitable target burial depths, defined in a CBRA, will mitigate the risk from vessel anchors. Periodic monitoring will be undertaken to confirm cable protection remains suitable as detailed in **Volume 2, Chapter 5: Project Description.**

The most likely consequences are limited damage to property (anchoring vessel or subsea cable). The maximum adverse scenario may include damage to property including to the vessel's anchor or subsea cable.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

Protection of the cables via burial and/or external protection will reduce the frequency of occurrence of anchor interaction.

Although there may be limited decision-making time if a vessel is drifting towards a hazard, it is anticipated that the charting of infrastructure including all subsea cables will inform any decision to anchor, as per Regulation 34 of SOLAS.

The frequency of occurrence is considered to be **extremely unlikely**.

Significance of effect

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.4 Fishing gear interaction with subsea cable

The risk of fishing gear interaction with the Offshore Export Cables during the operational phase could be increased if cumulative developments are expected to lead to increased fishing activity across the Marine Scheme.

Any displacement of fishing vessels into the Marine Scheme is expected to be minimal. Therefore, the impact is as per the equivalent operational phase impact for the Marine Scheme in isolation.

During the operation and maintenance phase the cables will be marked on UKHO Admiralty Charts and KIS-ORCA charts with associated note/warning about anchoring, trawling or seabed operations.

A CBRA will be undertaken to provide a detailed assessment of fishing activity along the Marine Scheme and fishing gear penetration depths for the various soil conditions in order to determine suitable protection measures for the cables during the operation and maintenance phase.

Severity of Consequence

The planned cable protection is assumed to provide effective mitigation from fishing gear snagging, reducing the risk of serious consequences such as snagging, capsize of the vessel and PLL.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is considered to be **extremely unlikely**.

Significance of effect

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.5 Vessel grounding due to reduced under keel clearance

There could be an increased risk of vessel grounding due to reduced under keel clearance if cumulative projects were to lead to additional vessel movements over the Marine Scheme, particularly in areas where water depths are shallow.

The Blyth Demo Phase 2 in particular may cause slight deviations in traffic across the Marine Scheme in English waters, however given the nature of the vessel traffic crossing the Marine Scheme, deviated traffic is expected to follow similar routes to existing traffic.

Given the distance of the other cumulative developments relative to the cable route, there is limited additional effect due to the presence of these developments.

Therefore, the impact is as per the equivalent operational phase impact for the Marine Scheme in isolation.

Severity of Consequence

Should a vessel grounding occur, the most likely consequences are minor damage to property and minor reputational effects on business but no perceptible effect on people. The maximum adverse scenario may include the vessel foundering resulting in PLL and the environmental consequence of pollution.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

For the Marine Scheme in English waters, the frequency of occurrence is considered to be **remote**.

For the Marine Scheme in Scottish waters, the frequency of occurrence is considered to be **extremely unlikely.**

Significance of the Effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be remote for the Marine Scheme in English waters. The cumulative effect will, therefore, be of **tolerable** adverse significance for the Marine Scheme in English waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely for the Marine Scheme in Scottish waters. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme in Scottish waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.6 Interference with magnetic compasses

Interference with magnetic position fixing equipment is local in nature, occurring only when a vessel is located in proximity to a subsea cable. Accounting for the distance between the Marine Scheme and the cumulative developments, it is not anticipated that the presence of the cumulative developments will result in any change to this impact.

Severity of Consequence

The severity of consequence is considered to be **minor**.

Frequency of Occurrence

The frequency of occurrence is considered to be **extremely unlikely**.

Significance of the Effect

Overall, the severity of consequence is deemed to be minor and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.7 Potential Effects during Decommissioning

12.2.2.8 Increased vessel to vessel collision risk between a third-party vessel and a project vessel

There may also be an increased collision risk created during the decommissioning phase if decommissioning works were to overlap temporally with maintenance or decommissioning works associated with the cumulative development. for all passing traffic due to the presence of vessels associated with decommissioning works.

Severity of Consequence

Since the numbers and types of vessel used to remove the Offshore Export Cables are expected to be similar to those used for construction, this impact is expected to be similar in nature to the equivalent construction phase impact.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

The impact will be present throughout the decommissioning phase which is assumed to last for a similar timeframe as the construction period. With the designed in measures previously noted implemented, it is considered unlikely that an encounter between a third-party vessel and a project vessel will occur. As per the equivalent construction phase impact, in the event that such an encounter does occur, collision avoidance action would be implemented by the vessels as per the COLREGs, thus ensuring that the likelihood of the encounter developing into a collision incident is very low.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of the effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.9 Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels

There may also be a risk of vessel displacement leading to increased vessel to vessel collision risk between third-party vessels created during the decommissioning phase if cumulative developments lead to further displacement of vessels around the developments.

Severity of consequence

Since the numbers and types of vessel used to remove the Offshore Export Cables are expected to be similar to those used for construction, this impact is expected to be similar in nature to the equivalent construction phase impact.

The severity of consequence is therefore considered to be **moderate**.

Frequency of Occurrence

The impact will be present throughout the decommissioning phase which is assumed to last for a similar timeframe as the construction period. Given that third-party vessels are expected to be compliant with Flag State regulations including the COLREGs, the likes of collision avoidance action ensure that the likelihood of an encounter developing into a collision incident is low. This is furthered by the promulgation of information which will maximise awareness of ongoing decommissioning activities, thus allowing third-party vessels to passage plan in advance.

