MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Environmental Statement

Volume 2, Annex 7.1: Navigation risk assessment – Part 1 of 2

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Glossary

Term	Meaning
Adverse Weather	Severe weather that creates potentially unsafe conditions for vessel transits.
Allision/Contact	Vessel makes contact with a fixed or floating object such as wind turbine.
Anchorage	A designated area where ships lower their anchors to remain in position.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
As Low As Reasonably Practicable	The principle that risk should be reduced as far as possible before further reduction is disproportionate to the costs of doing so.
Automatic Identification System	A system by which vessels automatically broadcast their identity, key statistics including location, destination, length, speed and current status.
Baseline	The status of the environment without the Transmission Assets in place.
Collision	The act or process of colliding (crashing) between two moving objects.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the Environmental Statement (ES).
Cumulative Effects	The combined effect of the Transmission Assets in combination with the effects from other proposed developments, on the same receptor or resource.
Cumulative Regional Navigation Risk Assessment	A Navigation Risk Assessment undertaken by the Applicants to review the cumulative shipping and navigation risk of the Crown Estate Offshore Wind Leasing Round 4 within the Irish Sea.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Draught	The maximum depth of any part of a vessel.
EIA Scoping Report	A report setting out the proposed scope of the Environmental Impact Assessment process. The Transmission Assets Scoping Report was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan and Morecambe Offshore Windfarms Transmission Assets in October 2022.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Exclusive Economic Zone	An exclusive economic zone, as prescribed by the 1982 United Nations Convention on the Law of the Sea, is an area of the sea in which a sovereign state has special rights regarding the exploration and use of marine resources, including energy production from water and wind.
Fishery	A group of vessel voyages which target the same species or use the same gear.

Term	Meaning
Formal Safety Assessment	A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity.
Generation Assets	The Generation Assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, inter-array cables, offshore substation platforms and platform link (interconnector) cables to connect offshore substations.
Grounding	Vessel makes contact with the seabed/shoreline or underwater assets.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Intertidal Infrastructure Area	The temporary and permanent areas between Mean Low Water Springs (MLWS) and MHWS.
Inter-related Effects	Inter-related effects arise where an impact acts on a receptor repeatedly over time to produce a potential additive effect or where a number of separate impacts, such as noise and habitat loss, affect a single receptor.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Marine Guidance Note	A system of guidance notes issued by the Maritime and Coastguard Agency which provide significant advice relating to the improvement of the safety of shipping and of life at sea, and to prevent or minimise pollution from shipping.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows Applicants for to apply for ‘deemed marine licences’ in English waters as part of the development consent process.
Master	The designated person in charge of a ship, its crew, passengers and cargo.
Maximum design scenario	The realistic worst-case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean Annual Significant Wave Height	A measure of wave height, it is the average height of the highest third of waves over a typical year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Mitigation measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morecambe Offshore Windfarm: Generation Assets	The offshore Generation Assets and associated activities for the Morecambe Offshore Windfarm.
Morecambe Offshore Windfarm: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morecambe Offshore Windfarm to the National Grid.
Morecambe OWL	Morecambe Offshore Windfarm Ltd is a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) (Cobra) and Flotation Energy Ltd.

Term	Meaning
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Generation Assets	The offshore Generation Assets and associated activities for the Morgan Offshore Wind Project.
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between bp Alternative Energy Investments Ltd. and Energie Baden-Württemberg AG (EnBW).
National Grid	National Grid is the system operator of Great Britain's electricity and gas supply. This includes England, Scotland and Wales. It is the company that manages the network and distribution of electricity and gas that powers homes and businesses.
National Policy Statements	The current national policy statements published by the Department for Energy Security and Net Zero in 2023 and adopted in 2024.
Nautical Charts	A graphic representation of a sea area and adjacent coastal regions.
Non-Statutory consultee	Organisations that an applicant may choose to consult in relation to a project who are not designated in law but are likely to have an interest in the project.
Offshore export cables	The cables which would bring electricity from the Generation Assets to the landfall.
Offshore export cable corridor	The corridor within which the offshore export cables will be located.
Offshore Permanent Infrastructure Area	The area within the Transmission Assets Offshore Order Limits (up to MLWS) where the permanent offshore electrical infrastructure (i.e. offshore export cables) will be located.
Offshore Order Limits	See Transmission Assets Order Limits: Offshore (below).
Offshore substation platform(s)	A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Offshore Wind Leasing Round 4	The Crown Estate auction process which allocated developers preferred bidder status on areas of the seabed within Welsh and English waters and ends when the Agreements for Lease are signed.
Offshore Transmission Network Review	A review led by the Department of Business, Energy & Industrial Strategy with support from a range of government and industrial bodies that looks into the way that the offshore transmission network is designed and delivered, consistent with the ambition to deliver net zero emissions by 2050.
Passage Plan	A detailed description of a vessel's voyage from start to finish, including the route and hazards likely to be encountered along the way.
Pilot	Professional seafarers with detailed knowledge of a port and expertise in ship manoeuvring.

Term	Meaning
Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.
Port or Harbour	A maritime facility compromising of one or more wharves or loading areas where ships load and discharge cargo or passengers.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
Routeing	The path taken by a vessel.
Safety zones	An area around a structure or vessel which should be avoided.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Significant Wave Height	The average wave height from trough to crest of the highest one-third of waves.
Snagging	Fishing Gear or anchors coming fast on sub-surface infrastructure such as cables.
Statutory consultee	Organisations that are required to be consulted by Applicants pursuant to the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
Study area	This is an area which is defined for each environmental topic which includes the Transmission Assets Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Survey area	The area within which each survey has been undertaken. This may differ from the Study Area as a Survey Area will be based on species or survey-specific guidance on the extent of survey required, which may be limited by, for example, habitat conditions, or be defined in terms of buffer areas around an area of potential impact.
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
The Secretary of State for Energy Security and Net Zero	The ultimate decision maker for the Transmission Assets (once the application for development consent is submitted).
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).
Transmission Assets Order Limits: Offshore	The area within which all components of the Transmission Assets seaward of Mean Low Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning. Also referred to in this report as the Offshore Order Limits, for ease of reading.

Term	Meaning
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning.
Transmission Assets Scoping Boundary	The term used to define the boundary used at the time the Scoping Report was submitted.
Traffic Separation Scheme	A traffic management route-system ruled by the International Maritime Organisation. The traffic-lanes (or clearways) indicate the general direction of the vessels in that zone; vessels navigating within a TSS all sail in the same direction or they cross the lane in an angle as close to 90 degrees as possible.
Under Keel Clearance	The vertical distance between the bottom of a ship and the seabed.
Vessel Monitoring System	A system used in commercial fishing to allow environmental and fisheries regulatory organisations to monitor, minimally, the position, time at a position, course and speed of vessels.
Vessel Traffic Services	A marine traffic monitoring system established by port authorities to manage vessel movements and safety.

Acronyms

Acronym	Meaning
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AtoN	Aids to Navigation
CBRA	Cable Burial Risk Assessment
CFLO	Company Fisheries Liasson Officer
CMS	Construction Method Statement
Cobra	Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company)
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
CoT	Commitment number
CRNRA	Cumulative Regional Navigation Risk Assessment
CSIP	Cable Specification and Installation Plan
CTV	Crew Transfer Vessel
DCO	Development Consent Order
DfT	Department for Transport
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMODnet	European Marine Observation and Data Network
EMSA	European Maritime Safety Agency

Acronym	Meaning
EnBW	Energie Baden-Württemberg AG
ERRV	Emergency Rescue and Recovery Vessel
ES	Environmental Statement
FSA	Formal Safety Assessment
HMCG	His Majesty's Coastguard
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ICW	In Collision With
IMO	International Maritime Organisation
IOER	Integrated Offshore Emergency Response
IoMSPC	Isle of Man Steam Packet Company
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MCAA	Marine and Coastal Access Act
MDS	Maximum Design Scenario
MGN	Marine Guidance Note
MMO	Marine Management Organisation
MNEF	Marine Navigation Engagement Forum
NASH	NASH Maritime Ltd
NEMO	Nucleus for European Modelling of the Ocean
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NWS	North West-European Shelf
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
PDE	Project Design Envelope
PEIR	Preliminary Environmental Information Report
PIANC	The World Association for Waterborne Transport Infrastructure
PSV	Platform Supply Vessel (oil and gas support)
RNLI	Royal National Lifeboat Institute
Ro-Ro	Roll-on Roll-off
RYA	Royal Yachting Association
SAR	Search and Rescue

Acronym	Meaning
SIRA	Simplified IALA Risk Assessment method
SOLAS	The International Convention for the Safety of Life at Sea
STCW	The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
TSS	Traffic Separation Scheme
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
VMS	Vessel Monitoring System
VTMP	Vessel Traffic Management Plan
VTS	Vessel Traffic Services

Units

Unit	Description
°	Degrees
Hs	Significant Wave Height
km	Kilometres
kts	Knots = 1 nautical mile per hour (Speed)
m	Metre
m/s	Metres Per Second (Speed)
MW	Mega watt
nm	Nautical mile = 1,852 metres
€	Euro
£	Pound Sterling
%	Percentage

1 Navigation risk assessment

1.1 Introduction

1.1.1 Background

1.1.1.1 Morgan Offshore Wind Limited, a joint venture of bp Alternative Energy Investments Ltd. (hereafter referred to as bp) and Energie Baden-Württemberg AG (hereafter referred to as EnBW) is developing the Morgan Offshore Wind Project, located in the east Irish Sea. Morecambe Offshore Windfarm Limited, a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) (Cobra) and Flotation Energy Ltd, is developing the Morecambe Offshore Windfarm. The rights to the seabed for both projects were awarded separately by the Crown Estate in Offshore Wind Leasing Round 4.

1.1.1.2 Both projects have been scoped into the Pathways to 2030 workstream under the Offshore Transmission Network Review. The output of this process concluded that the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm should work collaboratively seeking a single consent for their electrically separate transmission assets, to the National Grid at Penwortham in Lancashire, via a joint transmission, landfall and grid connection.

1.1.1.3 Given these arrangements and following advice from the Secretary of State issued in a direction under Section 35 of the Planning Act 2008, the proposed consenting strategy is to apply for three Development Consent Orders (DCOs). The offshore components of these DCOs are summarised below.

- The Morgan Offshore Wind Project: Generation Assets: The construction, operation and decommissioning of the offshore wind turbines, foundations and support structures, inter-array cables, interconnector cables and offshore substation platforms (OSPs).
- The Morecambe Offshore Windfarm: Generation Assets: The construction, operation and decommissioning of the offshore wind turbines, foundations and support structures, inter-array cables, interconnector cables and OSPs.
- The Morgan and Morecambe Offshore Wind Farms: Transmission Assets: The construction, operation and decommissioning of the offshore export cables. This DCO also covers the onshore components of the Transmission Assets including the Intertidal Infrastructure Area.

1.1.1.4 It is noted that the construction of all or part of the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (hereafter Transmission Assets) is dependent upon the construction of both/either the Morgan Offshore Wind Project: Generation Assets and/or the Morecambe Offshore Windfarm: Generation Assets. The focus of this Navigation Risk Assessment (NRA) is the Transmission Assets.

1.2 Description of NRA

1.2.1.1 Offshore developments can have potentially adverse impacts on the navigation and safety of maritime users. In order to understand the likelihood and magnitude of these impacts, a NRA is required. The Maritime and Coastguard Agency's (MCA) Marine Guidance Note (MGN) 654 (MCA, 2021) describes the necessary input requirements and assessment methodology to properly assess these impacts. The legislation and guidance relevant to the methodological basis of this NRA are described in **section 1.4**.

1.2.1.2 NASH Maritime Ltd (NASH) has been commissioned to undertake an NRA for the Transmission Assets. The NRA has been developed to account for potential impacts which may arise during construction, operation, and decommissioning of the Transmission Assets. The assessment is based on a Maximum Design Scenario (MDS), a conservative assumption on the design characteristics likely to have the greatest impact upon shipping and navigation receptors. Details of the MDS are presented in **section 1.6**.

1.2.1.3 This document describes the inputs, methodologies, and results of the NRA. The output of this assessment is used to inform the shipping and navigation assessment contained within the Environmental Statement (ES).

1.2.1.4 This NRA does not detail the impacts associated with the Generation Assets of these projects. Separate NRAs have been submitted for the Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets. Furthermore, a Cumulative Regional NRA (CRNRA) (**Appendix C**) has been undertaken in collaboration between the Applicants of the Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, Mona Offshore Wind Project and the Transmission Assets. The objective of the CRNRA is to enable stakeholders to engage with and understand the potential cumulative effects of the proposed projects which are being taken forward concurrently in the Irish Sea. A regional (collaborative) approach to assessment was adopted to enable individual projects to quantify and manage the cumulative impacts in a coordinated, consistent and efficient manner. This assessment will dovetail with the individual NRAs undertaken for each of the four projects.

1.2.1.5 The CRNRA was prepared using the Generation Assets information from the DCO Application and the Preliminary Environmental Information Report (PEIR) information for the Transmission Assets, which has subsequently been changed and updated since PEIR. A summary of these changes, which includes removal of surface piercing structures from within the Transmission Assets project, is included within **section 1.5.4**, together with how these changes have influenced the findings of the CRNRA as appended in **section 1.12**. The difference in project information being used is due to application submission timescales, with the Transmission Assets submitted last, after the Generation Assets DCO applications.

1.3 Document structure

1.3.1.1 This NRA consists of the following chapters and sections.

- **Section 1.1**: Introduction and background.
- **Section 1.2**: Description of NRA.
- **Section 1.3**: Document structure.
- **Section 1.4**: Policy, guidance and legislation.
- **Section 1.5**: NRA methodology.
- **Section 1.6**: Project description and maximum design scenario.
- **Section 1.7**: Description of the marine environment.
- **Section 1.8**: Description of existing marine activities.
- **Section 1.9**: Future case traffic profile.
- **Section 1.10**: Transmission Assets: Impact assessment.
- **Section 1.11**: Transmission Assets NRA.
- **Section 1.12**: Cumulative assessment.
- **Section 1.13**: Conclusions and recommendations.
- **Appendix A**: Hazard log.
- **Appendix B**: MGN654 Checklist.
- **Appendix C:** Cumulative Regional Navigation Risk Assessment.

1.4 Policy, guidance and legislation

1.4.1 Legislation and national policy

International obligations

1.4.1.1 The United Nations Convention on the Law of the Sea (UNCLOS) (UN, 1982) is an international agreement that establishes a legal framework for all marine and maritime activities. Article 60 concerns artificial islands, installations and structures in the exclusive economic zone. Article 60(7) states that '*Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation*.' As per Article 22(4), '*The coastal state shall clearly indicate such sea lanes and traffic separation schemes on charts to which due publicity shall be given*'.

1.4.1.2 Vessels navigating must also adhere to requirements under the International Convention for the Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). Furthermore, vessels will navigate in accordance with the Convention on the International Regulations for Preventing Collisions at Sea, 1972 as amended (COLREGs).

National Policy Statement

1.4.1.3 This NRA has been undertaken in accordance with the instructions and guidance provided within the National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) (Department for Energy Security & Net Zero, 2023). **Table 1.1** provides a summary of the guidance provided by NPS EN-3 that is relevant to shipping and navigation. **Table 1.2** refers to the decision making requirements. The NPS Tracker for human environment topics (document reference: J26) lists out those NPS statements relevant to shipping and navigation.

Table 1.1: Relevant shipping and navigation assessment requirements from NPS EN-3

NPS requirement	NPS reference	Where addressed in the NRA
Offshore wind farms and offshore transmission will occupy an area of the sea or sea bed. For offshore wind farms in particular it is inevitable that there will be an impact on navigation in and around the area of the site. This is relevant to both commercial and recreational users of the sea who may be affected by disruption or economic loss because of the proposed offshore wind farm and/or offshore transmission.	2.8.178	Impact on vessel routeing in **section 1.10.3** and **section 1.10.4** for ferries and commercial shipping respectively. This includes routeing in typical and adverse weather conditions. Impacts on recreational craft are described throughout **section 1.10.9**.
To ensure safety of shipping Applicants should reduce risks to navigational safety to As Low As Reasonably Practicable (ALARP), as described in Section 2.8.321.	2.8.179	Impacts to navigation are described in **section 1.10** and an NRA produced in **section 1.11.5**. The NRA for the Transmission Assets has concluded there are no unacceptable risks and that all risks have been reduced to Broadly Acceptable or ALARP.
There is a public right of navigation over navigable tidal waters and in International Law, foreign vessels have the right of innocent passage through the United Kingdom's (UK) territorial waters.	2.8.180	A summary of key legislation and policy is contained in **section 1.4**. Policy and legislation for the Transmission Assets is described in more detail within Volume 1, Chapter 2: Policy and legislation context of the ES.
Beyond the seaward limit of the territorial sea, shipping has the freedom of navigation although offshore infrastructure and the imposition of safety zones can hinder this.	2.8.181	A summary of key legislation and policy is contained in **section 1.4**. Applied risk controls are described in **section 1.6.5**. Additional risk control options that were discussed with oil and gas operators are considered in **section 1.11.6**.
Impacts on navigation can arise from the wind farm or other infrastructure and equipment creating a physical barrier during construction and operation.	2.8.182	Impact on vessel routeing in **section 1.10.3** and **section 1.10.4** for ferries and commercial shipping respectively. This includes routeing in typical and adverse weather conditions. Impacts on recreational craft are described throughout **section 1.10.9**.
There may be some situations where reorganisation of shipping traffic activity might be both possible and desirable when considered against the benefits of the wind farm and/or offshore transmission application and such circumstances should be discussed with the Government officials, including Secretary of State and Maritime and Coastguard Agency (MCA), and other stakeholders, including Trinity House, as The General Lighthouse Authority consultee, and the commercial shipping sector. It should be recognised that alterations might	2.8.183	Consultation has been undertaken through the Marine Navigation Engagement Forum (MNEF), individual meetings, and written correspondence which are summarised in **section 1.5.5**. Through this engagement, feedback has been received on the impacts of the Transmission Assets on different

NPS requirement	NPS reference	Where addressed in the NRA
require national endorsement and international agreement and that the negotiations involved may take considerable time and do not have a guaranteed outcome.		receptors, and as a result, substantial alterations were made to the Transmission Assets design to minimise these impacts (see **section 1.5.4**).
Applicants should engage with interested parties in the navigation sector early in the pre-application phase of the proposed offshore wind farm or offshore transmission to help identify mitigation measures to reduce navigational risk to ALARP, to facilitate proposed offshore wind development. This includes the Marine Management Organisation (MMO) or Natural Resources Wales in Wales, MCA, the relevant General Lighthouse Authority, such as Trinity House, the relevant industry bodies (both national and local) and any representatives of recreational users of the sea, such as the Royal Yachting Association (RYA), who may be affected. This should continue throughout the life of the development including during the construction, operation and decommissioning phases.	2.8.184	
Engagement should seek solutions that allow offshore wind farms, offshore transmission and navigation and shipping users of the sea to successfully coexist.	2.8.185	
Prior to undertaking assessments Applicants should consider information on internationally recognised sea lanes, which is publicly available.	2.8.187	Location of sea lanes are presented in **section 1.7.1** and impact on vessel routeing measures in **section 1.10.2**.
Applicants should refer in assessments to any relevant, publicly available data available on the Maritime Database.	2.8.188	Datasets used to undertake this assessment are described in **section 1.5.5**.
Applicants must undertake a Navigation Risk Assessment (NRA) in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above.	2.8.189	Impacts to navigation are described in **section 1.10** and an NRA produced in **section 1.11.5**. The NRA for the Transmission Assets has concluded there are no unacceptable risks and that all risks have been reduced to Broadly Acceptable or ALARP.

NPS requirement	NPS reference	Where addressed in the NRA
The Navigation Risk Assessment will for example necessitate: • A survey of vessel traffic in the vicinity of the proposed wind farm • A full NRA of the likely impact of the wind farm on navigation in the immediate area of the wind farm in accordance with the relevant marine guidance • Cumulative and in combination risks associated with the development and other developments (including other wind farms) in the same area of sea.	2.8.190	Various vessel traffic surveys were conducted between 2021 and 2023 in compliance with the requirements under MGN654, survey findings are presented in **section 1.8.2**. The NRA is presented in **section 1.11.5** and has been produced in accordance with MGN654. The cumulative impacts of the Transmission Assets on vessel routeing, collision and contact, in combination with multiple developments, are examined in **section 1.12.3**.
In some circumstances, Applicants may seek declaration of a safety zone around wind turbines and other infrastructure. Although these might not be applied until after consent to the wind farm has been granted.	2.8.191	Applied risk controls, including safety zone statement (Commitment number (CoT)66), are described in **section 1.6.5** (safety zone statement document reference: J33). Potential additional risk control options are identified in **section 1.11.6**.
The declaration of a safety zone excludes or restricts activities within the defined sea areas including navigation and shipping.	2.8.192	
Where there is a possibility that safety zones will be sought Applicants, assessments should include potential effects on navigation and shipping.	2.8.193	
Where the precise extents of potential safety zones are unknown, a realistic worst-case scenario should be assessed. Applicants should consult the MCA for advice on maritime and safety and refer to the government guidance on safety zones as a part of this process.	2.8.194	
Applicants should undertake a detailed NRA, which includes Search and Rescue Response Assessment and emergency response assessment prior to applying for consent. The specific Search and Rescue requirements will then be discussed and agreed post consent.	2.8.195	The NRA is presented in **section 1.11.5**, and impacts on search and rescue are described in **section 1.10.6**.

Table 1.2: Relevant shipping and navigation policy on decision making requirements from NPS EN-3

NPS requirement	NPS reference	NRA reference
The Secretary of State should not grant development consent in relation to the construction or extension of an offshore wind farm if it considers that interference with the use of recognised sea lanes essential to international navigation is likely to be caused by the development.	2.8.326	Location of sea lanes are presented in **section 1.7.1** and impact on vessel routeing measures in **section 1.10.2** and shows that there would be no significant adverse impact on sea lanes.

NPS requirement	NPS reference	NRA reference
The use of recognised sea lanes essential to international navigation means: a) anything that constitutes the use of such a sea lane for the purposes of Article 60(7) of the United Nations Convention on the Law of the Sea 1982 b) any use of waters in the territorial sea adjacent to Great Britain that would fall within paragraph (a) if the waters were in a Renewable Energy Zone.	2.8.327	
The Secretary of State should be satisfied that the site selection has been made with a view to avoiding or minimising disruption or economic loss to the shipping and navigation industries with particular regard to approaches to ports and to strategic routes essential to regional, national and international trade, lifeline ferries and recreational users of the sea.	2.8.328	Impact on vessel routeing in **section 1.10.3** and **section 1.10.4** for ferries and commercial shipping respectively. This includes routeing in typical and adverse weather conditions. Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES, provides details on the site selection process.
Where after carrying out a site selection, a proposed development is likely to adversely affect major commercial navigation routes, for instance by causing appreciably longer transit times, the Secretary of State should give these adverse effects substantial weight in its decision making.	2.8.329	
Where a proposed offshore wind farm is likely to affect less strategically important shipping routes, the Secretary of State should take a pragmatic approach to considering proposals to minimise negative impacts.	2.8.330	
The Secretary of State should be satisfied that risk to navigational safety is ALARP. It is Government policy that wind farms and all types of offshore transmission should not be consented where they would pose unacceptable risks to navigational safety after mitigation measures have been adopted.	2.8.331	Impacts to navigation are described in **section 1.10** and an NRA produced in **section 1.11.5**. The NRA for the Transmission Assets has concluded there are no unacceptable risks and that all risks have been reduced to Broadly Acceptable or ALARP.
The Secretary of State should be satisfied that the scheme has been designed to minimise the effects on recreational craft and that appropriate mitigation measures, such as buffer areas, are built into applications to allow for recreational use outside of commercial shipping routes.	2.8.332	Impacts on recreational craft are described throughout **section 1.10.9** and are shown to be minimal, with minor, short term deviations anticipated.
In view of the level of need for energy infrastructure, where an adverse effect on the users of recreational craft has been identified, and where no reasonable mitigation is feasible, the Secretary of State should weigh the harm caused with the benefits of the scheme.	2.8.333	

NPS requirement	NPS reference	NRA reference
The Secretary of State should make use of advice from the MCA, who will use the NRA described in paragraphs 2.8.179 and 2.8.180 above.	2.8.334	Relevant stakeholders have been consulted throughout, including the MCA. A summary of the key issues raised during consultation activities, the consultee and the consultation activity undertaken is provided in **section 1.5.5**. The Transmission Assets forms part of the MNEF, see **section 1.5.5**.
The Secretary of State should have regard to the extent and nature of any obstruction of or danger to navigation which (without amounting to interference with the use of such sea lanes) is likely to be caused by the development in determining whether to grant consent for the construction, or extension, of an offshore wind farm, and what requirements to include in such a consent.	2.8.335	Impacts to navigation are described in **section 1.10** and an NRA produced in **section 1.11.5**. The NRA for the Transmission Assets concludes that there will be no underwater obstruction to navigation.
The Secretary of State may include provisions, compliant with national maritime legislation and UNCLOS, within the terms of a development consent as respects rights of navigation so far as they pass through waters in or adjacent to Great Britain which are between the mean low water mark and the seaward limits of the territorial sea.	2.8.336	A summary of key legislation and policy is contained in **section 1.4**. Applied risk controls are described in **section 1.6.5**. Additional risk control options are discussed in **section 1.11.6** and were deemed to be captured by existing applied mitigations and commitments or designed out.
The provisions may specify or describe rights of navigation which: • Are extinguished • Are suspended for the period that is specified in the DCO • Are suspended until such time as may be determined in accordance with provisions contained in the DCO • Are exercisable subject to such restrictions or conditions, or both, as are set out in the DCO.	2.8.337	
The Secretary of State should specify the date on which any such provisions are to come into force, or how that date is to be determined.	2.8.338	
The Secretary of State should require the Applicants to publish any provisions that are included within the terms of the DCO, in such a manner as appears to the Secretary of State to be appropriate for bringing them, as soon as is reasonably practicable, to the attention of persons likely to be affected by them.	2.8.339	

NPS requirement	NPS reference	NRA reference
The Secretary of State should include provisions as respects rights of navigation within the terms of a DCO only if the Applicants has requested such provision be made as part of their application for development consent.	2.8.340	

Marine plans and marine policy statements

1.4.1.4 The Marine and Coastal Access Act (MCAA) 2009 requires all public authorities taking authorisation or enforcement decisions that affect or might affect the UK marine area, to do so in accordance with the 2011 UK Marine Policy Statement and the relevant marine plans.

1.4.1.5 The North West Marine Plan has been prepared for the purposes of section 51 of the MCAA 2009. Policies relevant to shipping and navigation and included in the plan are described in **Table 1.3.**

Table 1.3: North West Marine Policies relevant to shipping and navigation

Policy	Marine Policy Statement reference	NRA reference
Only proposals demonstrating compatibility with current port and harbour activities will be supported. Proposals within statutory harbour authority areas or their approaches that detrimentally and materially affect safety of navigation, or the compliance by statutory harbour authorities with the Open Port Duty or the Port Marine Safety Code, will not be authorised unless there are exceptional circumstances. Proposals that may have a significant adverse impact upon future opportunity for sustainable expansion of port and harbour activities, must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	NW-PS-1	Impacts on port and harbour access are assessed in **section 1.10.5**.
Proposals that require static sea surface infrastructure or that significantly reduce under keel clearance must not be authorised within or encroaching upon International Maritime Organization routeing systems unless there are exceptional circumstances.	NW-PS-2	No static sea surface infrastructure is associated with the Transmission Assets. Sea lane locations are presented in **section 1.7** and impact on vessel routeing measures in **section 1.10**.
Proposals that require static sea surface infrastructure or that significantly reduce under keel clearance which encroaches upon high density navigation routes, strategically important navigation routes, or that pose a risk to the viability of passenger services, must not be authorised unless there are exceptional circumstances.	NW-PS-3	No static sea surface infrastructure is associated with the Transmission Assets. Impacts to vessel grounding identified in **section 1.10** and **section 1.10.12**.
Proposals promoting or facilitating sustainable coastal and/or short sea shipping as an alternative to road, rail or air transport will be supported where appropriate.	NW-PS-4	N/A

1.4.2 Primary guidance

MGN 654

1.4.2.1 The principal guidance document for NRAs is the MCA's MGN 654 (MCA, 2021). MGN 654 describes the potential shipping and navigation issues which should be considered by Applicants when proposing Offshore Renewable Energy Installations (OREIs). Annex 1 (MCA, 2021) of the MGN provides a detailed methodology for assessing the marine navigational safety risks of OREIs. In particular, by following the methodology, the NRAs are:

- proportionate to the scale of the development and magnitude of risks;
- based on the risk assessment approach of the Formal Safety Assessment;
- are capable of utilising techniques and methods which produce results which are acceptable to the Government;
- compare the base case and future case risks in the study area before predicting the impacts of the OREIs on that risk through a hazard log; and
- determine which risk controls should be put in place to minimise the risks to ALARP.

1.4.2.2 MGN 654 Annex 1 provides a standardised format of submission which is described in **Table 1.4.** MGN 654 Annex 2 provides guidance on wind farm-shipping route interactions. MGN 654 Annex 3 provides guidance on under keel clearance. MGN 654 Annex 4 provides hydrography guidelines. MGN 654 Annex 5 contains guidance on requirements, guidance and operational considerations for search and rescue and emergency response.

1.4.2.3 A checklist is provided in Annex 6 of the MGN 654, which has been completed for this NRA within **Appendix B**.

Table 1.4: MGN 654 Annex 1 methodology for assessing the marine navigational safety and emergency response risks of offshore renewable energy installations

The following content is included	Compliant Yes/No	Comments
A risk claim is included supported by a reasoned argument and evidence	Yes	The risk assessment conducted in **section 1.11.7** is supported by data analysis (**section 1.8**), consultation (**section 1.5.5**) and a review and discussion of impacts (**section 1.10**). Therefore, a risk claim is made in **section 1.11.7**.
Description of the marine environment	Yes	A description of the baseline marine environment is provided in **section 1.8**.
Description of the Transmission Assets and how they change the marine environment	Yes	A description of the Transmission Assets is provided in **section 1.6**. Potential impacts are described in **section 1.10**.

The following content is included	Compliant Yes/No	Comments
Analysis of the Marine Traffic	Yes	A detailed analysis of the baseline vessel traffic is provided in **section 1.8**. **Section 1.9** presents the future baseline traffic profile. The impacts of the Transmission Assets on that traffic are contained within **section 1.10**.
Status of the hazard log	Yes	The NRA is provided in **section 1.10.12**. The hazard log is provided in **Appendix A**.
Navigation Risk Assessment	Yes	The NRA is provided in **section 1.10.12**.
Search and Rescue overview and assessment	Yes	Existing search and rescue provision is described in **section 1.7.4**. An assessment of impacts of the Transmission Assets to search and rescue is provided in **section 1.10**.
Emergency Response Overview and Assessment	Yes	
Status of Risk control log	Yes	Applied risk controls are described in **section 1.6.5**. Additional risk control options are identified in **section 1.11.6**.
Major Hazards Summary	Yes	A summary of the principal impacts of the Transmission Assets are contained within **section 1.10** and an NRA reported in **section 1.10.12**.
Statement of Limitation	Yes	Any limitations or assumptions of this assessment are reported in their relevant sections.
Through Life Safety Management	Yes	Applied risk controls are described in **section 1.6.5**. Additional risk control options are identified in **section 1.11.6**.

Formal Safety Assessment (FSA)

1.4.2.4 The International Maritime Organisation (IMO) FSA process has been applied within this NRA. The guidelines for FSAs were approved in 2002 and were most recently amended in 2018 (Marine Safety Committee and the Marine Environment Protection Committee, 2018). This NRA has been conducted utilising this methodology, as per recommendations from MGN 654.

1.4.2.5 The FSA is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and, if appropriate, cost-benefit assessment. The IMO FSA guidance defines a hazard as '*a potential to threaten human life, health, property or the environment*', the realisation of which results in an incident or accident. The potential for a hazard to be realised (i.e. likelihood) can be combined with an estimated or known consequence of outcome and this combination is termed '*risk'*. There are five steps within the FSA process.

- Step 1: Identification of hazards.
- Step 2: Risk analysis.
- Step 3: Risk control options.

- Step 4: Cost-benefit assessment (if applicable).
- Step 5: Recommendations for decision making.

1.4.3 Additional guidance and lessons learnt

1.4.3.1 Significant additional guidance, lessons learnt and supporting studies are available which have been used to inform this NRA. These additional documents are described in **Table 1.5** and **Table 1.6**.

Table 1.5: Summary of additional relevant guidance

Guidance	Description
MGN372: OREIs: Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2008).	Considerations to be taken into account when planning and undertaking voyages near offshore renewable energy installations off the UK coast.
International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 The Marking of Offshore Man-Made Structures (IALA, 2021).	Guidance on the lighting and marking arrangements for offshore wind farms.
RYA Position of Offshore Renewable Energy Developments: Wind Energy (RYA, 2019).	Describes key impacts of offshore wind farms on recreational activities.
The World Association for Waterborne Transport Infrastructure (PIANC) WG161 Interaction Between Offshore Wind Farms and Maritime Navigation (PIANC, 2018).	Provides guidelines and recommendations on impacts on mitigations for shipping routes near offshore wind farms.
Nautical Institute (2013) The Shipping Industry and Marine Spatial Planning.	Guidance on benefits and risks of marine spatial planning for shipping and navigation.
G+ Integrated Offshore Emergency Response (IOER) (G+IOER, 2019) Good practice guidelines for offshore renewable energy developments.	Guidance on emergency response for offshore wind farms.

Table 1.6: Lessons learnt and supporting studies

Guidance	Description
MCA and QinetiQ (2004) Results of the electromagnetic investigations and assessments of marine radar, communications and positioning systems undertaken at the North Hoyle wind farm by QinetiQ and the Maritime and Coastguard Agency.	Reporting of trial on impacts of offshore wind farms on shipboard equipment.
MCA (2005) Offshore Wind Farm Helicopter Search and Rescue Trials Undertaken at the North Hoyle Wind Farm.	Reporting of trial on impacts of offshore wind farms on Search and Rescue (SAR) equipment and activities.
BWEA (2007). Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats Offshore Wind Farm.	Reporting of trial on impacts of offshore wind farms on shipboard equipment.
MCA (2019) MCA report following aviation trials and exercises in relation to offshore windfarms.	Reporting of trial on impacts of offshore wind farms on SAR equipment and activities and the implications on offshore wind farm design.
Rawson and Brito (2022) Assessing the validity of navigation risk assessments: a study of offshore wind farms in the UK.	Analysis of historical incidents in UK offshore wind farms.

Guidance	Description
Walney Extension Offshore Wind Farm Application (c.2013).	Documents associated with application for Walney Extension Offshore Wind Farm.
Rhiannon Offshore Wind Farm Scoping Report (2012)	Documents associated with application for Rhiannon Offshore Wind Farm.
Awel-y-Môr Offshore Wind Farm Application (c. 2021).	Documents associated with application for Awel-y-Môr Offshore Wind Farm.
Anatec (2016). Influence of UK Offshore Wind Farm Installation on Commercial Vessel Navigation.	Analysis of impact of offshore wind farms on ship routes from historical data.

1.5 NRA methodology

1.5.1 Overview

1.5.1.1 The NRA has been produced in accordance with MGN 654 (see **section 1.4.2**) and follows the IMO's FSA (**section 1.11.1**). This assessment considers all identified impacts of the Transmission Assets on shipping and navigation receptors. The FSA defines a risk as '*the combination of the frequency and the severity of the consequence*' (IMO, 2018). Therefore, the likelihood and consequence of these impacts are assessed through the collection of high-quality datasets and consultation. Details on the risk criteria and matrix methodology are contained within **section 1.10.12**.

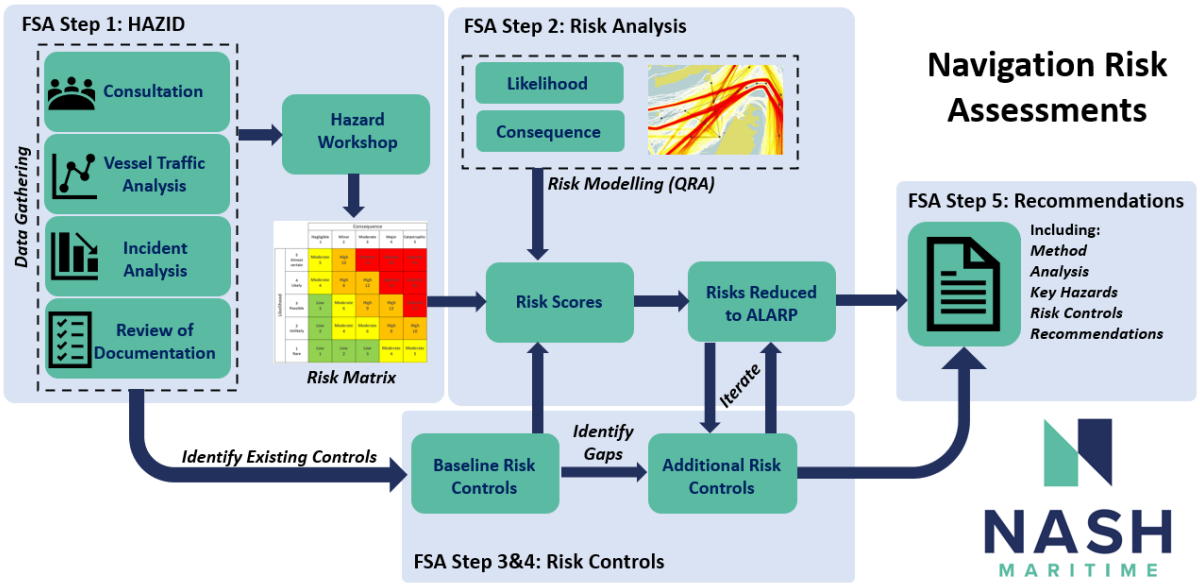

Figure 1.1: NRA methodology

1.5.2 Definition of shipping and navigation study area

1.5.2.1 The study area for undertaking the shipping and navigation risk assessment is defined as a single combined area seaward of Mean Low Water Springs (MLWS) of 3 nautical miles (nm) from the export cable corridor of the Transmission Assets Order Limits: Offshore and 10 nm from the area in which the Generation Assets would be located (see **Figure 1.2**). These distances ensure any relevant routeing which

may be affected is captured, whilst still remaining site specific to the area being studied.

1.5.2.2 This study area has been agreed with consultees (see **section 1.5.5**) and is consistent with industry best practice for NRAs.

1.5.3 IALA risk management tools

Qualitative risk assessment – SIRA

1.5.3.1 International Association of Marine Aids to Navigation and Lighthouse Authorities (IALAs) Simplified IALA Risk Assessment method (SIRA) follows the FSA process and allows organisations to assess maritime and navigation risk in their waters so they can meet their obligations for the management of navigation safety (e.g., obligations under international conventions such as SOLAS, national domestic legislation, etc.). The principles of the SIRA approach have been used to conduct the risk assessment.

1.5.3.2 Details of the overarching methodology are provided in the following IALA Guidance.

- IALA (2022) G1018 - Risk Management.
- IALA (2017) G1138 - The Use of The Simplified IALA Risk Assessment Method (SIRA).

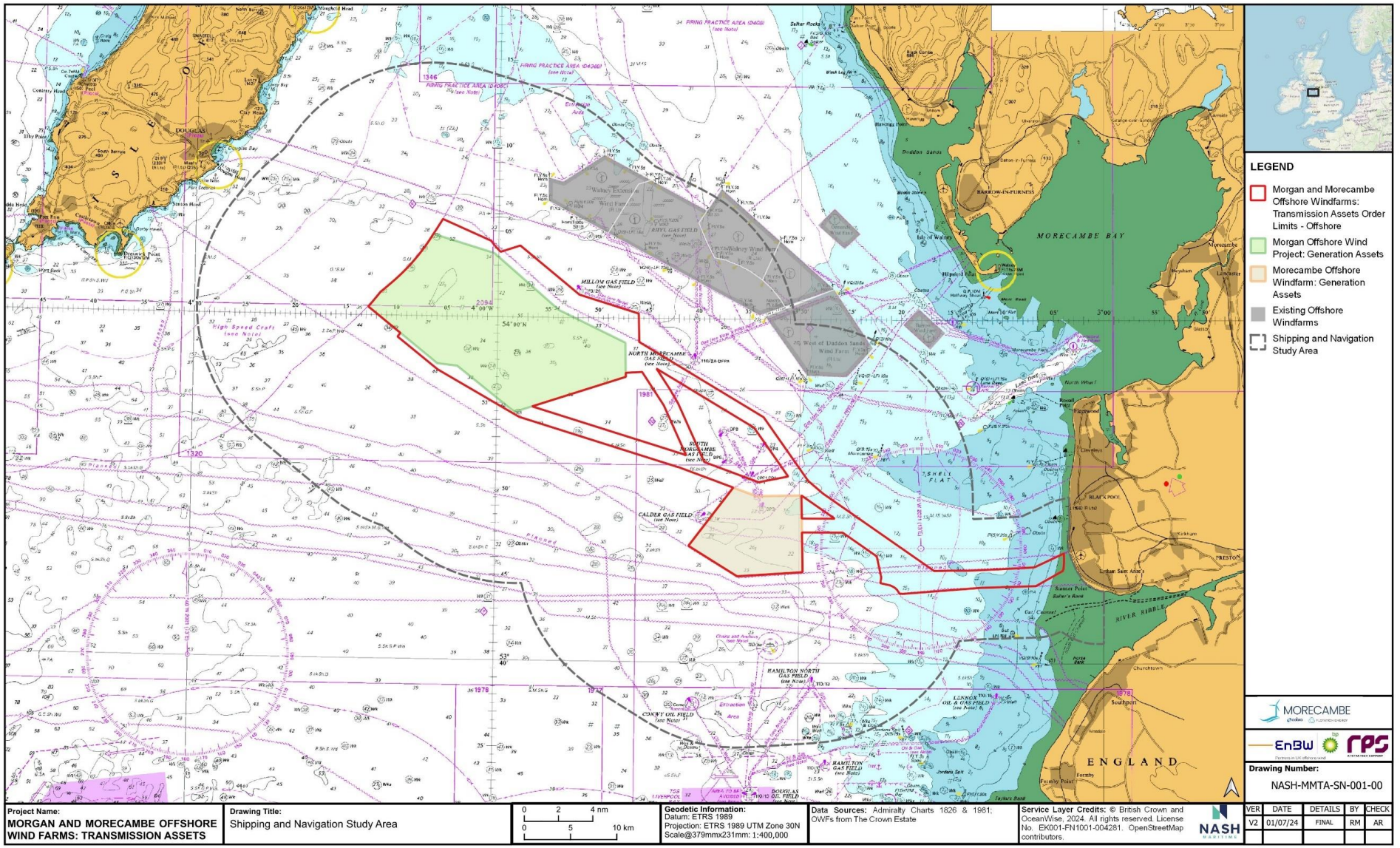

Figure 1.2: Study area

1.5.4 Cumulative NRA approach

1.5.4.1 This NRA considers the impacts of the Transmission Assets during construction, operation and maintenance, and decommissioning. Similarly, separate Environmental Statement Shipping and Navigation chapters and NRAs were also submitted for the respective Morgan Offshore Wind Project Generation Assets (Morgan Offshore Wind Limited, 2024 and 2024a, respectively) and Morecambe Offshore Windfarm: Generation Assets (Morecambe Offshore Windfarm Ltd, 2024 and 2024a, respectively).

1.5.4.2 Furthermore, a CRNRA (**Appendix C**) has been undertaken in collaboration between the Applicants of the Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, and the Mona Offshore Wind Project. The CRNRA considers the effects of the Generation Assets for each project, as well as the Transmission Assets associated with the projects. The CRNRA was used to dovetail into the individual NRAs for these projects and the individual NRA for the Transmission Assets.

Considerations for updated Transmission Assets since PEIR

1.5.4.3 The CRNRA was undertaken using the Transmission Assets PEIR information. Since the PEIR and following feedback received, changes have been made to the Project Design Envelope (PDE) as summarised below. As a result of these PDE changes, all offshore surface structures have been removed from the Transmission Assets, which now only contains subsea offshore export cables and onshore infrastructure. Transmission Assets design changes removed various components of infrastructure as listed below.

- Removal of interconnector cables. Previously, interconnector cables were included in both the Transmission Assets PDE and the Generation Assets PDE; now, Interconnector cables are only included within the Generation Assets PDE.
- Removal of Offshore OSPs. Previously, OSPs were included in both Transmission Assets PDE and the Generation Assets PDE; now, OSPs are only included within the Generation Assets PDE.
- Removal of Morgan Offshore Wind Project offshore booster station. This is no longer required and has been removed from the Transmission Assets PDE.

1.5.4.4 The CRNRA was undertaken using the Transmission Assets PDE which assumes the Morgan Offshore Wind Project offshore booster station would be situated in the worst-case location within the search areas previously designated for its location. The PDE updates since PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station. Where the impacts of the Morgan Offshore Wind Project offshore booster station have been assessed for each impact within the CRNRA, the changes arising from the PDE updates have been explained. The OSPs and interconnector cables which were

included within the PEIR PDE are also considered within the CRNRA, however the risks posed by these are still valid due to the fact that this infrastructure is still included in the Generation Assets PDEs.

1.5.5 Summary of data sources and information gathering

Consultation and engagement

1.5.5.1 Consultation has been undertaken with relevant shipping and navigation stakeholders prior to the NRA to help in the identification and assessment of risk. As part of this consultation process, a letter was issued to stakeholders on 18 May 2023 related to shipping and navigation describing the extent of the Transmission Assets and a request for feedback and opportunity for further consultation, if requested. A stakeholder briefing meeting was offered to all stakeholders and held on 7 June 2024 to provide information on the Transmission Assets and gather any remaining feedback, comments or concerns. Consultation meetings were also held with specific key stakeholders to discuss the Transmission Assets, their associated impacts and potential mitigation measures between 24 May 2023 and 6 June 2023, including the MCA, Trinity House, UK Chamber of Shipping, oil and gas operators and the RYA.

1.5.5.2 The Transmission Assets formed part of the MNEF (2021-2024). The MNEF is a shipping and navigation engagement forum originally established in 2021 to enable the Applicants to regularly update stakeholders on plans and progress of the Morgan Offshore Wind Project, Morecambe Offshore Windfarm and Mona Offshore Wind Project, and for stakeholders to express views or concern on the impacts of the projects for discussion and, where possible, resolution.

1.5.5.3 Details of consultation undertaken to date is presented in **Table 1.7** and includes responses to the shipping and navigation section of the Transmission Assets Scoping Report (RPS, 2022) as well as section 42 responses.

1.5.5.4 In addition to stakeholder consultation undertaken for the Transmission Assets, there has been considerable engagement with regulators and relevant stakeholders as part of the development of the CRNRA (Appendix C).

- Specific meetings with individual stakeholders through 2021-2023.
- CRNRA Hazard Workshop 1 (to inform the PEIR) in 2022.
- Full bridge simulator sessions conducted with Stena, Seatruck and Isle of Man Steam Packet Company (IoMSPC) at HR Wallingford:
  - in 2022 to inform the respective PEIRs for each project; and
  - in 2023 to inform the respective ESs following Morgan Offshore Wind Project, Morecambe Offshore Windfarm and Mona Offshore Wind Project changes.

- CRNRA Hazard Workshop 2 (to inform the ES following Morgan Offshore Wind Project, Morecambe Offshore Windfarm and Mona Offshore Wind Project changes) in 2023.

Table 1.7: Summary of key consultation comments raised during consultation activities undertaken for the Transmission Assets relevant to shipping and navigation

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
8 December 2022 Scoping response	Inspectorate	A study area of 10 nm has been proposed for the shipping and navigation assessment. The ES should explain the rationale behind the choice of study area and, where possible, the approach should be agreed with the relevant consultation bodies.	The study area and rationale are presented within **section 1.5.2** and have been considered to be adequate for assessing shipping and navigation movements throughout consultation with stakeholders including the MCA and Trinity House. The cumulative assessment in **section 1.12** also considers effects of projects further than the 10 nm study area where necessary.
8 December 2022 Scoping response	Inspectorate	The ES should clearly set out how the risk assessment and hazard workshop approach leads to an assessment of significance of effect consistent/compatible with the terminology used in the ES, for which the intended approach is set out in Part 1, Chapter 5, Section 5.5.4 of the Scoping Report.	The NRA process used within this report is outlined in **section 1.10.12**. The Transmission Assets have been assessed using the MDS approach, with the MDS described in **section 1.6**, as detailed within the Scoping Report. The scoring process for the hazards is laid out in **section 1.11.2**, including the discussion of the scores of relevant key hazards with appropriate stakeholders. Further detail is outlined in Volume 2, Chapter 7: Shipping and Navigation of the ES within the methodology section 7.10.
18 January 2023 MNEF	MNEF members	Introduction to Transmission Assets.	An overview of the Transmission Assets was provided and there were no comments to be addressed within the NRA.
24 May 2023 Stakeholder meeting	Stena	The main concern raised with respect to the Transmission Assets was the potential for the Morgan Offshore Wind Project offshore booster station to be placed as an isolated structure causing deviation and allision risk, rather than being located adjacent to the Morecambe Offshore Windfarm: Generation Assets.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
24 May 2023 Consultation response	Ministry of Defence	It was requested to provide the Ministry of Defence the main coordinates of the Offshore Order Limits and Morgan Offshore Wind Project offshore booster station search areas. Ministry of Defence comments are pending their review of the coordinates.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.
31 May 2023 Stakeholder meeting	Trinity House	It was highlighted that the Morgan Offshore Wind Project offshore booster station has potential to impact existing commercial routes, for example the dredger routes to/from Liverpool.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.
31 May 2023 Stakeholder meeting	Chamber of Shipping	It was advised that future project vessel numbers for the Generation Assets should also be considered when looking at the future case traffic profile.	The future case traffic profile in **section 1.9.7** includes the anticipated increase in crew transfer vessel (CTV) movements during the operation of the Generation Assets. Cumulative future case profile is considered within the CRNRA (Appendix **C**).
31 May 2023 Stakeholder meeting	MCA	If the Morgan Offshore Wind Project offshore booster station is to be located within 1 nm of the Morecambe Offshore Windfarm Generation Assets, it must align with the turbine layout.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.
31 May 2023 Consultation response	Spirit Energy	With the proposed increased level of activity in the area there will be considerable simultaneous operation planning required between existing activities and wind farm development activities to evaluate increased risks in the area and take appropriate measures to reduce and mitigate these.	Applied mitigation measures and commitments made for the Transmission Assets are described in **Table 1.10**. In relation to vessel traffic these are most notably CoT69 (vessel traffic management plans (VTMPs), outline document reference: J21), CoT 45 (CSIPs, outline document reference: J15) and CoT49 (Construction Method Statement(s) (CMSs)).

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
			Cumulative risks are assessed in the CRNRA (**Appendix C**).
31 May 2023 Consultation response	Spirit Energy	Stakeholder comments related to notice and discussion on exclusion zones for ongoing oil and gas operations and anticipated future requirements for surface and sub-surface infrastructure. This included throughout decommissioning activities and expectation for larger exclusions zones during heavy decommissioning activities so that these factors can be fully considered in Transmission Assets planning.	The Applicants acknowledges established safety zones, as required. Applied mitigations are discussed in **Table 1.10**, which applies CoT69 (VTMPs, outline document reference: J21), CoT45 (CSIPs, outline document reference: J15), CoT71 (offshore operations and maintenance plans, outline document reference: J19) and CoT49 (CMSs). Additional risk control options as discussed with oil and gas operators are also considered within **section 1.11.6**.
5 June 2023 Stakeholder meeting	Oil and gas operators (collectively)	Comment raised in relation to oil and gas assets that are planned to be repurposed/decommissioned in the coming years. Future liaison between oil and gas operators and the Applicants was noted to be important.	Additional risk control options as discussed with oil and gas operators are outlined within **section 1.11.6**.
5 June 2023 Stakeholder meeting	Oil and gas operators (collectively)	Comment in relation to consideration of oil and gas activities within the vessel management plan, as well as when looking at ferry route deviations.	Impacts to oil and gas activities are addressed within **section 1.10.8** and **section 1.12.3**. Stakeholder activities were considered within the applied risk controls identified in **Table 1.10**, including various plans, including CoT69 (VTMPs, outline document reference: J21).
5 June 2023 Stakeholder meeting	Oil and gas operators (collectively)	Cumulative issues with the Mona Offshore Wind Project were raised.	The CRNRA (**Appendix C**) addresses the cumulative impacts that arise as a result of the Mona Offshore Wind Project, Morgan Offshore Wind Project Generation Assets and Morecambe Offshore Windfarm Generation Assets in conjunction with the Transmission Assets.

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
5 June 2023 Stakeholder meeting	Oil and gas operators (collectively)	The Morgan Offshore Wind Project offshore booster station has potential to be located such that the Calder platform is put into a 'shadow zone' for the early radar detection monitoring system which monitors allision risks.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.
5 June 2023 Stakeholder meeting	Oil and gas operators (collectively)	Spirit would like for a corridor to be preserved between the Calder and CPP1 platforms, maintaining line of sight and emergency response on manned platforms.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.
5 June 2023 Stakeholder meeting	Oil and gas operators (collectively)	Additional risk controls were recommended. • Micro-siting of the Morgan Offshore Wind Project offshore booster station location to minimise impact to nearby oil and gas platforms/wells, and to allow for: – rig moves, decommissioning and repurposing activities; – allision radar detection system; – emergency response to manned platforms; and – aviation access to platforms. • Bridging/liaising/SIM-Ops.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable. Additional risk control options that were discussed with oil and gas operators are considered in **section 1.11.6**. Applied mitigations are discussed in **Table 1.10**, which includes various plans, such as CoT69 (VTMPs, outline document reference: J21), CoT45 (CSIPs, outline document reference: J15), CoT71 (offshore operations and maintenance plans, outline document reference: J19) and CoT49 (CMSs).
6 June 2023 Stakeholder meeting	Royal Yachting Association	The reduction in under keel clearance was the main area of concern to recreational users.	Applied mitigations in **Table 1.10** list commitments made by the Applicants, including CoT45 (CSIPs, outline document reference: J14) will mitigate the effects of reduced under keel clearance. Within this there will be no more than 5% reduction in water depth (referenced to Chart Datum) will occur

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
			at any point on the offshore export cable corridor route without prior written approval from the MCA.
7 June 2023 Stakeholder meeting	Wider stakeholder briefing	It was queried whether a cumulative assessment is being carried out for the Transmission Assets.	Cumulative impact assessment presented in **section 1.12**. Additionally, the CRNRA (**Appendix C**) further addresses the cumulative impacts.
7 June 2023 Stakeholder meeting	Wider stakeholder briefing	Fishing representatives were concerned about the cumulative effect of the wind farms within the Irish Sea.	Cumulative impact assessment presented in **section 1.12**. Additionally, the CRNRA (**Appendix C**) further addresses the cumulative impacts.
21 September 2023 MNEF	MNEF members	An update on the progress of the Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, Mona Offshore Wind Project and Transmission Assets projects was provided to attending stakeholders.	The updates across the respective projects were delivered to the attendees of the MNEF.
8 Feb 2024 MNEF	MNEF members	An update on the progress of the Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, Mona Offshore Wind Project and Transmission Assets projects was provided to attending stakeholders. The project changes to the Transmission Assets made since the PEIR submission were communicated to stakeholders.	All parties were content, and no concerns were raised in relation to the removal of the Morgan Offshore Wind Project offshore booster station. Transmission Assets changes are outlined in **section 1.5.4**.
8 March 2024 Letter	MCA and Trinity House	A letter was sent to the MCA and to Trinity House to formally communicate the latest project design updates, including the removal of the OSPs, Morgan Offshore Wind Project offshore booster station and interconnector cables, and offer follow up consultation meeting. Changes were understood and no follow up consultation meeting was requested by either the MCA or Trinity House.	Changes made to the Transmission Assets project are summarised in **section 1.5.4**.
23 November 2023 Section 42 Response	Natural England	Consideration to be given to the Liverpool dredge area 457 who will be renewing their aggregate extraction licence.	Dredge area 457 was included within the baseline presented in **section 1.7.2** and therefore has been considered throughout the assessment. No impact on dredge area 457 was identified within the NRA.

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
23 November 2023 Section 42 Response	Natural England	Mersey Tidal Power Project was scoped out in the screening matrix of the PEIR. However, this may need to be given further consideration as the project progresses. Consideration may need to be given to this proposal in the submitted Cumulative Effects Assessment (CEA).	The Mersey Tidal Power Project was captured within the CEA longlist of potential projects; however, both at the time of PEIR and subsequently, following an update of the CEA longlist, there is still a low data confidence for the Mersey Tidal Power. Its location within the Mersey is not expected to influence the findings fo the NRA.
23 November 2023 Section 42 Response	Trinity House	Outlining of conditions required for notification and inspections, aids to navigation, colouring of structures and construction monitoring.	The project updates since the PEIR stage include the removal of all surface piercing structures from the Transmission Assets project, as described in **section 1.5.4,** and related aspects for these structures are no longer required. The Applicants have committed to meeting requirements as identified in **Table 1.10**, most notably CoT46 (Aids to Navigation), CoT71 (offshore operations and maintenance plans, outline document reference: J19) and CoT72 (vessel traffic monitoring).
23 November 2023 Section 42 Response	MCA	General statement on compliance with MGN654 and the MGN checklist. It was noted that four 14-day traffic surveys (radar, AIS and visual) were completed and additional surveys of the Morgan Offshore Wind Project offshore booster station location and 'top up' surveys in 2023 will be completed and fed into the final NRA and ES for application. The MCA expect the NRA and ES to be updated with the additional data incorporated and MCA will provide further comments once completed.	An MGN654 checklist has been undertaken for the Transmission Assets and is shown in **Appendix B**. Additional surveys that have been undertaken are outlined within **section 1.8.1**. The survey data collected has been incorporated into the assessment presented in **section 1.10**.
23 November 2023 Section 42 Response	MCA	Responses were listed to draw attention to comments left on the DCO following the MCA review.	Comments left on the Development Consent Order (DCO) were acknowledged and understood by the Transmission Assets and have been addressed within the application DCO.

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
23 November 2023 Section 42 Response	Orsted Burbo Bank, Spirit Energy, Walney (UK) Offshore Windfarms Limited, Orsted West of Duddon Sands	The extent of routes and the volume of project vessels during the construction and operation and maintenance phase is yet undefined, as are the base port/s for these phases.	The construction and operation and maintenance port bases are not yet defined and the Transmission Assets project will be refining options as part of future project development. Increased vessel movements both associated with the Transmission Assets and wider macro-economic trends which have been considered within the NRA in **section 1.9** and within the CRNRA (**Appendix C**) for the cumulative future traffic profile. The Applicants have also committed to risk mitigations and the development of associated plans, as described in **Table 1.10**. Most notably this includes CoT 69 (VTMPs, outline document refence: J21), CoT 49 (CMSs) and CoT71 (offshore operations and maintenance plans, outline document reference: J19).
23 November 2023 Section 42 Response	Orsted Burbo Bank, Orsted Burbo Extension Ltd, Walney (UK) Offshore Windfarms Limited, Orsted West of Duddon Sands	There is a hope for more information on potential impacts and the proposed mitigation measures, in particular relating to Vessel Traffic Services (VTS), commercial routes, combined wind farm/oil and gas activity and additional construction vessel activity.	More information and details of the applied mitigation measures and commitments made are described in **Table 1.10**. Impacts associated with the Transmission Assets is described in **section 1.10**. The cumulative regional variations to commercial routes and associated risk implications are discussed in the CRNRA (**Appendix C**).
23 November 2023 Section 42 Response	Orsted Burbo Bank, Orsted Burbo Extension Ltd, Walney (UK) Offshore	Comments relating to the number of windfarms in Irish Sea and concerns over additional marine traffic in the area.	Burbo Bank, Burbo Bank Extension, Walney Windfarms and West of Duddon Sands are considered within the baseline environment and are therefore considered within the wider CEA. The cumulative assessment takes into account all Tier 1, 2 and 3 offshore wind farms within the Irish

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
	Windfarms Limited, Orsted West of Duddon Sands		Sea. The influence of cumulative projects within the Irish Sea and their associated risk implications are discussed in the CRNRA (**Appendix C**).
23 November 2023 Section 42 Response	Spirit Energy, Harbour Energy	The stakeholder responses draw attention to areas for consideration including safety zones, oil and gas vessel access and helicopter access.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable. During cable activities, applied mitigations in **Table 1.10** includes various plans, such as CoT69 (VTMPs, outline document reference: J21).
23 November 2023 Section 42 Response	Spirit Energy	Concerns around the displacement of traffic and increase in non-routine traffic within the area.	The construction phase of the Transmission Assets has potential to cause displacement to vessel traffic and this impact has been assessed within the NRA and within **section 1.10** of this NRA. These effects are not considered to be applicable for the operational phase of the Transmission Assets, except during major maintenance, as the subsea cable will be buried and/or protected. The influence of cumulative projects within the Irish Sea and their associated risk implications are discussed in the CRNRA (**Appendix C**).
23 November 2023 Section 42 Response	Spirit Energy, Harbour Energy	Comments relating to the location of the Morgan Offshore Wind Project offshore booster station and effects on oil and gas activity.	The project updates since the PEIR stage include the removal of the Morgan Offshore Wind Project offshore booster station, as described in **section 1.5.4,** and associated risks are no longer applicable.
23 November 2023	Spirit Energy	Concerns relating to emergency response, particularly on and around oil and gas platforms.	Emergency response and SAR capabilities have been considered within **section 1.10.6**. Applied mitigations in **Table 1.10** also includes CoT70

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
Section 42 Response			(offshore emergency and response and safety plan(s)).
23 November 2023 Section 42 Response	Spirit Energy	In relation to the management of simultaneous operations.	Management of simultaneous operations will be carefully managed to ensure risks resulting from increased level of marine activity and traffic being introduced to the area are minimal and mitigated throughout construction and operation and maintenance. The Applicants have also committed to risk mitigations and the development of associated plans, as described in **Table 1.10**. Most notably this includes CoT 69 (VTMPs, outline document refence: J21), CoT 49 (CMSs) and CoT71 (offshore operations and maintenance plans, outline document reference: J19). The MNEF covering the Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, Mona Offshore Wind Project and the Transmission Assets will be maintained.
23 November 2023 Section 42 Response	Spirit Energy	Advising Spirit Energy has been granted a carbon storage licence for developing North and South Morecambe reservoirs by the North Sea Transition Authority. The carbon store will need to be developed, monitored, maintained, and coexist with the existing and planned wind farms in the east Irish Sea Area.	The activities proposed for the development of carbon stores are acknowledged and considered in **section 1.9.4**. This was assessed with the Transmission Assets in **section 1.10.11** and the Irish Sea windfarm projects as described in the CRNRA (**Appendix C**).
23 November 2023 Section 42 Response	Isle of Man Department of Infrastructure, MLC (Legislative Council of the Isle of Man)	Raised concerns around ferry routes and the viability of lifeline ferry services for the Isle of Man.	The impact to commercial shipping during the three phases of the Transmission Assets project has been assessed within **section 1.10**, which concluded that cable laying operations alone would not have a significant effect on regular shipping routes. Cumulatively, this is assessed in CRNRA (**Appendix C**).

Date and Form of Consultation	Consultee	Comments raised	Response to comments raised and/or where considered in this NRA
23 November 2023 Section 42 Response	Isle of Man Department of Infrastructure, Natural Resources Wales Advisory	Raised the inclusion of Mooir Vannin within the cumulative assessment and identified that the Mooir Vannin Offshore Wind Farm was not included within the PEIR chapter for the Transmission Assets.	Mooir Vannin was not included within the cumulative assessments at PEIR stage due to limited data available at that time and not being included in the previous version of the CRNRA used at PEIR stage. Following the PEIR, the Mooir Vannin project has issued its Scoping Report and has been considered as a Tier 2 project which has also been assessed as an addendum to the CRNRA (**Appendix C**). The Mooir Vannin project has been considered in the CEA of the NRA within **section 1.12.3** and **section 1.12.4**, which found that the contribution of the Transmisison Assets was insubstantial compared to the effects of the proposed array areas of the Mooir Vannin Offshore Wind Farm and the Morgan Offshore Wind Project: Generation Assets.
23 November 2023 Section 42 Response	Northwest Wildlife Trust	Transboundary effects with Welsh waters and Isle of Man waters.	Transboundary effects related to the construction, operation and maintenance and decommissioning of the Transmission Assets are considered as part of the EIA. Transboundary effects are discussed in Volume 2, Chapter 7: Shipping and Navigation of the ES.
23 November 2023 Section 42 Response	Explorer Scouts	Concerns relating to potential lack of stakeholder consultation undertaken with shipping companies.	Stakeholder consultation is described within **section 1.5.5**. Consultation was undertaken with various commercial Shipping and Navigation stakeholders, including the UK Chamber of Shipping (representing commercial shipping interests), ferry operators and fishing operators, among other key Shipping and Navigation stakeholders.

Vessel traffic datasets

1.5.5.5 The vessel traffic data used to determine baseline conditions for this NRA is listed below.

- High fidelity Automatic Identification System (AIS) data for 2019 for the whole Irish Sea.
- High fidelity AIS data for 2022 for the whole Irish Sea.
- MMO 2019 anonymised AIS data.
- European Marine Observation and Data Network (EMODnet) 2021 vessel density grids.
- RYA Coastal Atlas.
- UK Vessel Monitoring System (VMS) 2019 data.
- Oslo and Paris Conventions EU VMS 2017 data.
- Department for Transport (DfT) shipping statistics (2022).
- MGN 654 compliant vessel traffic surveys within the Offshore Order Limits and study area collecting AIS, radar and visual observations. This NRA utilises various surveys that were undertaken by the Applicants, in addition to those undertaken for the respective Generation Assets projects. The areas of coverage of the surveys undertaken are listed with respect to the location of surface piercing structures plus a 10 nm buffer. This is summarised in chronological order within **Table 1.8** and further detailed in **section 1.8.2**.

Table 1.8: Summary of vessel traffic surveys

Survey	Dates	Area of coverage
14 day winter vessel traffic survey	21 November 2021 to 5 December 2021	Area containing the Morgan Offshore Wind Project: Generation Assets + 10 nm buffer
14 day winter vessel traffic survey	9 February 2022 to 26 February 2022	Are containing the Morecambe Offshore Windfarm: Generation Assets + 10 nm buffer
14 day summer vessel traffic survey	15 July 2022 to 29 July 2022	Area containing the Morgan Offshore Wind Project: Generation Assets + 10 nm buffer
14 day summer vessel traffic survey	30 July 2022 to 13 August 2022	Area containing the Morecambe Offshore Windfarm: Generation Assets + 10 nm buffer
14 day summer vessel traffic survey	3 August 2023 to 17 August 2023	Area containing the previously proposed Transmission Assets Morgan Offshore Wind Project offshore booster station search areas which covers the Transmission Assets Morgan Offshore Wind Project offshore booster station search areas.. Note This structure has subsequently been removed from the project design, as discussed in **section 1.5.4**. The survey data has; however, still been used to support the NRA.
14 day top up vessel traffic survey, as required in MGN654 to extend data validity	11 November 2023 to 27 November 2023	Area containing the Morgan Offshore Wind Project: Generation Assets + 10 nm buffer

Survey	Dates	Area of coverage
14 day winter top up vessel traffic survey, as required in MGN654 to extend data validity	27 November 2023 to 13 December 2023	Area containing Morecambe Offshore Windfarm: Generation Assets + 10 nm buffer

Incident data

1.5.5.6 Four incident datasets were utilised to support this assessment.

- Marine Accident Investigation Branch (MAIB) accidents database (2010-2022).
- Royal National Lifeboat Institute (RNLI) incident data (2008-2023).
- UpDfT SAR helicopter taskings (2022).
- G+ Accident Data (2013 to 2021).

Other data sources

1.5.5.7 Other datasets utilised to support this assessment include:

- marine aggregate dredging licences (Crown Estate, 2024);
- offshore renewables (Crown Estate, 2024);
- industrial infrastructure (wind turbines, oil and gas, cables etc.) (Oceanwise, 2022);
- oil and gas activity (North Sea Transition Authority [NSTA], 2023);
- Admiralty charts (2023);
- Admiralty Sailing Directions (2022) (NP40 Irish Coast Pilot, 2019 and NP37 West Coasts of England and Wales Pilot, 2022);
- passage plans and vessel information provided by ferry operators (2022);
- tidal data (Admiralty Total Tide); and
- MetOcean data (provided by bp/EnBW).

1.6 Project description and maximum design scenario

1.6.1 Introduction

1.6.1.1 The PDE approach (also known as the Rochdale Envelope approach) has been adopted for the Environmental Impact Assessment (EIA) of the Transmission Assets, in accordance with industry good practice. The PDE sets out the design assumptions and parameters from which the realistic MDSs are drawn for the Transmission Assets EIA. The Transmission Assets are in the early stages of the development process. The project envelope has been designed to include appropriate flexibility to accommodate further project refinement during detailed design, post consent.

1.6.1.2 Therefore, when undertaking assessments on projects a number of years ahead of the time of construction, the assessment can consider what impacts might be significant based on the maximum design parameters and assumptions.

1.6.1.3 The MDS relevant to shipping and navigation receptors is described within this section. This considers:

- the largest extent of the development;
- the longest duration of activities;
- the most vessel movements undertaken by the project;
- the longest lengths of export cables;
- the maximum number of cable crossings;
- the minimum cable burial depth; and
- the maximum height and length of cable protection.

1.6.2 Transmission infrastructure

1.6.2.1 Up to six offshore export cables will be required (up to four for the Morgan Offshore Wind Project and up to two for the Morecambe Offshore Windfarm). Each offshore export cable will be installed in a separate trench with a typical separation distance of approximately 200 m between cables.

1.6.2.2 The offshore export cables will be buried below the seabed surface wherever possible (CoT45 and CoT54) and protected with cable protection where adequate burial is not achievable. Where offshore export cables cannot be buried sufficiently due to ground conditions, external cable protection measures will be required. Up to 10% (48.4 km) of the total offshore export cable length may require cable protection.

1.6.2.3 The export cable corridor crosses a number of existing assets, including telecoms cables and oil and gas pipelines in the Irish Sea. It is impossible to bury the cables at these crossings, so to protect the existing assets and the export cables, cable protection will be used.

1.6.2.4 The design envelope for the offshore export cables is detailed in **Table 1.9**.

Table 1.9: Design envelope - offshore export cables

Parameter	Maximum design parameter		
	Morgan Offshore Wind Project	Morecambe Offshore Windfarm	Maximum design parameter
Maximum number of offshore export cables	4	2	6
Maximum length per cable (km)	100	42	N/A
Maximum total length of offshore export cables (km)	400	84	484
Burial techniques	Trenching, plough, jetting, mechanical cutting		
Maximum burial depth (m)	3	3	3
Minimum burial depth (m)	0.5	0.5	0.5
Offshore export cables, cable protection due to ground conditions			
Cable protection type (ground conditions)	Rock dump, rock armour, mattresses, articulated pipe		
Maximum height of cable protection (m)	2	2	2
Maximum width of cable protection per cable (m)	10	10	10
Maximum offshore export cable corridor with cable protection coverage (%), **whole route**	10% (40 km)	10% (8.4 km)	10% (48.4 km)
Offshore export cables, cable protection due to asset crossings			
Cable crossing protection type	Rock dump, rock armour, mattresses, articulated pipe		
Maximum number of individual cable crossings, whole route	45	6	51
Maximum length of crossings (m)	150	150	150
Maximum width of crossings (m), per cable	30	30	30
Maximum height of crossing (m)	2.8	2.8	2.8

1.6.3 Construction and decommissioning activities

1.6.3.1 The construction phase is anticipated to take up to 21 months for sequential construction, or up to 18 months based on concurrent construction. The MDS for shipping and navigation is considered to be concurrent construction due to the larger number of construction vessels expected during construction and on site at any one time, leading to increased vessel activity and interactions. If the Transmission Assets were to be constructed sequentially over a longer timescale, it is not anticipated that there would be any additional impacts to those assessed in the NRA. The decommissioning phase is anticipated to be the same duration as for construction.

1.6.3.2 An outline cable specification and installation plan (CSIP) (document reference: J15) and outline cable burial risk assessment (document reference: J14) are provided with the application; however, the detailed installation methods will be defined post consent taking into account further pre-construction survey results and third party activities such as trawling and vessel anchors.

1.6.3.3 During construction, the MDS for concurrent construction (which represents the worst-case for this parameter) consists of up to a total of 30 construction vessels expected on site at any one time (19 for the Morgan Offshore Wind Project and 10 for the Morecambe Offshore Windfarm), including tug/anchor handlers, cable lay and support vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs and cable protection installation vessels.

1.6.3.4 In this scenario (concurrent), up to 278 vessel movements (return trips) are expected during construction per year.

1.6.3.5 It is not defined at present how many vessel trips will be required during the decommissioning phase; however, it is anticipated that vessel types and number of trips will be similar to those during the construction phase with highest vessel numbers occurring if decommissioning were undertaken concurrently. Decommissioning activities consider the removal of all export cables and associated cable protection.

1.6.4 Operation and maintenance activities

1.6.4.1 The longest duration of the operational life of the Transmission Assets will be up to 35 years, in line with the associated Generation Assets.

1.6.4.2 The overall operation and maintenance strategy will be finalised once the detailed design and technical specifications of the Transmission Assets offshore infrastructure are known. Further information on operation and maintenance requirements for the offshore export cables are set out within an outline offshore operations and maintenance plan (document reference: J19).

1.6.4.3 Up to 77 operation and maintenance vessel movements (return trips) are expected per year. This includes CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredgers. This assumes normal route inspections and a maximum of up to four cable reburials per year and a maximum of two cable repairs per year at any point along the cable route.

1.6.5 Applied mitigations

1.6.5.1 **Table 1.10** describes applied mitigations committed to by the Transmission Assets and therefore are included in the NRA. These are fully contained within the commitments register (Volume 1, Annex 5.3: Commitments Register of the ES).

1.6.5.2 All referenced plans and documents are separate and standalone to those that are identified in Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets projects.

Table 1.10: Applied mitigations

Title	Risk mitigated	CoT number	Commitment (CoT) wording	How will the measure be secured
Outline offshore cable specification and installation plan(s) (CSIP), including cable protection, monitoring, layout plan, and cable burial risk assessment (CBRA) Outline CSIP document reference: J15, and Outline CBRA document reference: J14.	Risk of grounding or snagging of cables.	CoT45	The Outline Offshore Cable Specification and Installation Plan (CSIP) for the Fylde MCZ includes: details of cable burial depths, cable protection, and cable monitoring. The Outline CSIP also includes an Outline Cable Burial Risk Assessment (CBRA). Detailed CSIP(s) and CBRA(s) will be prepared by the Applicants covering the full extent of their respective offshore export cable corridors. Detailed CSIPs will be developed in accordance with the Outline CSIP and will ensure safe navigation is not compromised including consideration of under keel clearance. No more than 5% reduction in water depth (referenced to Chart Datum) will occur at any point on the offshore export cable corridor route without prior written approval from the MCA.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)
Aids to navigation (marking and lighting)	Risk of collision with project vessels.	CoT46	Aids to navigation (marking and lighting) will be deployed in accordance with international maritime regulations and the latest relevant available standard industry guidance as advised by Trinity House or MCA. This will include a buoyed construction area around cable laying operations, cable repairs and during cable maintenance.	DCO Schedules 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 -& 15, Condition15 (Aids to navigation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition15 (Aids to navigation)
Construction method statement(s) (CMSs)	Risk of collision with construction vessels.	CoT49	Construction Method Statement(s) (CMSs) including Offshore Cable Specification and Installation Plan(s), will be produced and implemented prior to construction. These will contain: - details of cable installation and methodology; and - details of foundation installation methodology covering scour protection and the deposition of	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 -

Title	Risk mitigated	CoT number	Commitment (CoT) wording	How will the measure be secured
			material arising from drilling, dredging, and/or sandwave clearance.	Condition 18(1)(e) (Pre-construction plans and documentation)
Fisheries Liaison Officer	Fishing hazards, including snagging of cables. Risk of collision with project vessels.	CoT52	Ongoing liaison with the fishing industry through the appointment of a Company Fisheries Liaison Officer(s) (CFLO)(s) and adherence to good practice guidance with regards to fisheries liaison (e.g. Fishing Liaison with Offshore Wind and Wet Renewables Group FLOWW (2014, 2015) guidance).	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(f)(iv) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition18(1)(f)(iv) (Pre-construction plans and documentation)
Cable burial as preferred option for cable protection	Fishing hazards, including snagging of cables. Risk of grounding or snagging of cables.	CoT54	An Outline Offshore Cable Specification and Installation Plan (CSIP) includes for cable burial to be the preferred option for cable protection, where practicable. Detailed CSIP(s) will be developed in accordance with the Outline CSIP.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)
Site Marking and Charting	All direct impacts of the Transmission Assets.	CoT59	The United Kingdom Hydrographic Office will be notified of both the commencement, progress and completion of offshore construction works to allow marking of all installed infrastructure on nautical charts.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition14 (8-10) (Notifications and inspections) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition14 (8-10) (Notifications and inspections)

Title	Risk mitigated	CoT number	Commitment (CoT) wording	How will the measure be secured
Minimise disruption to fisheries	All direct impacts of the Transmission Assets.	CoT61	An Outline Fisheries Coexistence and Liaison Plan will seek to minimise the duration for which the offshore export cable corridors will be closed to vessels during construction, to limit disruption to commercial fishing activities, if and where practicable. Detailed Fisheries Coexistence and Liaison Plan(s) will be developed in accordance with the Outline Plan.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(f)(iv) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition18(1)(f)(iv) (Pre-construction plans and documentation)
Offshore environmental management plans (EMPs) including marine pollution contingency plan, fisheries liaison and coexistence plan, chemical risk review and waste management and disposal arrangement.	Fishing hazards, including snagging of cables. Risk of collision with project vessels. Reduction of consequences of incidents.	CoT65	Offshore Environmental Management Plan(s) (EMPs) will be developed and will include details of: • a marine pollution contingency plan to address the risks, methods and procedures to deal with any spills and collision incidents during construction and operation of the authorised scheme for activities carried out below MHWS; • a chemical risk review to include information regarding how and when chemicals are to be used, stored and transported in accordance with recognised best practice guidance; • waste management and disposal arrangements; • the appointment and responsibilities of a fisheries liaison officer; • a fisheries liaison and coexistence plan (which accords with the outline fisheries liaison and co-existence plan) to ensure relevant fishing fleets are notified of commencement of licensed activities pursuant to condition and to address the interaction of the licensed activities with fishing activities; • measures to minimise disturbance to marine mammals and rafting birds from vessels; and	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 20(1)(b) (UXO clearance) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition20(1)(b) (UXO clearance)

Title	Risk mitigated	CoT number	Commitment (CoT) wording	How will the measure be secured
			• measures to minimise the potential spread of invasive non-native species, including adherence to IMO ballast water management guidelines.	
Safety zone statement, advisory passing distances and guard vessels Safety zone statement document reference: J33.	Risk of collision with project vessels.	CoT66	A Safety Zone Statement has been submitted as part of the application for development consent. Advisory exclusion zones of 500 m will be applied during construction and maintenance. Where defined by risk assessment, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances to mitigate impacts which pose a risk to surface navigation.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(f)(iv) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition18(1)(f)(iv) (Pre-construction plans and documentation)
VTMP including project vessel routing, vessel standards and codes of conduct. Outline VTMP document reference: J21.	Risk of collision with project vessels.	CoT69	Detailed Vessel Traffic Management Plan(s) (VTMP) will be developed pre-construction in line with legislation, guidance and industry best practice which will: - determine vessel routing to and from construction areas and ports; - include vessel standards and a code of conduct for vessel operators; and - minimise, as far as reasonably practicable, encounters with marine mammals and basking sharks. These plans will be developed in accordance with the Outline VTMP prepared and submitted with the application for development consent.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(h) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition18(1)(h) (Pre-construction plans and documentation)
Offshore emergency and response and safety plan(s)	Reduction of consequences of incidents.	CoT70	Offshore Emergency and Response and Safety Plan(s) will be prepared post consent to ensure relevant compliance with MGN654, where appropriate.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 20 (Offshore Safety Management) and DCO Schedule 15

Title	Risk mitigated	CoT number	Commitment (CoT) wording	How will the measure be secured
			This includes completion of an MGN654 Search and Rescue Checklist in consultation with the MCA.	(Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition 20 (Offshore Safety Management)
Offshore operations and maintenance plan. Outline offshore operations and maintenance plan document reference: J19.	Risk of project asset failure. Risk of grounding or snagging of cables.	CoT71	An Outline Offshore Operation and Maintenance Plan has been prepared and submitted as part of the application for development consent. Detailed Offshore Operation and Maintenance Plan(s) will be produced prior to entering the operation and maintenance phase.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition11(3) (Maintenance of the authorised scheme) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition11(3) (Maintenance of the authorised scheme)
Vessel traffic monitoring and continuous watch.	Responding to incidents swiftly. Risk of collision with project vessels. Identification of unanticipated project impacts.	CoT72	The Applicants will ensure compliance with MGN654 for vessel traffic monitoring and continuous watch, where appropriate, in consultation with the MCA.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 22 (Offshore safety management) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 – Condition 22 (Offshore safety management)
Notice to Mariners	All direct impacts of the Transmission Assets.	CoT112	Advance warning will be provided via Notice to Mariners to ensure that the appropriate authorities are informed of offshore construction, operation and maintenance, and decommissioning activities. Copies of all notices must be provided to the MMO, MCA and	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 14(8-9) (Notifications and inspections) and DCO Schedule 15 (Marine Licence 2: Morecambe

Title	Risk mitigated	CoT number	Commitment (CoT) wording	How will the measure be secured
			UKHO as well as other interested parties, as appropriate.	Offshore Wind Farm Transmission Assets), Part 2 - Condition 14(8-9) (Notifications and inspections)

1.7 Description of the marine environment

1.7.1 Principle navigational features

1.7.1.1 Key features relevant to the project and features relating the management of vessels and safety of navigation are described in this section.

1.7.1.2 Principle navigational features relevant to the Transmission Assets have been identified using the appropriate UK United Kingdom Hydrographic Office (UKHO) Admiralty charts and UKHO Admiralty Sailing Directions appropriate to the area. Principle navigational features in proximity to the project are shown in **Figure 1.3**. Details of these navigational features are described in the following sections.

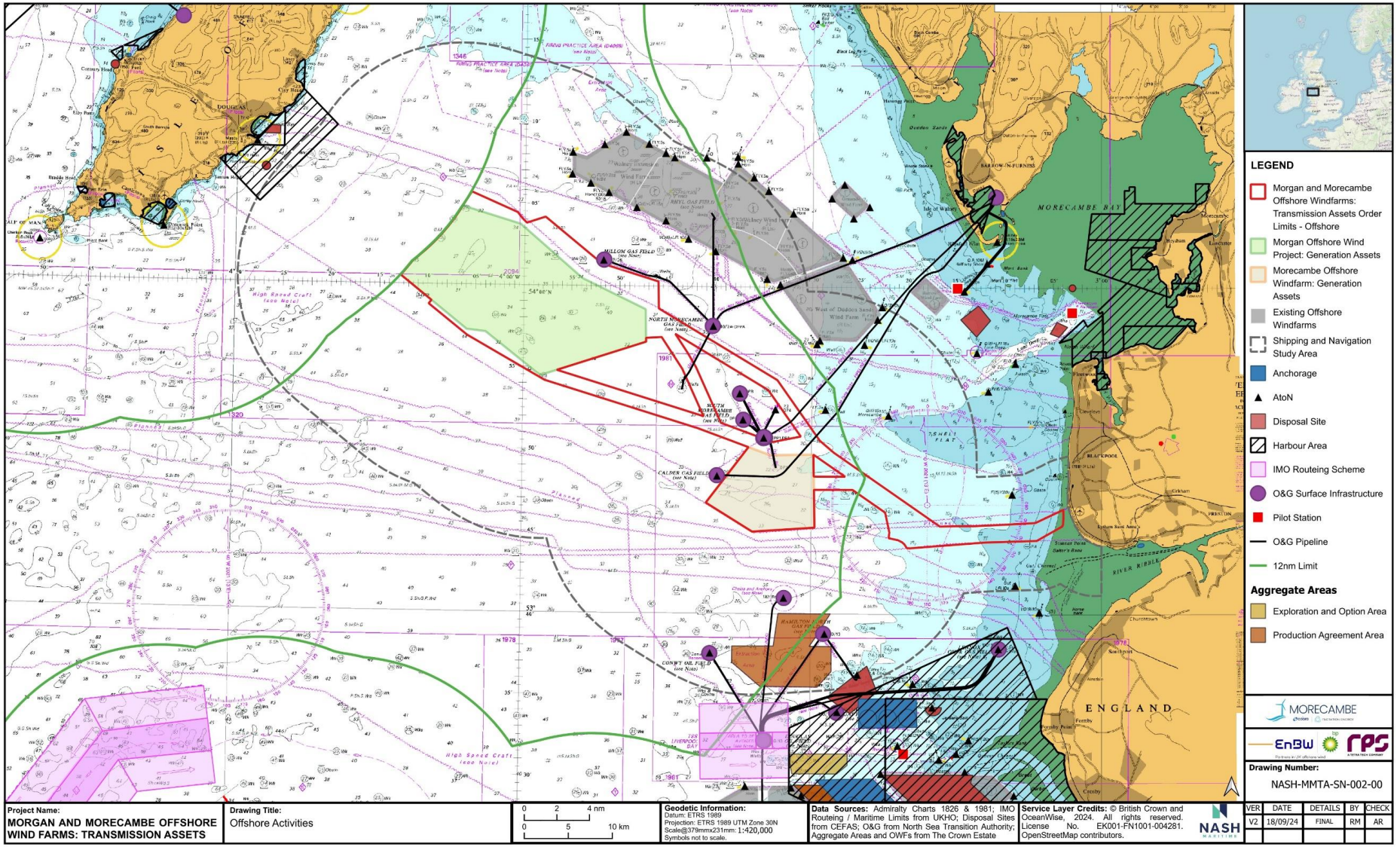

Figure 1.3: Overview of the existing marine environment

Responsible authorities – MCA

1.7.1.3 The study area is in a region of general navigation in UK waters with the MCA as the responsible authority for safe navigation.

IMO routeing schemes, reporting measures and recommended channels

1.7.1.4 There are two IMO adopted routeing measures located within the Irish Sea. The Liverpool Bay Traffic Separation Scheme (TSS) is located approximately 10.5 nm south and the Off Skerries TSS is located approximately 27 nm south west of the Offshore Order Limits, as shown in **Figure 1.3**.

1.7.1.5 The area surrounding the Douglas Oil Field infrastructure is charted on Admiralty Chart 1826 as an Area to be Avoided with the accompanying note: 'The IMO adopted Area to be Avoided should only be entered by authorised vessels to access the Douglas Oil Field'. The Douglas Oil Field lies 12.8 nm south of the Offshore Order Limits.

1.7.1.6 There are no reporting measures within the study area.

Aids to navigation

1.7.1.7 Aids to Navigation (AtoNs) located in the study area are shown in **Figure 1.3**.

1.7.1.8 There are numerous AtoNs within the study area, primarily these are marking:

- the existing offshore wind farms of Walney, Walney Extension and East of Duddon Sands, marked by cardinal marks that indicate the position of a danger and the direction of the safe side on which to pass it;
- the oil and gas surface structures marking the presence of the structure; and
- other marks closer to the shore and within the east of the study area, including the Morecambe AtoN marking shallower water of Shell Flat (less than 10 m depth to Chart Datum), and two buoys within 3 nm of the shore within the Flyde marine conservation zone – a special mark (undefined purpose, but potentially recreation use or and the Gut safe water buoy marking the Gut Channel adjacent to the coast near the entrance to the River Ribble).

Pilot boarding stations

1.7.1.9 Pilot boarding stations are shown in **Figure 1.3**. These include, Douglas, Liverpool, Mostyn, Mostyn Outer, Point Lynas (Liverpool) and Menai Strait. None of these stations fall within the study area.

Practice and exercise areas

1.7.1.10 There is a firing practice area (D406) located approximately 3.4 nm to the north of the Offshore Order Limits. No restrictions are placed on the right to transit the firing practice areas at any time. The firing practice area is operated using a clear range procedure, meaning that firing only takes place when the area is confirmed as being clear of all shipping.