The frequency of occurrence is therefore considered to be **extremely unlikely**.

Significance of the effect

Overall, the severity of consequence is deemed to be moderate and the frequency of occurrence is considered to be extremely unlikely. The cumulative effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme as a whole cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

12.2.2.10 Reduced access to local ports

There may be potential for further reduced access to local ports during the decommissioning phase if maintenance or decommissioning works associated with cumulative developments were to overlap temporally with the decommissioning of the Marine Scheme.

Project vessels will be managed by marine coordination, will display appropriate marks and lights, broadcast on AIS (where available) and will be compliant with relevant Flag State regulations including the COLREGs, including rule 18 which applies to vessels which are RAM. Liaison with local ports and FLO will help to manage disruption.

With the designed in measures listed above, the effect due to the presence of cumulative developments is anticipated to be manageable.

Severity of Consequence

Since the numbers and types of vessels used to remove the Offshore Export Cables are expected to be similar to those used for construction, this impact is expected to be similar in nature to the equivalent construction phase impact.

The severity of consequence is therefore considered to be **minor**.

Frequency of Occurrence

The impact will be present throughout the decommissioning phase which is assumed to last for a similar timeframe as the construction period. Cumulative developments may lead to an increase in the number of vessels crossing the Marine Scheme in English waters to access the Port of Blyth and crossing the Marine Scheme in Scottish waters to access ports in the Firth of Forth.

However, due to the distance between the Port of Blyth and the Marine Scheme, and the localised and temporary nature of decommissioning works, the disruption to port access is reduced.

For the Marine Scheme in English waters, the frequency of occurrence is considered to be **remote**.

For the Marine Scheme in Scottish waters, the frequency of occurrence is considered to be **extremely unlikely.**

Significance of the effect

The severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in English waters is considered to be remote. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme in English waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

The severity of consequence is deemed to be minor and the frequency of occurrence for the Marine Scheme in Scottish waters is considered to be extremely unlikely. The effect will, therefore, be of **broadly acceptable** adverse significance for the Marine Scheme in Scottish waters cumulatively with other relevant plans, developments and activities, which is not significant in EIA terms.

13 Risk Control Log

Table 13.1 presents a summary of the assessment of shipping and navigation hazards scoped into the risk assessment. This includes the proposed mitigation measures, frequency of occurrence, severity of consequence and significance of risk, per hazard.

Table 13.1 Risk control log

Phase	Hazard	Measure[14]	Frequency of Occurrence	Severity of Consequence	Significance of Risk
Construction	Increased vessel to vessel collision risk between a third-party vessel and a project vessel	Promulgation of Information	**Extremely Unlikely**	**Moderate**	**Broadly Acceptable**
		Lighting and marking of project vessels			
		Temporary AtoNs			
		Guard vessels and advisory safe passing distances			
		Marine coordination			
		Compliance with COLREGs and SOLAS			
		Liaison with ports and harbours			
		FLO / recreational user notifications			
	Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels	Promulgation of Information	**Extremely Unlikely**	**Moderate**	**Broadly Acceptable**
		Guard vessels and advisory safe passing distances			

[14] Measures are summarised here and are detailed in full in section 10.

Phase	Hazard	Measure[14]	Frequency of Occurrence	Severity of Consequence	Significance of Risk
		Liaison with ports and harbours			
		FLO / recreational user notifications			
		Compliance with COLREGs and SOLAS			
	Reduced access to local ports	Promulgation of Information	**Extremely Unlikely in Scottish Waters** **Remote in English Waters**	**Minor**	**Broadly Acceptable**
		Marine coordination			
		Lighting and marking of project vessels			
		Compliance with COLREGs and SOLAS			
		Liaison with ports and harbours			
		FLO / recreational user notifications			
	Anchor interaction with exposed subsea cable between laying and protection campaigns	Promulgation of Information	**Extremely Unlikely**	**Moderate**	**Broadly Acceptable**
		Guard vessels			
	Fishing gear interaction with exposed subsea cable between laying and protection campaigns	Promulgation of Information	**Remote**	**Serious**	**Tolerable**
		Guard vessels and advisory safe passing distances			

Phase	Hazard	Measure[14]	Frequency of Occurrence	Severity of Consequence	Significance of Risk
		FLO / recreational user notifications			
Operations and Maintenance	Increased vessel to vessel collision risk between a third-party vessel and a project vessel	Promulgation of Information	**Extremely Unlikely**	**Moderate**	**Broadly Acceptable**
		Lighting and marking of project vessels			
		Marine coordination			
		Compliance with COLREGs and SOLAS			
		Guard vessels and advisory safe passing distances			
	Reduced access to local ports	Promulgation of Information	**Negligible in Scottish Waters** **Extremely Unlikely in English Waters**	**Negligible**	**Broadly Acceptable**
		Marine coordination			
		Lighting and marking of project vessels			
		Compliance with COLREGs and SOLAS			
		Liaison with ports and harbours			
		FLO / recreational user notifications			