Anchorages and waiting areas

1.7.1.11 Two charted anchorages are located within the Port of Liverpool Statutory Harbour Authority Area, as shown in **Figure 1.3**. One of these lies to the south of the approaches to Liverpool between the Burbo Bank Extension and Gwynt y Môr windfarms. The other anchorage is to the north of the approaches to the Mersey.

1.7.1.12 Douglas Bay is used as an anchorage for vessels waiting to enter the Port of Douglas and for cruise vessels when undertaking tendering operations.

1.7.1.13 Whilst not charted, analysis of vessel traffic data identified a commercial ship anchorage located to the east of Anglesey, by Point Lynas, that offers good shelter in westerly winds.

Spoil and disposal grounds

1.7.1.14 No active spoil or disposal grounds are present in the study area.

Wrecks

1.7.1.15 There are over 1,300 charted wrecks in the Irish Sea. These are identified on navigational charts.

1.7.2 Existing infrastructure

Ports and harbours

1.7.2.1 There are no ports or harbours within the study area. The Offshore Order Limits does not enter any port jurisdictions. **Table 1.11** lists the key ports and harbours within the Irish Sea.

Table 1.11: Key ports and harbours

Name	Location relative to the Offshore Order Limits
Douglas Port (Isle of Man)	12.3 nm north west
Port of Liverpool (England)	18.2 nm south
Heysham Port (England)	16.1 nm north east
Belfast Port (Northern Ireland)	69.1 nm north west
Dublin Port (Ireland)	80.5 nm south west

Existing offshore wind projects

1.7.2.2 Existing offshore wind farm infrastructure within the east Irish Sea and within the study area is listed in **Table 1.12.** The Walney, Walney Extension and West of Duddon Sands offshore wind farms lie within the study area.

Table 1.12: Existing offshore wind projects within the study area

Name	Capacity	Location relative to the Offshore Order Limits	Status
Walney Offshore Wind Farms	Group of operational wind farms with a total capacity of 1,026 MW	3.0 nm north east	Operational since 2011, with extensions operational in 2012 and 2018
West of Duddon Sands Offshore Wind Farm	389 MW capacity	3.5 nm north east	Operational since 2014

Oil and gas

1.7.2.3 Oil and gas infrastructure within the east Irish Sea is listed in **Table 1.13** and shown in **Figure 1.3.**

1.7.2.4 The study area overlaps with the South Morecambe gas field, North Morecambe gas field and the Calder gas field. South Morecambe gas field is owned and operated by Spirit Energy. Calder 110/7a is owned by Harbour Energy and operated by Spirit Energy. These fields are supported by offshore infrastructure (platforms, pipelines, cables and wells). Subsea pipelines connecting offshore platforms to shore or wells to offshore platforms cross the Offshore Order Limits at five places.

Table 1.13: Oil and gas Infrastructure within the east Irish Sea

Name	Type	Location relative to the Offshore Order Limits	Status
North Morecambe Gas Field	Manned	Located partially within Offshore Order Limits	Producing
South Morecambe Gas Field	Manned	Located partially within Offshore Order Limits	Producing. Decommissioning of two drilling platforms commenced in 2021
Calder Gas Field	Normally unmanned	Partially located within Offshore Order Limits	Producing
Millom Gas Field	Normally unmanned	500 m north	Production ceased
Hamilton North Gas Field	Normally unmanned	6.4 nm south	Producing
Conwy Oil Field	Manned	7.9 nm south	Producing
Hamilton gas field	Normally unmanned	11.2 nm south	Producing
Millom gas field	Normally unmanned	14.2 nm north west	Producing

Name	Type	Location relative to the Offshore Order Limits	Status
Douglas Oil field	Manned	12.4 nm south	Producing
Lennox Oil and gas field	Normally unmanned	13.3 nm south east	Producing

Submarine cables

1.7.2.5 A total of seven charted subsea cables cross or lie within the Offshore Order Limits, as presented in **Figure 1.3**.

7.1.1.1 A summary of the subsea cables that cross the Offshore Order Limits is provided in **Table 1.14.** Further details on cable crossings can be found within Volume 1, Annex 3.1: Offshore Crossing Schedule of the ES.

Table 1.14: Submarine cables intersecting the Offshore Order Limits

Name	Type	Owner
Havhingsten/CeltixConnect-2	Communications	Aqua Comms, Bulk, Meta
Lanis-1	Communications	Vodafone
IOM UK Interconnector	Power cable	Manx Electricity Authority
Calder to CPP1	Oil and gas electrification	Spirit Energy
DP3 to CPP1	Oil and gas electrification	Spirit Energy
CPP1 to DP3	Oil and gas electrification	Spirit Energy
CPP1 to DP3 2	Oil and gas electrification	Spirit Energy

1.7.2.6 In addition, there are multiple other cables within the study area, including interconnectors, export cables, communications cables and cables associated with oil and gas fields. Further details on cable crossings can be found within Volume 1, Annex 3.1: offshore crossing schedule of the ES.

Aggregates

1.7.2.7 Aggregate and extraction areas are shown in **Figure 1.3** and listed in **Table 1.15.** One extraction area is located within the study area.

Table 1.15: Aggregate and extraction areas within the study area

Name	Type	Location relative to Offshore Order Limits
Area 457: Liverpool Bay	Production Agreement Area	5.1 nm south

1.7.3 MetOcean conditions

1.7.3.1 In this section, MetOcean conditions are described for the study area for the wind and wave climate, tide and currents, and visibility. This includes analysis undertaken by HR Wallingford, to underpin the

CRNRA bridge navigation simulations and Admiralty Sailing Directions West Coasts of England and Wales Pilot, NP37, 21st Edition, 2022.

Wind and wave

1.7.3.2 **Figure 1.4** shows the modelled wind speeds and directions within the centre of the study area for the years 1988 to 2018. The predominant wind direction is from the south west, and accounts for the greatest proportion of strong wind events. The Admiralty Sailing Directions state that gales are reported between 12 days/year (at Walney) and 30 days/year (at Ronaldsway).

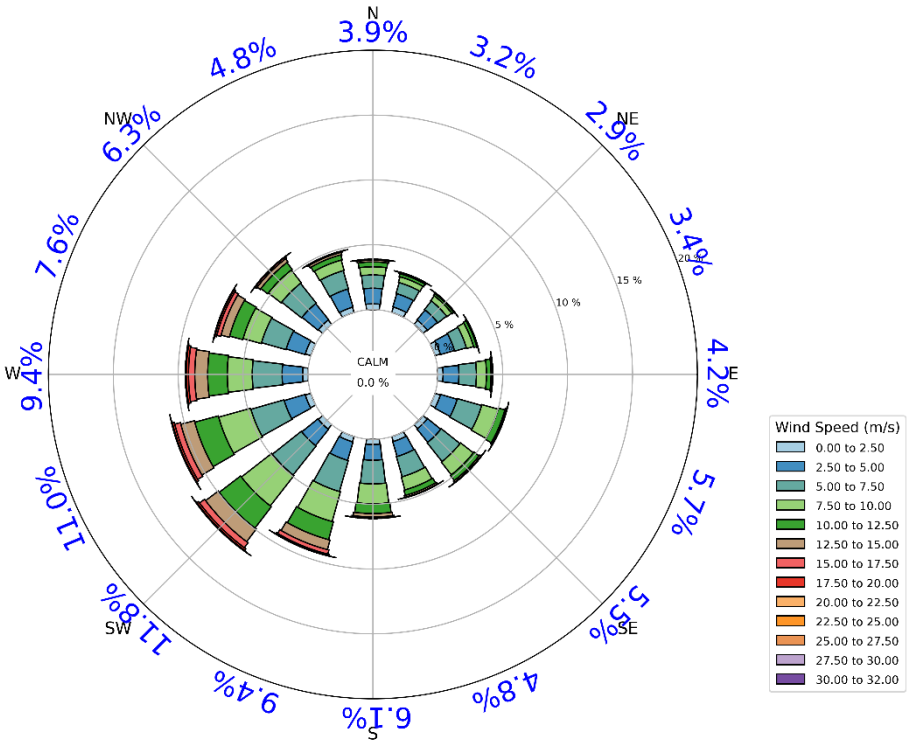

Figure 1.4: Annual average wind rose. Source: Morgan Project (1988-2018). Analysed by HR Wallingford

1.7.3.3 The Met Office North West Shelf Reanalysis Hindcast covers the period 1980 to 2021 and is based on coupled Nucleus for European Modelling of the Ocean (NEMO) and WaveWatchIII hydrodynamics and wave models, with the wave model forced with European Centre for Medium-Range Weather Forecasts Reanalysis v5 model winds. The wave model's horizontal resolution is between 3 to 1.5 km in coastal waters. Model wave data was downloaded for the south east Irish Sea and a subset of model points were extracted and analysed by HR Wallingford.

1.7.3.4 Annual average wave conditions at a point (53.8°N, -4.0°E) within the area of interest is shown in **Figure 1.5.** These demonstrate that wave conditions are predominantly south westerly and account for the majority of wave conditions greater than 2.5 m mean annual significant wave height (Hs). **Table 1.16** demonstrates the extreme wave

conditions within the study area, with 4.2 m Hs and 50 kts winds from the south west the typical annual extreme.

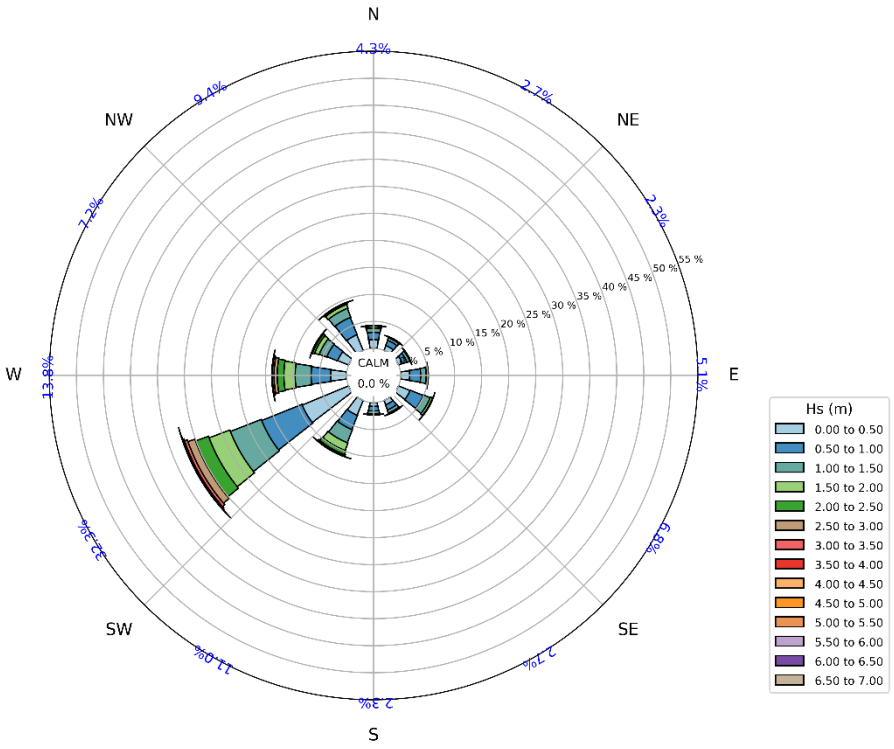

Figure 1.5: Annual average wave rose (53.8N, -4.0E) Source: Met Office North West-European Shelf (NWS) model (1980-2021). Analysed by HR Wallingford

Table 1.16: Summary of wave extremes. Source: Met Office NWS model (1980-2021). Analysed by HR Wallingford

Return Period	Significant wave height Hs (m)	Wave Direction	Corresponding Approximate Wind Speed (kts)
Weekly (1 in 50)	1.6	232	15
Monthly (1 in 10)	2.9	264	30
Yearly (1 in 1)	4.2	227	50
1 in 5 years	4.6	236	-
1 in 10 years	5.4	240	-

Tidal

1.7.3.5 Flow modelling for a spring tide by HR Wallingford for the Irish Sea is shown in **Figure 1.6**. The maximum flow speeds in the study area are therefore less than 1.5 m/s.

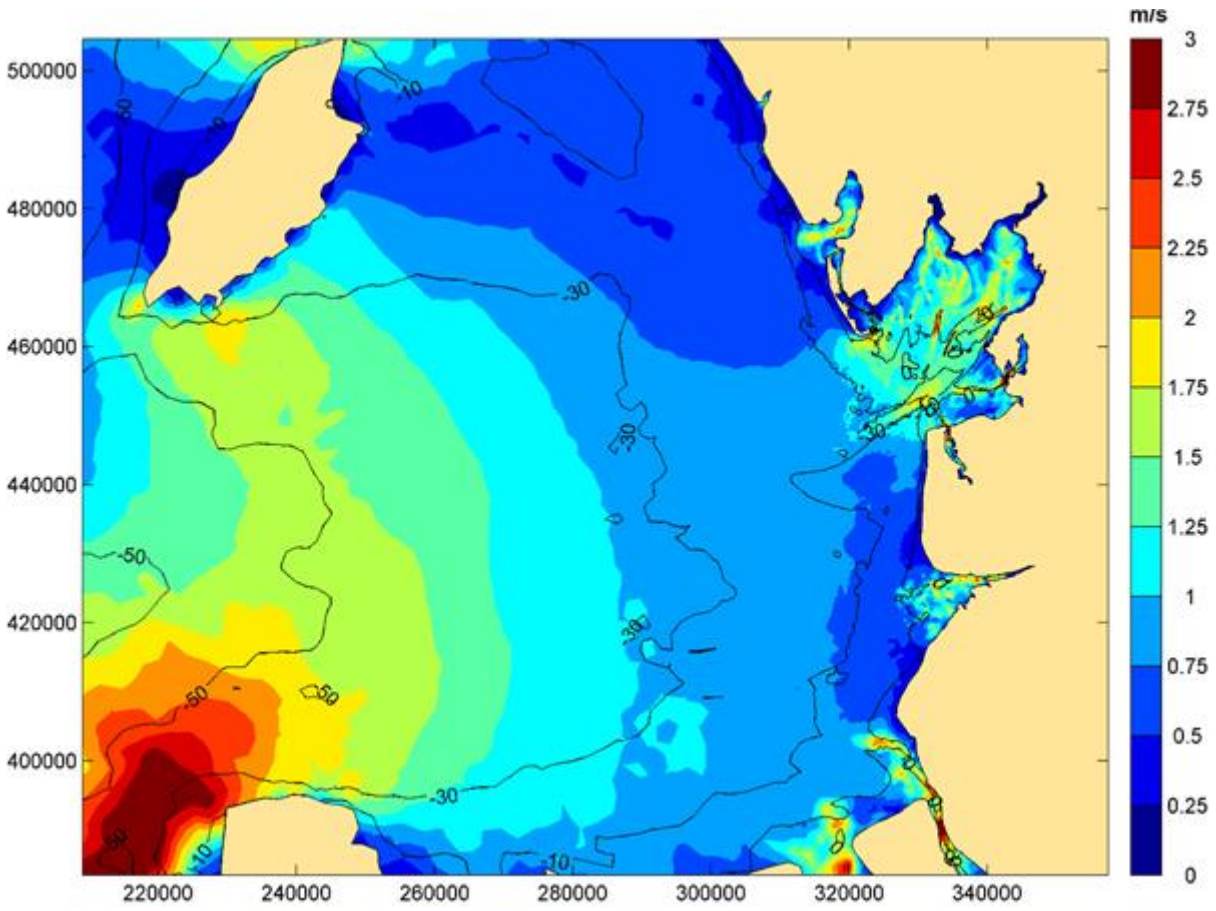

Figure 1.6: Maximum current flow speeds (m/s) for spring tide. Source: HR Wallingford

Visibility

1.7.3.6 The Admiralty Sailing Directions report fog between 12 days/year (at Crosby), 24 days/year (at Ronaldsway) and 43 days/year (Blackpool).

1.7.4 Search and rescue

His Majesty's Coast Guard

1.7.4.1 His Majesty's Coastguard (HMCG) is responsible for requesting and coordinating Search and Rescue (SAR) activities within the UK's SAR region. The local coastguard base for the region is Holyhead Coastguard Operations Centre.

1.7.4.2 The nearest HMCG helicopter base is located approximately 47 nm south west of the Offshore Order Limits at Caernarfon Airport, Gwynedd, as shown in **Figure 1.7.** The Caernarfon facility provides a 24-hour SAR service, with two Sikorsky S-92 helicopters.

RNLI

1.7.4.3 There are 25 RNLI lifeboat stations in within a 50.0 nm proximity to the study area, as detailed in **Table 1.17** and shown in **Figure 1.7.** The nearest lifeboat station is Lytham St. Annes, situated 1.1 nm south east

of the Offshore Order Limits and equipped with a Shannon class all-weather lifeboat and a D class inshore boat.

Table 1.17: RNLI stations

Name	Type	Location relative to the Offshore Order Limits
Lytham St. Annes	Shannon and D class lifeboats	1.1 nm south east
Blackpool	Three inshore lifeboats, including an Atlantic 85 and two D class lifeboats	2.2 nm north
Fleetwood	Shannon and D class lifeboats	9.3 nm north east
Douglas	Mersey class lifeboat	12.2 nm north west
Barrow	Tamar class and D class lifeboats	17.0 nm north east
Ramsey	Shannon class lifeboat	17.0 nm north west
New Brighton	B class Atlantic 85 lifeboat	18.3 nm south
Port St. Mary	Trent class and D class lifeboats	19.0 nm west
Morecambe	D class and Hover class lifeboats	19.3 nm north east
Port Erin	B class lifeboat	20.2 nm west
Hoylake	Shannon class lifeboat	20.5 nm south
Peel	Shannon class lifeboat	21.6 nm west
West Kirby	D class lifeboat	22.5 nm south
Rhyl	Shannon and D class lifeboats	25.8 nm south
Llandudno	Shannon and D class lifeboats	26.7 nm south
St Bees	B class lifeboat	28.0 nm north
Conwy	D class lifeboat	29.3 nm south
Flint	D class lifeboat	29.5 nm south
Moelfre	Tamar class and D class lifeboats	32.1 nm south west
Beaumaris	B class lifeboat	34.2 nm south west
Workington	Shannon class and a D class boat	37 nm north east
Holyhead	Severn class and D class lifeboats	42.6 nm south west
Trearddur Bay	B class and D class lifeboats	44.1 nm south west
Kirkcudbright	B class lifeboat	44.6 nm north
Kippford	D class lifeboat	47.4 nm north

Other assets

1.7.4.4 All vessels have an obligation under the SOLAS convention to render assistance to persons or vessels in distress, including CTVs or other project craft.

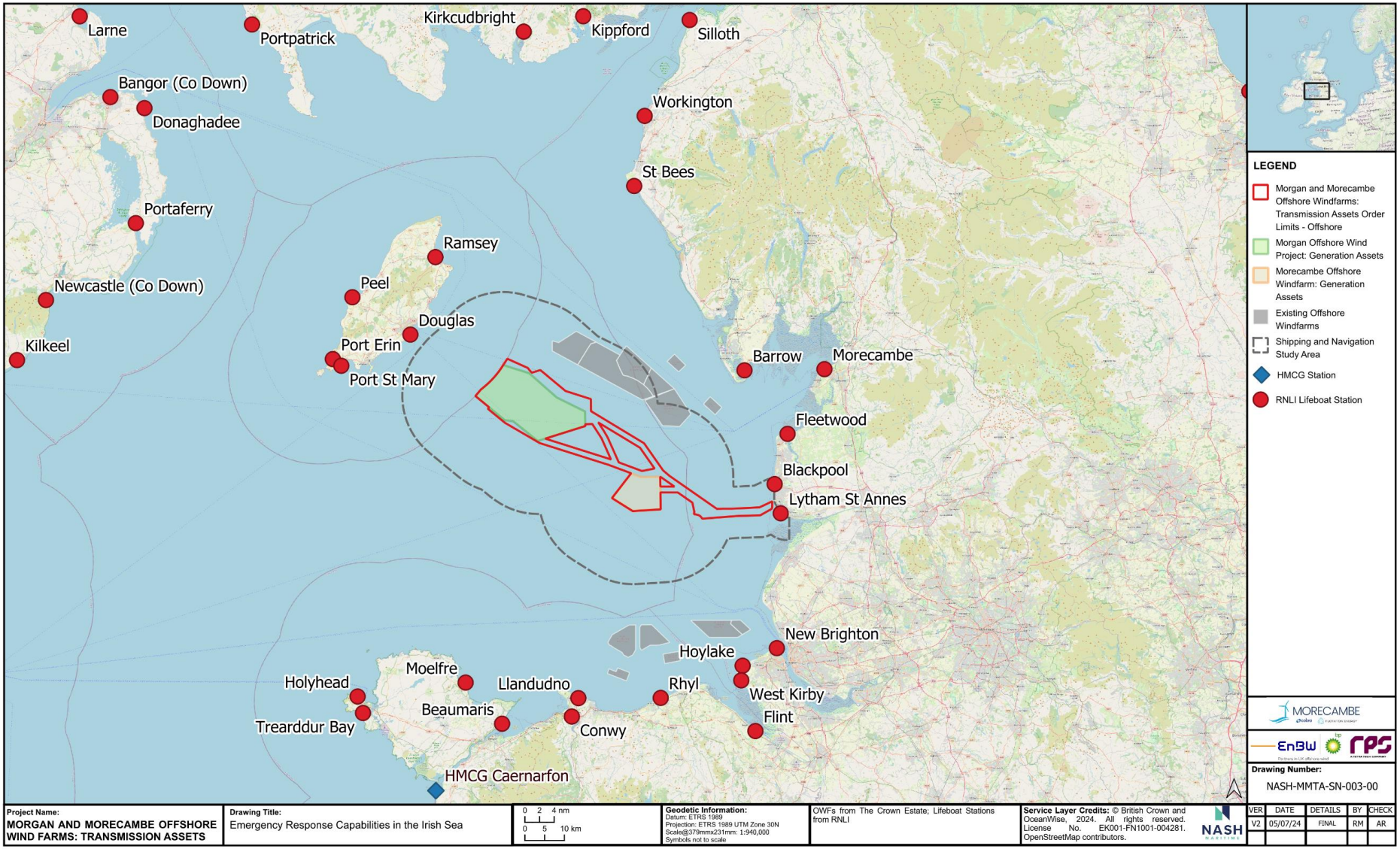

Figure 1.7: Emergency response capabilities in Irish Sea

1.8 Description of existing maritime activities

1.8.1 Introduction and data sources

1.8.1.1 A description of existing marine activities in the study area is presented based on the data collected as listed in **section 1.5.5**. Primarily this includes vessel traffic surveys (undertaken in accordance with MGN 654) and analysis of full year 2019 and 2022 AIS datasets. The following section includes:

- description of COVID effects;
- details of the vessel traffic surveys;
- analysis of vessel traffic by:
  - traffic types;
  - determination of vessel routes;
  - during adverse weather; and
  - non-transit activity;
- analysis of historical maritime incidents.

Effects of Covid-19

1.8.1.2 Since early 2020, the COVID-19 pandemic has substantially impacted recreational and commercial vessel movements both globally and locally. It is therefore possible that data collected between 2020 and 2022 may be influenced by the pandemic although current vessel traffic levels are expected to have largely returned to pre-pandemic levels. As such, where appropriate, datasets have been used that precede the pandemic, such as the 2019 AIS dataset, to benchmark those collected more recently, such as the 2022 AIS dataset, in order to provide a representative description of the baseline vessel traffic activity.

Vessel traffic survey

1.8.1.3 MGN 654 sets a requirement that an up-to-date vessel traffic survey capturing all vessel types and therefore comprising AIS, radar and visual observations, of at least 28-days duration, should be conducted of a proposed development area.

1.8.1.4 There is no requirement within the guidance or precedent to undertake vessel traffic surveys for the entirety of the export cable corridor of an offshore wind farm. Therefore, identification of vessel activities within the study area is primarily undertaken on AIS data. Small boat traffic, particularly fishing and recreational, may therefore be underrepresented.

1.8.1.5 As per MGN 654, vessel traffic surveys were undertaken to account for seasonality during winter and summer survey periods. As previously discussed in **section 1.5.5**, various surveys were undertaken for the within the Offshore Order Limits. These included surveys per MGN 654 requirements for the Morecambe Offshore Windfarm: Generation

Assets, Morgan Offshore Wind Project: Generation Assets, and Morgan Offshore Wind Project offshore booster station search areas. Additional "top up" surveys were also undertaken for the each of the respective Generation Assets projects to ensure data validity in accordance with MGN 654 (see **Appendix B**). All vessel traffic surveys were 14-day vessel-based traffic surveys and included the following data collection.

- Commercial vessel traffic that are required to carry AIS under SOLAS are captured through the vessel traffic surveys.
- Recreational and fishing captured through AIS for those vessels that choose to do so and through radar for those that do not.
- Visual observations to identify non-AIS vessel types.

1.8.1.6 All surveys have therefore been grouped within this assessment and distinguished by the area the survey was undertaken for. These were:

- the area covering the Morecambe Offshore Windfarm: Generation Assets (three surveys in total covering this area + 10 nm buffer) These surveys are described in **Table 1.18** and **Figure 1.8**, **Figure 1.9** and **Figure 1.10** present tracks of the survey vessel, all tracks recorded during the survey and the tracks during the busiest day of the survey, respectively;
- the area covering the Morgan Offshore Wind Project: Generation Assets (three surveys in total covering this area + 10 nm buffer) These surveys are described in **Table 1.19** and **Figure 1.11**, **Figure 1.12** and **Figure 1.13** present tracks of the survey vessel, all tracks recorded during the survey and the tracks during the busiest day of the survey. respectively; and
- the area surrounding the Morgan Offshore Wind Project offshore booster station search areas (one survey in total covering the Morgan Offshore Wind Project offshore booster station search areas + 10 nm buffer). This survey is described in **Table 1.20** and **Figure 1.15** presents the tracks of the survey vessel, all tracks recorded during the survey and the tracks during the busiest day of the survey. The Morgan Offshore Wind Project offshore booster station was subsequently removed from the project design, as described in **section 1.5.4**.

Table 1.18: Summary of vessel traffic surveys covering Morecambe Offshore Windfarm: Generation Assets

Attributes	Winter 2021/2022	Summer 2022	Top up Survey 2023 (winter)
Vessel	KARELLE (28 m Fishing Vessel)	MORNING STAR (23 m Fishing Vessell)	MORNING STAR (23 m Fishing Vessell)
Dates	9 February 2022 to 26 February 2022	30 July 2022 to 13 August 2022	27 November 2023 to 13 December 2023
Downtime	18 February 2022 00:10 to 19 February 2022 06:29 20 February 2022 06:53 to 21 February 2022 15:00	8 August 2022 10:00 to 9 August 2022 03:40	6 December 2023 10:30 to 8 December 2023 14:59. 8 December 2023 19:26 to.9 December 2023 01:05
Survey Area	Generation Assets + 10 nm survey area	Generation Assets + 10 nm survey area	Generation Assets + 10 nm survey area
Total Vessels Recorded (Generation Assets + 10 nm)	355 (25.5/day)	460 (32.9/day)	348 (24.9/day)
Total Vessels Recorded (Generation Assets)	31 (2.2/day)	35 (2.4/day)	41 (2.9/day)
Cargo	**Survey area:** 13 (0.9/day) **Generation Assets:** 5 (0.4/day)	**Survey area:** 7 (0.5/day) **Generation Assets:** 2 (0/day)	**Survey area:** 13 (0.9/day) **Generation Assets:** 4 (0.3/day)
Fishing	**Survey area:** 73 (5.2/day) **Generation Assets:**1 (0.1/day)	**Survey area:** 25 (1.8/day) **Generation Assets:** 1 (0.1/day)	**Survey area:** 29 (2.1/day) **Generation Assets:** 4 (0.3/day)
Passenger	**Survey area:** 168 (12/day) **Generation Assets:**5 (0.4/day)	**Survey area:** 240 (17.1/day) **Generation Assets:** 10 (0.7/day)	**Survey area:** 181 (12.9/day) **Generation Assets:** 15 (1.1/day)
Recreational	None	**Survey area:** 12 (0.9/day) **Generation Assets:** 6 (0.4/day)	None
Tanker	**Survey area:** 12 (0.9/day) **Generation Assets:** 6 (0.4/day)	**Survey area:** 3 (0.2/day) **Generation Assets:** 2 (0.1/day)	**Survey area:** 8 (0.6/day) **Generation Assets:** 0 (0/day)
Tug and Service	**Survey area:** 89 (6.4/day) **Generation Assets:**14 (1/day)	**Survey area:** 173 (12.4/day) **Generation Assets:**13 (0.9/day)	**Survey area: 117** (8.4/day**)** **Generation Assets: 18** (1.3/day)

Table 1.19: Summary of vessel traffic surveys covering Morgan Offshore Wind Project: Generation Assets

Attributes	Winter 2021/2022	Summer 2022	Top Up Survey 2023 (Winter)
Vessel	KARELLE (28 m Fishing Vessel)	KARELLE (28 m Fishing Vessel)	MORNING STAR (23 m Fishing Vessel)
Dates	21 November 2021 to 15 December 2021	15 July 2022 to 29 July 2022	11 November 2023 to 27 November 2023
Downtime	None	None	13 November 2023 07:00 to 14 November 2023 20:36
Survey Area	Generation Assets + 10 nm survey area	Generation Assets + 10 nm survey area	Generation Assets + 10 nm survey area
Total Vessels Recorded (Generation Assets + 10 nm)	649 (46.4/day)	426 (30.4/day)	343 (24.5/day)
Total Vessels Recorded (Generation Assets)	150 (10.7/day)	193 (13.8/day)	169 (12.1/day)
Cargo	**Survey area**:29 (2.1/day) **Generation Assets:** 12 (0.9/day)	**Survey area**: 20 (1.4/day) **Generation Assets:** 7 (0.5/day)	**Survey area**: 21 (1.5/day) **Generation Assets:** 10 (0.7/day)
Fishing	**Survey area**: 220 (15.7/day) **Generation Assets:** 18 (1.3/day)	**Survey area**: 43 (3.1/day) **Generation Assets:** 30 (2.1/day)	**Survey area**: 43 (3.1/day) **Generation Assets:** 29 (2.1/day)
Passenger	**Survey area**: 150 (10.7/day) **Generation Assets:** 88 (6.3/day)	**Survey area**: 206 (14.7/day) **Generation Assets:** 129 (9.2/day)	**Survey area**: 165 (11.8/day) **Generation Assets:** 110 (7.9/day)
Recreational	None	**Survey area**: 20 (1.4/day) **Generation Assets:** 14 (1/day)	None
Tanker	**Survey area**: 24 (1.7/day) **Generation Assets:** 4 (0.3/day)	**Survey area**: 11 (0.8/day) **Generation Assets:** 4 (0.3/day)	**Survey area**: 8 (0.6/day) **Generation Assets:** 3 (0.2/day)
Tug and Service	**Survey area**: 225 (16.1/day) **Generation Assets:** 28 (2.0/day)	**Survey area**: 124 (8.9/day) **Generation Assets:** 8 (0.6/day)	**Survey area**: 95 (6.8/day) **Generation Assets:** 8 (0.6/day)

Table 1.20: Summary of vessel traffic surveys covering Morgan Offshore Wind Project offshore booster station search areas

Attributes	Summer 2023-(booster station search area survey)
Vessel	MORNING STAR (23 m Fishing Vessel)
Dates	3 August 2023 to 17 August 2023
Downtime	No Downtime
Survey Area	Morecambe Offshore Windfarm Generation Assets, Morgan Offshore Wind Project offshore booster station search areas + 10 nm survey area
Total Vessels Recorded (Morecambe Offshore Windfarm, Morgan Offshore Wind Project offshore booster station search areas + 10 nm)	557 (39.8/day)
Total Vessels Recorded (booster station search areas)	69 (4.9/day)
Cargo	**Survey area:** 7 (0.5/day) **Booster station search areas:** 0 (0/day)
Fishing	**Survey area:** 28 (2.0/day) **Booster station search areas:** 21 (1.5/day)
Passenger	**Survey area:** 244(17.4/day) **Booster station search areas:** 2 (0.1/day)
Recreational	**Survey area:** 4 (0.3/day) **Booster station search areas:** 0 (0/day)
Tanker	**Survey area:** 5 (0.4/day) **Booster station search areas:** 5 (0.4/day)
Tug and Service	**Survey area:** 144 (10.3/day) **Booster station search areas:** 30 (2.1/day)

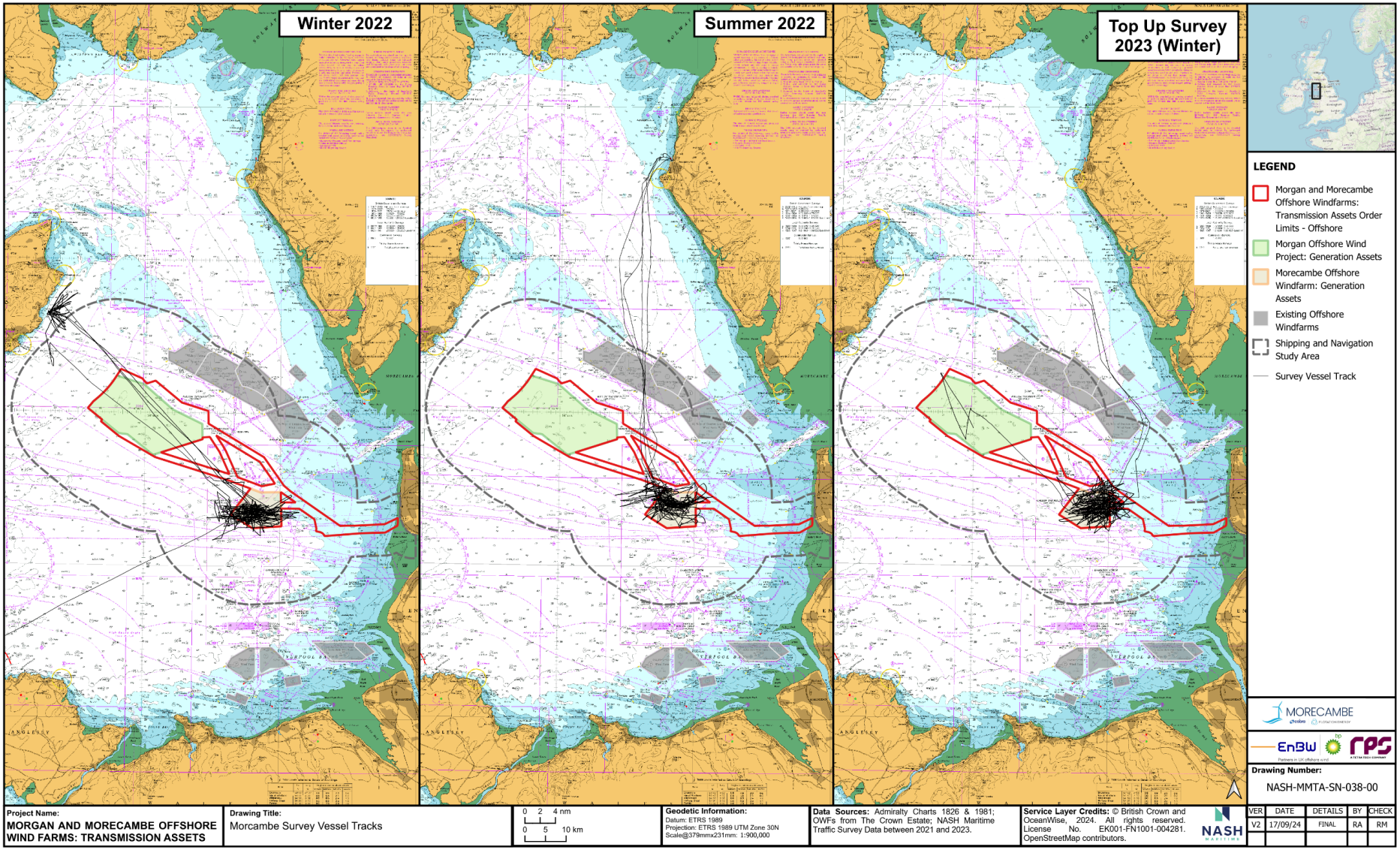

Figure 1.8: Survey vessel tracks for surveys undertaken covering the Morecambe area

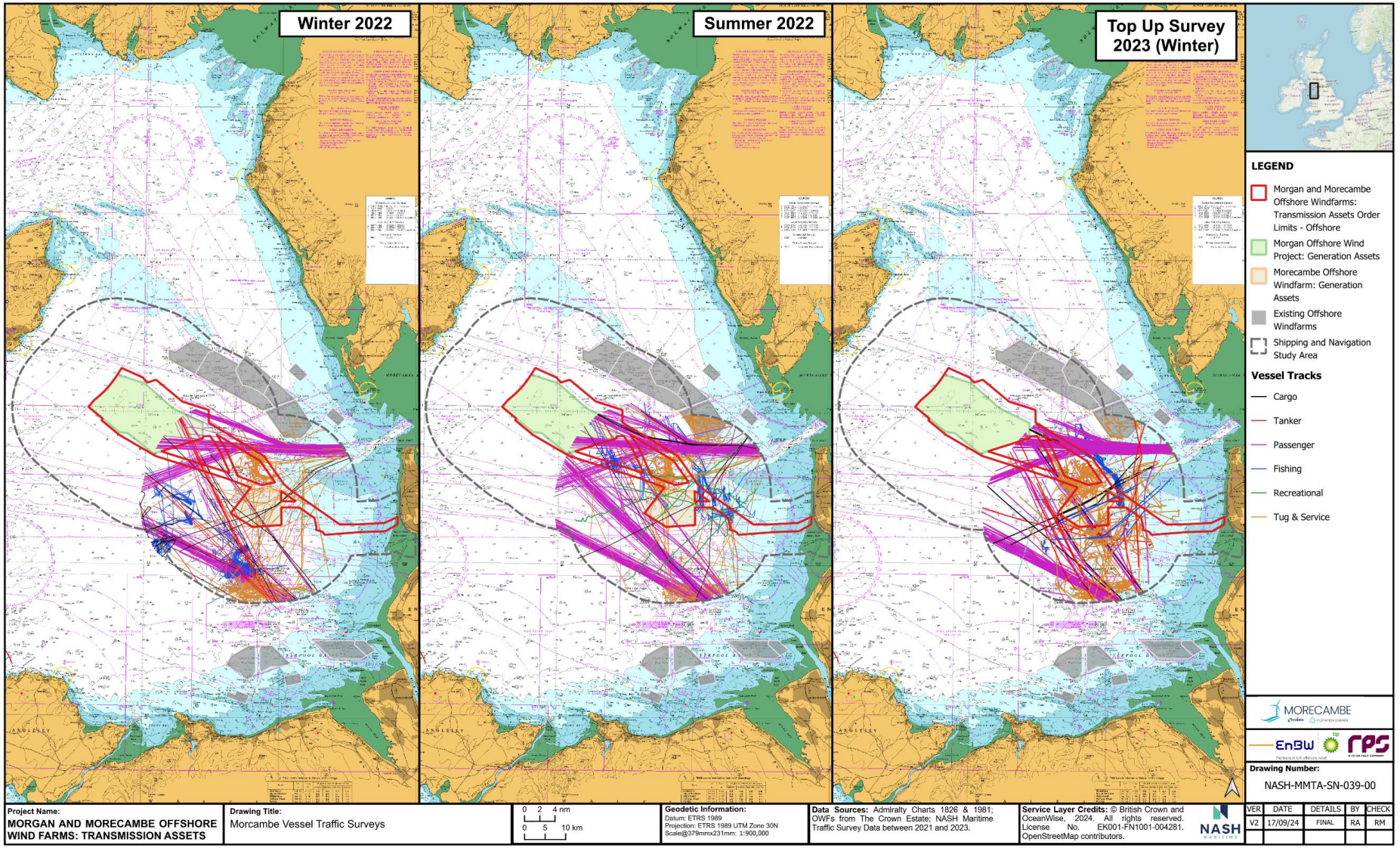

Figure 1.9: Vessel traffic tracks for surveys undertaken covering the Morecambe area

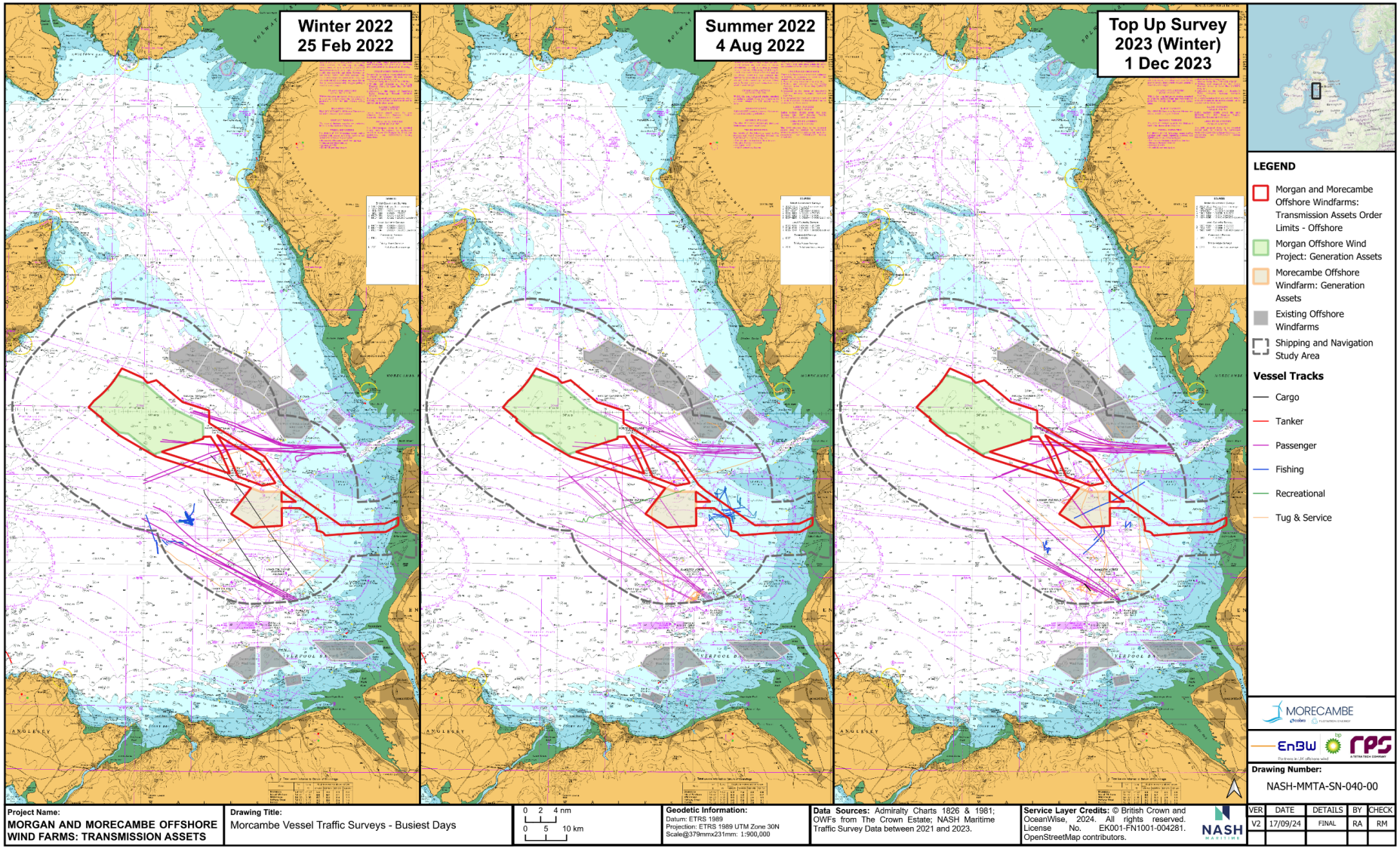

Figure 1.10: Vessel traffic tracks for surveys undertaken covering the Morecambe area – busiest days

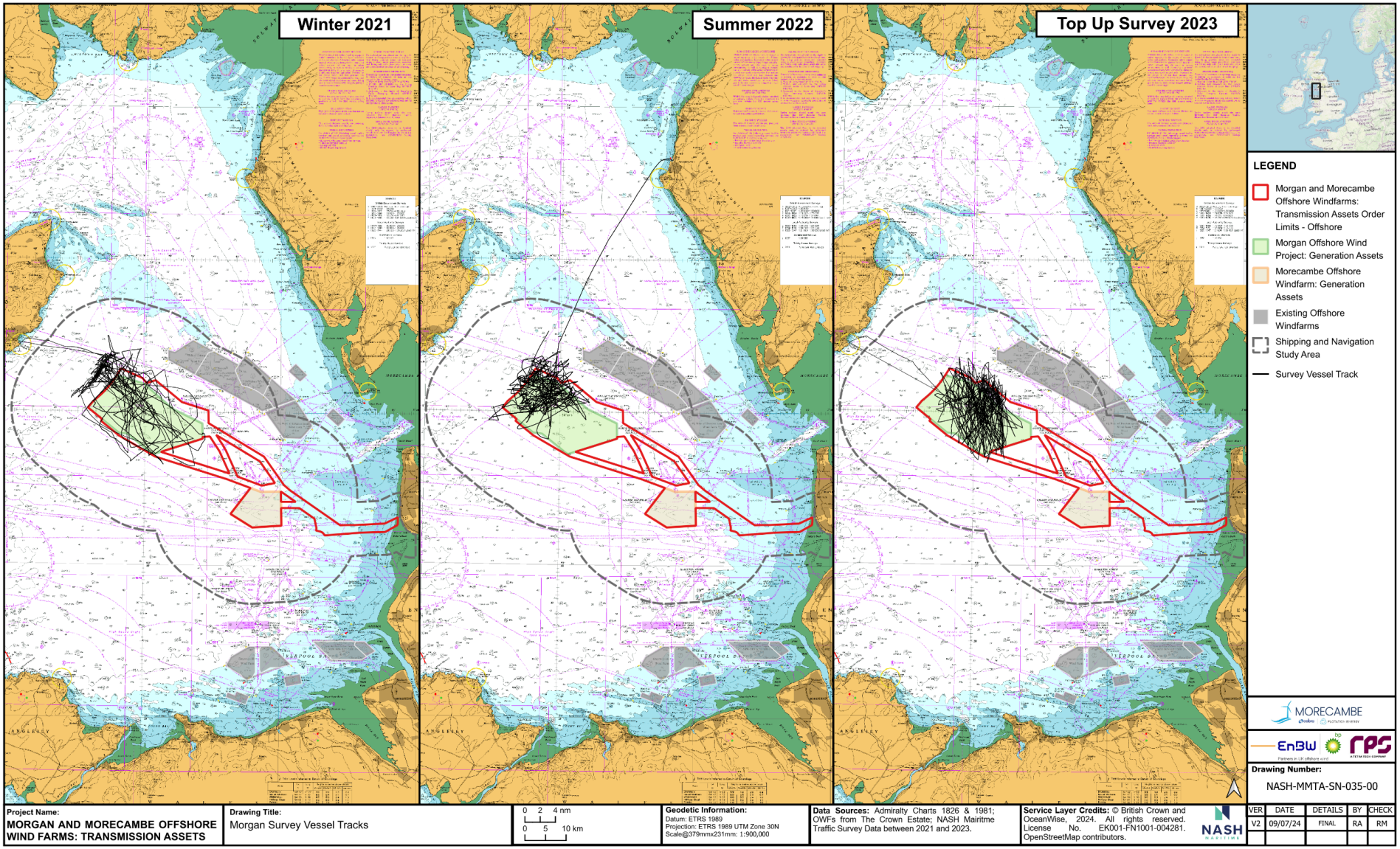

Figure 1.11: Survey vessel tracks for surveys undertaken covering the Morgan area

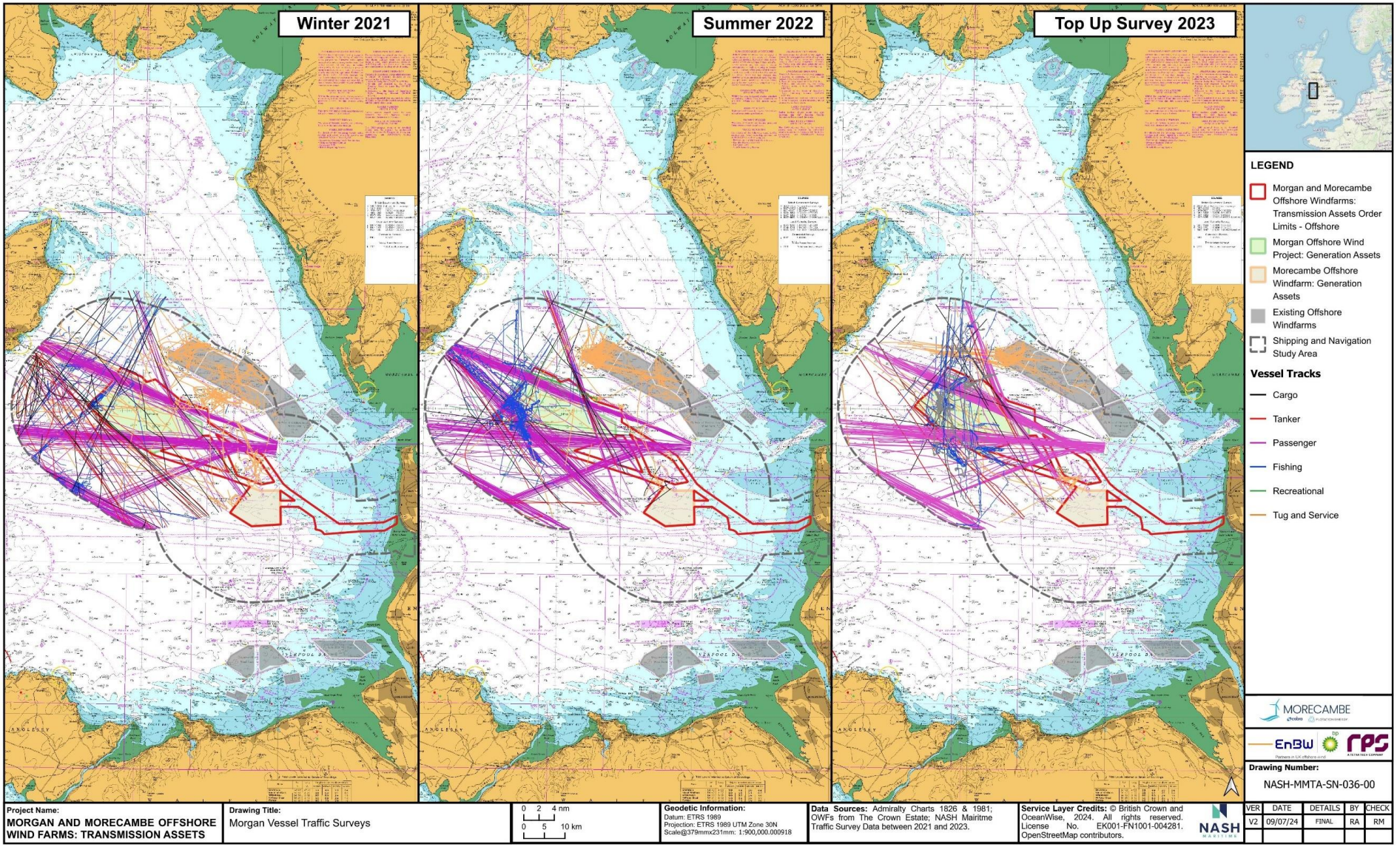

Figure 1.12: Vessel traffic tracks for surveys undertaken covering the Morgan area

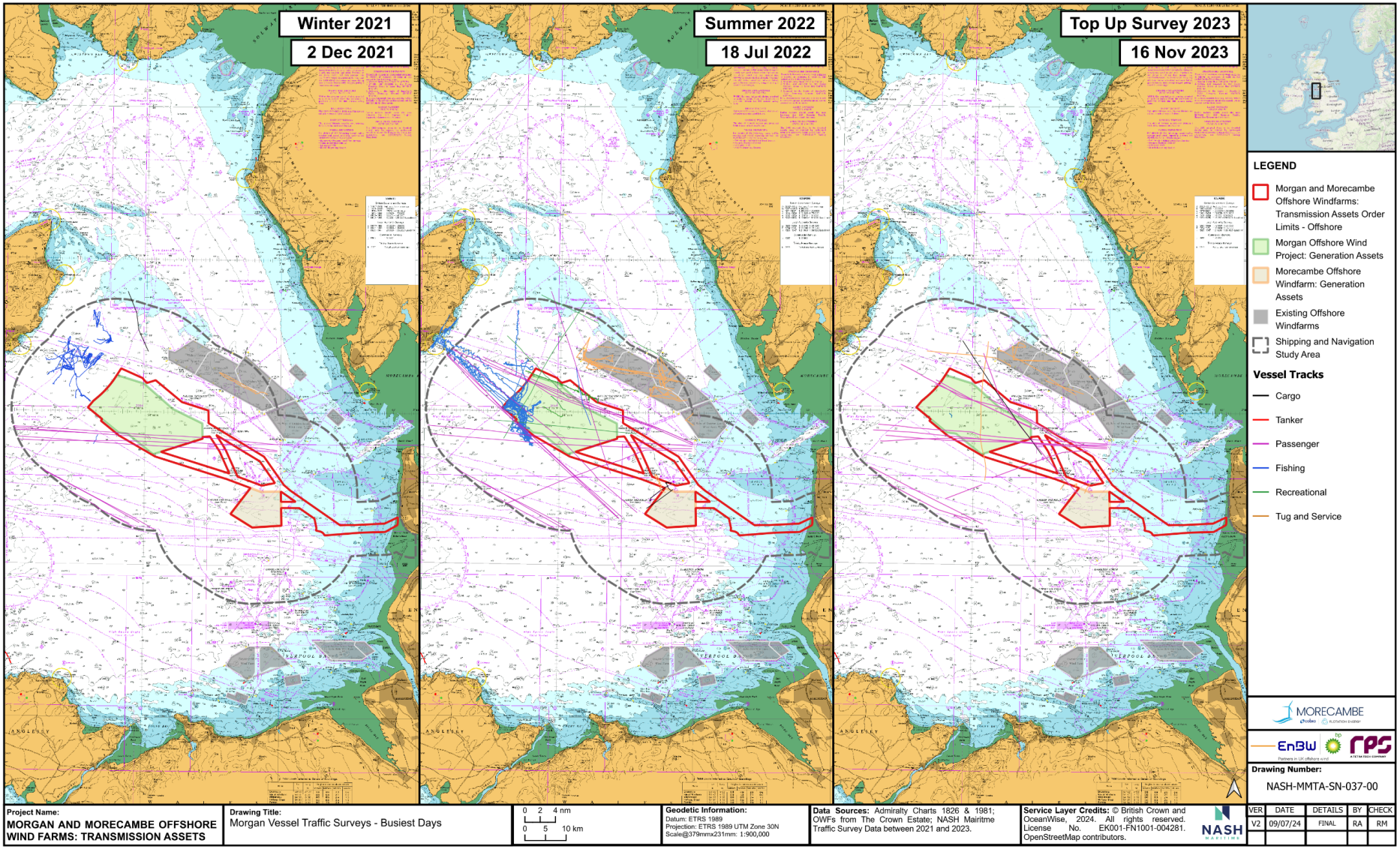

Figure 1.13: Vessel traffic tracks for surveys undertaken covering the Morgan area – busiest days

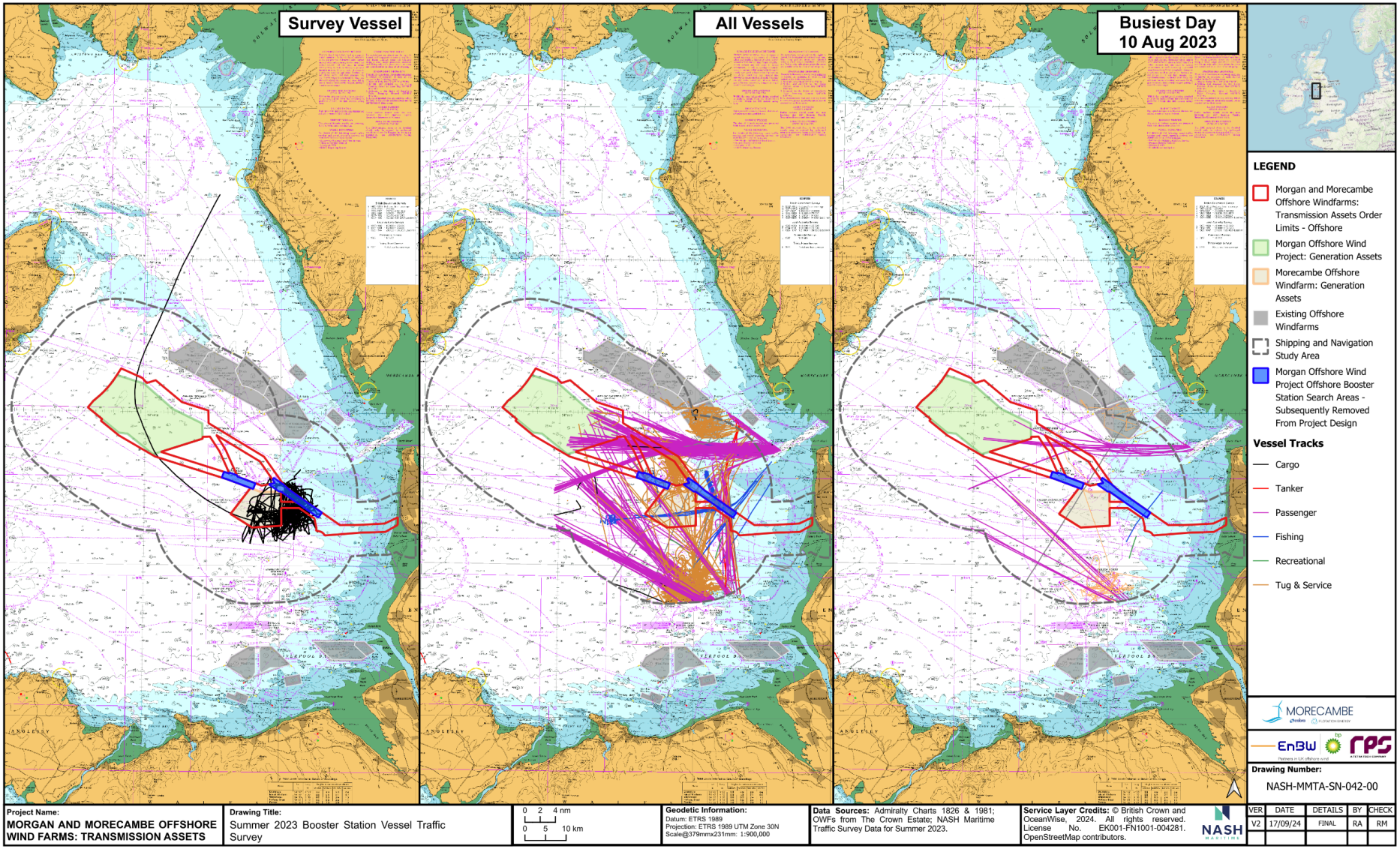

Figure 1.14: Vessel traffic tracks for survey covering the Morgan Offshore Wind Project: offshore booster station search areas

1.8.2 Vessel traffic analysis

Overview

1.8.2.1 Annualised vessel traffic density during 2022 in **Figure 1.15**, which presents the number of vessel transits through each grid cell, show the following.

- There were several high density routes through the study area, largely associated with ferry routes between Douglas, Heysham, Liverpool and the island of Ireland.
- High density vessel activity within the north east of the study area was associated with the existing offshore wind farms and CTV movements, as well as oil and gas infrastructure and ancillary vessels.

1.8.2.2 **Figure 1.16** shows all vessel tracks by vessel draught recorded during 2022. Vessels with a draught over 11 m infrequently navigated within the study area and are not generally on passage, instead likely loitering in the lee of the Isle of Man or conducting pilotage transfers at Douglas. Vessel traffic within the Offshore Order Limits largely comprises of vessels with a draught under 7.5 m.

1.8.2.3 **Figure 1.17** shows all vessel tracks by vessel length during 2022. The majority of large vessels within the Irish Sea were bound for the Port of Liverpool, typically passing either through the centre of the Offshore Order Limits or to the south west of the study area. Vessels over 200 m in length and over 11 m in draught infrequently navigated within the study area. This included the largest vessel which is 349 m in length, the Container Ship APL Gwangyang. Almost all vessels over 100 m in length that have been identified within the study area were ferries on well-defined routes. Small craft, including fishing vessels, were located throughout the study area, but largely concentrated around the offshore wind farms and oil and gas infrastructure.

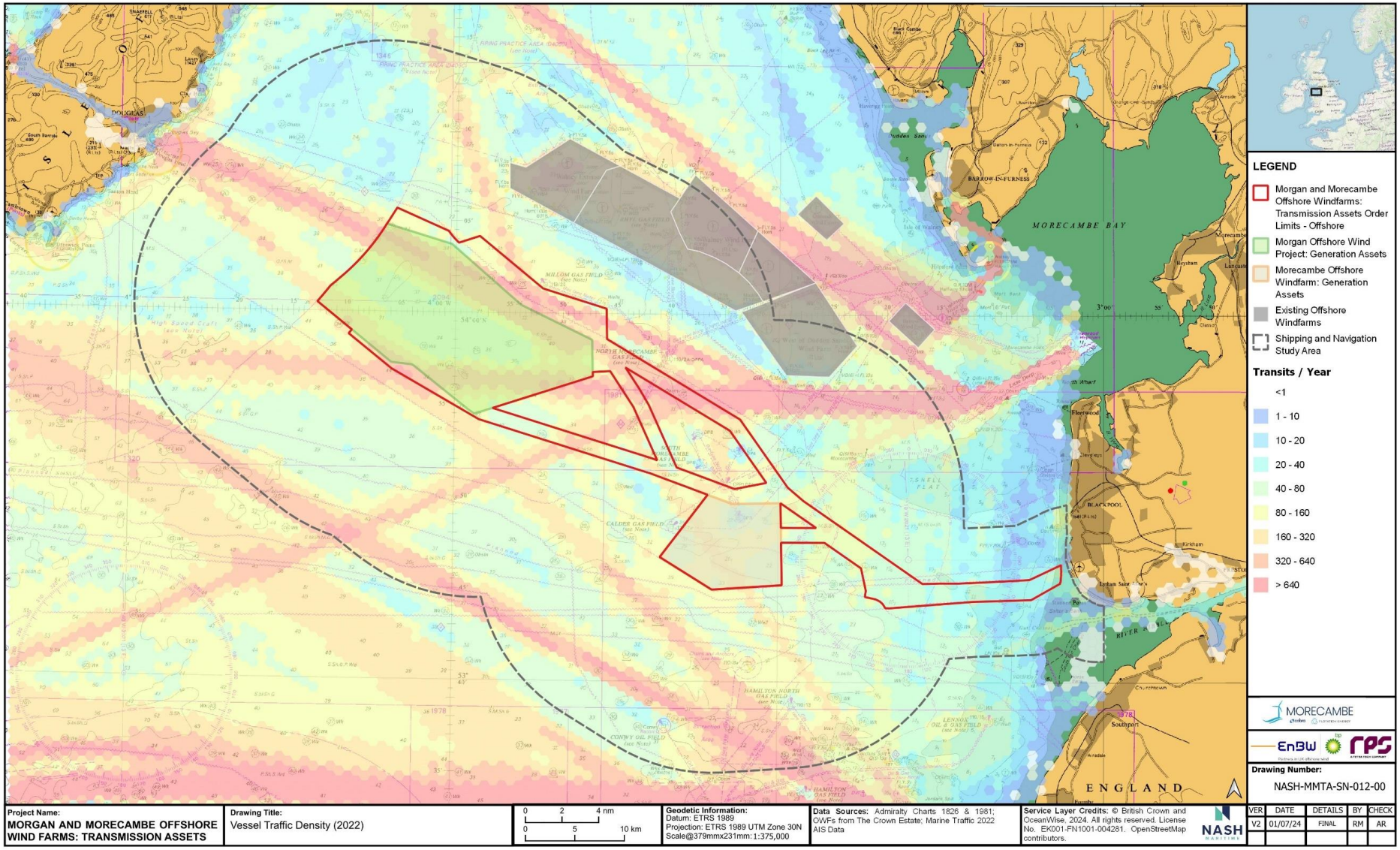

Figure 1.15: Annualised vessel traffic density (2022)

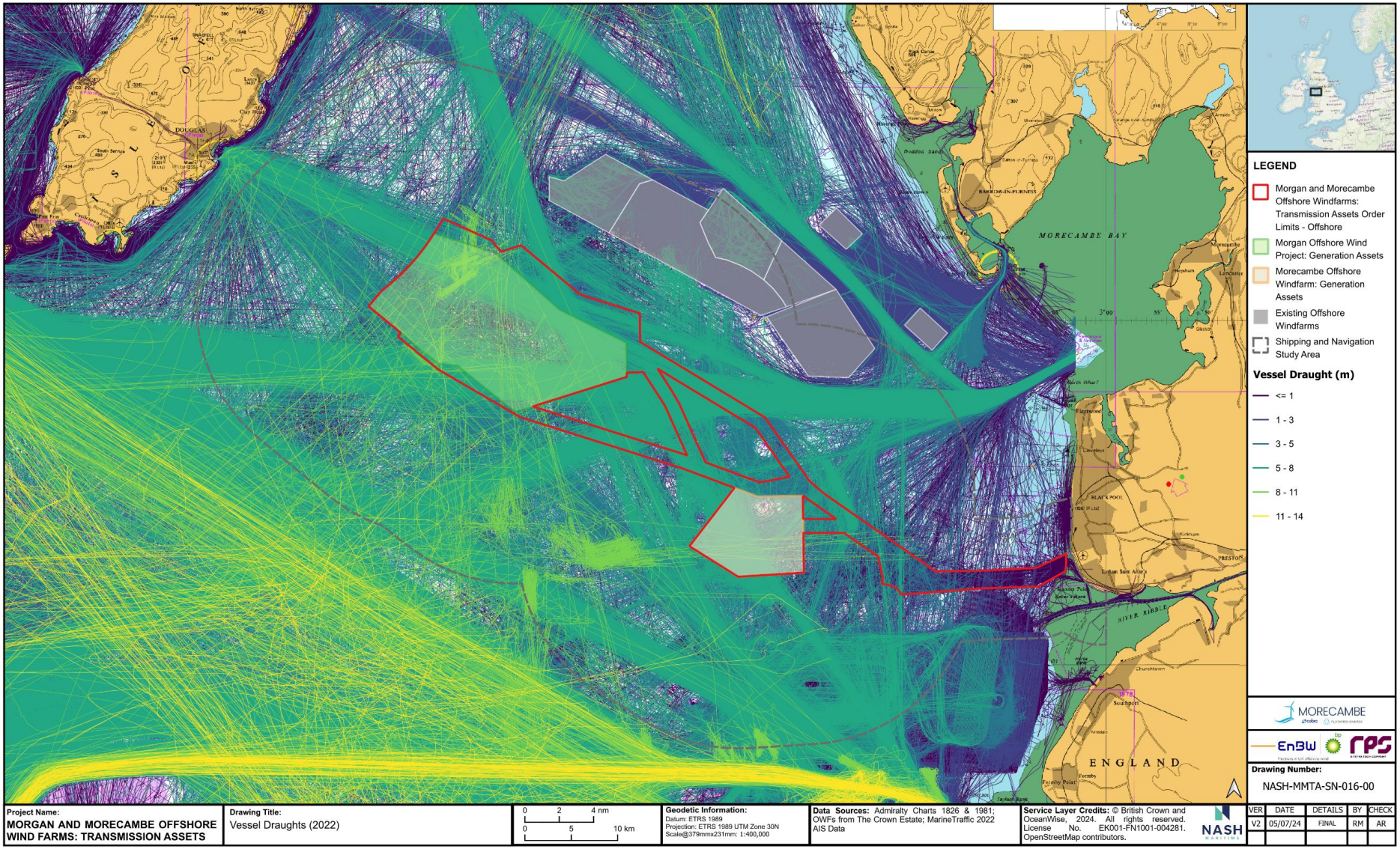

Figure 1.16: Vessel traffic by draught (2022)

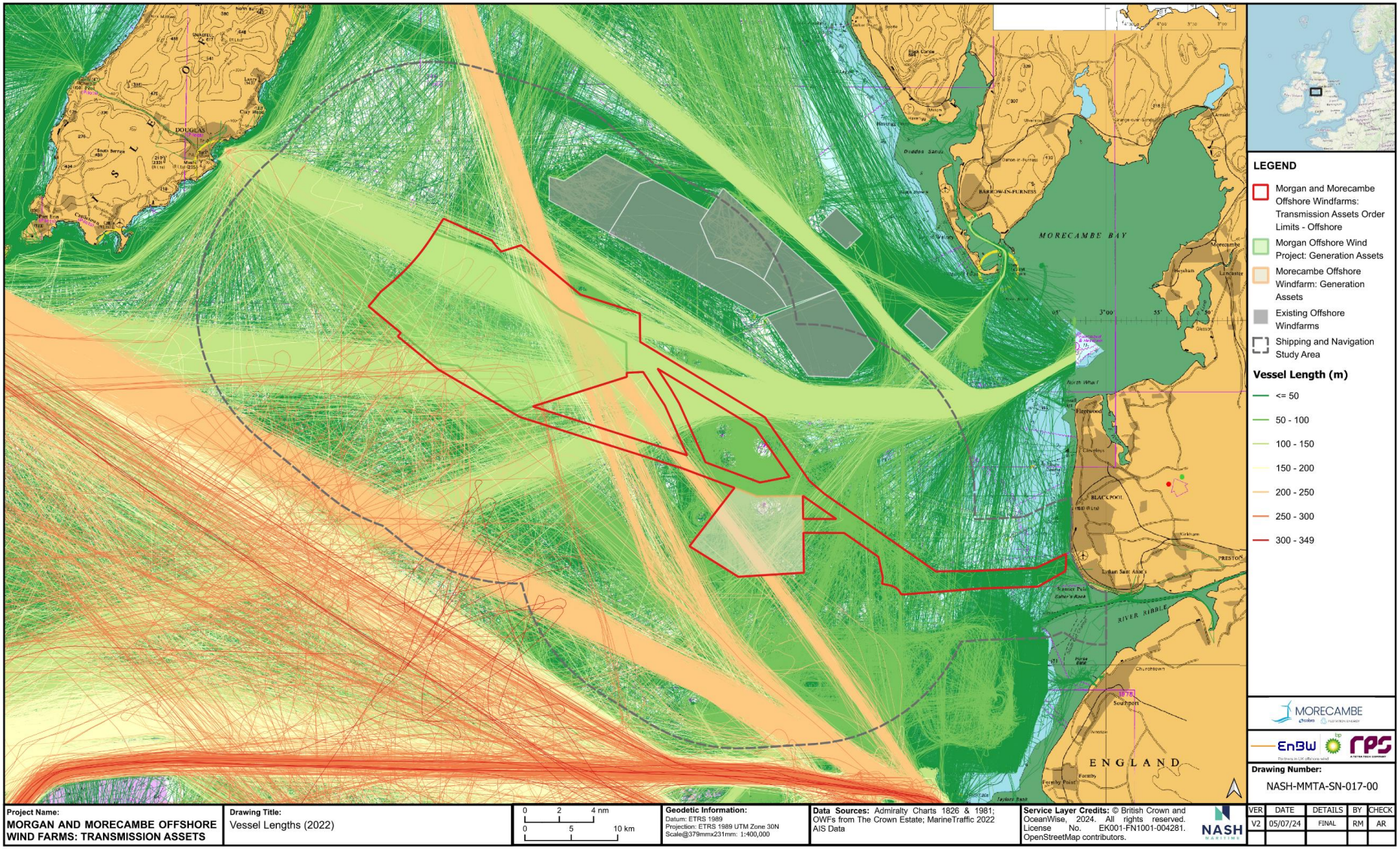

Figure 1.17: Vessel traffic by length (2022)

Vessel tracks by type

Commercial

1.8.2.4 The tracks of commercial vessels, namely dry cargo vessels and liquid tankers, are shown in **Figure 1.18** and **Figure 1.19** respectively.

1.8.2.5 There were 593 cargo ship transits through the study area during 2022, of which 225 passed through the Offshore Order Limits. These are mostly general cargo vessels of less than 100 m in length. The majority of cargo ship transits are shown to be between the west of the Isle of Man and Liverpool, passing outside of the study area. These tend to include larger vessels such as container ships and bulk carriers.

1.8.2.6 Tanker vessel tracks were largely consistent with the shipping routes identified for cargo ships, albeit with less frequency with 208 transits through the study area in 2022 and 146 through the Offshore Order Limits. Of these, the 77 m Keewhit, 274 m Aura M, 78 m Zapadnyy, and various 90-100 m Stolt vessels accounted for the majority. These vessels are operating between Liverpool, Douglas, Belfast, and Silloth.

1.8.2.7 Detailed analysis of commercial shipping routes is contained later within **section 1.8.2**.

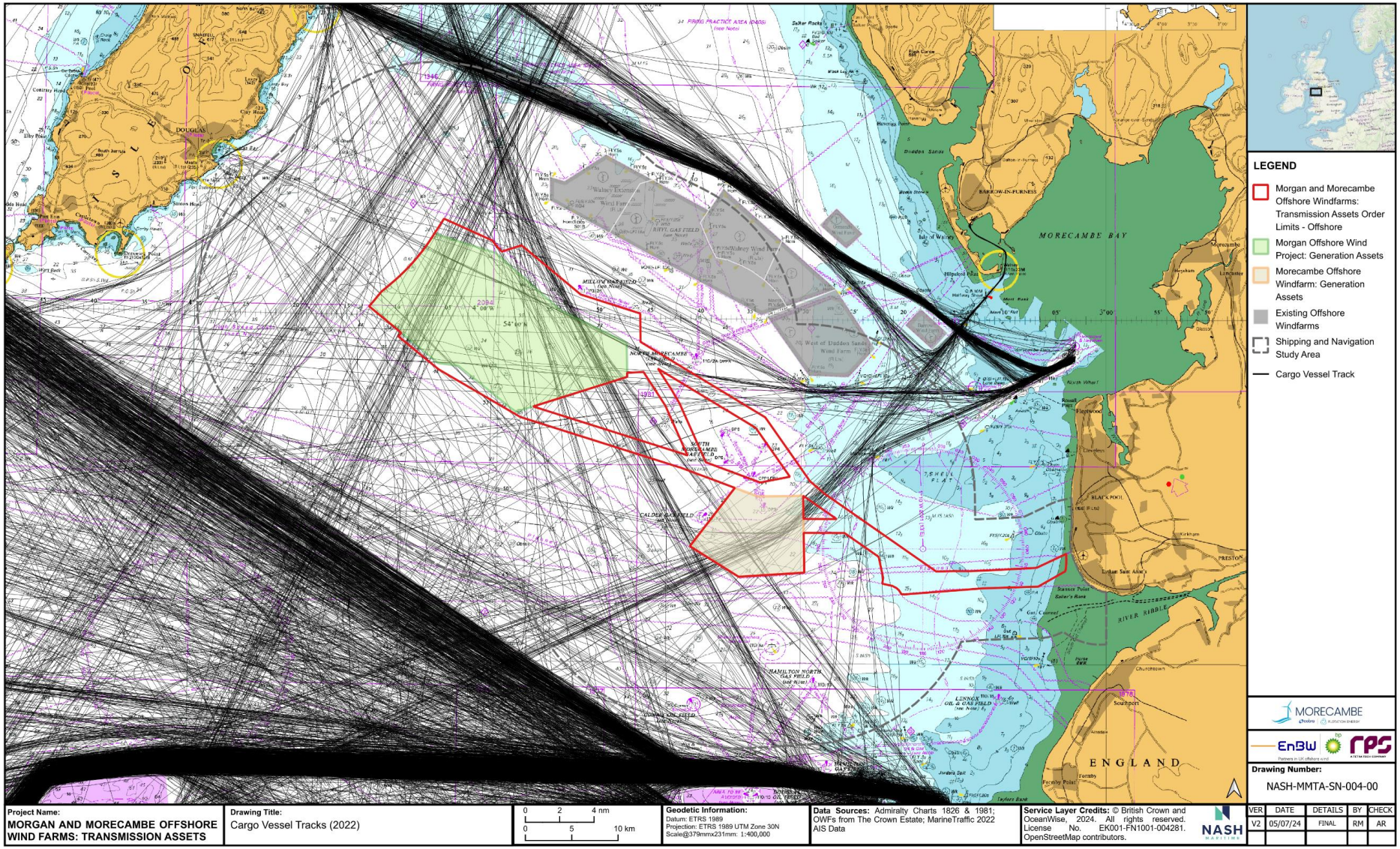

Figure 1.18: Cargo vessel traffic (2022)

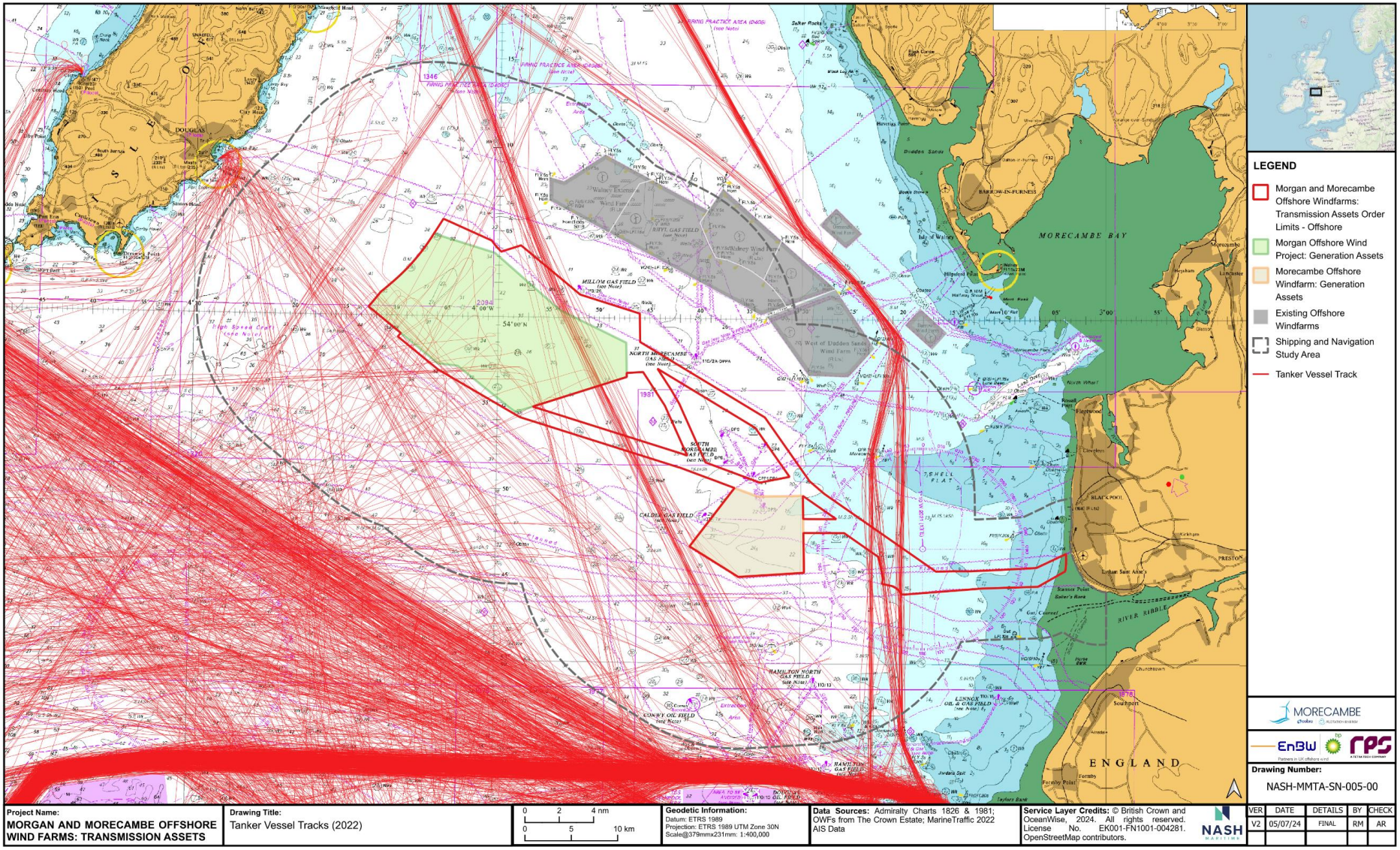

Figure 1.19: Tanker vessel traffic (2022)

Ferries

1.8.2.8 The tracks of ferries are shown in **Figure 1.20,** including passenger and freight services. On average, 15.2 ferry transits per day passed through the study area, a total of 5,542 in 2022. 4,014 of these passed through the Offshore Order Limits, a rate of 11 per day. Four principal operators have been identified in the east Irish Sea.

- The IoMSPC operate between Douglas, Liverpool and Heysham.
- Seatruck operate between Heysham, Liverpool, Warrenpoint and Dublin.
- Stena operate between Liverpool, Heysham and Belfast.
- P&O operate between Liverpool and Dublin.

1.8.2.9 Detailed analysis of these routes is contained later within **section 1.8.2**.

Cruise ships

1.8.2.10 The tracks of cruise ships are shown in **Figure 1.21**, with 28 transits recorded within the study area, of which only 15 passed through the Offshore Order Limits during 2022. The 90 m cruise ship Corinthian was recorded making visits to Barrow-in-Furness on 10 occasions. The majority of cruise ships in the Irish Sea are bound for Liverpool and pass outside of the study area, principally between April and September.

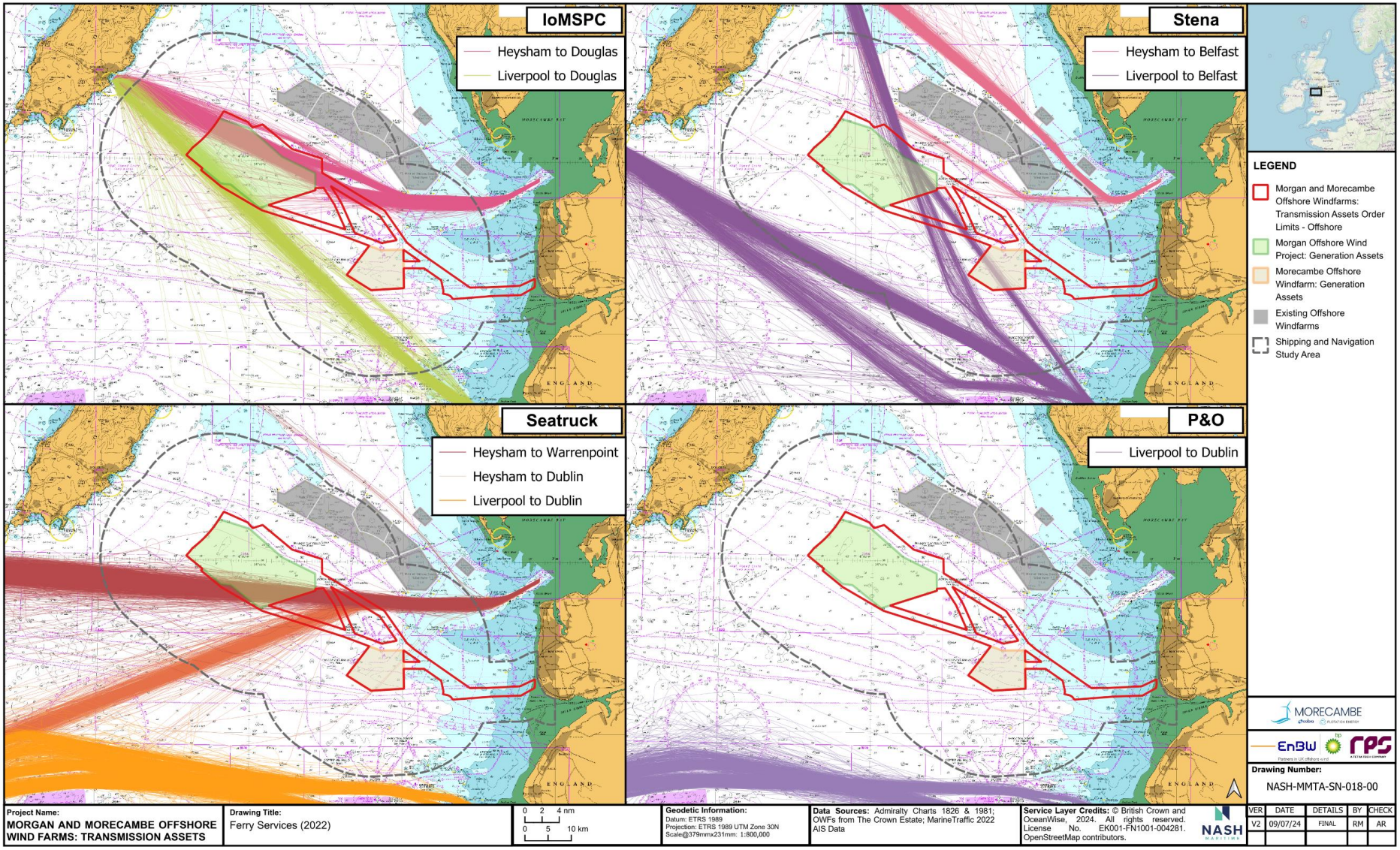

Figure 1.20: Ferry services (2022)

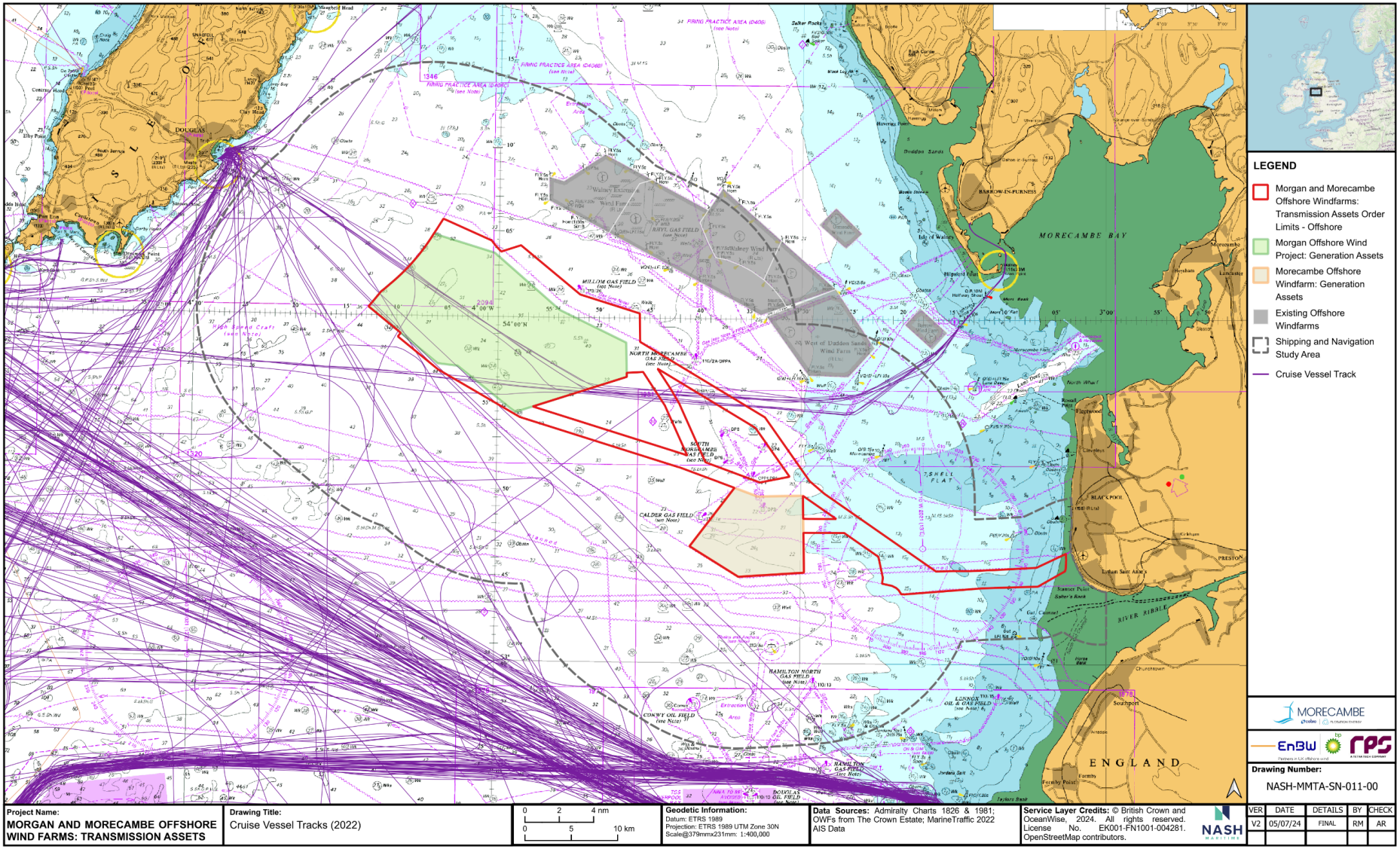

Figure 1.21: Cruise vessel transits (2022)

Recreational activity

1.8.2.11 The intensity of recreational vessel activity is shown in **Figure 1.22**. Historical AIS data and the RYA Coastal Atlas have been combined to determine which areas are likely to have greater recreational intensity. There is generally little recreational activity throughout the area within the Offshore Order Limits, with most recreational activity occurring along the coast, particularly near to Morecambe Bay, Liverpool and to a lesser extent, the River Ribble. There is low recreational activity shown to be present near to the cable landfall at Lytham St Annes.