Phase	Hazard	Measure[14]	Frequency of Occurrence	Severity of Consequence	Significance of Risk
	Anchor interaction with subsea cable	As-Built Information	**Extremely Unlikely**	**Minor**	**Broadly Acceptable**
		Cable Plan			
		Cable Burial			
		Rock protection			
		Monitoring of cable burial and protection			
	Fishing gear interaction with subsea cable	As-Built Information	**Extremely Unlikely**	**Minor**	**Broadly Acceptable**
		Cable Plan			
		Cable Burial			
		Rock protection			
		Monitoring of cable burial and protection			
	Vessel grounding due to reduced under keel clearance	Compliance with MGN 654	**Extremely Unlikely in Scottish Waters** **Remote in English Waters**	**Moderate**	**Broadly Acceptable in Scottish Waters** **Tolerable in English Waters**
	Interference with magnetic position fixing equipment	Compass deviation effects minimised	**Extremely Unlikely**	**Minor**	**Broadly Acceptable**
Decommissioning	Increased vessel to vessel collision risk between a third-party vessel and a project vessel	Promulgation of Information	**Extremely Unlikely**	**Moderate**	**Broadly Acceptable**
		Lighting and marking of project vessels			
		Temporary AtoNs			

Phase	Hazard	Measure[14]	Frequency of Occurrence	Severity of Consequence	Significance of Risk
		Guard vessels and advisory safe passing distances			
		Marine coordination			
		Compliance with COLREGs and SOLAS			
		Liaison with ports and harbours			
		FLO / recreational user notifications			
	Vessel displacement leading to increased vessel to vessel collision risk between third-party vessels	Promulgation of Information	**Extremely Unlikely**	**Moderate**	**Broadly Acceptable**
		Guard vessels and advisory safe passing distances			
		Liaison with ports and harbours			
		FLO / recreational user notifications			
		Compliance with COLREGs and SOLAS			
	Reduced access to local ports	Promulgation of Information	**Extremely Unlikely in Scottish Waters**	**Minor**	**Broadly Acceptable**
		Marine coordination			

Phase	Hazard	Measure[14]	Frequency of Occurrence	Severity of Consequence	Significance of Risk
		Lighting and marking of project vessels	**Remote in English Waters**		
		Compliance with COLREGs and SOLAS			
		Liaison with ports and harbours			
		FLO / recreational user notifications			

14 Proposed Mitigation and Monitoring

14.1 Additional Mitigation

Proposed additional mitigation measures to ensure tolerable risks are ALARP are as follows:

- The period during which the subsea cables are surface laid and not yet buried or protected – and thus exposed to the impact – should be reduced so far as practicable. This reduces the risk of vessel anchors and fishing gear snagging on surface-laid cable should there be a period of time between cable lay and protection when the cable is surface-laid.

14.2 Monitoring

14.2.1 Cable Protection

The subsea cable routes will be subject to periodic inspection post-construction to monitor the cable protection, including burial depths. Maintenance of the protection will be undertaken as necessary.

If exposed cables or ineffective protection measures are identified during post-construction monitoring, these would be promulgated to relevant sea users including via Notice to Mariners and Kingfisher Bulletins. Where immediate risk was observed, the Applicant would also employ additional temporary measures where appropriate (such as a guard vessel or temporary buoyage) until such time as the risk was permanently mitigated.

Details will be included in full within the Cable Plan.

14.2.2 Compass Deviation

A compass deviation modelling study will be undertaken post consent, once the detailed design and cable configuration is available. This will determine whether the compass deviation limits set by the MCA can be met. If it cannot be demonstrated that MCA deviation requirements can be met pre-construction, a post construction compass deviation survey of the 'as laid' Offshore Export Cable Route will be undertaken.

14.2.3 Hydrographic Surveys

Detailed and accurate hydrographic surveys will be undertaken periodically at intervals agreed with the MCA.

15 Summary

Using baseline data, expert opinion and the outputs of consultation, impacts relating to shipping and navigation have been identified for the proposed Marine Scheme for all phases of the development (construction, operation and maintenance and decommissioning). This has been fed into the FSA undertaken in section 10.

15.1 Consultation

Throughout the NRA process, consultation has been undertaken with key shipping and navigation stakeholders including:

- MCA;
- Trinity House;
- NLB;
- RYA;
- Cruising Association;
- UK Chamber of Shipping;
- Port of Blyth; and
- MOD.

In addition, Forth Ports were consulted through the MD-LOT Scoping Opinion.

15.2 Baseline Environment

15.2.1 Navigational Features

Key navigational features in the area include a firing practice area which is intersected by approximately 26 nm of the mid-section of the Offshore Export Cable Corridor, as well as submarine exercise areas which intersect the Marine Scheme within the BBWF array area.

The closest port is the Port of Blyth, the entrance of which is located 1.4 nm south of the Landfall. The Offshore Export Cable Corridor lies just outside of the Seaward Limit of Blyth Harbour Commission at its Landfall. The closest anchorage area is located 2.5 nm south, outside the Port of Blyth.

The fully commissioned Blyth Demo Phase 1 is located 1.1 nm south of the Offshore Export Cable Corridor while Blyth Demo Phase 2 has been consented and site boundaries are located 0.3 nm north and 1.1 nm south.

The Marine Scheme overlaps two operational cables close to the Landfall, with a further two located to the south of the Landfall. Another proposed cable crosses the Marine Scheme further offshore.

There are five buoys located within the Marine Scheme boundary, with four scientific buoys located within the BBWF array area, and a further buoy situated in the north of the Offshore Export Cable Corridor, to the east of Berwick Bank.

15.2.2 Maritime Incidents

An average of four incidents per year was reported by the MAIB within the Shipping and Navigation Study Area between 2010 and 2019. Incidents were mainly recorded close to shore. The most frequently recorded incident types were machinery failure and accident to person, while fishing vessels and 'other commercial' vessels made up the majority of vessel types involved. Two incidents took place within the Offshore Export Cable Corridor close to the Landfall. One incident involved a fishing vessel suffering machinery failure and one was a minor contact between a SAR vessel and the quay during berthing, which did not result in significant damage.

An average of 31 incidents per year was responded to by the RNLI within the Shipping and Navigation Study Area between 2010 and 2019, the majority of which were within 3 nm of the coast. Person in danger and machinery failure were the most frequently recorded incident types. The most common types of vessel involved were recreational vessels and fishing vessels. 11 incidents took place within the Marine Scheme, most of which were close to the Landfall, most commonly person in danger.

15.2.3 Vessel Traffic Movements

Based on the six months of AIS vessel traffic data, there was an average of approximately 39 unique vessels per day recorded within the Shipping and Navigation Study Area. The most common vessel types recorded were commercial fishing vessels, tankers and cargo vessels. Cargo vessels and tankers were recorded throughout the Shipping and Navigation Study Area, with prominent routes noted transiting north/south past Blyth and to/from the Firth of Forth.

The smallest vessels in the Shipping and Navigation Study Area were typically fishing, recreational and pilot vessels, and were generally recorded close to shore, particularly at the Landfall at Blyth. The largest vessels were typically cargo vessels and tankers, frequently recorded on north/south routes or heading to/from Forth Ports, further offshore.

Fishing vessel activity was recorded throughout the Shipping and Navigation Study Area, particularly to the south of the Marine Scheme close to Blyth and within the BBWF array area. The most common types of fishing recorded were demersal trawlers and potters/whelkers.

The majority of anchored vessels were associated with the charted anchorage area close to the Port of Blyth and were mainly cargo vessels, 'other' vessels, oil and gas vessels and tankers. A small number of anchored vessels were also recorded in the north of the Marine Scheme.

15.3 Future Case Vessel Traffic

It is anticipated that commercial vessel traffic will navigate around the Blyth Demo Phase 2, which could impact vessel routeing near the Landfall. In addition, the construction of the BBWF could alter vessel routeing at the northern section of the Marine Scheme as commercial vessels are expected to navigate around the wind farm.

Port statistics showed a reduction in port arrivals from 2017 to 2021. The Port of Blyth is currently undergoing major redevelopment works at one of its terminals, which may lead to an increase in vessel traffic. Vessel traffic at the Port of Aberdeen is also estimated to increase, with the addition of the new South Harbour, which could increase the number of vessels transiting across the Offshore Export Cable Corridor.

Fishing activity was significant within 3 nm of the coast, with a lower level of activity recorded further offshore. Fishing trends are difficult to predict and can depend on various influencing factors such as fish stocks, quotas, and any continuing changes in legislation post-Brexit.

Recreational activity may remain similar or increase slightly in future years, due to population growth and longer life expectancies, which means people have more leisure time. However, this can also be impacted by factors such as weather and the economy.

15.4 Risk Statement

Using the baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments, various shipping and navigation hazards have been risk assessed in line with the FSA approach. The full risk control log including details of hazards, proposed embedded mitigation measures and significance of risk is presented in Section 13.

The significance of risk has been determined as either **Broadly Acceptable** or **Tolerable** for all hazards assessed. Proposed additional mitigation measures to ensure tolerable risks are ALARP are as follows:

- The period during which the subsea cables are surface laid and not yet buried or protected, and thus exposed to the impact, should be reduced so far as practicable. This reduces the risk of vessel anchors and fishing gear snagging on surface-laid cable should there be a period of time between cable lay and protection when the cable is surface-laid.

Appendix A Marine Guidance Note 654 Checklist

The MGN 654 Checklist can be divided into two distinct checklists, one considering the main MGN 654 guidance document and one considering the Methodology for Assessing Marine Navigational Safety and Emergency Response Risks of OREIs which serves as Annex 1 to MGN 654 (Ref. i).

Due to the nature of the proposed Marine Scheme, which consists of an Offshore Export Cable Corridor only and no surface infrastructure, certain aspects of the checklists are not relevant.

The checklist for the main MGN 654 guidance document is presented in Table A.1. Following this, the checklist for the MCA's methodology annex is presented in Table A.2. For both checklists, references to where the relevant information and/or assessment is provided in the NRA is given.