1.8.2.12 Offshore cruising routes are evident between Liverpool and Douglas and between the Menai Straits and Douglas, passing through the study area. Relatively few yachts were recorded during the 2022/2023 vessel traffic surveys, with less than one per day during the summer survey and none at all recorded during the winter survey indicating strong seasonality.

Fishing activity

1.8.2.13 Commercial fishing in the east Irish Sea has a wide spatial distribution and targets a number of valuable fisheries for demersal, pelagic and shellfish species. Key shellfish species include king scallop and queen scallop, which are targeted by dredges and trawls; whelk, lobster and crab, which are targeted by pots; and Norway Lobster which are targeted by trawls. The most important demersal target species include bass, sole, thornback ray and plaice, which are typically caught by beam and otter trawlers. Pelagic fish landings from this area are mainly of herring and mackerel which are predominantly caught by pelagic trawls. Key fishing ports in the region include Fleetwood, Lytham St Annes, Port St Mary, Ramsey, Conwy, and Holyhead. Fishing vessels are also active from Annan, Douglas, Kilkeel, Kirkcudbright, Maryport and Peel. In addition, Belgian trawlers are known to operate throughout the study area.

1.8.2.14 The tracks of fishing vessels during 2022 are shown in **Figure 1.23** throughout each season, and the VMS data during 2020 is presented in **Figure 1.24.** There was considerable fishing activity within and near the Offshore Order Limits, with vessels up to 51.9 m in length engaged in mobile and static gear fishing. However, some fishing vessels were engaged in guard vessel duties or other survey works and account for some of the concentrations around oil and gas installations. This was significantly lower in all other surveys undertaken across summer 2022, summer 2023 and the two top up surveys in winter of 2023 – 25 to 29 vessels were recorded (average 2.0 per day) within the overall survey area around the Morecambe Offshore Windfarm: Generation Assets area and 43 vessels were recorded (average 3.1 per day) within the overall survey area around the Morgan Offshore Wind Project: Generation Assets area. It is observed that far higher fishing vessel activity was recorded in the surveys undertaken in the winter of 2021/2022 – 73 vessels (average 5.2 per day) and 220 vessels (average 15.7 per day) in each of the above respective areas.

1.8.2.15 The majority of the fishing activity recorded during the summer vessel traffic survey was to the west of the Offshore Order Limits, this activity was associated with the Isle of Man Queen Scallop fishing season

Tug and service

1.8.2.16 The tracks of tug and service vessels are shown in **Figure 1.25**. These have been subdivided into sub-categories based on their activities.

1.8.2.17 Crew Transfer Vessels (CTVs) operating between operation and maintenance bases and the existing offshore wind farms were mostly clear of the Offshore Order Limits, except when relocating on less routine transits.

1.8.2.18 Oil and gas associated supply ships and standby safety vessels had a high intensity within the north west and the east of the Offshore Order Limits where gas fields are located. In particular, the Millom, South Morecambe and Calder gas fields.

1.8.2.19 The activities of dredgers were concentrated outside of the study area. Search and Rescue vessels were dispersed throughout the study area, but mostly in coastal waters. Survey vessels were apparent throughout much of the Offshore Order Limits.

1.8.2.20 Other vessel types were concentrated nearshore, with relatively few intersecting the Offshore Order Limits compared to other vessel types.

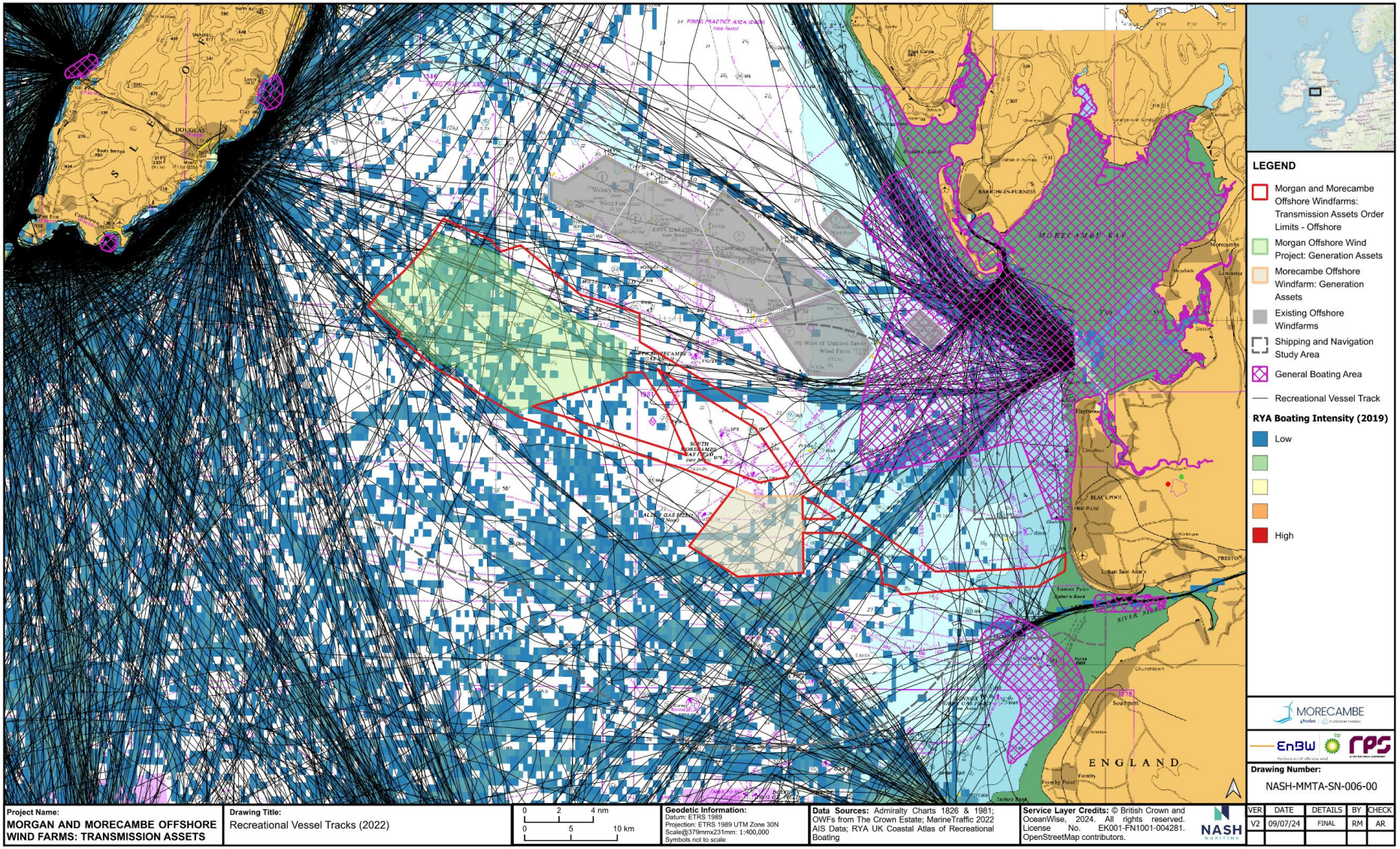

Figure 1.22: Recreational vessel tracks (2022)

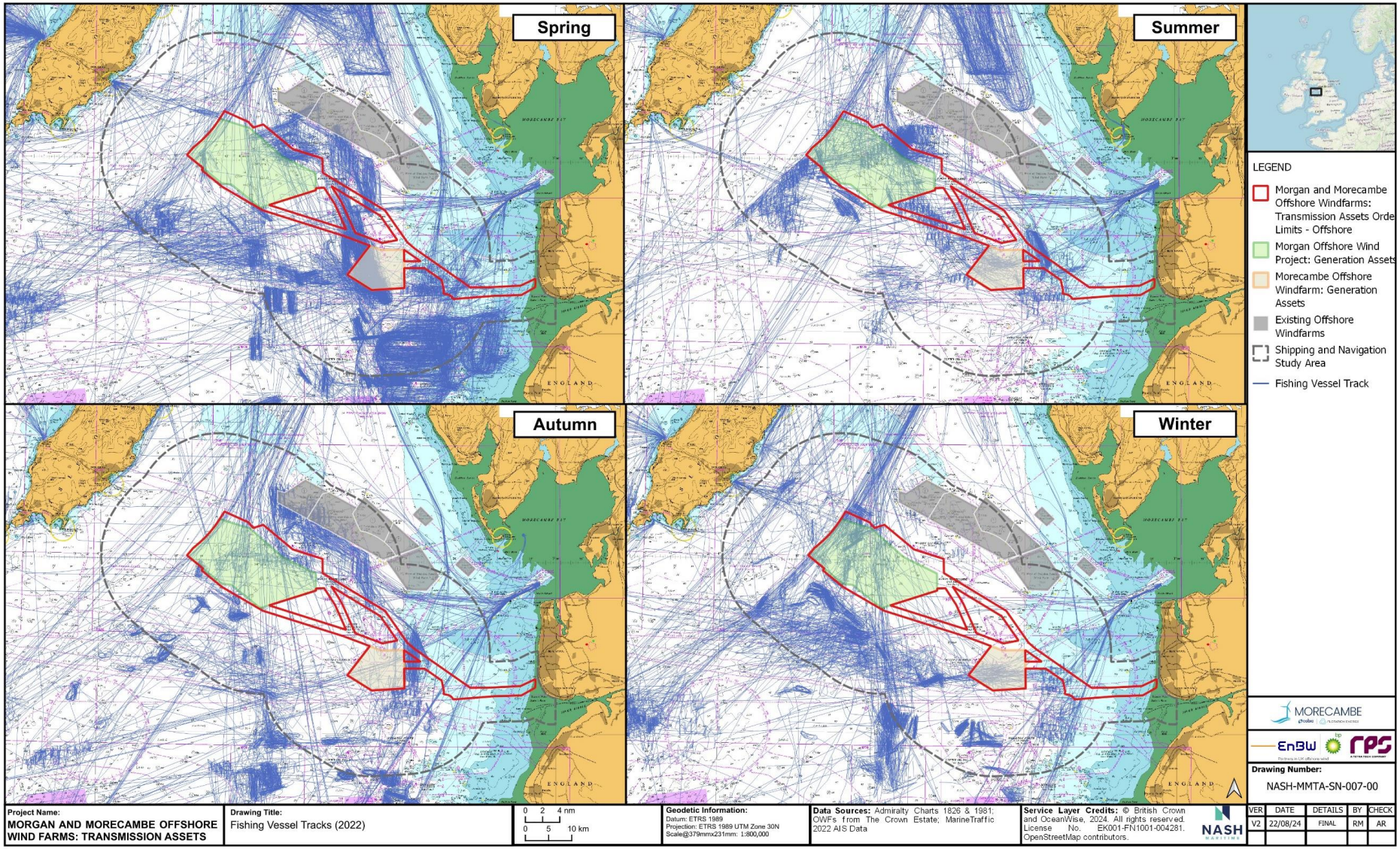

Figure 1.23: Fishing Vessel Tracks (2022)

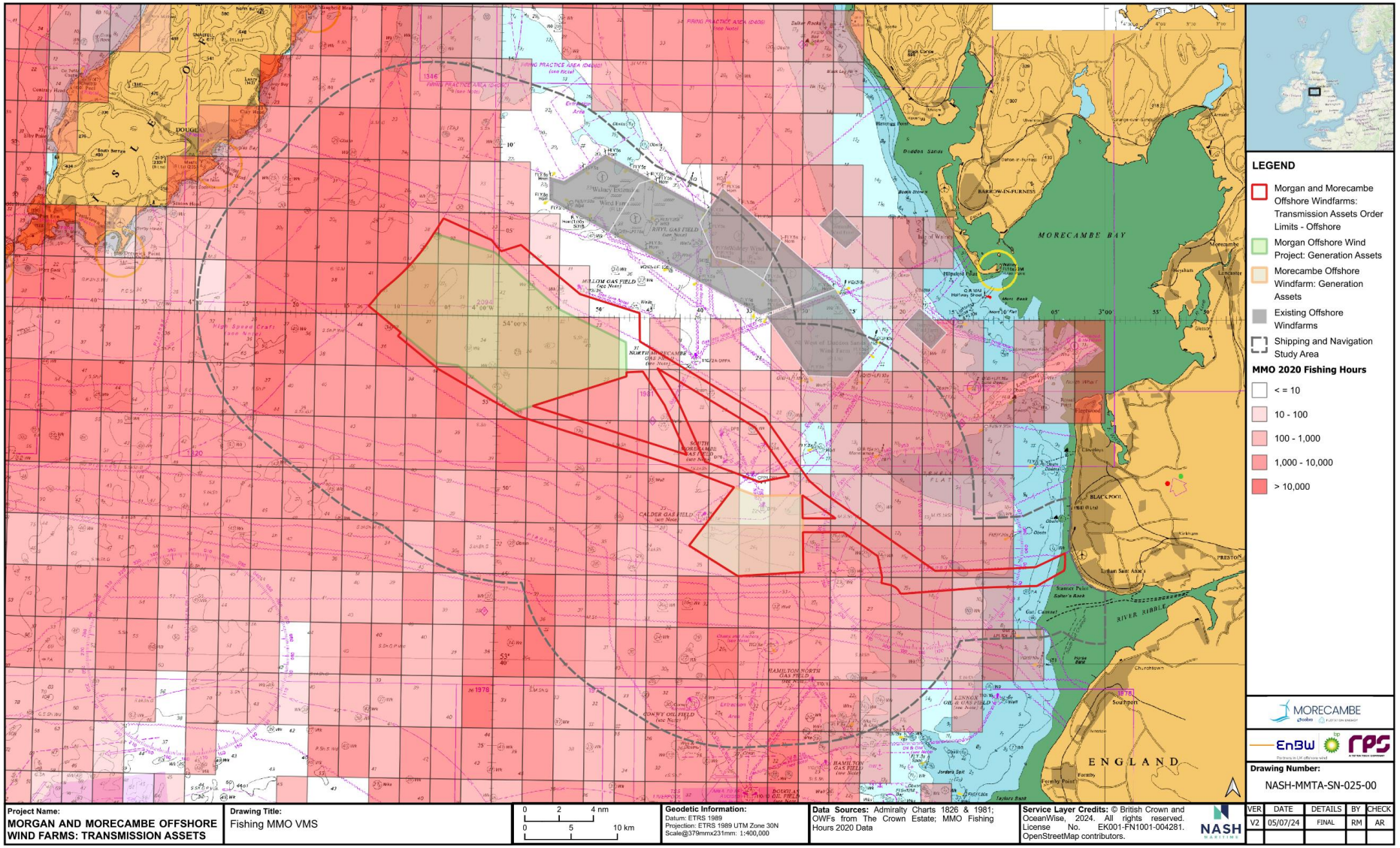

Figure 1.24: Fishing MMO VMS

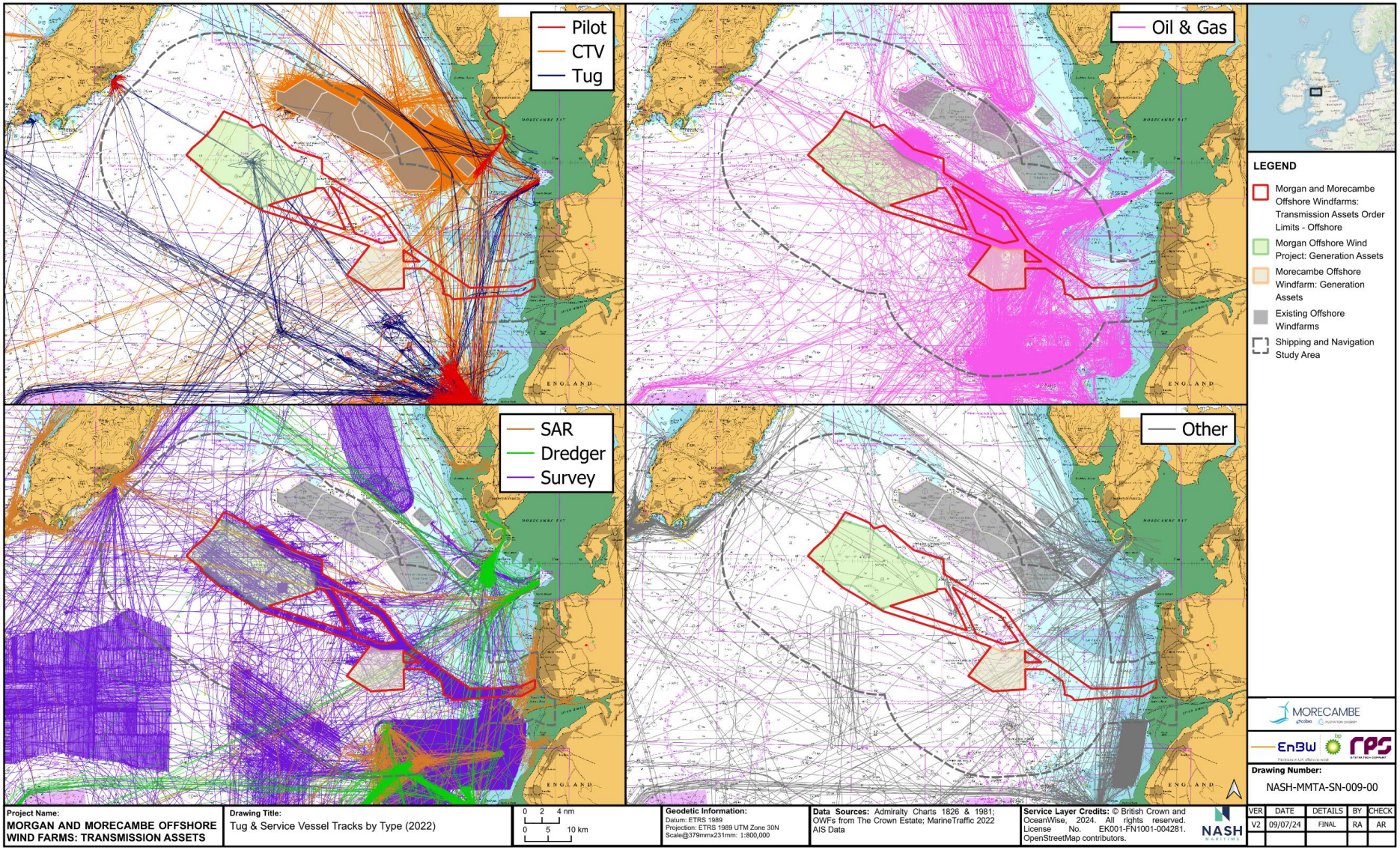

Figure 1.25: Tug and service vessel tracks (2022)

Vessel traffic near cable landfall

1.8.2.21 **Figure 1.26** shows a detailed overview of the vessel traffic in proximity to the landfall area.

1.8.2.22 The main type of vessel activity in proximity to the landfall was tug and service with 389 occurring both within 5 nm of landfall and within the study area. Of these, search and rescue and survey vessels were the most common with 264 search and rescue vessel tracks and 46 survey vessel tracks. The concentration of tug and service vessel tracks north east of the study area are RNLI lifeboats operating out of the Blackpool lifeboat station. The survey vessels were observed carrying out surveys near to the shore, south west of Blackpool. Fishing and recreational vessels were also recorded inside the study area and within 5 nm of landfall, with 21 and 38 vessel track records being observed, respectively. Most of the fishing activity took place further west.

1.8.2.23 Of the 212 vessels that crossed the cable corridor within 5 nm of landfall, 73 (34.43%) had a recorded draught. Of these, 61 had a draught of 0-3 m and 12 had a draught of over 3 m.

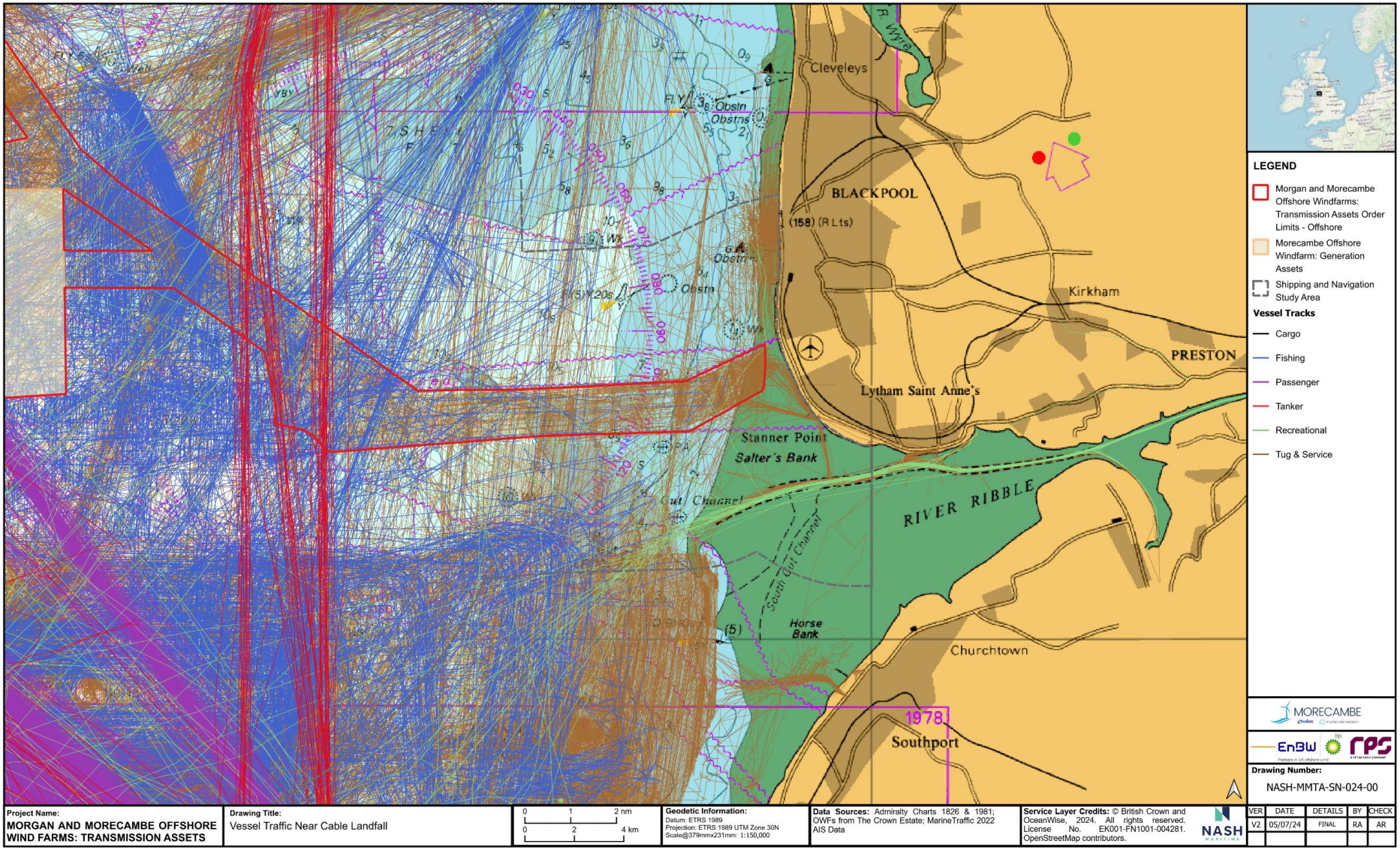

Figure 1.26: Vessel traffic near cable landfall

Vessel traffic counts and seasonality

Count by vessel type

1.8.2.24 **Figure 1.27** shows the number of vessel transits through the Offshore Order Limits, as well as the study area, from analysis of 2022 AIS data. It is noted that there are instances where vessels have been counted multiple times within the areas represented on the graph. This is due to the fact that the Generation Assets lie within the Offshore Order Limits, as well as the fact that all three of these areas (the Generation Assets and the Offshore Order Limits) lie within the Study Area.

1.8.2.25 Approximately 8,590 vessels pass through the Offshore Order Limits area per year, equivalent to approximately 23.5 per day. Passenger vessels are responsible for the majority of this activity, representing 50.4% of vessel traffic. This is mostly the Stena, IoMSPC and Seatruck routes which pass through or immediately adjacent to the site.

1.8.2.26 233 cargo and 157 tankers pass through the Offshore Order Limits per year, a total rate of two vessels per day and one vessel every three days, respectively. The density of commercial vessel traffic through the area is therefore low.

1.8.2.27 Whilst not all fishing and recreational vessels carry AIS, they account for 1,184 transits (3.2 per day) and transits 682 (1.9 per day) respectively through the study area.

1.8.2.28 The study area has 17,596 vessel transits per year, or 48.2 per day. Given that the study area includes several oil and gas platforms and the existing offshore wind farms, the contribution of tug and service to the total is substantial, with 23.8 per day or 49.4% of the total.

1.8.2.29 Numerous passenger routes pass within the study area, with 6,390 transits per year. Recreational vessel transits remain low within the study area, with 1.3 transits per day. 1,184 fishing transits were recorded within the study area, a rate of 3.2 per day.

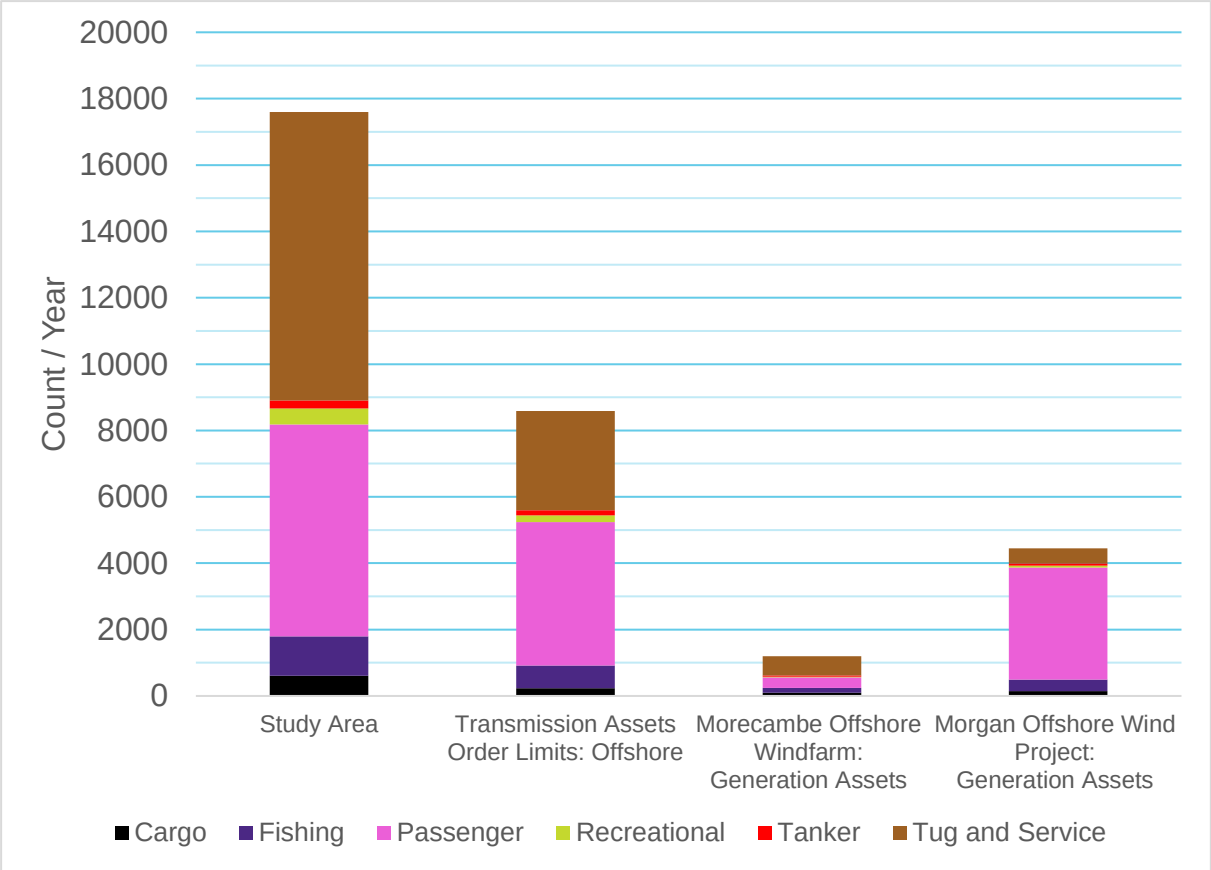

Figure 1.27: Vessel count per year by vessel type[1]

Count by vessel size

1.8.2.30 **Figure 1.28** shows that whilst there is a wide range of vessel sizes intersecting the study area. It is noted that there are instances where vessels have been counted multiple times within the areas represented on the graph. This is due to the fact that the Generation Assets lie within the Offshore Order Limits, as well as the fact that all three of these areas (the Generation Assets and the Offshore Order Limits) lie within the Study Area.

1.8.2.31 Vessels between 50 m and 150 m make up the most common vessel size intersecting the Offshore Order Limits, reflecting the greater proportion of ferry transits, as shown in **Figure 1.27**. Vessels less than 50 m account for a higher proportion of transits within the 10 nm study area than any other length range.

1.8.2.32 The largest vessel navigating through the Offshore Order Limits was the 289 m Emerald Princess cruise ship.

[1] It is noted that vessels transiting through the Generation Assets will also be transiting across the Offshore Order Limits.

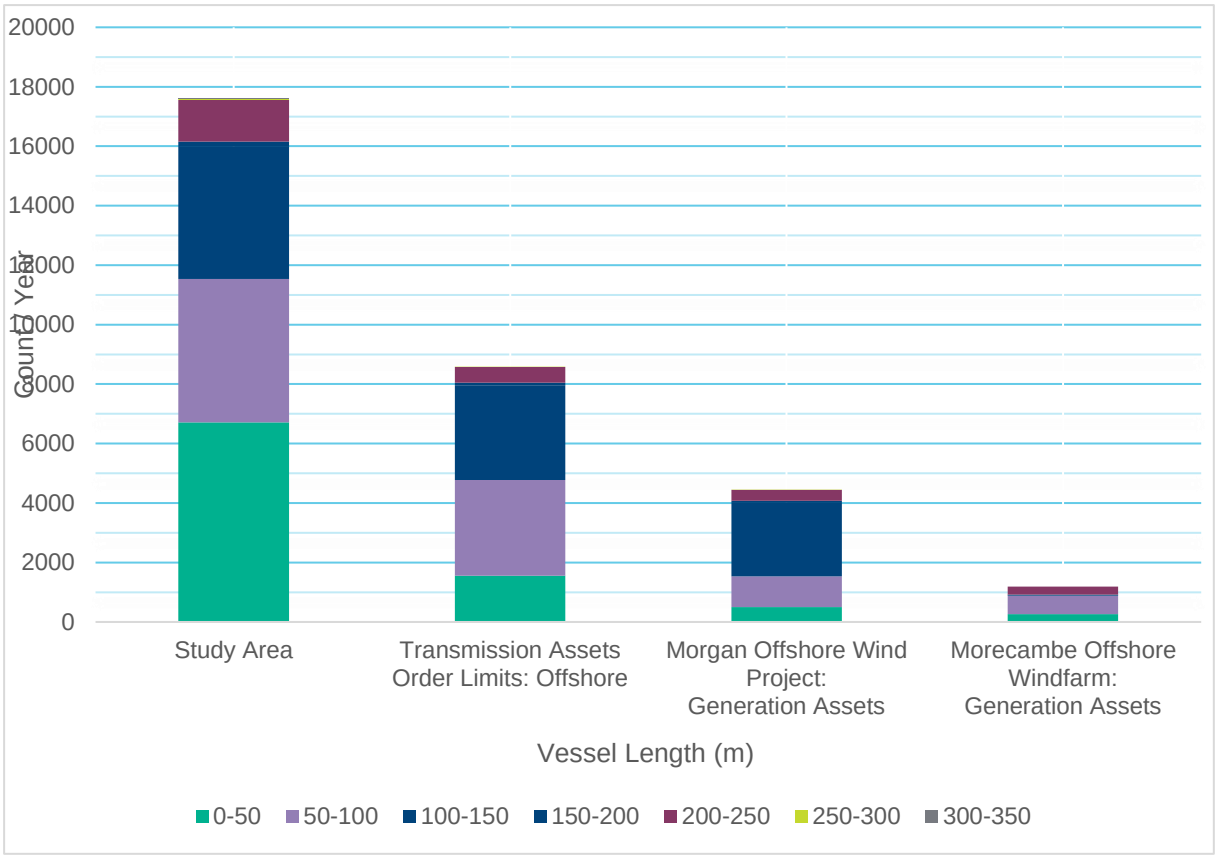

Figure 1.28: Vessel count per year by vessel length (m)[2]

Monthly count

1.8.2.33 **Figure 1.29**presents the monthly count of each vessel type recorded within each area. It is noted that there are instances where vessels have been counted multiple times within the areas represented on the graph. This is due to the fact that the Generation Assets lie within the Offshore Order Limits, as well as the fact that all three of these areas (the Generation Assets and the Offshore Order Limits) lie within the Study Area.

1.8.2.34 **Figure 1.29** shows a seasonal trend that peaks over the summer months (May 2022 - Aug 2022) and decreases in the winter months (November 2021 - February 2022). Within the Offshore Order Limits, this is primarily due to an increase in ferry service operations, recreational and fishing activity.

1.8.2.35 **Figure 1.29** is determined based on analysis of 2022 AIS data and therefore underrepresents small craft activity due to smaller vessels not broadcasting on AIS, particularly fishing and recreational vessel movements. It is notable that during the winter vessel traffic survey, significantly more fishing vessel activities were recorded to the north

[2] It is noted that vessels transiting through the Generation Assets will also be transiting across the Offshore Order Limits.

west of the Morgan Offshore Wind Project: Generation Assets, of which relatively few had AIS.

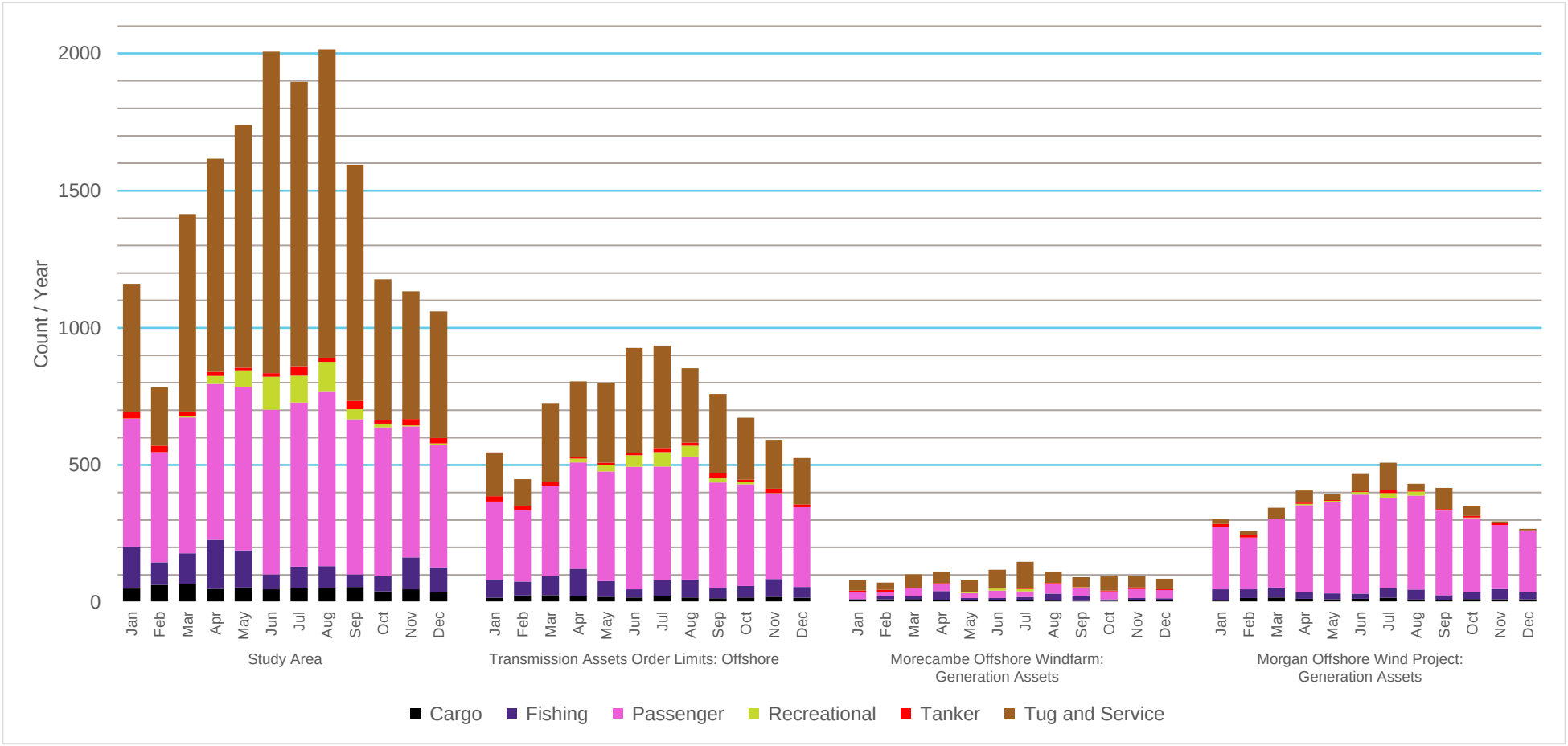

Figure 1.29: Vessel count per month[3]

[3] It is noted that vessels transiting through the Generation Assets will also be transiting across the Offshore Order Limits.

Identification of vessel routes

1.8.2.36 MGN 654 (MCA, 2021) provides guidance regarding the definition of shipping routes in order to inform offshore wind farm assessments. To account for variation of tracks taken by vessels, the guidance note establishes the 90th percentile corridor principles, the central portion of traffic on a route containing the majority of vessel traffic. The 90th percentile concept considers that as vessels navigate between specific locations, they may take a variety of routes due to avoiding other traffic or as a result of leeway from wind or waves. To minimise any anomalous tracks and therefore mark the width of a specified route, the MCA advise using the centre 90th percentile of the determined Total Route Width (see **Figure 1.30**) around the assumed Median or Centre Line, for all vessels engaged on passage between the same two points.

1.8.2.37 To identify the 90th percentile routes, the following data processing steps were undertaken.

1. Step 1: Vessel tracks filtered to commercial only (cargo, tanker and passenger).
2. Step 2: Tracks along a defined route selected.
3. Step 3: Gate transects constructed along the length of the route (ensuring transects at course changes are included).
4. Step 4: Calculate number of tracks through cross track transect subsections.
5. Step 5: Calculate location of 90th percentile through transect (**Figure 1.31**).
6. Step 6: Draw polygon capturing all 90th percentile locations on each transect.

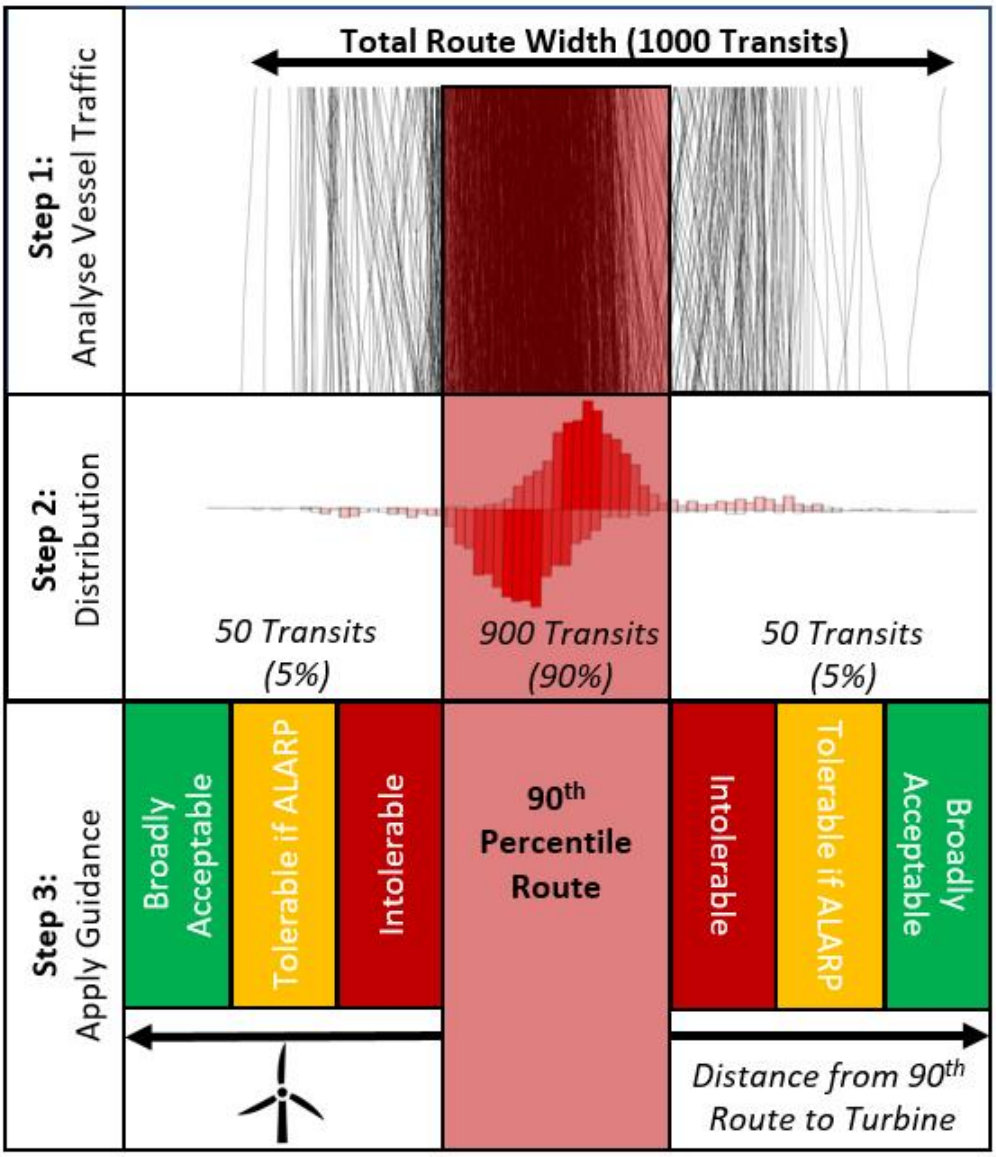

Figure 1.30: Identification of 90th percentile routes

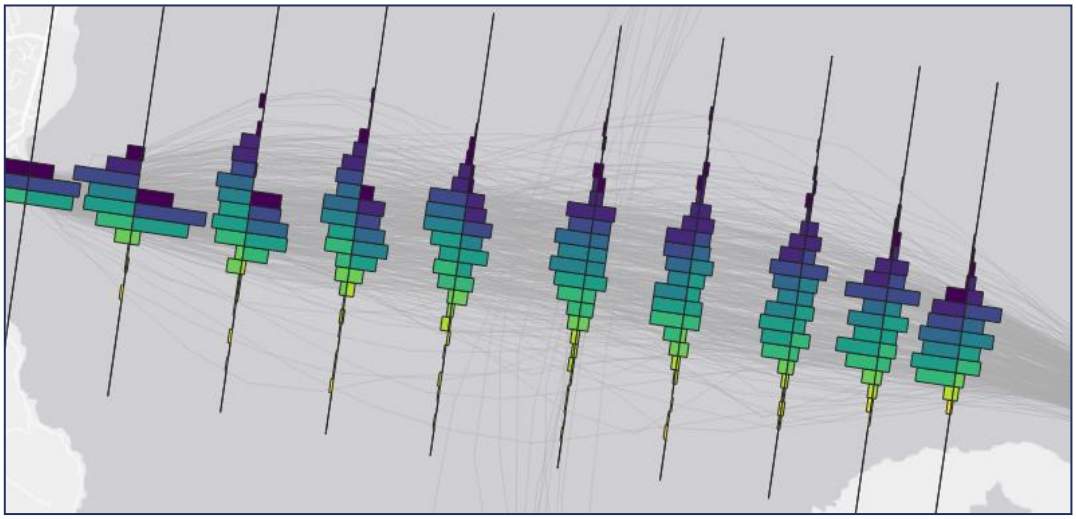

Figure 1.31: Determination of 90th percentile transects using cross track distributions

Commercial routeing

1.8.2.38 Commercial vessel routes have been identified in **Figure 1.32** which also shows the number of vessel movements per day from analysis of 2022 AIS data. All routes with more than one vessel movement per day are to/from the Port of Liverpool or Morecambe Bay from the Irish Sea.

1.8.2.39 There are a number of commercial routes with less than one vessel per day passing through the Offshore Order Limits. These include routes into Douglas and alternative routes to/from Liverpool.

Table 1.21: Statistics of commercial vessel routes in the study area (highlighted indicate routes intersecting the Offshore Order Limits)

Route	Approximate annual crossings (2022)
Liverpool TSS to Skerries TSS (E)	1,563
Liverpool TSS to Inshore Anglesey (W)	13
Liverpool TSS to Central Irish Sea (W)	45
Liverpool TSS to Irish Sea via Skerries TSS (W)	137
Liverpool TSS to W IoM (W)	533
E IoM to Heysham	184
Douglas to Heysham	6
Liverpool to W IoM	153
Douglas to Liverpool TSS (E)	9
W IoM to Liverpool TSS (E)	428
South Irish Sea to Solway Firth	60
Off Skerries TSS to Solway Firth	42
Douglas to Liverpool TSS	21
Liverpool to E West of Duddon Sands	66
Off Skerries TSS to Barrow (E)	9
Colwyn Bay to W IoM	13
Liverpool TSS to north Irish Sea (W)	55
Skerries TSS to Liverpool TSS (W)	1,610
Liverpool TSS to Skerries TSS and Anglesey (E)	525
Inshore Anglesey to Liverpool TSS (E)	17
Off Skerries TSS to Heysham (E)	23
Off Skerries TSS to Barrow (W)	4
Heysham to Off Skerries TSS (W)	7
Liverpool to E IoM - E	14

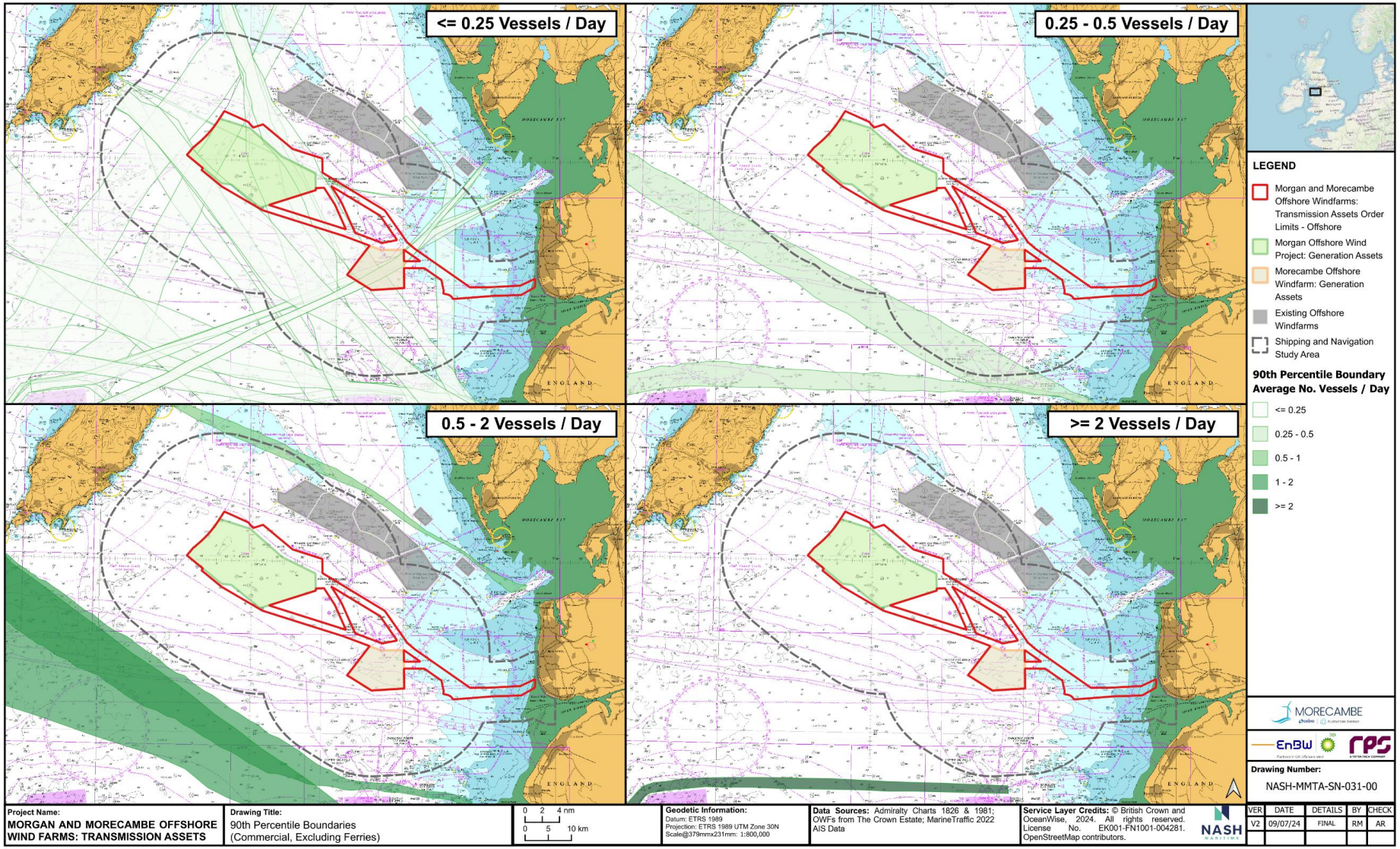

Figure 1.32: Commercial vessel 90th percentile routes (excluding ferries)

Ferry routeing

1.8.2.40 The ferry routes in the study area are presented in **Table 1.22** along with a count of the crossings during 2019 and 2022. There are 12 ferry routes through the study area, as shown in **Figure 1.33**, split between four operators, with all routes divided between the operators in **Figure 1.34**.

1.8.2.41 The IoMSPC ferries operate between Douglas on the Isle of Man, and either Heysham or Liverpool. The Heysham/Douglas route is the most frequently run route and passes east/west between South Morecambe gas field and West of Duddon Sands and Walney offshore wind farms through the north region of the Offshore Order Limits. The vessel Manannan runs a seasonal service on this route, with four transits per day in summer.

1.8.2.42 Stena Line operates routes between Belfast and either Liverpool or Heysham. Vessels between Heysham and Belfast operate on a route between Barrow/Ormonde and West of Duddon Sands/Walney offshore wind farms. Vessels using the route between Belfast and Liverpool pass east or west of the Isle of Man dependent on prevailing MetOcean conditions. Primarily, vessels use the westerly route that passes south of the Isle of Man.

1.8.2.43 Seatruck operates two east-west routes through the study area that pass through the centre of the Offshore Order Limits. Seatruck also operates a route between Liverpool to Dublin south of the study area.

1.8.2.44 P&O ferries operate a route between Liverpool and Dublin which passes south of the study area.

Table 1.22: Ferry routes and annual crossings by operators passing through the study area

Operator	Route	Example Vessels	Approximate Annual Crossings (2019)	Approximate Annual Crossings (2022)
IoMSPC	HEY - DOUG	ARROW	86	107
		BEN MY CHREE	1,286	1,275
		MANANNAN	0	69
	LIV - DOUG	MANANNAN	628	590
		BEN MY CHREE	46	3
Stena	LIV - BEL west of IOM and No TSS	STENA EDDA STENA EMBLA STENA FORECASTER STENA ESTRID (2022 only) STENA FORETELLER (2022 only) STENA HORIZON (2019 only) STENA LAGAN (2019 only) STENA MERSEY (2019 only) STENA FORERUNNER (2019 only)	1,442	1,098
	LIV - BEL east of IOM (east of CALDER)		153	196
	LIV - BEL east of IOM (west of CALDER)		200	194
	HEY - BEL	STENA HIBERNIA STENA SCOTIA	1,150	1,094
Seatruck	HEY - WAR	SEATRUCK PERFORMANCE PRECISION	967	1,099*
	HEY - DUB	SEATRUCK PACE SEATRUCK PANORAMA (2019 Only)	523	606**
	LIV - DUB	CLIPPER PENNANT SEATRUCK PACE SEATRUCK POWER CLIPPER PROGRESS (SEATRUCK PROGRESS in 2022) SEATRUCK PANORAMA (2019 Only)	1,800	1,627

*14 transits of HEY- WAR in 2022 were undertaken by the vessels CLIPPER PENNANT (2), CLIPPER POINT (1), SEATRUCK PACE (10), and SEATRUCK PROGRESS (1).** 48 transits of HEY - DUB in 2022 were undertaken by the vessels CLIPPER POINT (25), SEATRUCK PERFORMANCE (14), and SEATRUCK PRECISION (9).

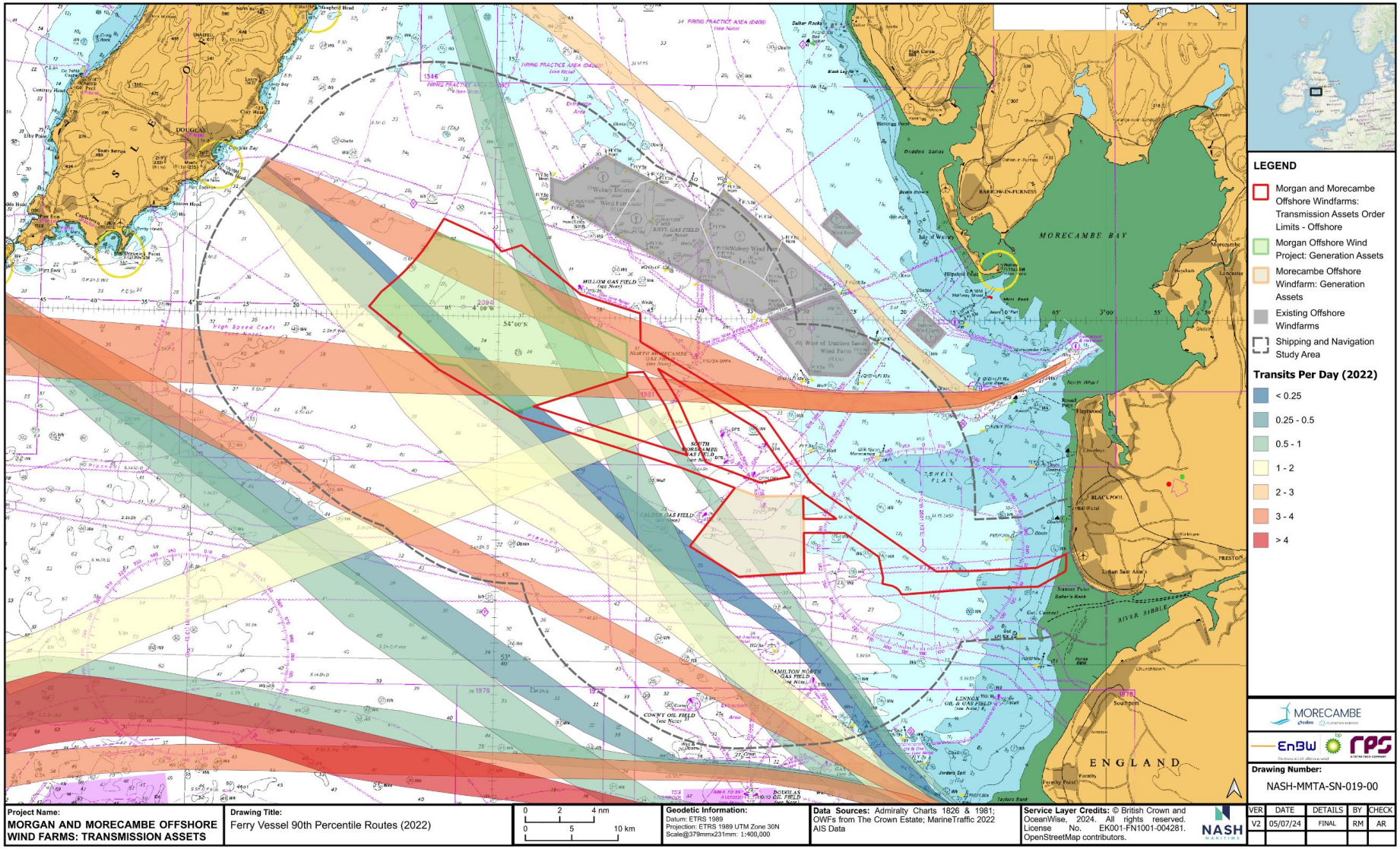

Figure 1.33: Ferry vessel 90th percentile routes 2022

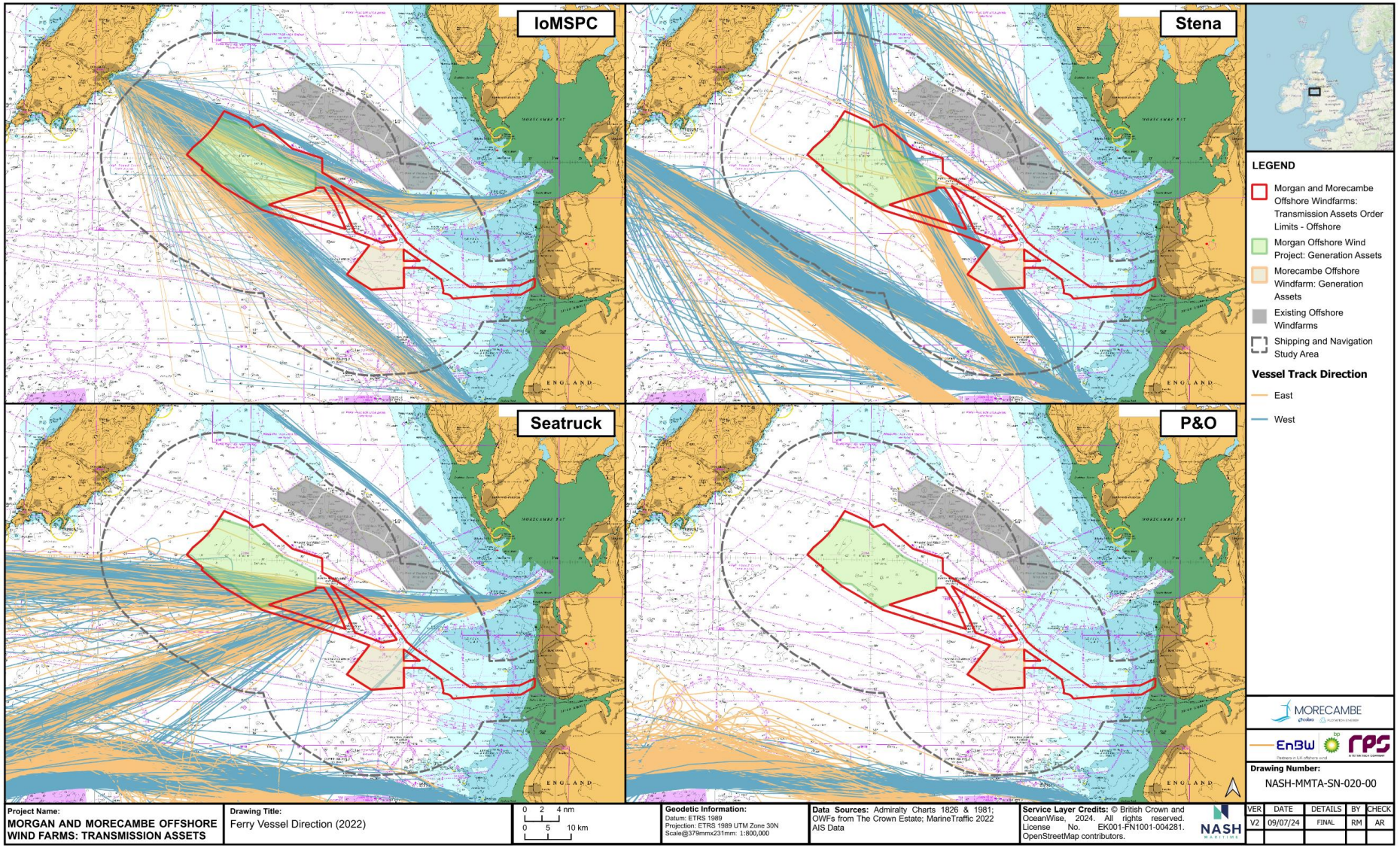

Figure 1.34: Ferry vessel direction 2022

Adverse weather routeing

Commercial routeing

1.8.2.45 Analysis of vessel tracks during MetOffice named storm events did not identify any repeatable adverse weather routeing behaviours taken by commercial shipping. During strong south westerlies, the anchorage to the east of Anglesey was in greater demand by vessels.

Ferry routeing

1.8.2.46 **Figure 1.35** shows the ferry route passage plans and **Figure 1.36** shows the non-typical routes taken by ferries, including during adverse weather conditions. Prevailing south westerlies result in vessels taking a more south westerly transit in order to both control the course relative to the conditions and take advantage of the lee from the shore. This minimises dangerous motions aboard the vessel and improves passenger comfort.

1.8.2.47 During adverse weather, the IoMSPC take routes to the south west of their typical route. For the Liverpool to Douglas route, this takes vessels clear of the Offshore Order Limits as opposed to their usual passage plan passing through its west boundary. The Heysham to Douglas route is similarly deviated to the south west, taking vessels more frequently south of the North Morecambe Gas Field.

1.8.2.48 The Stena route to the west of the Isle of Man between Liverpool and Belfast similarly is deviated further south west, and therefore outside of the study area. There is little evidence of considerable adverse weather routeing for Stena transits to the east of the Isle of Man, albeit some transits do pass further west than their normal route.

1.8.2.49 During adverse weather, Stena vessels operating between Heysham and Belfast may choose not to pass between Barrow and West of Duddon Sands, given the navigable width is 2 nm this route carries greater risk. Therefore, vessels may choose to pass to the west of the existing offshore wind farms, where there is greater searoom and more ability to weather route, thereby passing within the Offshore Order Limits.

1.8.2.50 The Seatruck adverse weather routes between Heysham to Dublin/Warrenpoint pass through the centre of the Offshore Order Limits, similar to their regular routes.

1.8.2.51 Further discussion on adverse routeing of ferries is contained in **section 1.10.3**.

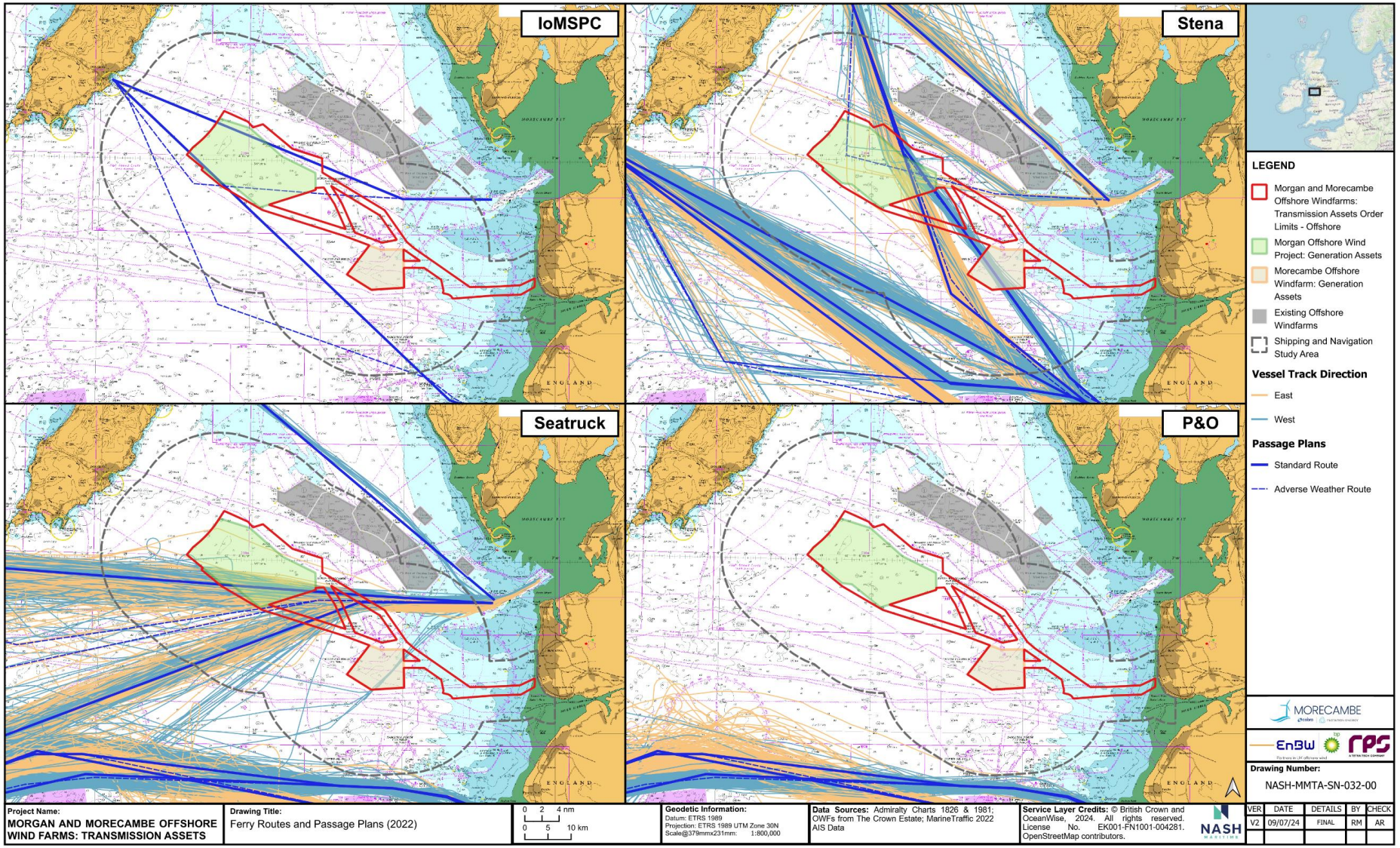

Figure 1.35: Ferry route passage plans 2022

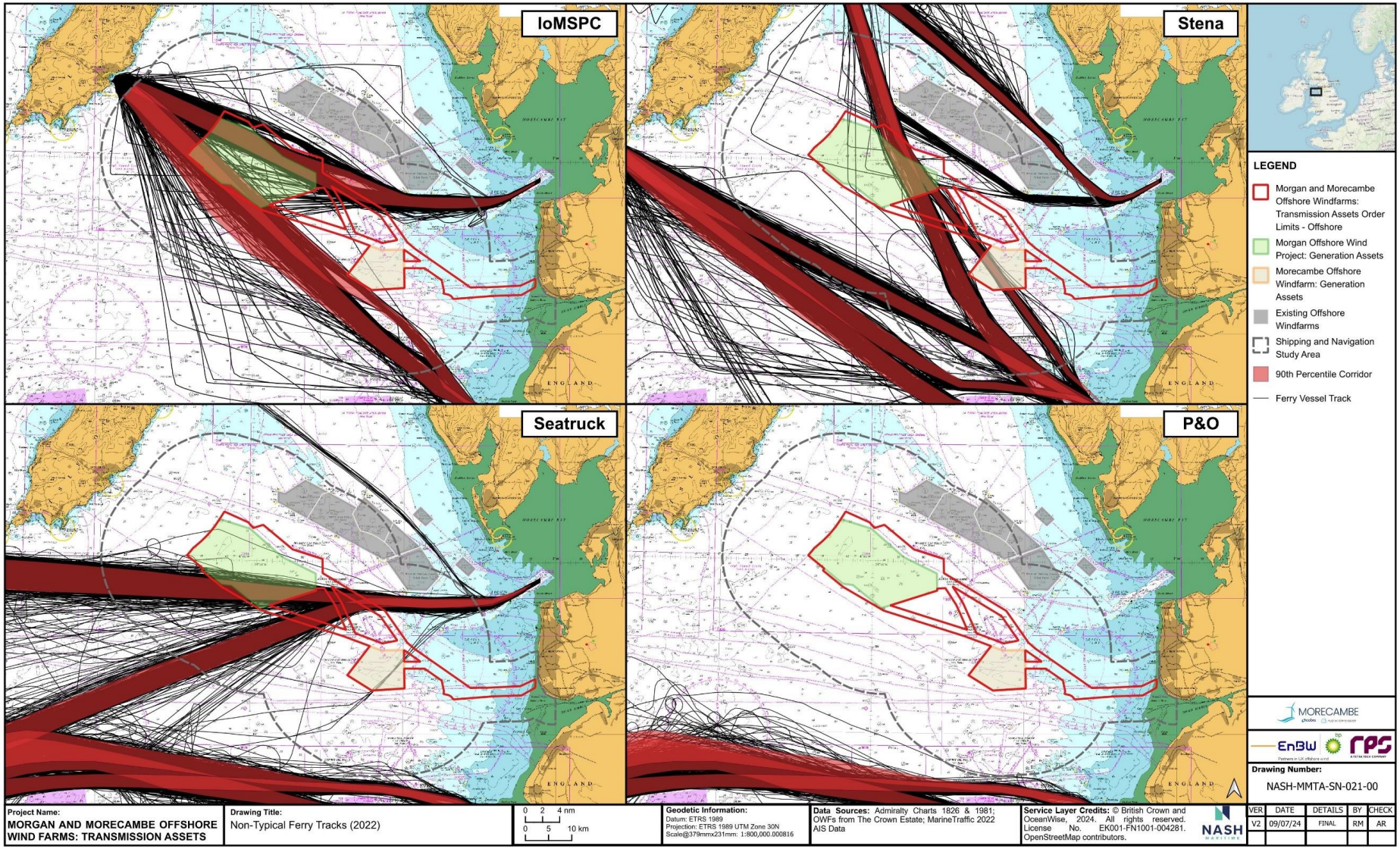

Figure 1.36: Non-typical ferry tracks 2022

Non-transit activity (including anchoring, loitering and out of region pilot transfer)

1.8.2.52 **Figure 1.37** is a density plot showing areas in which all vessels were recorded at speeds of less than 5 kts.

1.8.2.53 Tug/service vessels were observed travelling at speeds less than 0.5 kts within operational wind farms, as well as at the oil and gas fields in the area. Tug and service vessel positions observed close to the landfall were a RNLI lifeboat, which was likely training.

1.8.3 Incident analysis

Historical incidents associated with subsea infrastructure

1.8.3.1 **Table 1.23** details historic incidents relating to snagging of subsea infrastructure.

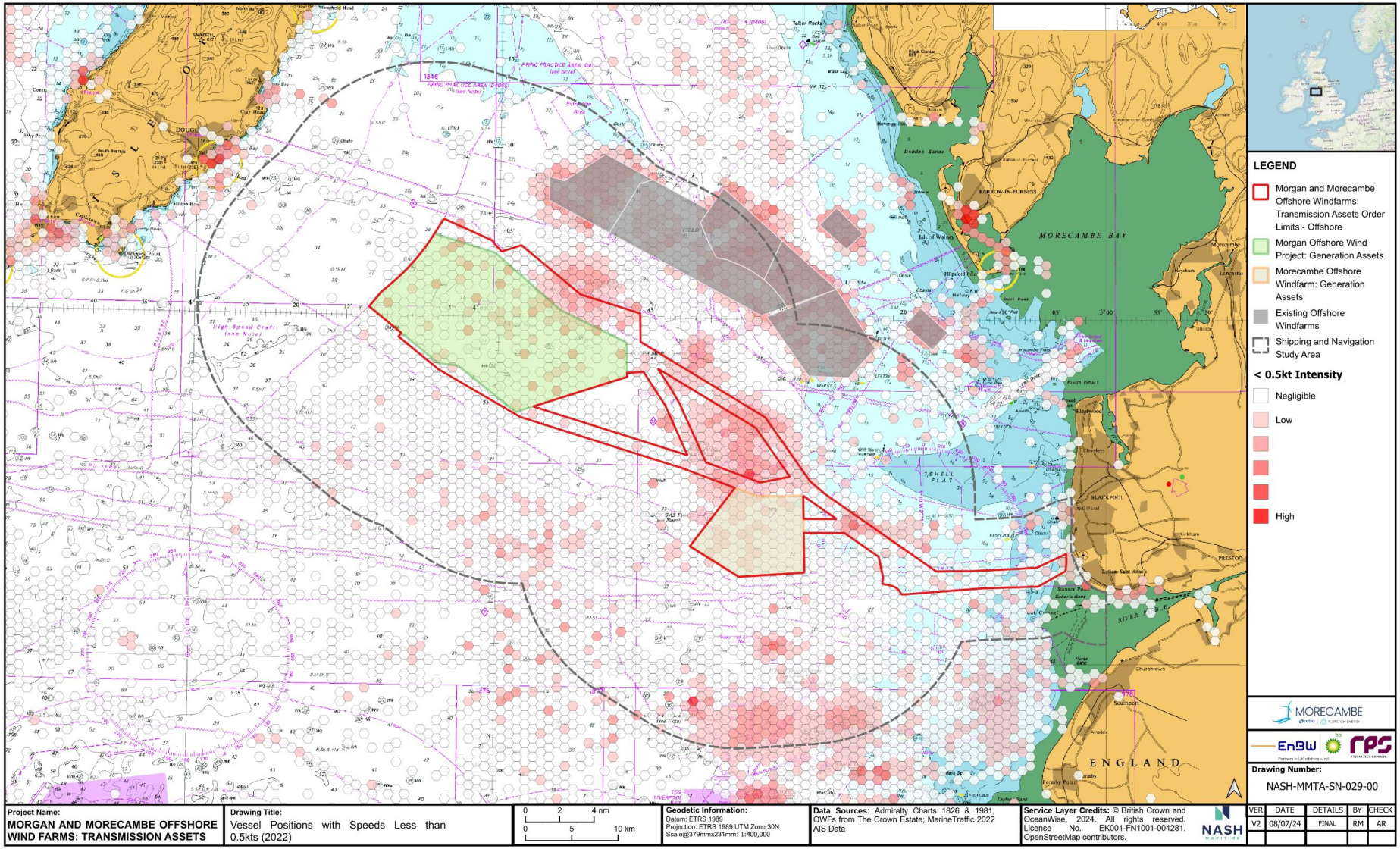

Figure 1.37 Non-transiting vessel tracks (less than 0.5 kts)

Table 1.23: Incidents relating to subsea infrastructure

Incident date	Subsea assets	Vessel type	Incident type	Incident description
1997	PIPER to Flotta 30" pipeline	Fishing vessel	Snagging	The 19 m wooden fishing vessel Westhaven AH190 was fishing the Fladen Grounds in the North Sea with a crew of four. Weather conditions were good and a slight swell was running. She capsized at about 10:10 whilst attempting to pull her port trawl door clear of a seabed obstruction which was subsequently found to be the PIPER to Flotta 30" pipeline. The Inquiry found that the vessel capsized as her crew attempted to free the trapped port trawl door from the pipeline. Excessive force exerted by the port trawl warp on the port gallows, caused by a combination of winch pre-tension, swell and propeller thrust, pulled the vessel over. The capsize of the vessel resulted in four deaths; all of the crew that were on board.
2007	CATS gas pipeline	Tanker	Anchor drag	A tanker started to drag her anchor in Tees Bay. At the time, the wind speed was in excess of 40 kts and there was a heavy northerly swell. The master decided to weigh anchor and depart, but during the operation the windlass hydraulic motor exploded and the cable ran out to the bitter end. The vessel continued to drag her anchor until when, passing over the CATS gas pipeline, the anchor flukes snagged the pipe. The vessel was caught on the pipeline for about 10 minutes before a wide yaw caused the flukes to free themselves. The vessel continued dragging until the anchor finally held as it rode over a shoal patch, 2.5 nm off a lee shore. There were no injuries sustained or damage caused by pollution. A subsequent survey of the pipeline showed that the anchor had lifted the pipeline out of its trench and dragged it about 6 m laterally. The pipeline suffered damage to the concrete coating and impact damage to the steel surface.
2016	IFA1	Rock barge	Collision/ subsequent anchor drag	Stema Barge II was being used to supply rock armour to a sea defence project commissioned by Network Rail. The barge had been anchored close to the subsea cable runs of Interconnector France-Angleterre 1, a high voltage power supply system operating between the UK and France. After Saga Sky had passed through Dover Strait in the south west traffic lane, the weather deteriorated significantly with the approach of Storm Angus. The south westerly wind and tidal stream significantly reduced the ship's progress. The master attempted to turn the ship to starboard to steer a reciprocal course and run with the weather until the storm abated. The effect of the wind acting on the ship's cranes and aft superstructure overcame the turning moment of the rudder and prevented the turn from being completed. Despite maintaining propulsion, Saga Sky was blown broadside over a distance of approximately 7.4 nm whilst the master continued with his attempts to turn the vessel to starboard until it collided with Stema Barge II. The combination of wind and tide propelled Saga Sky, beam on to the wind, at speeds of up to 9 kts, and even after deploying both anchors the ship continued to move under the effects of the storm. Both vessels dragged their anchors and two of the four subsea cable pairs that made up the interconnector were severed. As a result of the incident, recommendations have since been made to the MMO, UKHO and the MCA.

Incident date	Subsea assets	Vessel type	Incident type	Incident description
2016	Jersey internet cables	Chemical tanker	Inadvertent anchoring	Whilst on passage from Rotterdam to Cork, a chemical tanker was passing 6 nm south of the Lizard Point in Cornwall UK when the Officer of the Watch noticed that the vessel's speed was reducing, and its heading was changing unexpectedly. The vessel was stopped, and it was quickly established that its anchor was out. The anchor was then hauled in and when it was in sight, it was apparent that a seabed cable had been snagged. The coastguard was informed, and the crew also checked their electronic chart display and information system display and established that the cable was charted and in use. It could not be released from the anchor so, instead, the anchor was released back to the seabed and the bitter end also released. The vessel then proceeded on its passage. It was established that the anchor had not been properly secured when the vessel had left port and must have released itself on passage. Only when the vessel approached shallow water and snagged the seabed cable, did it become apparent to the crew that the anchor and cable were paid out.

Historical incidents within study area

1.8.3.2 **Table 1.24** and **Figure 1.38** shows navigational incidents recorded in the study area between the MAIB (1992-2022) and RNLI (2008-2023) databases. In processing the incidents, non-vessel related incidents have been removed, such as shore-based activities (e.g. people cut off by the tide or swimmers in distress). Furthermore, duplicate values recorded in both databases have been removed.

1.8.3.3 32 incidents were recorded within the Offshore Order Limits, the majority of these involved recreational or fishing vessels with 20 and eight incidents, respectively.

1.8.3.4 302 incidents were recorded within the study area. The majority of which are non-navigationally significant hazards such as 116 mechanical failures and 42 personal injuries. The most notable include:

- May 2019 – Dive support vessel contact with wind turbine, reported as follows:

  '*Dive support vessel was moving from one position to another when the current pushed it toward a fixed wind turbine causing minor damage*.'

- April 2017 – Contact between windfarm support vessel and wind turbine, reported as follows:

  '*A windfarm crew transfer vessel suffered a propulsion control failure which resulted in a minor impact with a turbine support column. There was minor damage above the waterline*'

- August 2013 – Guard vessel collision with yacht, reported as follows:

  '*Fishing vessel on wind farm guard vessel duties collided with yacht whilst escorting her clear of wind farm.*'

- January 2008 – Cargo ship grounding, reported as follows:

  '*Bahamas registered Ro-Ro* [Roll-on Roll-off] *cargo vessel, MS Riverdance, grounded and became stranded on the Shell Flats, off Cleveleys Beach, Lancashire*.'

1.8.3.5 Accident frequencies have been calculated per vessel type within the study area. These are shown in **Table 1.24**. These show very low incident rates, particularly for larger commercial vessels.

Table 1.24: MAIB/RNLI incident frequencies within 10 nm of Morecambe and Morgan Transmission Assets (1992-2023)[4]

Incident Type	Cargo	Fishing	Not Classified	Passenger	Recreational	Tanker	Tug and Service	Total
Adverse Weather	-	2	-	-	26	-	-	28
Capsize/Flooding/Foundering	1	10	-	-	13	-	2	26
Collision	-	2	-	-	1	-	2	5
Contact	1	2	-	-	-	-	4	7
Fire/Explosion	-	2	-	3	3	-	-	8
Grounding	-	2	-	-	34	-	-	36
Mechanical/Damage	-	27	-	1	85	-	3	116
Missing Vessel	-	-	-	-	9	-	-	9
Near Miss	1	8	1	1	-	-	0	11
Other	-	7	-	-	6	-	1	14
Personal Injury	1	12	-	1	15	-	13	42
Total	4	74	1	6	192	-	2	302

[4] Due to the levels of co-ordinate accuracy provided in the data from MAIB and RNLI some incidents may share co-ordinates within the corresponding incident figure, thus under-representing the incidents illustratively but counted within the data table.

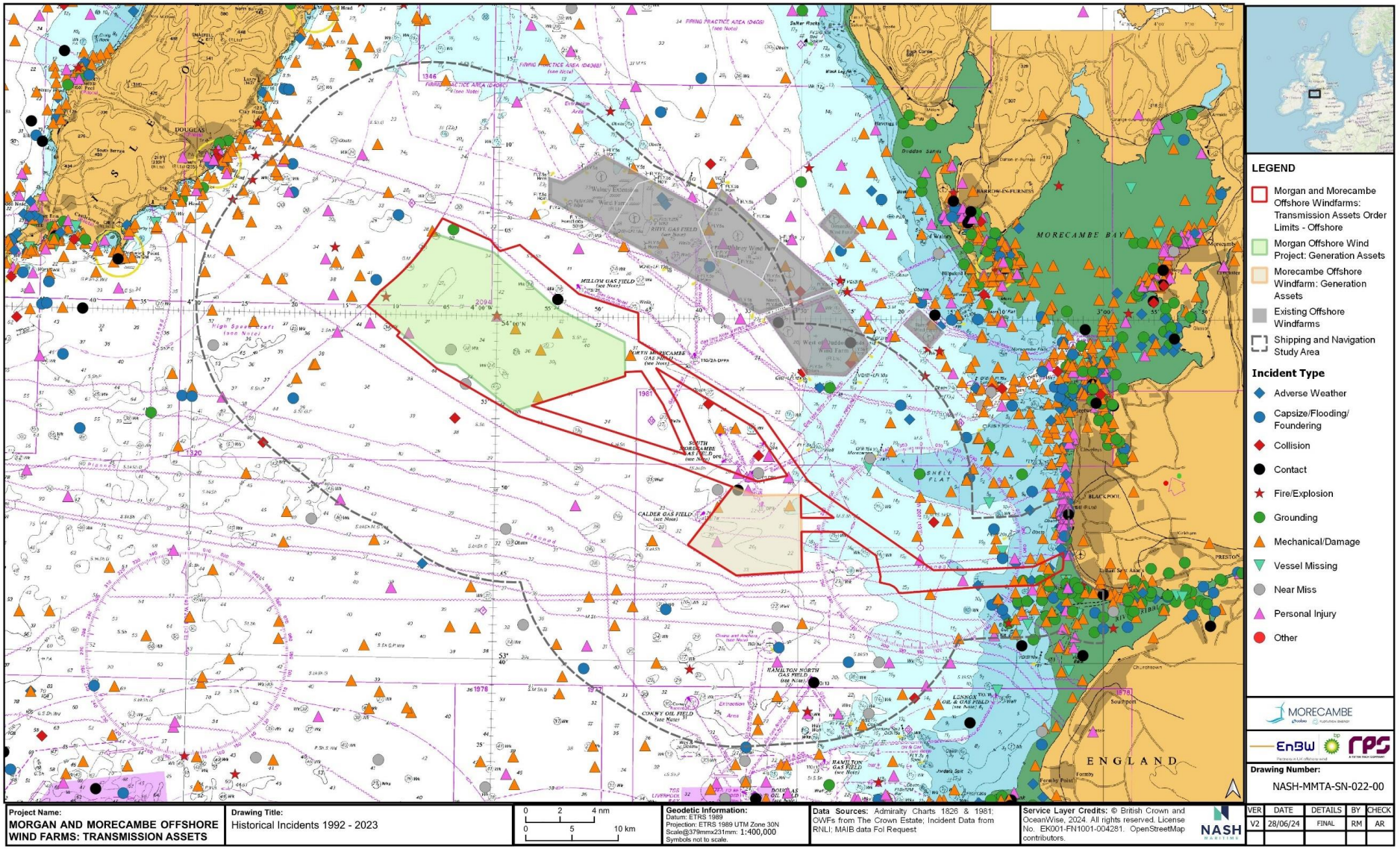

Figure 1.38: Historical incidents 1992 - 2023

Consequences of collision

1.8.3.6 International studies have explored the consequences of collision between large vessels. The European Maritime Safety Agency (EMSA) collision risk model (EMSA, 2015) developed for their FSA based on historical incidents estimated that 33% of struck RoPax vessels would result in water ingress and 14% of those would result in sinking (joint probability of 4%). The MSC 85-17-2 FSA gives probabilities of 16% of collisions resulting in a serious incident of which 50% of struck vessels would flood, of which 22% would sink and a further 50% split between gradual sinking or rapid capsize (joint probability of the latter being 0.8%).

1.8.3.7 Analysis of MAIB data suggests that approximately 1% of collisions would result in loss of life. However, it is likely as most collisions occur within ports and harbours, vessels are navigating at slower speeds than they may do in open sea. Furthermore, there are relatively few incidents in UK waters of significant loss of life following collisions or allisions involving large commercial shipping or ferries. Collisions between commercial vessels, even at speed, often result in only damage and no pollution or injuries (MAIB 7/2018, 28/2015, 3/2017, 15/2013).

1.8.3.8 During the hazard workshop undertaken for the CRNRA, it was noted that a collision between a large commercial ship or ferry with a small craft such as fishing boat would likely result in the loss of the small craft and multiple fatalities (7/2007, 10/2015). However, a more likely outcome (as demonstrated by analysis of historic incident data) is serious damage to the small craft and either no or minor injuries/pollution (MAIB 4/2019, 16/2015, 20/2011, 17/2011).

1.8.3.9 During hazard workshop consultation undertaken for the CRNRA, some consultees made reference to the light weight nature of the Manannan high speed ferry's structural integrity, having been designed for high speed transit and therefore with aluminium build. Therefore, any collision involving this vessel could have a higher potential consequence.

Consequences of snagging

1.8.3.10 To better understand the potential consequences of snagging involving subsea cables, **Table 1.23** includes case studies of past incidents and the resulting impacts to people, property and the environment. These have been collated from accident reports or news articles.

1.8.3.11 The main risk to vessels when a cable or pipeline is snagged is capsizing/foundering. Case studies show that this is more likely to occur with smaller vessels, which are likely to lose stability more readily.

1.9 Future case traffic profile

1.9.1 Introduction

1.9.1.1 This section presents the predicted future case traffic profile within the study area for commercial, ferries, oil and gas, fishing and recreational vessel traffic.

1.9.2 Commercial traffic

1.9.2.1 DfT data on UK port trade is presented in **Figure 1.39** and **Figure 1.40** and shows a general decline in port freight in the previous 20 years at both the national and port level (noting also an anomalous but marked reduction in 2020 due to the impacts of COVID-19 restrictions). Since 2020, the post-pandemic figures indicate an increasing trend back towards pre-pandemic levels and it is anticipated that UK port trade will continue to return to those levels.