Table A.1 MGN 654 Checklist for main document

Issue	Compliance	Comments
Site and Construction Coordinates. Developers are responsible for ensuring that formally agreed coordinates and subsequent variations of site perimeters and individual OREI structures are made available, on request, to interested parties at relevant project stages, including application for consent, development, array variation, operation and decommissioning. This should be supplied as authoritative Geographical Information System (GIS) data, preferably in Environmental Systems Research Institute (ESRI) format. Metadata should facilitate the identification of the data creator, its date and purpose, and the geodetic datum used. For mariners' use, appropriate data should also be provided with latitude and longitude coordinates in WGS84 (European Terrestrial Reference System 1989 (ETRS89)) datum.		
Traffic Survey. Includes:		
All vessel types.	✓	**Section 9: Vessel Traffic Movements** All vessel types are considered with specific breakdowns by vessel type given within the Shipping and Navigation Study Area. Additional data sources and consultation used to supplement AIS data for vessels not on AIS (e.g. small fishing vessels and recreational craft).
At least 28 days duration, within either 12 or 24 months prior to submission of the ES.	✓	**Section 6: Data Sources** A total of six months of AIS data between November 2021 and July 2022 has been assessed within the Shipping and Navigation Study Area.
Multiple data sources.	✓	**Section 6: Data Sources** AIS data supplemented with 28 days of AIS, Radar and visual observations for the BBWF array area, as well as additional data sources for fishing vessels and recreational craft, and consultation. Use of AIS data as the primary source was agreed with key stakeholders during consultation.

Issue	Compliance	Comments
Seasonal variations.	✓	**Section 6: Data Sources** Three months winter (November 2021 to February 2022) and three months summer (May to July 2022) has been assessed within the Shipping and Navigation Study Area.
MCA consultation.	✓	**Section 4: Consultation** The MCA has been consulted as part of the NRA process.
General Lighthouse Authority (GLA) consultation.	✓	**Section 4: Consultation** Trinity House and NLB have been consulted as part of the NRA process.
UK Chamber of Shipping consultation.	✓	**Section 4: Consultation** The UK Chamber of Shipping has been consulted as part of the NRA process.
Recreational and fishing vessel organisations consultation.	✓	**Section 4: Consultation** The RYA has been consulted as part of the NRA process. Fishing vessel organisations were consulted via the commercial fisheries, presented in **Volume 2, Chapter 12: Commercial Fisheries**.
Port and navigation authorities consultation, as appropriate.	✓	**Section 4: Consultation** The Port of Blyth has been consulted as part of the NRA process.
Assessment of the cumulative and individual effects of (as appropriate):		
i. Proposed OREI site relative to areas used by any type of marine craft.	✓	**Section 9: Vessel Traffic Movements** Vessel traffic data in proximity to the proposed Marine Scheme has been analysed. **Section 10: Impact Assessment** The hazards due to the Marine Scheme have been assessed for each phase. **Section 12: Cumulative Impacts** Cumulative hazards due to the Marine Scheme have been assessed for each phase.
ii. Numbers, types and sizes of vessels presently using such areas.	✓	**Section 9: Vessel Traffic Movements** Vessel traffic data in proximity to the Marine Scheme has been analysed and includes breakdowns of daily vessel count, vessel type and vessel size.
iii. Non-transit uses of the areas, e.g., fishing, day cruising of leisure craft, racing, aggregate dredging, personal watercraft, etc.	✓	**Section 7: Navigational Features** Non-transit uses of the areas in proximity to the Marine Scheme have been identified, including pilotage and anchorage areas. **Section 9: Vessel Traffic Movements** Non-transit users were identified in the vessel traffic survey data and included fishing vessels engaged in fishing activities, dredgers engaged in maintenance dredging activities, pilotage activities, anchoring activities and recreational activities.

Issue	Compliance	Comments
iv. Whether these areas contain transit routes used by coastal or deep-draught vessels on passage.	✓	**Section 9: Vessel Traffic Movements** Main commercial routes have been identified using the principles set out in MGN 654 in proximity to the Marine Scheme, with these routes taking into account coastal, deep-draught and internationally scheduled vessels.
v. Alignment and proximity of the site relative to adjacent shipping lanes.	✓	**Section 7: Navigational Features** Main navigational features have been identified, including checking for any IMO routeing measures in proximity to the Marine Scheme. No IMO routeing measures were identified.
vi. Whether the nearby area contains prescribed routeing schemes or precautionary areas.	✓	**Section 7: Navigational Features** No IMO routeing measures in proximity to the Marine Scheme. Section 7.3 identifies the military PEXAs and firing practice areas in proximity to the Marine Scheme.
vii. Proximity of the site to areas used for anchorage (charted or uncharted), safe haven, port approaches and pilot boarding or landing areas.	✓	**Section 7: Navigational Features** Port approaches, anchorage areas and pilot boarding stations in proximity to the Marine Scheme are identified in section 7.2.
viii. Whether the site lies within the jurisdiction of a port and/or navigation authority.	✓	**Section 7: Navigational Features** Section 7.2 identifies the locations of ports in proximity to the Marine Scheme. The Marine Scheme Boundary Landfall lies to the south of the Seaward Limit of Blyth Harbour Commission.
ix. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✓	**Section 9: Vessel Traffic Movements** Fishing vessel movements are considered within the Shipping and Navigation Study Area in section 9.4.2. Detailed analysis of dedicated fishing vessel activities is undertaken in **Volume 2, Chapter 12: Commercial Fisheries**.
x. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✓	**Section 7: Navigational Features** Section 7.3 identifies military PEXAs in proximity to the Marine Scheme.
xi. Proximity of the site to existing or proposed submarine cables or pipelines, offshore oil/gas platforms, marine aggregate dredging, marine archaeological sites or wrecks, Marine Protected Areas or other exploration/exploitation sites.	✓	**Section 7: Navigational Features** The navigational features, including existing and proposed infrastructure, dredging areas and wrecks, are presented in section 7. Section 7.5 identifies existing and proposed cables and pipelines in the vicinity of the Marine Scheme. No marine aggregate dredging areas were identified. Charted wrecks are discussed in section 7.7. **Section 12: Cumulative Impacts** Cumulative impacts with proposed developments in proximity to the Marine Scheme are considered.

Issue	Compliance	Comments
xii. Proximity of the site to existing or proposed OREI developments, in cooperation with other relevant developers, within each round of lease awards.	✓	**Section 7: Navigational Features** Section 7.4 identifies other offshore wind farm developments in proximity to the Marine Scheme. **Section 12: Cumulative Impacts** Considers other OREI sites in proximity to the Marine Scheme cumulatively.
xiii. Proximity of the site relative to any designated areas for the disposal of dredging spoil or other dumping ground.	✓	**Section 7: Navigational Features** Section 7 identifies spoil and dumping rounds in proximity to the Marine Scheme.
xiv. Proximity of the site to aids to navigation and/or VTS in or adjacent to the area and any impact thereon.	✓	**Section 7: Navigational Features** Section 7.2 details VTS areas in proximity to the Marine Scheme and section 7.6 identifies aids to navigation in proximity to the Marine Scheme.
xv. Researched opinion using computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density and nearby or consented OREI sites not yet constructed.	✓	No permanent displacement of traffic and no choke points are anticipated.
xvi. With reference to xv. above, the number and type of incidents to vessels which have taken place in or near to the proposed site of the OREI to assess the likelihood of such events in the future and the potential impact of such a situation.	✓	**Section 8: Emergency Response Overview** Historical vessel incident data published by DfT (section 8.1), RNLI and MAIB in proximity to the Marine Scheme has been reviewed.
xvii. Proximity of the site to areas used for recreation which depend on specific features of the area.	✓	**Section9.4.3 9: Vessel Traffic Movements** Recreational users of the site are considered in section 9.4.3, including vessels identified on AIS and using the RYA Coastal Atlas to identify general boating areas and facilities.
Predicted effect of OREI on traffic and interactive boundaries. Where appropriate, the following should be determined:		
a. The safe distance between a shipping route and OREI boundaries.	✓	Not applicable for subsea cables
b. The width of a corridor between sites or OREIs to allow safe passage of shipping.	✓	Not applicable for subsea cables
OREI Structures. The following should be determined:		

Issue	Compliance	Comments
a. Whether any feature of the OREI, including auxiliary platforms outside the main generator site, mooring and anchoring systems, inter-device and export cabling could pose any type of difficulty or danger to vessels underway, performing normal operations, including fishing, anchoring and emergency response.	✓	**Section 10: Impact Assessment** The hazards due to the Marine Scheme have been assessed for each phase and include consideration of users such as commercial vessels, fishing vessels, recreational vessels and anchored vessels.
b. Clearances of fixed or floating WTG blades above the sea surface are not less than 22 m (above Mean High Water Springs (MHWS) for fixed). Floating turbines allow for degrees of motion.	✓	Not applicable for subsea cables
c. Underwater devices: i. Changes to charted depth; ii. Maximum height above seabed; and iii. Under keel clearance.	✓	Section 5.3 outlines the shipping and navigation MDS for subsea cables including the cable burial and protection specifications.
d. Whether structures block or hinder the view of other vessels or other navigational features.	✓	Not applicable for subsea cables
The effect of tides, tidal streams and weather. It should be determined whether:		
a. Current maritime traffic flows and operations in the general area are affected by the depth of water in which the proposed construction is situated at various states of the tide, i.e. whether the construction could pose problems at high water which do not exist at low water conditions, and vice versa.	✓	**Section 9: Vessel Traffic Movements** Vessel traffic data in proximity to the Marine Scheme has been analysed including vessel draught. **Section 10: Impact Assessment** Provides assessment of vessel grounding due to reduced under keel clearance, which could present higher impact during low water conditions.
b. The set and rate of the tidal stream, at any state of the tide, has a significant effect on vessels in the area of the OREI site.	✓	Not applicable for subsea cables
c. The maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.	✓	

Issue	Compliance	Comments
d. The set is across the major axis of the layout at any time, and, if so, at what rate.	✓	
e. In general, whether engine failure or other circumstance could cause vessels to be set into danger by the tidal stream, including unpowered vessels and small, low speed craft.	✓	Not applicable for subsea cables
f. The structures themselves could cause changes in the set and rate of the tidal stream.	✓	Not applicable for subsea cables
g. The structures in the tidal stream could be such as to produce siltation, deposition of sediment or scouring, affecting navigable water depths in the wind farm area or adjacent to the area.	✓	**Section 10: Impact Assessment** The hazards due to the Marine Scheme have been assessed for each phase and include consideration of the potential for reduction in under keel clearance.
h. The site, in normal, bad weather, or restricted visibility conditions, could present difficulties or dangers to craft, including sailing vessels, which might pass in close proximity to it.	✓	Not applicable for subsea cables
i. The structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.	✓	Not applicable for subsea cables
j. In general, taking into account the prevailing winds for the area, whether engine failure or other circumstances could cause vessels to drift into danger, particularly if in conjunction with a tidal set such as referred to above.	✓	Not applicable for subsea cables
Assessment of access to and navigation within, or close to, an OREI. To determine the extent to which navigation would be feasible within the OREI site itself by assessing whether:		
a. Navigation within or close to the site would be safe:		
i. For all vessels.	✓	No restriction to access associated with subsea cables