1.9.2.2 Freight activity by port over the previous 20 years for Liverpool, Fleetwood, Heysham and Holyhead have all shown a generally steady, or marginal increase, in freight tonnage. In more recent years between 2014 and 2019, the Port of Liverpool showed a steady increase and the Ports of Heysham and Holyhead have remined relatively steady. It should be noted that an increase in tonnage does not necessarily correlate with an increase in the number of vessels. New build vessels are often larger, capable of carrying more cargo, and ports such as Liverpool have invested in shoreside infrastructure to better handle these larger vessels.

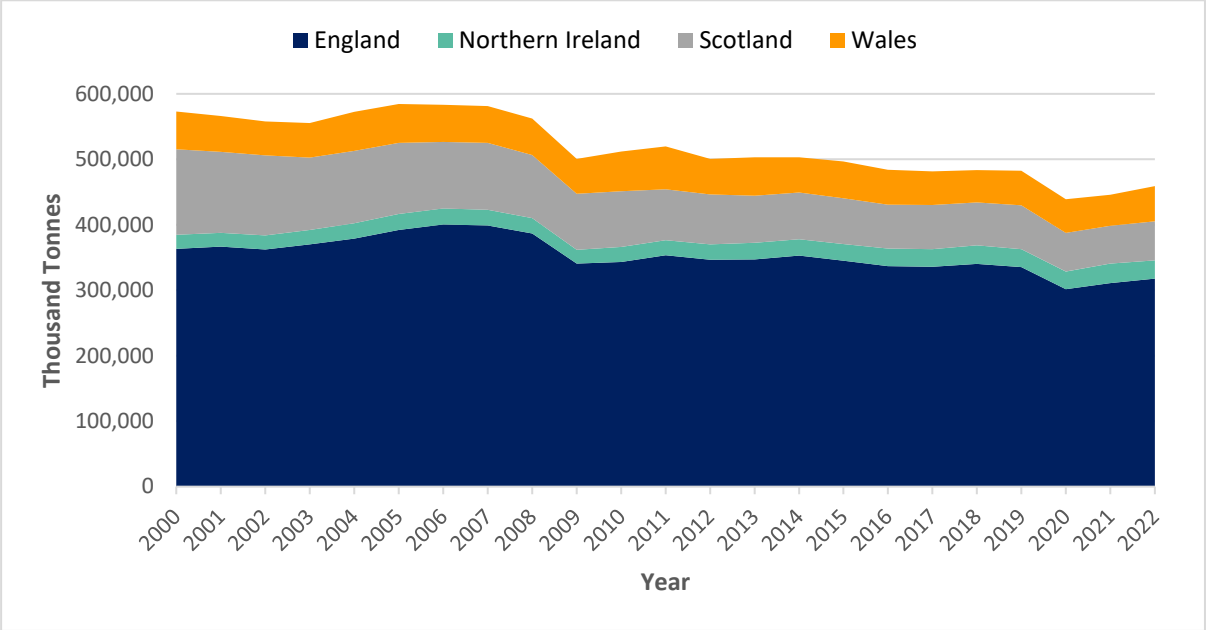

Figure 1.39: UK major port freight

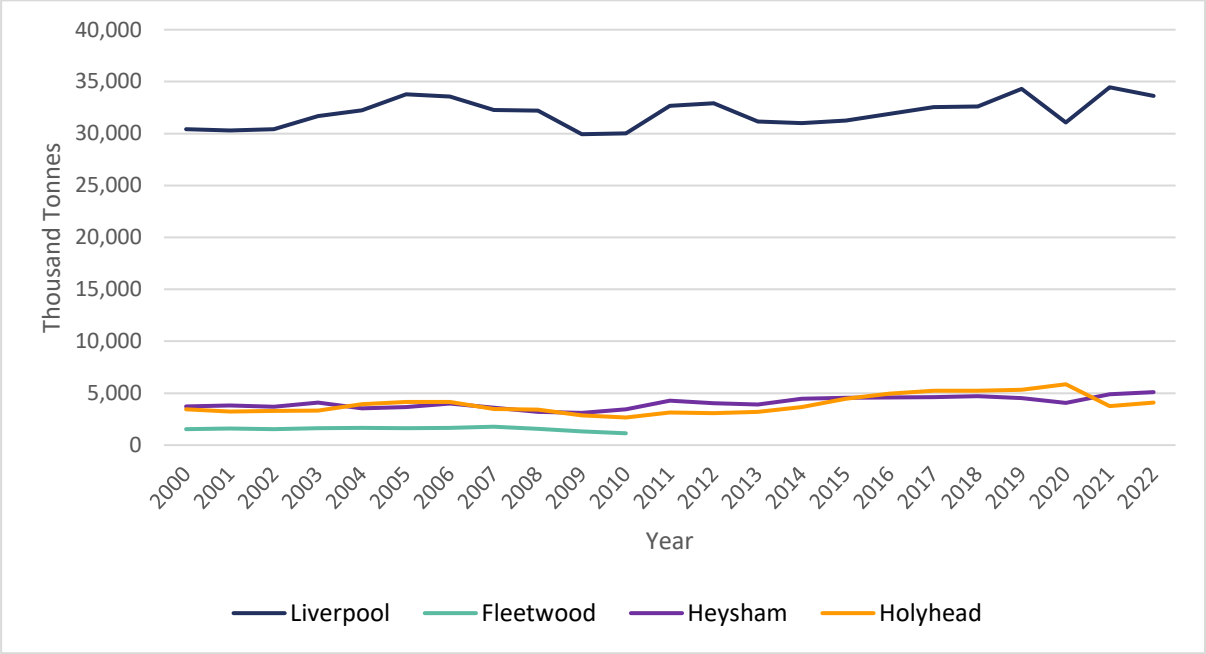

Figure 1.40: Port freight for major ports in the Irish Sea (Fleetwood ferry service closed at the end of 2010)

1.9.2.3 **Figure 1.41** shows projected freight traffic into UK major ports, produced by the DfT. Overall, port traffic is forecast to remain relatively flat in the short term but grow in the long term, with tonnage 39% higher in 2050 compared to 2016. This equates to approximately a 15% increase in national freight tonnage by 2035.

1.9.2.4 The long term growth in port traffic is driven by increases in unitised freight traffic, which compensates for decreases in other freight in the short term. Liquid bulk traffic (principally crude oil) has the largest forecasted decreases, continuing a historical trend. Similarly, general cargo is forecast to decrease, in line with the historic decreasing trend, which is likely driven by increased containerisation of goods. Dry bulk

traffic is forecast to have a relatively large decrease in the short term, driven primarily by demand for coal being projected to fall. In the long term, dry bulk traffic is forecast to increase, with other dry bulk, the largest category, continuing to increase as it has done historically (principally biomass). Motor vehicles, Twenty foot Equivalent Unit container forecast for Lift-on Lift-off, and the unit forecast for Ro-Ro are all forecast to grow strongly, driven by economic growth.

1.9.2.5 It is also noted that the Douglas Harbour Master Plan (2018) considers the potential for development of a day-call cruise ship berth, which might increase the number of cruise ship calls to the Isle of Man.[5]

1.9.2.6 Other future changes that might occur by 2035 could include the increased operation of autonomous vessels within UK waters. During the course of the NRA, autonomous or remote-controlled survey vessels were active within the Offshore Order Limits. No incidents were recorded in relation to autonomous or remote-controlled survey vessels. Regulatory bodies have insisted that any introduction of autonomous vessels into UK waters would have equivalent safety standards as conventional crewed vessels.

[5] https://www.gov.im/media/1360794/harbours-strategy-technical-information-gd2018-0012.pdf

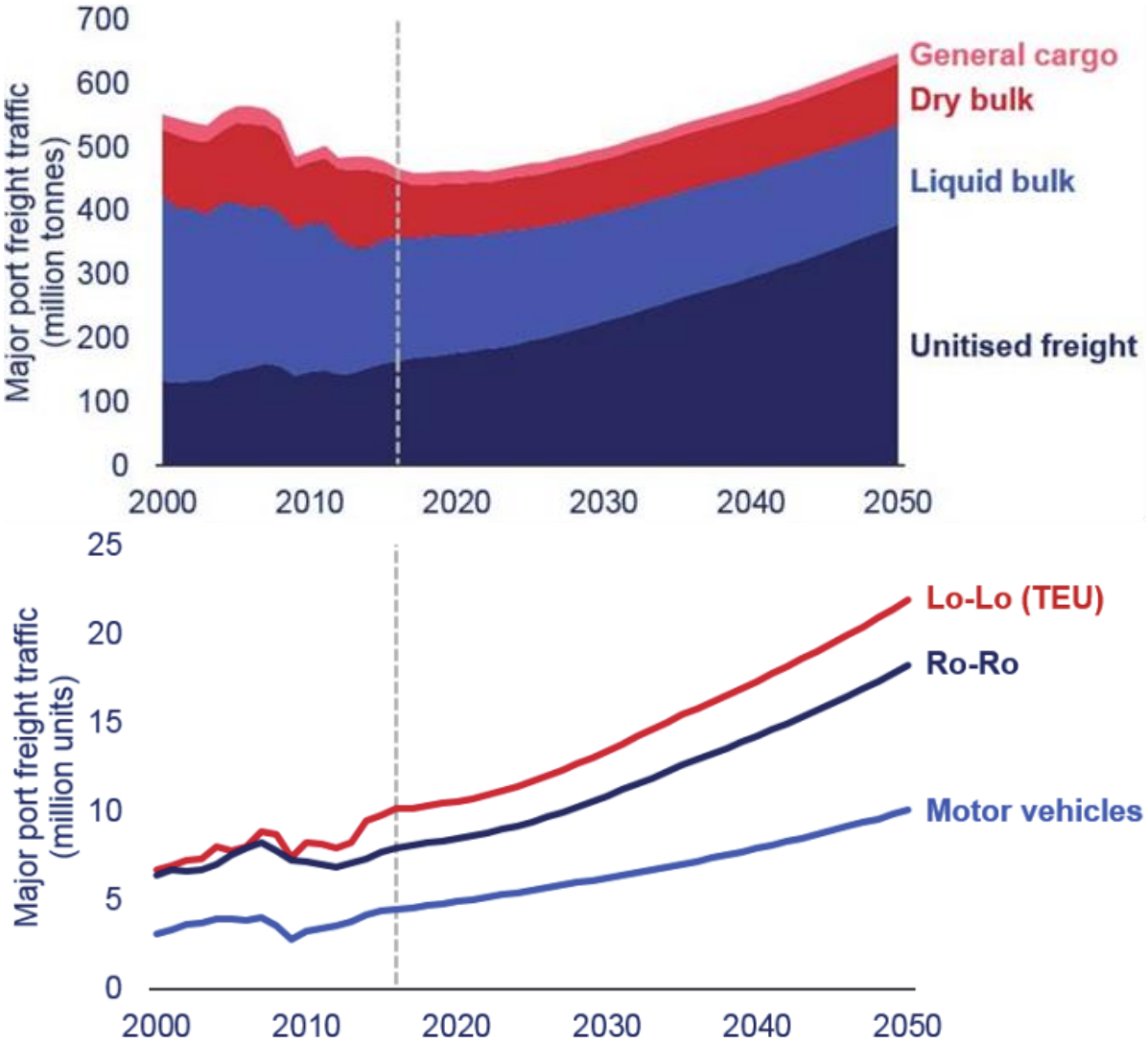

Figure 1.41: UK port freight projections (DfT, 2019)

1.9.3 Ferries

1.9.3.1 Freight and passenger ferries account for a large proportion of vessel movements within the study area. These routes are subject to change both in terms of schedule, vessels and the addition of new routes in order to meet market demand. For example, between the 2019 AIS analysis and the 2022 NRA, Stena replaced several of their ferries with the new E-flex class. During consultation, each operator was asked on any potential future changes, noting that these were subject to change.

1.9.3.2 Seatruck have showed significant growth in demand. In 2018, Seatruck reported a 30% increase in volumes since 2015, with a 10% increase in 2017 alone.[6] The increase in unaccompanied trailer volumes between 2007 and 2018 was reportedly 250%.[7] A €100 million investment by

[6] https://www.seatruckferries.com/news/seatruck-surge-continues

[7] https://www.seatruckferries.com/news/seatruck-boost-capacity-driver-shortages-fuel-unaccompanied-trailer-growth

Seatruck in 2018 was announced to increase capacity on the Warrenpoint to Heysham route by 30%.

1.9.3.3 Both of the IoMSPC vessels are 20 years old and will require replacement before 2035. The Ben-my-Chree will be replaced by the Manxman, introduced during 2023 Consultation during the CRNRA development, the IoMSPC Ben-my-Chree and Manxman have similar handling and endurance capabilities. Manannan is due for replacement before 31 December 2026[8]. This may be replaced by either a new fast craft or a fast conventional ferry.

1.9.3.4 Trends for passenger numbers are shown in **Figure 1.42**. Although there is variability in the passenger number counts, particularly observable during and following the COVID and Brexit 2020-2021 period. Predicting how trends may influence vessel schedules and routes is, however, full of uncertainty. Therefore, in the absence of definitive information, an assumption is made that vessel routes and schedules will be similar in 2035 as to the existing base case but with a likely overall increase in services.

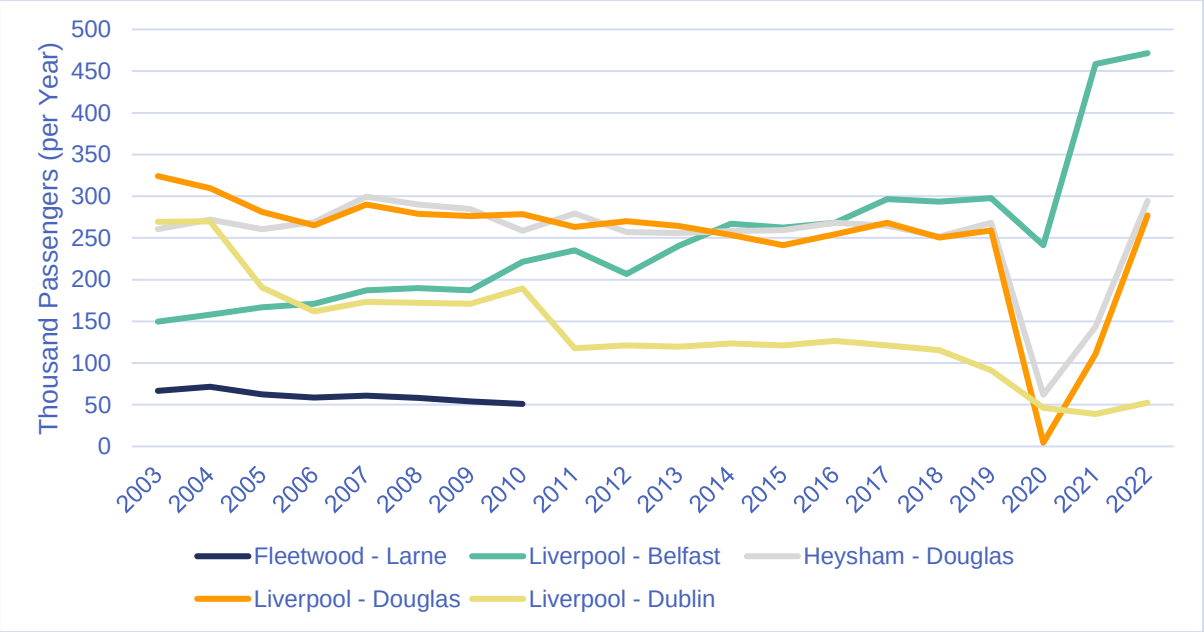

Figure 1.42: Passenger numbers (Fleetwood ferry service closed at the end of 2010). 2020/2021 figures heavily impacted by COVID-19

1.9.4 Oil and gas

1.9.4.1 The Offshore Order Limits covers or runs adjacent to the South Morecambe gas fields, the Calder gas field, the Millom gas field and the North Morecambe gas field. These fields are supported by offshore infrastructure including platforms, pipelines, cables and wells.

[8] https://www.tynwald.org.im/business/opqp/sittings/20182021/2019-GD-0009.pdf

1.9.4.2 Irish Sea oil and gas platforms are reaching end of life, and some platforms may be decommissioned and others may be repurposed for Carbon Capture and Storage.

1.9.4.3 The South Morecambe gas field includes the platforms DP6, DP8 and the Central Processing Complex (a hub complex made up of three platforms on jacket substructures (CPP1, AP1 and DP1) together with the associated cable, pipeline and umbilical infrastructure. Infrastructure associated with DP3 and DP4 are planned to be fully decommissioned and removed prior to 2026, whilst the surface structure platforms of DP3 and DP themselves were removed in 2023.

1.9.4.4 Future decommissioning operations of oil and gas platforms will require all production platform jackets and topsides to be removed, wells plugged and abandoned, and pipelines cleaned in line with an approved decommissioning programme for this infrastructure. A jack-up barge, or heavy lift vessel, drilling rig, and supported by service vessels would be required. The decommissioning programme for these works is currently unknown.

1.9.4.5 Calder CA1 is a small production platform with a single topside located 0.5 nm to the mid-west of the Offshore Order Limits. Decommissioning of CA1 is planned to commence in 2027, however some decommissioning activities could take place as early as Q3 2024 (Harbour Energy, 2024). Decommissioning activities are anticipated to conclude by Q4 2034, following the post-decommissioning surveys and debris clearance.

1.9.4.6 It is noted that there is a 500 m safety zone around platforms, and oil and gas operators have also noted 1 nm wide access paths for Platform Supply Vessels (PSV) and Emergency Rescue and Recovery Vessel (ERRV). The International Guidance for Offshore Marine Operations state that vessels should plan for vessel passing distance of at least 1 nm (1.8 km) from platform and operations, which might be in progress in its immediate vicinity.

1.9.4.7 Some oil and gas infrastructure in North Morecambe and South Morecambe gas fields are designated for carbon capture storage. An Agreement for Lease with The Crown Estate was awarded for the Gateway Gas Storage Facility in 2018; however, no development activities have taken place to date. The storage facility is located approximately 1 nm to the north east of the nearest point on the Offshore Order Limits.

1.9.4.8 Rights for the exploration and appraisal of potential carbon dioxide storage sites were granted by the North Sea Transition Authority in 2023. This area contains the Spirit Energy proposed Morecambe Net Zero Cluster Project which would provide a carbon storage and hydrogen production cluster if a permit is sought and granted, which may introduce additional new infrastructure; however, detailed plans for this potential project are not currently available.

1.9.4.9 It is expected that future vessel movements will continue for ERRVs during the oil and gas infrastructure decommissioning works, and there is a potential for operations of the PSVs and supporting service vessels

during active decommissioning works, with some service vessels associated with Carbon Capture and Storage if repurposing plans are progressed.

1.9.4.10 In 2020 ENI UK Limited were awarded a carbon dioxide appraisal and storage licence covering an area located within the Liverpool Bay area. Under the licence, Eni plans to reuse and repurpose depleted Hamilton, Hamilton North and Lennox fields and associated infrastructure. These fields are located 5.4 nm to the south of the Offshore Order Limits.

1.9.5 Fishing activity

1.9.5.1 Fishing within the Irish Sea is important for the UK and Isle of Man fisheries. There is limited information available for future fishing vessel activity on which reliable assumptions can be made as commercial fisheries patterns change and fluctuate based on a range of natural and management-controlled factors. Commercial fisheries chapter can also be found in Volume 2, Chapter 6: Commercial fisheries of the ES.

1.9.5.2 Within the study area, UK fisheries primarily target non-quota shellfish species, namely queen scallop, whelk, king scallop, and lobster. Therefore, fishing fleets are unlikely to be impacted by quota transfers following the UK's withdrawal from the European Union. Market changes have the potential to impact fishing activity in the study area, however, fishing activity in the area is not anticipated to change significantly, with both local and foreign vessels continuing fishing activity in the area.

1.9.6 Recreational activity

1.9.6.1 The RYA Water Sports Participation Survey conducted in 2019 found that the proportion of adults participating in boating activities has fluctuated between 6% and 8% between 2002 and 2018. Between 2008 and 2018, the proportion participating in yacht cruising, motor boating and power boating have remained consistent at 0.8%, 1.1% and 0.7% respectively.

1.9.6.2 Therefore, it is unlikely there will be a significant change in the number of recreational users due to macro trends.

1.9.7 Project vessel movements

1.9.7.1 Details of vessel numbers associated with the Transmission Assets are described in **section 1.6**. The operation and maintenance base for the project has not yet been determined; however, the MDS assumes that operation and maintenance vessel movements are up to 77 return trips per year.

1.9.7.2 Vessels, their requirements or minimum standards, and planned routing during construction and through-life operation and maintenance, will be contained with the VTMP (outline document reference: J21) (CoT69, **Table 1.10**). Major or significant maintenance, such as cable repair or reburials, will therefore be managed in line with company operating procedures and the further risk control measures as documented in

section 1.6.5, including the offshore operations and maintenance plan (outline document reference: J19) (CoT71, **Table 1.10**).

1.10 Transmission Assets: Identification of potential impacts

1.10.1 Impact identification

1.10.1.1 On the basis of the MDS as described in **section 1.6**, following consultation with stakeholders, analysis of data and a review of guidance, 11 potential impacts of the Transmission Assets were identified on shipping and navigation as documented in **Table 1.25**.

Table 1.25: Impact identification

ID	Potential Impact	Description	C*	O*	D*
1	Potential impact to recognised sea lanes essential to international navigation.	The Transmission Assets could impede access into major international sea lanes.	✔	✖	✔
2	Potential impact to commercial operators including strategic routes and lifeline ferries.	The Transmission Assets could necessitate deviations to commercial vessel and ferry routeing increasing distances resulting in additional cost and time for the passage.	✔	✖	✔
3	Potential impact to adverse weather vessel routeing.	The Transmission Assets could reduce the optionality of vessels to maintain a safe and comfortable heading to the adverse conditions.	✔	✖	✔
4	Potential impact on access to ports and harbours.	The Transmission Assets could impede the access for vessels into ports and harbours.	✔	✖	✔
5	Potential impact on emergency response capability due to increased incident rates and reduced access for SAR responders.	The Transmission Assets could adversely impact a vessels ability to respond to an emergency or inhibit search and rescue access for vessels or aircraft during an emergency.	✔	✖	✔
6	Potential impact on vessel to vessel collision risk.	The Transmission Assets could increase the risk of collision between navigating vessels, such as through the creation of choke points or increased vessel movements.	✔	✖	✔
7	Potential impact on marine navigation, communications, electromagnetic interference and radar and positioning systems.	The Transmission Assets infrastructure could interfere with shipboard or land-based equipment essential to communications or positioning.	✔	✔	✔
8	Potential impact to recreational craft passages and safety.	The Transmission Assets could interfere with the activities and safety of small craft navigation such as cruising.	✔	✖	✔
9	Potential impact on snagging risk to vessel anchors and fishing gear.	The presence of subsea cables could pose a hazard to vessels using anchors or fishing gear.	✔	✔	✔
10	Potential impact to oil and gas navigation, operations and safety.	The Transmission Assets could disrupt or impede oil and gas activities or safety of installations or vessels.	✔	✖	✔
11	Potential impact on under keel clearance.	The Transmission Assets could reduce the navigable depth of water, increasing the risk of grounding.	✔	✔	✔

* C= Construction, O= Operation and maintenance, D= Decommissioning

1.10.2 Impact to recognised sea lanes essential to international navigation

1.10.2.1 The Liverpool Bay TSS and Off Skerries TSS are charted IMO routeing measures and provide the only route for large ships into Liverpool so would meet the definitions as sea lanes essential to international navigation.

1.10.2.2 The Offshore Order Limits are located approximately 10.6 nm north of the Liverpool Bay TSS and 27 nm north east of the Off Skerries TSS, and the presence of a subsea cable is not expected to pose a major disruption to vessel navigation of sea lanes essential to international navigation. Short term and localised impacts on vessel routes could be experienced during construction, however TSSs are not expected to be impacted given the distance from the proposed project activities. The impact during the decommissioning phase is likely to be similar to that of the construction phase.

1.10.3 Impact to commercial vessel and ferry vessel routeing

1.10.3.1 During construction of the Transmission Assets, route deviations may be necessary. For regular runners such as ferries, this has the potential to result in an increase in costs or make schedules unviable. Furthermore, impacts on routeing may result in an increased risk of collision, which is considered in **section 1.10**. There are no anticipated changes in commercial ship routeing during the operation and maintenance phase as a result of the Transmission Assets.

1.10.3.2 During the construction phase, it is expected that commercial vessels may be required to reroute due to the presence of cable installation vessels and associated safe passing distances. The construction phase is expected to last for a period of up to 24 months. The impact during the decommissioning phase is likely to be similar or less than that of the construction phase.

1.10.3.3 During consultation with ferry operators several existing operational constraints were raised which are considered during the impact assessment where ferries may be required to reroute.

- Schedules: Existing schedules are developed to maintain consistent arrival and departure times per 24-hour period. This may not be achievable with increased transit time on some routes.
- Hours of Rest: The Maritime Labour Convention requires 10 hours of rest in any 24-hour period, in a maximum of two periods, of which at least six hours must be uninterrupted. Existing schedules enable this requirement to be met, but increased transit duration could make compliance with the convention impossible without compromising schedules or hiring additional crew.
- Turn-around times: Turn-around times within ports are constrained to enable safe loading and unloading. During busy periods, it may not be possible to reduce this duration to make up lost time due to increased transit duration.

- Berth/port constraints: Several ports have clear operational constraints where delays might result in missing crucial arrival windows.
  - Heysham – Has a tight entrance, which in combination with strong tides and wind conditions, makes berthing challenging. The harbour is also dredged but occasionally arrival at spring low tides is not achievable with sufficient under keel clearance, requiring amendments to timetables.
  - Douglas – Berthing in certain wind conditions is challenging and may result in cancellations.
  - Warrenpoint – Is tidally constrained.
  - Belfast – There is a limitation on berths given the number of vessels operating on a route.
  - Liverpool – Constrained by lock timings and other vessel movements.
  - Dublin – Proposed relocation of freight terminals further from the seaward entrance would increase transit duration.

1.10.3.4 Ferry route deviations are expected to be minimal during the construction phase due to the localised nature of cable laying activities. Once the export cables are installed, routes are expected to reflect those observed within the baseline analysis.

1.10.3.5 The assessment of impacts on ferry vessel routing has concluded that the Transmission Assets are not considered to cause any notable deviations, hence will not make existing services unviable in normal weather conditions.

1.10.4 Impact to adverse weather vessel routeing

1.10.4.1 The previous section has been limited to an assessment of routeing in normal weather conditions. Where significant adverse weather is encountered, vessels on timetabled routes, particularly ferries, take less direct routes to take advantage of lees from land masses, avoiding dangerous sea states or minimising the motions onboard. Without the ability to adequately account for adverse weather routeing, excessive roll would be experienced that can pose a hazard to the vessel cargo and passengers and reduce vessel control.

1.10.4.2 The subsea cables associated with the Transmission Assets are not expected to affect the routes taken by commercial vessels and ferries in adverse weather.

1.10.5 Impact to access of ports and harbours

1.10.5.1 The Irish Sea has a number of key ports and harbours (see **section 1.7.2**), the most notable of which in the vicinity of the Offshore Order Limits are Liverpool (18.2 nm south), Heysham (16.1 nm north east) and Douglas (12.3 nm north west). These ports all lay outside of the study area. The installation of the offshore export cables could

potentially reduce the accessibility of these ports and harbours which could theoretically impact on their operations. Subsea cables will be below the sea surface once installed so it is only during cable laying and repair/maintenance works that disruptions may occur. The cable route does not enter port areas and therefore disruption of direct access to ports is not expected outside of project vessel movements. The base ports for construction and operation and maintenance phases are not yet established.

1.10.5.2 As shown in the data plots shown in **Figure 1.15**, **Figure 1.16**, and **Figure 1.17**, vessel pass to and from these ports with ample sea room to navigate on approach. During cable activities (such as installation, survey or repair, reburial and maintenance) the deviation of vessel routes due to a project vessel will be short term temporary and minor – typically limited to the advisory passing distance or exclusion zone (if required and applied) (CoT66, **Table 1.10**). Vessels entering ports will have nil or negligible impact caused by cable activities arising during each phase and therefore no impact is anticipated.

1.10.6 Impact to emergency response capability due to increased incident rates and reduced access for SAR responders

1.10.6.1 Impacts to emergency response capability is identifiable through potential influences to frequency (number of emergency responses) and consequence (reduced access for SAR operations). During construction, the total project vessel numbers on site and number of return trips is higher than the throughout operation and maintenance (decommissioning is assumed to be similar to construction) and the potential for increase of incident rates is therefore higher. However, the volume of construction required for subsea export cables is low when compared to offshore wind farm WTG installation. The maximum number of Transmission Assets project vessels on site at one time is 30 with a maximum of 278 return trips in one year (**section 1.6.3**). This represents a very small proportion of the overall traffic volume in the study area (comprising 8,590 passing through the Offshore Order Limits and 17,596 passing through the study area in 2022) and the overall increase in incident rates is therefore expected to be similarly very small.

1.10.6.2 During operation and maintenance the incident rates can also increase from cable snagging from small craft or fishing vessels (as identified within the incident analysis in **section 1.8.3**, this can result in capsize and potentially require SAR operations. However, the cable will be buried where possible and cable protection will be used where burial is not possible (see **section 1.6.2**). Further applied mitigations defined in **Table 1.10** also contribute to minimising impact to incident occurrence, and therefore SAR requirements, and include risk controls such as a CBRA as part of the CSIP (CoT45), Notice to Mariners (CoT112), site marking and charting (CoT59), fisheries liaison officer (CoT52), fisheries liaison and coexistence plans as part of EMPs (CoT65). In the unlikely event of an incident on a vessel, SAR assets are required to

access the incident location or surrounding area without risk to themselves. The Transmission Assets infrastructure consists of subsea cables only which are highly unlikely to have an impact on SAR approaches and access to a SAR incident.

1.10.6.3 A marginal additional SAR incident rate may arise for project vessels during localised cable activities; however, mitigations defined in **section 1.6.5** and as listed above would be expected to minimise and potential impedance of SAR effectiveness and therefore result in minimal overall impact to emergency response and SAR capability.

1.10.7 Impact on vessel to vessel collision risk

1.10.7.1 The presence of the Transmission Assets installation vessels during the construction phase could potentially alter existing shipping routes and create pinch points or hot spots where vessels may encounter one another at a closer distance. This has the potential to increase the risk of collision between vessels. The impact during the decommissioning phase is likely to be similar to that of the construction phase and once the export cables are installed on the sea floor there is not expected to be any notable impact to collision risk.

Commercial vessels and ferries

1.10.7.2 A key factor in the risk of collision is the frequency at which two vessels would meet in the same area at the same time.

1.10.7.3 During the construction phase, commercial vessels may need to reroute to maintain a safe passing distance from any construction activities. This has potential to result in an increase to collision risk where searoom is reduced due to project vessel activity. The potential risk is not anticipated to increase greatly due to the localised activities associated with each phase of the Transmission Assets.

Project vessels

1.10.7.4 The routes and base port of project vessels is not known at present; however, risk controls have been adopted to minimise the risk of collision. These include safety zones (document reference: J33) (CoT66, **Table 1.10**) and an outline VTMP (CoT69).

Recreational vessels

1.10.7.5 The presence of the offshore export cables is not expected to greatly impact the routeing of recreational vessels during the operational phase, as buried cables would not be expected to impact surface navigation. Vessel traffic in the near shore areas on approach to cable landfall indicate that recreational traffic in **Figure 1.22** is relatively low volume and commitments made to minimise reduction in under keel clearance (as part of the CSIP in CoT45, **Table 1.10**).

1.10.7.6 During the construction phase, recreational vessels may need to alter their route to maintain a safe passing distance from any construction activities. This is unlikely to result in a notable increases in collision risk

due to the sea room available and minimal deviation required for cable activities.

Fishing vessels

1.10.7.7 The fishing activity presented in **Figure 1.23** and **Figure 1.24** showed that fishing is seasonal and has year on year variability, but is observed to take place within the Offshore Order Limits, particularly scallop fishing was observed in west portion of the Offshore Order Limits, in the vicinity of the Morgan Offshore Wind Project: Generation Assets.

1.10.7.8 During the construction phase, transiting fishing vessels may need to alter their route to maintain a safe passing distance from any construction activities; however, route deviation is anticipated to be minimal in line with safety zones, where applicable, with an active guard vessel via the safety zone statement (document reference: J33) (CoT66, **Table 1.10**). Similarly, fishing vessels engaged in fishing activity may be required to adjust where they fish to maintain a safe passing distance from any construction vessels. These factors have the potential to result in a minimal increase to collision risk. Risk controls creating awareness of operations and minimisation of disruptions contribute to the management of risk. These include commitments to the outline VTMP (CoT69), Fisheries Liaison Officer (CoT52) and minimisation of disruption (CoT61).

1.10.8 Impact on marine navigation, communications, electromagnetic interference and radar and positioning systems

1.10.8.1 Installed subsea cables are known to have effects on vessel compasses used for vessel navigation due to electromagnetic interference; however, trials indicate this may be mitigated (MCA and QinetiQ, 2004). These are potentially impacted by electromagnetic interference from the cables. The degree of this impact is related to the depth of water, cable design and alignment with the earth's magnetic field.

1.10.8.2 Subsea cables of the Transmission Assets will be buried wherever practical and cable protection applied where not possible (CoT54), such as cable and pipeline crossings or ground conditions. The CSIP (CoT45, **Table 1.10**) includes details of cable burial depths, cable protection, cable monitoring, and a cable layout plan which ensures safe navigation is not compromised. With these mitigations in place, particularly cable burial, no impact is anticipated.

1.10.9 Impact to recreational craft passages and safety

1.10.9.1 There are no anticipated changes in small craft routeing during the operation and maintenance phase as a result of the Transmission Assets.

1.10.9.2 During the construction phase, small craft may be required to alter their route due to the presence of installation vessels and associated safe

passing distances. The construction phase is expected to last for a period of up to 24 months. The impact during the decommissioning phase is likely to be similar or less than that of the construction phase and there is not expected to be any notable impact to recreational craft during operation due to the fact that routeing will remain unchanged.

1.10.9.3 The recreational vessel transits presented in **Figure 1.22** identified relatively few routes within the study area, with the majority of the activity focused around Douglas and Morecambe Bay.

1.10.10 Impact on snagging risk to vessel anchors and fishing gear

1.10.10.1 The subsea cables associated with the Transmission Assets introduce a risk of snagging, either with vessel anchors or fishing gear. The potential for impact is present through construction, operation and decommissioning phases.

1.10.10.2 The cables are intended to be buried to a minimum depth of 0.5 m to mitigate the risk of snagging. Cables will be buried where possible (CoT54) and where burial is not possible, cable protection may be required up to a height of 2.8 m. Burial depths and cable protection will be informed by the CBRA and set out in the CSIP (CoT45, **Table 1.10**) which, in turn, will be monitored in line with an offshore operations and maintenance plan (CoT71).

Anchor interaction

1.10.10.3 Analysis of anchoring activity is contained within **section 1.8**. There are no designated or customary anchorages in the study area. Commercial ships may choose to deploy an anchor in an emergency, and whilst uncommon, this could result in cable snagging.

1.10.10.4 Cable burial is planned where possible, with a target depth of between 0.5 m and 3.0 m as determined by a CBRA included as part of the CSIP (CoT45, **Table 1.10**). Anchor interaction with cable protection may be more likely; however, there are no designated anchorage areas near to the Offshore Order Limits and cable protection will only be used where burial is not possible (CoT54). Parameters of cable protection will be similarly informed by the CBRA and marked on the navigational charts (CoT59). Anchor interaction with the subsea cables are therefore unlikely to result in impact to snagging.

Fishing gear snagging

1.10.10.5 As previously discussed in **section 1.10.7.7**, the fishing vessel tracks presented in **Figure 1.23** and **Figure 1.24** highlighted that fishing activity is variable but is observed to take place within the Offshore Order Limits, particularly scallop fishing near the west portion of the Offshore Order Limits. Fishing by both static and mobile gears is understood to take place throughout the study area although minimal to no commercial fishing activity was recorded within the data near the export cable landfall site.

1.10.10.6 As with anchor interaction above, the impact on snagging risk as a result of fishing gear interaction is minimised through cable burial where possible (CoT54) and the CBRA included as part of the CSIP (CoT45, **Table 1.10**). The CBRA will take into account fishing activity, and burial will mitigate the risk of fishing gear snagging the cable. Parameters of cable protection will be similarly informed by the CBRA to ensure, where protection is required, that snagging risk is adequately addressed for the types of gear used in the local area. Furthermore, a Transmission Assets will have a fisheries liaison officer (CoT52), outline fisheries liaison and coexistence plans (CoT61), and cables will be marked on the navigational charts (CoT59). Snagging risk for small fishing vessels carries the potential for serious consequences, with risk of capsize and fatality (incident analysis in **section 1.8.3**). Although snagging carries a high potential for a serious consequence to small vessels, the applied mitigations will greatly reduce the likelihood of a snagging incident occurring (predominantly through burial and cable protection). The subsea cables would therefore have a minimal impact to snagging risk.

1.10.11 Impact to oil and gas navigation, operations, safety and assets

1.10.11.1 The Transmission Assets are located close to several oil and gas fields (see existing marine environment **Figure 1.3** and existing oil and gas activities **section 1.7.2**). As discussed in **section 1.9.4**, Irish Sea oil and gas platforms are progressively reaching end of life and it is understood that some platforms may be decommissioned or repurposed and these activities may be concurrent Transmission Assets construction or operation and maintenance phases.

1.10.11.2 During the construction phase, project vessels associated with the installation of the subsea cables have potential to displace oil and gas support vessels to ensure a safe passing distance is maintained. This may lead to an increased risk of collision with other vessels, or causing other vessels to navigate closer to oil and gas assets. The decommissioning phase of the project is predicted to have a similar or lesser impact to oil and gas vessels. The applied mitigations in **Table 1.10** such as Notice to Mariners (CoT112), VTMP (CoT69, outline document reference: J21), advisory passing distance with guard vessel or safety zone statement (CoT66, document reference: J33), CSIP (CoT45, outline document reference: J15) and CMS (CoT49) will all contribute to awareness and minimisation of oil and gas impacts to navigation, operations and safety of infrastructure. The impact to oil and gas operations is therefore minimal and of short duration during cable laying and seabed preparation activities.

1.10.11.3 During the operation and maintenance phase the subsea cables will typically have lower impact to the oil and gas activities than during the construction phase with respect to shipping and navigation (subsea asset interactions are discussed within the Environmental Statement Volume 2, Chapter 9: Other sea users of the ES). Routine inspection or temporary cable repair works are expected to have a similar or lower

short term impact as construction activities and are anticipated to be managed through the application of the offshore operations and maintenance plan (CoT71, outline document reference: J19).

1.10.12 Impact on under keel clearance

1.10.12.1 The Transmission Assets could increase the risk of grounding by reducing the depth of water due to subsea cable protection.

1.10.12.2 Where the offshore export cables cannot be sufficiently buried, cable protection may be employed which could reduce the depth of water. Guidance from the MCA contained in MGN 654 states: '*the MCA would be willing to accept up to 5% reduction in surrounding charted depths referenced to Chart Datum, unless developers are able to demonstrate that any identified risks to any vessel type are satisfactorily mitigated*'. This is reflected in the CSIP (CoT45, **Table 1.10**, outline document reference: J15) and associated commitment made by the Applicants.

1.10.12.3 For the majority of the offshore export cable corridor route, the depth of water is greater than 10 m and a maximum height of 2.0 or 2.8 m protection (as per the MDS depending on whether ground conditions or crossing respectively, described in **section 1.6.2**) would maintain sufficient depth of water for all vessel draughts recorded in the AIS data. Recreational activity near to shore in water depths less than 10 m appears to be low in the vicinity of the transmission cable route as indicated in the RYA boating intensity 2019 data. The impact to under keel clearance during all phases is therefore nil to minimal.

1.11 Transmission Assets NRA

1.11.1 Introduction

1.11.1.1 The NRA has been produced in accordance with MGN 654 and follows the IMO's FSA (see **section 1.11.1**). MGN654 requires that the NRA contain a log of shipping and navigation hazards caused or changed by the project. This is to include an assessment of risk with applied risk controls in place. Applied those controls are those designed in and included in the project which are commonly accepted as industry good practice (**section 1.6.5**). This then also includes an assessment of risk for the project with possible additional risk controls in place if they are warranted (**section 1.11.6**).

1.11.1.2 The development of the NRA, hazard log and associated risk scoring process is based on the following data, analysis, modelling and expertise of the project team.

- Project description and MDS (see **section 1.6**).
- Overview of baseline environment (see **section 1.7**).
- Description of existing marine activities (see **section 1.8**).
- Future case vessel traffic profiles (see **section 1.9**).
- Potential impact assessment (see **section 1.10**).

1.11.1.3 In addition to the above, a key component of the NRA is engagement with regulators and local stakeholders to confirm baseline shipping and navigation characteristics and elicit judgement on the levels of navigation risk with the project in place (**section 1.5**).

1.11.1.4 The risk assessment methodology employed for the project is the IALA SIRA process, which follows both the MCA MGN 654 guidance and is also endorsed by the IMO via SN.1/Circ.296 in December 2010. The following sections outline:

- the overarching methodology of the risk assessment;
- the process of hazard identification;
- risk control measures;
- results of the assessment of risk with the applied risk controls in place; and
- possible additional risk control measures if required to reduce risk to acceptable levels.

1.11.1.5 The risk assessment project methodology follows the FSA and is based on the principles set out in IALA Guidelines 1018 and 1138 which are endorsed by the IMO in SN.1/Circ.296 and the IMO's FSA and is as shown in **Figure 1.1**. Navigation hazards are identified through, consultation and data analysis, before being assessed in terms of their likelihood and consequence. A risk matrix is then utilised to identify the significance of each hazard with possible additional risk controls identified where necessary based on the resultant risk score to reduce the risks to acceptable levels.

1.11.1.6 A description of the FSA process is as follows.

1. FSA Step 1: Hazard Identification: The project team identifies navigation hazards related to defined and agreed assessment parameters, such as geographic areas, marine operation, or vessel type. This is achieved using a suite of quantitative (e.g. statistical vessel traffic analysis) and qualitative (e.g. consultation with stakeholders) techniques which enables an evidentially robust identification of navigation hazards.
2. FSA Step 2: Risk Analysis: A detailed investigation of the causes, including the initiating events, and consequences of the hazards identified in Step 1 is undertaken. This is completed using a risk matrix, and enables ranking of hazards based on navigation risk, and a determination of hazard acceptability tolerability. This process allows attention to be focused upon higher-risk hazards enabling identification and evaluation of factors which influence the level of risk.
3. FSA Step 3 and 4: Risk Controls: The identification of existing risk controls measures (which are assumed to be included in the assessment of navigation risk), and the identification of possible additional risk controls, not currently in place for the assessment parameters is undertaken. Possible additional risk control measures are identified based on prioritising mitigation of higher-

risk hazards. During this stage risk control measures may be grouped into a defined and considered risk mitigation strategy.

4. FSA Step 5: Findings: The assessment findings are developed and documented into a technical report and then presented to the relevant decision makers in an auditable and traceable manner. The findings are based upon a comparison and a ranking of all hazards and their underlying causes; the comparison and ranking of possible additional risk control options as a function of associated costs and benefits; and the identification of those options which mitigate hazards to acceptable or ALARP.

1.11.2 Scoring criteria

1.11.2.1 Having identified all relevant impacts and hazards as a result of the Transmission Assets, a hazard log is constructed as described in MGN 654 Annex 1 (Appendix D). Whilst there is no generally accepted standard for risk matrices, the matrix outlined in this section is proposed as suitable for the project as it meets IMO and IALA guidance and is consistent with industry best practice.

1.11.2.2 Each hazard is scored based on its predicted frequency of occurrence (**Table 1.26**) and consequence (**Table 1.27**) for two scenarios, the 'most likely' and 'worst credible'. Severity of consequence with each hazard under both scenarios is considered in terms of damage to:

- people – hazards may result in injuries or fatalities;
- property – hazards may result in damage or loss of vessels or subsea cables;
- environment – hazards may result in environmental pollution such as oil spills; and
- commercial and reputation – hazards may result in loss of economic output, impact on vessel routes, interruption of supply/generation capacity and adverse media coverage.

1.11.2.3 The hazards were scored internally by the NASH risk assessment team including a master mariner familiar with the Transmission Assets and with prior involvement in the CRNRA. The Hazard scoring was based on both the vessel data analysed, historic incident data for the area and industry experience. The key highest scoring hazards were discussed with relevant stakeholders during the consultation process and feedback was used to ensure the scores adequately reflected the severity of each hazard.