Issue	Compliance	Comments
ii. For specified vessel types, operations and/or sizes.		
iii. In all directions or areas.		
iv. In specified directions or areas.		
v. In specified tidal, weather or other conditions.		
b. Navigation in and/or near the site should be prohibited or restricted:		
i. For specified vessel types, operations and/or sizes.	✓	No restriction to access associated with subsea cables
ii. In respect of specific activities.	✓	
iii. In all areas or directions.	✓	
iv. In specified areas or directions.	✓	
v. In specified tidal or weather conditions.	✓	
c. Where it is not feasible for vessels to access or navigate through the site it could cause navigational, safety or routeing problems for vessels operating in the area, e.g., by preventing vessels from responding to calls for assistance from persons in distress.	✓	No restriction to access associated with subsea cables
d. Guidance on the calculation of safe distance of OREI boundaries from shipping routes has been considered.	✓	Not applicable for subsea cables
SAR, maritime assistance service, counter pollution and salvage incident response.		
The MCA, through HM Coastguard, is required to provide SAR and emergency response within the sea area occupied by all OREIs in UK waters. To ensure that such operations can be safely and effectively conducted, certain requirements must be met by developers and operators.		

Issue	Compliance	Comments
a. An ERCoP will be developed for the construction, operation and decommissioning phases of the OREI.	✓	**Section 4: Consultation** Full ERCoP not required. MEAC is appropriate.
b. The MCA's guidance document *Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for Search and Rescue and Emergency Response* (MCA, 2021) for the design, equipment and operation requirements will be followed.	✓	**Section 2: Guidance and Legislation** Outlines the guidance and legislation used within the NRA including Annex 5 of MGN 654.
c. A SAR checklist will be completed to record discussions regarding the requirements, recommendations and considerations outlined in Annex 5 (to be agreed with MCA).	✓	**Section 4: Consultation** Booster station or any other surface infrastructure not included within the Marine Scheme specifications, therefore SAR Checklist not required.
6. Hydrography. In order to establish a baseline, confirm the safe navigable depth, monitor seabed mobility and to identify underwater hazards, detailed and accurate hydrographic surveys are included or acknowledged for the following stages and to MCA specifications:		
i. Pre-construction: The proposed generating assets area and proposed cable route.	✓	**Section 14: Proposed Mitigation and Monitoring** Confirms that hydrographic surveys will be undertaken in agreement with the MCA.
ii. On a pre-established periodicity during the life of the development.	✓	
iii. Post construction: Cable route(s).	✓	
iv. Post decommissioning of all or part of the development: the installed generating assets area and cable route.	✓	
Communications, Radar and positioning systems. To provide researched opinion of a generic and, where appropriate, site specific nature concerning whether:		
a. The structures could produce radio interference such as shadowing, reflections or phase changes, and emissions with respect to any frequencies used for marine positioning, navigation and timing (PNT) or communications, including GMDSS and AIS, whether ship borne, ashore or fitted to any of the proposed structures, to:		
i. Vessels operating at a safe navigational distance.	✓	Not applicable for subsea cables

Issue	Compliance	Comments
ii. Vessels by the nature of their work necessarily operating at less than the safe navigational distance to the OREI, e.g., support vessels, survey vessels, SAR assets.	✓	
iii. Vessels by the nature of their work necessarily operating within the OREI.	✓	
b. The structures could produce Radar reflections, blind spots, shadow areas or other adverse effects:		
i. Vessel to vessel.	✓	Not applicable for subsea cables
ii. Vessel to shore.	✓	
iii. VTS Radar to vessel.	✓	
iv. Racon to/from vessel.	✓	
c. The structures and generators might produce SONAR interference affecting fishing, industrial or military systems used in the area.	✓	Not applicable for subsea cables.
d. The site might produce acoustic noise which could mask prescribed sound signals.	✓	Not applicable for subsea cables
e. Generators and the seabed cabling within the site and onshore might produce EMFs affecting compasses and other navigation systems.	✓	**Section 10: Impact Assessment** Assesses the potential risks associated with the use of navigation, communication and position fixing equipment due to the Marine Scheme in relation to electromagnetic interference.
Risk mitigation measures recommended for OREI during construction, operation and decommissioning.		
Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the EIA. The specific measures to be employed will be selected in consultation with the MCA and will be listed in the developer's ES. These will be consistent with international standards contained in, for example, SOLAS Chapter V (IMO, 1974), and could include any or all of the following:		
i. Promulgation of information and warnings through notices to mariners and other appropriate MSI dissemination methods.	✓	**Section 10: Embedded Mitigation Measures** Outlines the embedded mitigation measures to be implemented to reduce the significance of risk of shipping and navigation hazards including promulgation of information.
ii. Continuous watch by multi-channel VHF, including DSC.	✓	**Section10: Embedded Mitigation Measures** Outlines the embedded mitigation measures to be implemented to reduce the significance of risk of shipping and navigation hazards including marine coordination.

Issue	Compliance	Comments
iii. Safety zones of appropriate configuration, extent and application to specified vessels[15].	✓	Not applicable for subsea cables
iv. Designation of the site as an Area to be Avoided (ATBA).	✓	Not applicable for subsea cables
v. Provision of aids to navigation as determined by the GLA.	✓	**Section 10: Embedded Mitigation Measures** Outlines the embedded mitigation measures to be implemented to reduce the significance of risk of shipping and navigation hazards including aids to navigation in accordance with Trinity House, NLB and MCA requirements.
vi. Implementation of routeing measures within or near to the development.	✓	There are no plans to implement any new routeing measures in proximity to the Marine Scheme
vii. Monitoring by Radar, AIS, Closed Circuit Television (CCTV) or other agreed means.	✓	Not applicable for subsea cables
viii. Appropriate means for OREI operators to notify, and provide evidence of, the infringement of Safety Zones.	✓	Not applicable for subsea cables
ix. Creation of an ERCoP with the MCA's SAR Branch for the construction phase onwards.	✓	**Section 4: Consultation** Full ERCoP not required. MEAC is appropriate.
x. Use of guard vessels, where appropriate.	✓	**Section 10: Embedded Mitigation Measures** Outlines the embedded mitigation measures to be implemented to reduce the significance of risk of shipping and navigation hazards including the use of guard vessels.
xi. Update NRAs every two years, e.g. at testing sites.	✓	Not applicable to the Marine Scheme
xii. Device-specific or array-specific NRAs.	✓	**Section 5: Project Description Relevant to Shipping and Navigation** All offshore elements of the Marine Scheme have been considered in this NRA.
xiii. Design of OREI structures to minimise risk to contacting vessels or craft.	✓	Not applicable for subsea cables
xiv. Any other measures and procedures considered appropriate in consultation with other stakeholders.	✓	**Section 10: Embedded Mitigation Measures** Outlines the embedded mitigation measures to be implemented to reduce the significance of risk of shipping and navigation hazards.

[15] As per SI 2007 No 1948 "The Electricity (Offshore Generating Stations) (Safety Zones) (Application Procedures and Control of Access) Regulations 2007.

Table A.2 MGN 654 Annex 1 checklist

Item	Compliance	Comments
A risk claim is included that is supported by a reasoned argument and evidence.	✓	**Section 10: Impact Assessment** The impact assessment provides a risk claim for a range of hazards based on a number of inputs including (but not limited to) baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments.
Description of the marine environment.	✓	**Section 7: Navigational Features** Relevant navigational features in proximity to the Marine Scheme have been described including (but not limited to) other offshore wind farm developments, ports, harbours and related facilities, charted anchorage areas, aids to navigation, subsea cables, military PEXAs, firing practice areas and charted wrecks. **Section 12: Cumulative Impacts** Potential future developments have been screened in to the cumulative risk assessment where a cumulative activity has been identified based upon the location and distance from the Marine Scheme, including consideration of other subsea cable projects and offshore wind farms.
SAR overview and assessment.	✓	**Section 8: Emergency Response Overview** Existing SAR resources in proximity to the Marine Scheme are summarised including the UK SAR operations contract, RNLI stations and assets and HMCG stations.
Description of the OREI development and how it changes the marine environment.	✓	**Section 5: Project Description Relevant to Shipping and Navigation** The maximum extent of the Marine Scheme for which any shipping and navigation hazards are assessed is provided including a description of the Offshore Export Cable Corridor infrastructure, construction phase programme and indicative vessels used during the construction and operation and maintenance phases. No permanent alternative routeing is anticipated for the Marine Scheme.
Analysis of the marine traffic, including base case and future traffic densities and types.	✓	**Section 9: Vessel Traffic Movements** Vessel traffic data in proximity to the Marine Scheme has been analysed and includes vessel density and breakdowns of vessel type. This includes potential changes in future vessel traffic.
Status of the hazard log: ▪ Hazard identification; ▪ Risk assessment; ▪ Influences on level of risk; ▪ Tolerability of risk; and ▪ Risk matrix.	✓	**Section 3: Navigational Risk Assessment Methodology** A tolerability matrix has been defined to determine the tolerability (significance) of risks.

Item	Compliance	Comments
NRA: ▪ Appropriate risk assessment; ▪ MCA acceptance for assessment techniques and tools; ▪ Demonstration of results; and ▪ Limitations.	✓	**Section 2: Guidance and Legislation** MGN 654 and the IMO's FSA guidelines are the primary guidance documents used for the assessment. **Section 10: Impact Assessment** Provides qualitative and quantitative risk assessment (using FSA) for the hazards identified due to the Marine Scheme, based on baseline data, expert opinion, stakeholder concerns and lessons learnt from existing offshore developments.
Risk control log	✓	**Section 13: Risk Control Log** Provides the risk control log which summarises the assessment of shipping and navigation hazards scoped into the risk assessment. This includes the proposed embedded mitigation measures, frequency of occurrence, severity of consequence and significance of risk, per hazard.

16 References

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