1.11.2.4 This NRA assumes that vessels will be compliant with international conventions (e.g. COLREGS and STCW), and National regulations and Guidance (e.g. UK Merchant Shipping Act 1995, and MCA MGNs).

Table 1.26: Frequency of occurrence criteria

Rank	Title	Description	Definition
1	Remote	Remote probability of occurrence at project site and few examples in wider industry.	<1 occurrence per 10,000 years
2	Extremely unlikely	Extremely unlikely to occur at project site and has rarely occurred in wider industry.	1 per 100 – 10,000 years
3	Unlikely	Unlikely to occur at project site during project lifecycle and has occurred at other offshore wind farms.	1 per 10 – 100 years
4	Reasonably probable	May occur once or more during offshore wind farm lifecycle.	1 per 1 – 10 years
5	Frequent	Likely to occur multiple times during offshore wind farm lifecycle.	Yearly

Table 1.27: Severity of consequence categories and criteria

Rank	Description	People	Property	Environment[9]	Business
1	Negligible	Minor injury	Less than £10,000	Minor spill no assistance required	Minimal impact on activities.
2	Minor	Multiple minor injuries	£10,000-£100,000	Tier 1 local assistance required	Local negative publicity. Short term loss of revenue or interruption of services to ports/offshore wind farm/oil and gas/ferries and other marine users.
3	Moderate	Multiple major injuries	£100,000-£1 million	Tier 2 limited external assistance required	Widespread negative publicity. Temporary suspension of activities to ports/offshore wind farm/oil and gas/ferries and other marine users.
4	Serious	Fatality	£1 million-£10 million	Tier 2 regional assistance required	National negative publicity. Prolonged closure or restrictions to ports/offshore wind farm/oil and gas/ferries and other marine users.

[9] In the context of oil spills, tier systems refer to a classification framework used to categorise and respond to different levels of oil spill incidents based on their severity and complexity. Typically, these tier systems are designed to aid emergency response teams in deploying appropriate resources and measures to contain and mitigate the environmental impacts of the spill. The tier systems used to categorise oil spills are not related to those defined within the cumulative assessment tiers.

Rank	Description	People	Property	Environment[9]	Business
5	Major	Multiple fatalities	>£10 million	Tier 3 national/international assistance required	International negative publicity. Serious and long term disruption to ports/offshore wind farm/oil and gas/ferries and other marine users.

1.11.3 Risk matrix

1.11.3.1 The combination of frequency and consequence scores for each scenario are then combined to produce an overall risk score, which is used to assign hazard risk rating in the project risk matrix (**Table 1.28**). The methodology utilised was discussed with stakeholders during consultation and is consistent with other NRAs submitted for other offshore developments in the UK.

1.11.3.2 The assessment of risk is calculated eight times for each identified hazard; four times for the "realistic most likely" occurrence for each consequence category and four times for the "realistic worst credible" outcome for each consequence category. An overall risk score is then calculated using an averaging function weighted to the highest risk score for the "realistic most likely" and the highest risk score for the "realistic worst credible". The weighted averaging calculation is an average of:

- the average of all the "realistic most likely" risk scores;
- the average of all the "realistic worst credible" risk scores;
- highest individual score from the "realistic most likely" scores; and
- highest individual score from the "realistic worst credible" scores.

1.11.3.3 The tolerability of these hazard risk scores with regards to significance and acceptability with or without further action are shown in **Table 1.29**.

1.11.3.4 MGN 654 Annex 1 (MCA, 2021b) notes that '*There is no generally accepted standard for a risk matrix therefore the Applicants will be expected to define the following as appropriate to the OREI development.'*

- *Likelihood/frequency of incident scenarios.*
- *Severity/consequence of incident scenarios.*
- *Risk matrix.*
- *Tolerability matrix scores.* '

1.11.3.5 The assessment criteria, including frequency and consequence bandings, are consistent with previous NRAs submitted and approved by the MCA. Furthermore, reference has been made to Intolerable/ALARP/Negligible bandings defined in IMO FSA studies, such as the FSA for RoPax Vessels (MSC 85 INF3). For example, a fatality every 10 years or multiple fatalities every 100 years within the

RoPax FSA was defined as the threshold between Unacceptable and ALARP, this translates to a score between 12-16 and 10-15 respectively on the risk matrix. Similarly, the same study determined that a fatality every 1,000 years, or multiple fatalities every 10,000 years was defined as the threshold between ALARP and Negligible, this translates to a score between 4-8 and 5-10 respectively on the risk matrix. The risk matrix presented in **Table 1.28** is therefore consistent with the FSA for RoPax Vessels (MSC 85 INF3).

1.11.3.6 Hazards are then defined as either Broadly Acceptable, with existing mitigation, or Unacceptable. MGN 654 Annex 1 states that where risks are scored as Medium Risk, "Further risk control options must be considered to the point where further risk control is grossly disproportionate (i.e. the ALARP principle) and an ALARP justification and declaration made." Therefore, hazards scored as Medium Risk can only be Tolerable if ALARP is met.

Table 1.28: Risk matrix

Risk Matrix							
Severity of consequences	Major	5	5	10	15	20	25
	Serious	4	4	8	12	16	20
	Moderate	3	3	6	9	12	15
	Minor	2	2	4	6	8	10
	Negligible	1	1	2	3	4	5
			1	2	3	4	5
			Remote	Extremely unlikely	Unlikely	Reasonably probable	Frequent
			Likelihood of Occurrence				

Table 1.29: Tolerability and risk ratings

Hazard Score	Tolerability	Description
Negligible Risk (≤4)	Broadly Acceptable	Generally regarded as not significant and adequately mitigated. Additional risk reduction should be implemented if reasonably practicable and proportionate.
Low Risk (>4 and ≤6)		
Medium Risk (>6 and ≤12)	Tolerable if ALARP	Generally regarded as within a zone where the risk may be tolerable in consideration of the project. Requirement to properly assess risks, regularly review and implement risk controls to maintain risks to within ALARP where possible.
High Risk (>12 and ≤20)	Unacceptable	Generally regarded as significant and unacceptable for project to proceed without further risk controls.
Extreme Risk (<20)		

1.11.4 Hazard identification

1.11.4.1 An NRA should consider all identified hazards of the project on shipping and navigation receptors. In developing the hazard log, consideration was given to project phases, areas, hazard types and vessel types.

1.11.4.2 Nine hazard types were identified, of which five were scoped out. **Table 1.30** presents the nine hazards, whether they were scoped in/out, and if scoped out, an explanation.

Table 1.30: Identified hazards

Hazard type	Definition	Scoped in/out	Explanation
Collision	Collision between two vessels underway (also includes striking of an anchored or moored vessel).	In	N/A
Grounding	Vessel makes contact with the seabed/shoreline or underwater assets.	In	N/A
Snagging	Vessel fishing gear or anchor snags a sub-surface hazard (e.g. export cable).	In	N/A
Allision	Vessel makes contact with Fixed or Floating Object (e.g. oil and gas platform).	In	N/A
Foundering/ capsize	Vessel sinks or grounds caused by loss of stability, buoyancy or water tight integrity (e.g. may be caused by severe adverse weather or mechanical failure).	Out	The presence of subsea cables is not deemed to have any impact on the likeliness that a vessel will founder or capsize, as this is typically caused by other external factors (for example machinery failure).
Personnel	Incident to personnel associated with navigation related activities - e.g. pilot/crew/passenger boarding, mooring a vessel, tender operations, etc.	Out	The presence of subsea cables is not deemed to have any impact on the probability of a personal injury to personnel. Pilot boarding and port operations do not occur in proximity to the Transmission Assets.
Wake wash	Vessel wave wake wash effect on other vessels.	Out	The presence of subsea cables is not deemed to increase the likeliness of wake wash effect as this is directly caused by vessels themselves.
Fire/explosion	Fire or explosion aboard a vessel.	Out	The presence of subsea cables is not deemed to affect the risk of fire occurring on board a vessel.
Vessel motions	Project puts vessels on routes which exposes them to increased risks associated with vessel motions such as cargo shift and injuries.	Out	The presence of subsea cables is not deemed to impact vessel motions.

1.11.4.3 The vessel types in **Table 1.31** were identified, in order to assess vessels according to their size and/or activities. For example, incidents involving small craft may have larger consequences than the same incident involving a large commercial ship.

1.11.4.4 The study area has been considered in three separate sub-areas covering the entirety of the study area (as illustrated in **Figure 1.43**) to assist assessment of the identified hazards. Sub-areas have been considered to increases the granularity of the risk assessment by

allowing distinction in differences in the risk profile between areas and to isolate specific risks unique to one area, where this is necessary.

- Area 1: the Transmission Assets between landfall and Morecambe Offshore Windfarm: Generation Assets array area.
- Area 2: the Transmission Assets in proximity to Morecambe Offshore Windfarm: Generation Assets array area.
- Area 3: the Transmission Assets between Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets.

1.11.4.5 The NRA considers the construction (C), operation and maintenance (O), and decommissioning (D) phases of the Transmission Assets. To reflect the similarity of the impacts during construction and decommissioning, these two categories were combined in all cases. Similarly, where hazards were deemed to have similar risk profile, causes and consequences between construction/decommissioning and operation and maintenance phases, they were combined into a single hazard. The riskier scenario was then used to assess that hazard's risk. Due to the Transmission Assets being subsea cables only and cable cables will be buried where possible, the construction and decommissioning phases are considered to be the risker scenarios, due to the fact that during operation and maintenance phase the cables will be buried and project vessel activity will be lower.

Table 1.31: NRA vessel types

ID	Description	Definition
1	Ferry or Passenger Vessel	Passenger Ferry Freight Ferry Cruise Ship
2	Cargo Vessel or Tanker	Cargo (Container, Bulk, Reefer, General etc.) Tanker (Oil, Chemical etc.)
3	Tug and Service Vessels	Tugs Offshore Supply Vessels Standby Rescue Vessels Pilot Boats Non-Project CTVs Other Service Vessels
4	Fishing	Trawlers Fishing Boats
5	Recreational	Yachts Pleasure Boats
6	Small Project Vessels	CTVs Survey Vessels Workboats
7	Large Project Vessels	Cable Layer Heavy Lift Vessels

1.11.4.6 Based on the phases, vessel types, hazard types and hazard areas of the Transmission Assets, a total of 16 hazards were identified (see **Table 1.32** and **Appendix A**).

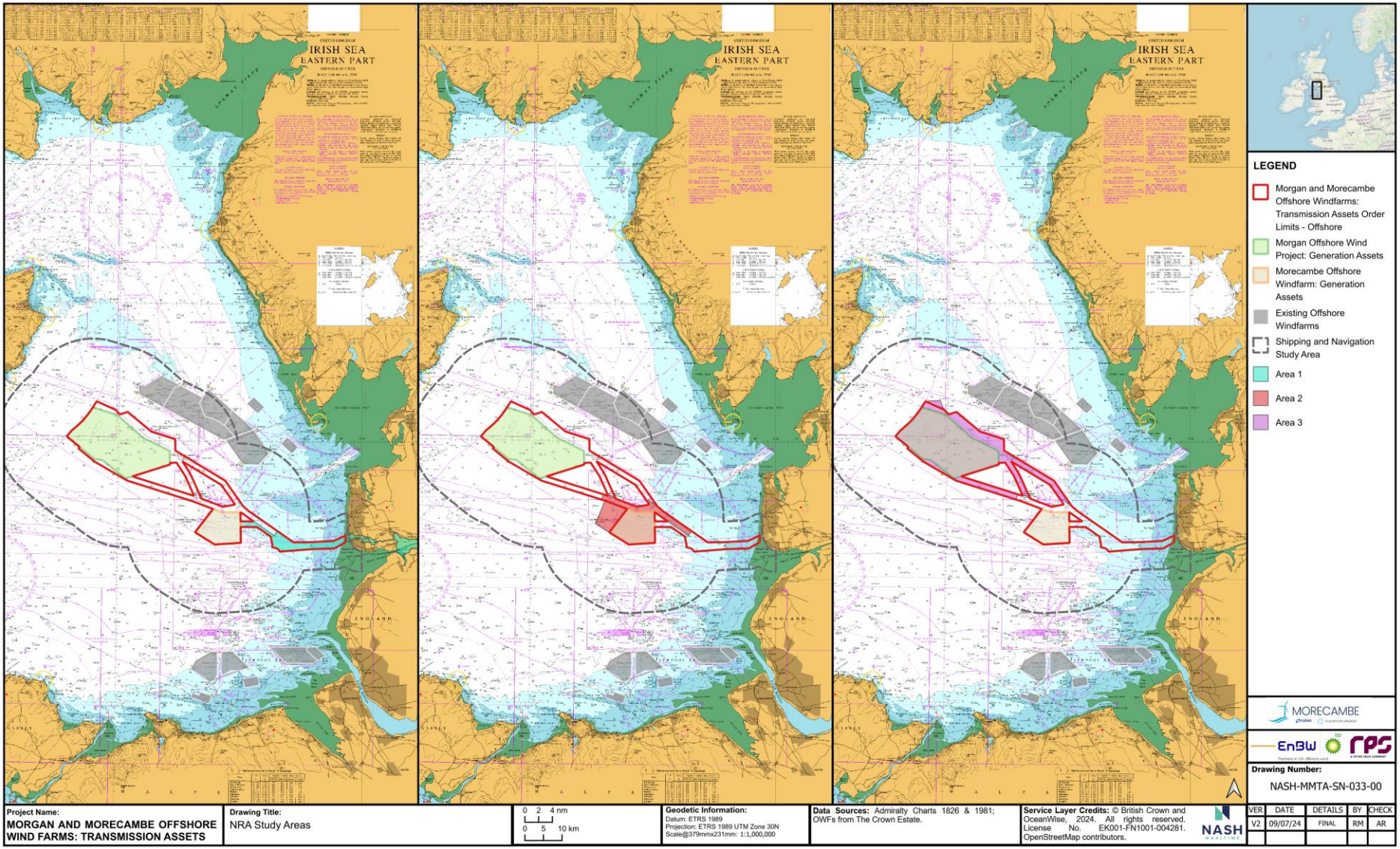

Figure 1.43: Three sub-areas covering the entirely of the study area considered within the Transmission Assets NRA

1.11.5 Transmission Assets results

Risk assessment summary

1.11.5.1 The results of the NRA, based on the approach described above shows that in total:

- no hazards were assessed as High Risk – Unacceptable;
- four hazards were assessed as Medium Risk – Tolerable (if ALARP);
- seven hazards were assessed as Low Risk – Broadly Acceptable; and
- five hazards were assessed as Negligible Risk – Broadly Acceptable.

1.11.5.2 The full hazard log is available in **Appendix A**. **Table 1.32** presents a summary of all 16 hazards identified in the NRA in order of highest to lowest risk score.

Table 1.32: Hazard scores across all identified risks

ID	Rank	Phase	Area	Hazard title	Score	Rating
3	1	C/O/D	1, 2 & 3	Collision - Ferry/Passenger or Cargo/Tanker in collision with (ICW) Small Craft	7.3	Medium Risk - Tolerable (if ALARP)
4	2	C/O/D	1, 2 & 3	Collision - Small Craft ICW. Small Craft	6.6	Medium Risk - Tolerable (if ALARP)
8	2	C/O/D	1, 2 & 3	Snagging - Fishing	6.6	Medium Risk - Tolerable (if ALARP)
15	4	C/O/D	2 & 3	Allision (O&G) - Ferry/Passenger or Cargo/Tanker or Large Project Vessel	6.3	Medium Risk - Tolerable (if ALARP)
10	5	C/O/D	1, 2 & 3	Snagging - Cargo/Tanker or Ferry/Passenger	5.9	Low Risk - Broadly Acceptable
1	6	C/O/D	1, 2 & 3	Collision - Ferry/Passenger ICW. Cargo/Tanker or Ferry/Passenger	5.3	Low Risk - Broadly Acceptable
5	6	C/O/D	1, 2 & 3	Collision - Large Project Vessel ICW. Ferry/Passenger	5.3	Low Risk - Broadly Acceptable
2	8	C/O/D	1, 2 & 3	Collision - Cargo/Tanker ICW. Cargo/Tanker	5.1	Low Risk - Broadly Acceptable
6	8	C/O/D	1, 2 & 3	Collision - Large Project Vessel ICW. Cargo/Tanker	5.1	Low Risk - Broadly Acceptable
16	8	C/O/D	2 & 3	Allision (O&G) - Small craft	5.1	Low Risk - Broadly Acceptable
7	11	C/O/D	1, 2 & 3	Collision - Large Project Vessel ICW. Small Craft	4.9	Low Risk - Broadly Acceptable

ID	Rank	Phase	Area	Hazard title	Score	Rating
14	12	C/O/D	1	Grounding - Ferry/Passenger or Cargo/Tanker	3.8	Negligible Risk - Broadly Acceptable
12	13	C/O/D	1	Grounding - Small Craft	3.8	Negligible Risk - Broadly Acceptable
13	13	C/O/D	1	Grounding - Large or Small Project Vessel	3.8	Negligible Risk - Broadly Acceptable
9	15	C/O/D	1, 2 & 3	Snagging - Recreational or Tug/Service	3.6	Negligible Risk - Broadly Acceptable
11	15	C/O/D	1, 2 & 3	Snagging - Large or Small Project Vessel	3.6	Negligible Risk - Broadly Acceptable

Risk of collision

1.11.5.3 **Table 1.33** presents the seven collision hazards identified and their associated hazards scores and ratings.

Table 1.33: Collision hazards, scores and ratings

ID	Rank	Phase	Area	Hazard Title	Score	Rating
3	1	C/O/D	1, 2 & 3	Collision - Ferry/Passenger or Cargo/Tanker ICW. Small Craft	7.3	Medium Risk - Tolerable (if ALARP)
4	2	C/O/D	1, 2 & 3	Collision - Small Craft ICW. Small Craft	6.6	Medium Risk - Tolerable (if ALARP)
1	6	C/O/D	1, 2 & 3	Collision - Ferry/Passenger ICW. Cargo/Tanker or Ferry/Passenger	5.3	Low Risk - Broadly Acceptable
5	6	C/O/D	1, 2 & 3	Collision - Large Project Vessel ICW. Ferry/Passenger	5.3	Low Risk - Broadly Acceptable
2	8	C/O/D	1, 2 & 3	Collision - Cargo/Tanker ICW. Cargo/Tanker	5.1	Low Risk - Broadly Acceptable
6	8	C/O/D	1, 2 & 3	Collision - Large Project Vessel ICW. Cargo/Tanker	5.1	Low Risk - Broadly Acceptable
7	11	C/O/D	1, 2 & 3	Collision - Large Project Vessel ICW. Small Craft	4.9	Low Risk - Broadly Acceptable

1.11.5.4 The highest scored collision hazard relates to a Ferry/Passenger or a Cargo/Tanker in collision with a small craft such as a fishing, recreational, tug and service or CTV. The deviation of traffic around the Transmission Assets during construction and decommissioning towards the Walney Offshore Wind Farm, reduces the ability to avoid a collision where searoom is more limited. Furthermore, emergence of small craft from the operational offshore wind farms (i.e. Walney Extension and West of Duddon Sands) with reduced visibility due to radar interference or visual obscuration could exacerbate these risks (**section 1.1.1**),

particularly CTVs which may be operating at higher speeds and in closer proximity to wind farms.

1.11.5.5 Analysis and consultation with stakeholders identified that high densities of fishing boats may be encountered within the west portion of the Transmission Assets, particularly close to the Isle of Man (see **section 1.8.2**). Some stakeholders asserted that any such collision might involve loss of life; however, comparative historical incidents suggest this is extremely unlikely, with multiple injuries a more likely outcome (**section 1.8.3**). However, the loss of the small craft with multiple loss of life was agreed as a worst credible outcome. Due to the number of oil and gas platforms in the vicinity of observed fishing areas and fishing vessel transit areas the potential for ferry/passenger or cargo/tanker colliding with a small vessel remained low. The combined most likely and worst credible overall risk for this hazard was assessed as Medium Risk – Tolerable if ALARP.

1.11.5.6 The risk of collision between small craft was also scored as Medium Risk – Tolerable. The presence of the Transmission Assets could increase the likelihood of this occurrence by offsetting small craft traffic into more dense areas (**section 1.10.4.1**). Collisions involving small craft occur routinely throughout the UK and it is rare that a fatality occurs (see **section 1.8.3**); however, this is still considered a realistic worst credible scenario. Small craft inherently have a lower potential for damage and pollution is inherently lower than for other large vessels, and the scoring reflects this.

1.11.5.7 Given the low predicted frequency of two Cargo/Tankers meeting and colliding due to the relatively low commercial density around the Transmission Assets, this hazard was assessed as Low Risk – Broadly Acceptable.

1.11.5.8 Several risk controls have been applied by the Transmission Assets to mitigate the risks of collision (see **section 1.6.5** for full wording and details of commitments) which were sufficient to reduce the risk to ALARP.

- Promulgation such as Notice to Mariners (CoT112).
- Site marking and charting (CoT59).
- Safety zone statement (document reference: J33), advisory passing distances and guard vessels (CoT66).
- Appointment of Fisheries Liaison Officer (CoT52).
- Offshore EMPs including fisheries liaison and coexistence plans and marine pollution contingency plans (CoT65).
- Offshore emergency and response and safety plan(s) (CoT70).
- Aids to navigation (marking and lighting) (CoT46).
- CMSs (CoT49).
- VTMP (outline document reference: J21) (CoT69).
- Vessel traffic monitoring and continuous watch (CoT72).

- Minimise disruption to fisheries (CoT61).

Risk of contact (allision)

1.11.5.9 **Table 1.34** presents the two allision hazards identified and their associated hazards scores and ratings.

Table 1.34: Allision hazards, scores and ratings

ID	Rank	Phase	Area	Hazard Title	Score	Rating
15	4	C/O/D	2 & 3	Allision (O&G) - Ferry/Passenger or Cargo/Tanker or Large Project Vessel	6.6	Medium Risk - Tolerable (if ALARP)
16	8	C/O/D	2 & 3	Allision (O&G) - Small craft	5.1	Low Risk - Broadly Acceptable

1.11.5.10 The highest ranked oil and gas allision hazard relates to a ferry/passenger/cargo/tanker or large project vessel allision with an oil or gas platform. During the construction/decommissioning phases, it is possible that commercial vessels will be required to deviate to maintain a safe passing distance from Transmission Assets vessels. Dependant on the final cable route, the potential proximity of the cable laying activities and associated project vessels could also increase the potential for this hazard occurrence from large project vessels; however, large project vessels engaged in cable laying activities are typically highly manoeuvrable with propulsion and station-keeping redundancy. Multiple major injuries, severe damage and moderate pollution would be a most likely outcome, but a worst credible result could include multiple fatalities and permanent interruption of production/operation at the platform. The resulting most likely consequences from a large vessel allision (ferry/passenger/cargo/tanker or large project vessel) would be more severe than from a small vessel and due to potential operations involving large vessels in close proximity to the oil and gas platforms, the overall risk score is marginally higher for his hazard. The combined most likely and worst credible overall risk for this hazard was assessed as Medium Risk – Tolerable if ALARP.

1.11.5.11 The second highest ranked oil and gas allision hazard relates to an allision between a small craft and an oil or gas platform. Avoidance of other traffic, mechanical failure or human error could all result in an allision. During consultation with local oil and gas operators, it was agreed that the worst credible consequence for a vessel allision with an oil and gas platform could include multiple fatalities and permanent interruption of production at the platform. The consequences in the worst credible scenario are ranked highly and represent an extreme scenario. Due to the fact that vessel patterns are expected to return to the baseline once the export cable installation is completed, and the main risk will be during the construction/decommissioning phases which will displace vessel activity, it is not considered likely that an incident will occur during the lifetime of the Transmission Assets. The most likely

outcome is expected to be minor injuries and moderate damage. Therefore, a small vessel allision with an oil and gas platform was ranked as Low Risk – Broadly Acceptable.

1.11.5.12 Several risk controls have been applied by the Transmission Assets to mitigate the risks of allision (see **section 1.6.5** for full wording and details of commitments) which were sufficient to reduce the risk to ALARP.

- Promulgation such as Notice to Mariners (CoT112).
- Offshore emergency and response and safety plan(s) (CoT70).
- CMSs (CoT49).
- VTMP (outline document reference: J21) (CoT69).
- Inspection and maintenance programme for timing of works (CoT71).
- Existing oil and gas platform and major works safety zones.

Risk of grounding

1.11.5.13 **Table 1.35** presents the three grounding hazards identified and their associated hazards scores and ratings.

Table 1.35: Grounding hazards, scores and ratings

ID	Rank	Phase	Area	Hazard Title	Score	Rating
14	12	C/O/D	1	Grounding - Ferry/Passenger or Cargo/Tanker	3.8	Negligible Risk - Broadly Acceptable
12	13	C/O/D	1	Grounding - Small Craft	3.8	Negligible Risk - Broadly Acceptable
13	13	C/O/D	1	Grounding - Large or Small Project Vessel	3.8	Negligible Risk - Broadly Acceptable

1.11.5.14 The scores for all grounding risks irrespective of vessel types were scored as a Negligible Risk – Broadly Acceptable. Grounding is more likely to occur where water depths are shallower, where small craft are known to be active (**section 1.8.2**). Grounding of a small craft is likely to result in minor injuries and pollution in the most likely instance but could result in loss of the vessel with the potential for loss of life. Grounding of a large commercial vessel carries less potential for damage to the vessel; however, could still have the potential for a fatality in the worst credible scenario.

1.11.5.15 Several risk controls also apply to mitigate the risks of grounding (see **section 1.6.5** for full wording and details of commitments).

- Promulgation such as Notice to Mariners (CoT112).
- Site marking and charting (CoT59).

- Appointment of Fisheries Liaison Officer (CoT52).
- Offshore EMPs including fisheries liaison and coexistence plans (CoT65).
- Outline CSIP and CBRA (CoT45).
- Cable burial as preferred option for cable protection (CoT54).

Risk of snagging

1.11.5.16 **Table 1.36** presents the four snagging hazards identified and their associated hazards, scores and ratings.

Table 1.36: Snagging hazards, scores and ratings

ID	Rank	Phase	Area	Hazard Title	Score	Rating
8	2	C/O/D	1, 2 & 3	Snagging - Fishing	6.6	Medium Risk - Tolerable (if ALARP)
10	5	C/O/D	1, 2 & 3	Snagging - Cargo/Tanker or Ferry/Passenger	5.9	Low Risk - Broadly Acceptable
9	15	C/O/D	1, 2 & 3	Snagging - Recreational or Tug/Service	3.6	Negligible Risk - Broadly Acceptable
11	15	C/O/D	1, 2 & 3	Snagging - Large or Small Project Vessel	3.6	Negligible Risk - Broadly Acceptable

1.11.5.17 Snagging of export cables by fishing gear was scored as Medium Risk – Tolerable (if ALARP). Fishing using mobile and static gear is shown to occur throughout the study area and therefore there is potential for these activities to occur in the. A Medium Risk was determined due to the worst credible consequences which could include capsize and loss of life; however, the snagging of fishing gear is more likely to result in only gear damage/loss in the most likely instance.

1.11.5.18 Snagging by ship anchors is less likely, but could carry a greater potential for damage to the export cable, particularly by commercial ship anchors which have far greater penetration depths and potential for damage. Anchors may also be deployed in an emergency although this is relatively unlikely, but the potential would be greatest where the density of shipping is greatest. The consequences of snagging are relatively low for the vessel but would result in a major commercial impact to the Transmission Assets. Hence, a Low Risk score has resulted for large vessels.

1.11.5.19 Snagging by small craft anchors is unlikely to cause notable damage and is not likely to occur due to the risk controls and mitigations described below. Therefore the risk score resulted in Low Risk.

1.11.5.20 Several risk controls have been applied by the Transmission Assets to mitigate the risks of snagging (see **section 1.6.5** for full wording and details of commitments).

- Promulgation such as Notice to Mariners (CoT112).
- Site marking and charting (CoT59).
- Appointment of Fisheries Liaison Officer (CoT52).
- Offshore EMPs including fisheries liaison and coexistence plans (CoT65).
- Outline CSIP and CBRA (CoT45).
- Cable burial as preferred option for cable protection (CoT54).

1.11.6 Potential additional risk control options

1.11.6.1 During the NRA, stakeholder consultation and stakeholder responses (**section 1.5.5**) a number of potential additional risk control options were identified. These are summarised below in **Table 1.37.** These additional mitigation measures have subsequently been adopted by the Applicants and have become applied, or embedded, mitigations (through Commitments listed in **Table 1.10)** or are no longer relevant due to Transmission Assets design changes (**section 1.5.4**) as indicated below**.**

Table 1.37: Potential additional risk control options identified and status

ID	Title	Description	Status
1	Liaison with Oil and Gas operators on vessel movements and operations	Liaison and understanding of the Transmission Assets and ferry operations to deconflict, derisk and minimise vessel interactions during oil and gas ongoing and proposed operations (including platform and pipeline decommissioning activities and repurposing plans) with cable installation and maintenance activities.	Adopted by the Applicants through development of: • Notice to Mariners (CoT112); • VTMP (CoT69, outline document reference: J21); • Offshore CSIP (CoT45, outline document reference: J15); • Offshore operations and maintenance plan (CoT71, outline document reference: J19); and, • CMSs (CoT49). Transmission Assets updates would continue to be incorporated into the ongoing MNEF as it has been to date. Details of how commitments have been secured are outlined in **Table 1.10**.
2	Liaison with Ferry Operators on vessel movements and operations	Liaison and understanding of the Transmission Assets and ferry operations to deconflict, derisk and minimise vessel interactions during cable installation and maintenance activities.	Adopted by the Applicants through development of: • Notice to Mariners (CoT112); • VTMP (CoT69, outline document reference: J21); • Offshore CSIP (CoT45, outline document reference: J15); • Offshore operations and maintenance plan (CoT71, outline document reference: J19); and, • CMSs (CoT49).

ID	Title	Description	Status
			Transmission Assets updates would continue to be incorporated into the ongoing MNEF as it has been to date. Details of how commitments have been secured are outlined in **Table 1.10**.
3	Construction scheduling	Managing construction activities to deconflict with other marine activities.	Adopted by the Applicants through development of: • Notice to Mariners (CoT112); • VTMP (CoT69, outline document reference: J21); • Offshore CSIP (CoT45, outline document reference: J15); • Offshore operations and maintenance plan (CoT71, outline document reference: J19); • CMSs (CoT49); • Offshore EMPs, including fisheries liaison and coexistence plans (CoT65); and, • Minimise disruption to fisheries (CoT61). Transmission Assets updates would continue to be incorporated into the ongoing MNEF as it has been to date. Details of how commitments have been secured are outlined in **Table 1.10**.
4	Morgan Offshore Wind Project offshore booster station micro-siting	Locating the Morgan Offshore Wind Project offshore booster station away from vessel traffic routes, in line with adjacent Morecambe Offshore Windfarm: Generation Assets turbine arrays., and with consideration of oil and gas asset safety zones.	No longer required due to Transmission Assets design changes and removal of Morgan Offshore Wind Project offshore booster station. Details of how commitments have been secured are outlined in **Table 1.10**.

1.11.7 Summary

1.11.7.1 The NRA has found the impacts of the Transmission Assets would not result in any hazard with an Unacceptable navigational risk score. Four hazards were identified as Medium Risk – Tolerable if ALARP, relating to collision, snagging and allision with oil and gas platforms. Risks were assessed with the implementation of applied mitigations (**Table 1.10**) and potential additional risk controls (**Table 1.37**) that were identified during stakeholder consultation and stakeholder responses (**section 1.5.5**). The potential additional risk controls previously identified with stakeholders were either adopted through commitments made by the Applicants (hence were applied risk controls), or were no longer required following Transmission Assets design changes and removal of the surface piercing structures from the Transmission Assets (as discussed in **section 1.5.4**).

1.11.7.2 Hazard workshops undertaken to inform the CRNRA (**Appendix C**) also reached stakeholder consensus on mitigation measures for cumulative projects of the Morgan Offshore Wind Farm: Generation Assets, Morecambe Offshore Windfarm: Generation Assets and Mona Offshore Wind Farm, when considered with the Awel-y-Môr Offshore Wind Farm and the Transmission Assets. These identified mitigations were reviewed against applicability to the Transmission Assets and considered to be either not relevant for subsea-only infrastructure or already adopted through existing applied mitigations (**Table 1.10**).

1.11.7.3 Therefore all risks identified as Medium Risk were considered to be ALARP and therefore Tolerable.

1.12 Cumulative Assessment

1.12.1 Introduction and approach

1.12.1.1 It was noted during the PEIR stage of the Transmission Assets within the cumulative impact assessment that the presence of the Morgan Offshore Wind Project, Morecambe Offshore Windfarm and Mona Offshore Wind Project would result in corridors between them that had greater impacts on navigation safety and commercial operations than each project would have in isolation. The Applicants (EnBW, bp, Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) and Flotation Energy plc) commissioned a joint CRNRA with the objective of enabling stakeholders to engage with and understand the potential cumulative effects of the proposed projects.

1.12.1.2 The CRNRA is presented in separately (**Appendix C**). This section presents a summary of the results of the CRNRA as described below for each impact identified. The key findings of the CRNRA are first presented for each identified impact. As discussed in **section 1.5.4,** at the time the CRNRA was prepared, it used the Transmission Assets PEIR information which included the Morgan Offshore Wind Project offshore booster station which has since been removed from the Transmission Assets DCO application. Therefore, the difference in the effect for each impact listed in the following sections due to the removal of the Morgan Offshore Wind Project offshore booster station has also been included.

1.12.1.3 The CRNRA assumed the planned decommissioning of some oil and gas structures and these activities are presented in **section 1.9.4**, although the full extents of the plans are not yet known. As more information is ascertained the impacts associated with the decommissioning, in combination with the proposed wind farm developments, can be further assessed.

1.12.2 Cumulative regional Navigation Risk assessment

1.12.2.1 A CRNRA has been carried out to assess the impact of the Mona Offshore Wind Project, Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, the Morgan and Morecambe Transmission Assets and the Awel-y-Môr

Offshore Wind Farm in combination with existing navigational features on shipping and navigation (NASH, 2024). Due to insufficient information at the time of the assessment given the early stage in development, the proposed Mooir Vannin Offshore Wind Farm was not included in the main body of the CRNRA. However, the potential cumulative impact is considered separately within an addendum to the CRNRA (Appendix D of the CRNRA, which is **Appendix C** of this document). These have been considered within the cumulative impacts assessment contained within this section.

1.12.2.2 The objective of the CRNRA was to enable decision makers and stakeholders to engage with, and understand, the potential cumulative effects of the aforementioned projects. Adopting a regional (collaborative) approach to the assessment also enabled those individual projects to assess and manage the cumulative effects in a coordinated, consistent and efficient manner.

1.12.2.3 The findings of the CRNRA are summarised in the following list. 56 total hazards were identified.

- No hazards were assessed as being High Risk – Unacceptable.
- 45 of the hazards were assessed as Medium Risk – Tolerable (if ALARP). The highest of these are represented by collisions and allisions involving Ferry/Passenger vessels and between large ships and small craft, often in the Morgan-Walney, Mona-Morgan and the area south of the Mona Offshore Wind Project.
- 11 of the hazards were assessed as Low Risk – Broadly Acceptable.

1.12.3 Cumulative impacts

Impact on sea lanes essential to international navigation

1.12.3.1 The CRNRA concluded that the Mona, Morgan and Morecambe Offshore Windfarms in combination with the Transmission Assets and Awel-y-Môr Offshore Wind Farm would not impede access to internationally recognised sea lanes essential to navigation, due to the distance between the developments and TSSs.

1.12.3.2 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The resulting cumulative impact with the removal of the Morgan Offshore Wind Project offshore booster station is not considered to differ from that assessed within the CRNRA.

Impact on commercial vessel and ferry vessel routeing

1.12.3.3 The CRNRA found that whilst the impacts vary by operator, the results suggest that in normal conditions the additional transit duration is not likely to significantly impact upon ferry operations. The deviations during normal sailing conditions as a result of the Generation Assets and Mona Offshore Wind Project are presented in **Figure 1.44.**

1.12.3.4 The cumulative scenario considered that the removal of the Morgan Offshore Wind Project offshore booster station is not likely to affect the deviations assessed for ferries within the CRNRA.

1.12.3.5 The CRNRA determined that commercial shipping routes are concentrated into the Port of Liverpool, and therefore minor deviations around the Mona array area are required. Minor routes with fewer than 200 crossings per year would have greater deviations, however this is not considered to make such operations unviable. Due to the low frequency of the vessels required to deviate further and/or transit via new navigation corridors, it is not anticipated that the navigation corridors will become unsafe.

1.12.3.6 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The cumulative scenario considered that the removal of the Morgan Offshore Wind Project offshore booster station is not likely to affect the deviations assessed for commercial vessels within the CRNRA.

1.12.3.7 The CRNRA addendum for the Mooir Vannin Offshore Wind Farm concluded that the reduced searoom between the Morgan Offshore Wind Project: Generation Assets and the Mooir Vannin Offshore Wind Farm has potential to significantly impact commercial vessel routeing. The influence from the Transmission Assets on the findings of the CRNRA for this impact is explored in **section 1.12.4**. Overall, the Transmission Assets were not considered to significantly increase the impact as determined in the CRNRA.

Impact on adverse weather vessel routeing

1.12.3.8 In adverse weather, the reduced sea room and increased duration of journey, particularly if vessels elect to deviate around the proposed wind farms, could necessitate additional operational constraints and could result in cancellations to some services.

1.12.3.9 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station will not have any material effect on the impact to adverse weather routeing.

1.12.3.10 The CRNRA addendum for the Mooir Vannin Offshore Wind Farm concluded that the reduced searoom between the Morgan Offshore Wind Project: Generation Assets and the Mooir Vannin Offshore Wind Farm has potential to significantly impact adverse weather routeing. The influence from the Transmission Assets on the findings of the CRNRA for this impact is explored in **section 1.12.4**. Overall, the Transmission Assets were not considered to significant increase the impact as determined in the CRNRA.

Impact to access of ports and harbours

1.12.3.11 The cumulative effect of the projects being cumulatively assessed on access to ports and harbours is not expected to impact the existing vessel traffic approaches to local ports and harbours, given the distance

and locations relative to the wind farm developments. As stated within the cumulative assessment for the impact on sea lanes, the TSS Liverpool Bay, which operates as the main route in/out of Liverpool, is not anticipated to be substantially impacted by the proposed developments.

1.12.3.12 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station is not deemed to significantly alter the impact as assessed within the CRNRA.

Impact to emergency response capabilities due to increased incident rates and reduced access for SAR responders

Emergency response

1.12.3.13 Responding to vessel emergencies on board, particularly fire or a man overboard, requires immediate action by the bridge teams. For example, during fire, it may be necessary to turn the vessel into the wind such that the smoke does not blow across the passenger decks. Consultation has identified that these incidents infrequently occur on board ferries in the CRNRA study area (in the order of less than once a year). Whilst the cumulative projects within the regional area do not necessarily impact upon the likelihood that fire may occur, their presence constricts the sea room to perform these manoeuvres, and may increase the resulting consequences. The likelihood of these incidents occurring, and them occurring during a temporary transit of the corridor, is unlikely. The ability to hold a heading may be hampered in adverse weather conditions such as a large sea state or wind speed. Furthermore, whilst the sea room is reduced, at least several nm would exist to undertake some degree of mitigation, greater than vessels would have available elsewhere such as the approaches to ports for example.

1.12.3.14 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station does not affect the findings of the assessment for emergency response presented within the CRNRA.

Search and rescue

1.12.3.15 The CRNRA noted that several trials have been conducted by HMCG and MCA in SAR at offshore wind farms (see MCA, 2005; 2019). They found that searching within an offshore wind farm is more complex than in open sea and there may be a delay for entry into an offshore wind farm whilst the crew familiarise themselves with the site and layouts. During poor visibility, the importance of linear SAR lanes of sufficient width was identified as of great importance. When transiting through an offshore wind farm, all communications and navigation equipment was reported to be operated successfully with wind turbines identifiable through radar. Unfamiliarity with transiting and winching in vicinity of wind turbines results in slower speeds and delays which increases fuel

consumption and may make searches less effective. During the CRNRA, concerns had also been raised regarding visual identification of casualties as wind turbines block the view, particularly during rough weather.

1.12.3.16 The proposed minimum spacing between turbines required by MGN654 and adopted by the Generation Assets and the Mona Offshore Wind Project was considered for emergency response access and was determined to provide sufficient space for SAR helicopter access. The design of these respective projects' should also enable surface SAR assets (such as RNLI lifeboats) to safely navigate through the site and between the wind turbines. The deemed marine licences for each respective project will require approval of each project's array area Design Plan in consultation with MCA and Trinity House in order to ensure that access of SAR assets is not compromised. The CRNRA identified that this is included in the applied mitigations adopted by those projects.

1.12.3.17 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station from the CRNRA's assessment would make the impact on SAR marginally less than that summarised within the CRNRA.

Impact on vessel to vessel collision risk

1.12.3.18 The results of the CRNRA suggest that whilst the Transmission Assets, Generation Assets, and Mona Offshore Wind Project in the regional area could increase the risk of collision between navigating vessels, the greatest increase would be the result of CTVs operating between the operation and maintenance base and the offshore wind farm. In combination, Transmission Assets, Generation Assets, Awel-y-Môr Offshore Wind Farm and Mona Offshore Wind Project could result in an additional several thousand vessel trips per year. Other vessel types such as ferries and commercial shipping would experience an increase in collision risk, concentrated within the corridors. Furthermore, the analysis highlighted that the greatest risk of an incident pre-construction and during operation of the offshore wind farm developments was in the approaches to Liverpool.

1.12.3.19 The removal of the Morgan Offshore Wind Project offshore booster station is not anticipated to have a noticeable effect on the impact to collision risk assessed within the CRNRA.

1.12.3.20 The CRNRA addendum for the Mooir Vannin Offshore Wind Farm concluded that vessel to vessel collision risk had potential to increase due to the heightened likelihood of vessel to vessel encounters between the Morgan and Mooir Vannin wind farms. The influence from the Transmission Assets on the findings of the CRNRA for this impact is explored in **section 1.12.4**. Overall, the Transmission Assets were not considered to significant increase the impact as determined in the CRNRA.

Impact on marine navigation, communications, electromagnetic interference and radar and positioning systems

1.12.3.21 The CRNRA concluded that all proposed offshore wind farms are outside of the port limits, VTS and pilotage areas and therefore whilst shore-based radar may have partial coverage of the sites, it would not be actively monitored. Therefore, the presence of the projects in the regional area would not compromise vessel traffic monitoring.

1.12.3.22 With respect to electromagnetic interference produced by the presence of subsea cables, the CRNRA concluded that it is possible that small vessel compasses could be impacted near to cable landfall. However, small vessel activity was found to be low near cable landfall and it is considered likely that small craft would also navigate visually in this area. Therefore, the impact on navigation safety of these vessels is considered to be low.

1.12.3.23 The CRNRA also concluded that there is sufficient searoom between the Generation Assets for radar effects to be avoided should vessels navigate the centre of the routes. Such effects are routinely experienced by operators passing the existing Irish Sea offshore wind farms and oil and gas structures. To limit radar interference caused by offshore structures, mariners can also employ measures such as radar settings adjustments.

1.12.3.24 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station is not anticipated to cause a material difference to the findings of the CRNRA on the impact on marine navigation and communications.

Impact to recreational craft passages and safety

1.12.3.25 The CRNRA found that fishing boats operating in the CRNRA study area are generally small enough to transit through the array areas when on passage to fishing grounds, as evidenced by both their existing passages between turbines within the Irish Sea and the wide spacing for the proposed offshore wind farms. However, to some extent the presence of offshore wind farms in the regional area might displace their activities into adjacent corridors that increases the risk of collision. It is noted that low fishing levels were observed within the navigation corridors, and that fishers tend to fish within the proposed offshore wind farms more frequently. If fishing activities are displaced from the wind farm areas. it is unlikely that fishermen will concentrate their efforts in the corridors as these locations have not been previously identified as favourable fishing grounds.

1.12.3.26 During consultation with the RYA, it was noted that recent evidence from AIS data suggests that yachts avoid transiting through an offshore wind farm less than previously thought based on responses to surveys. This may increase the number of recreational craft navigating through a corridor, albeit that the density of recreational traffic near to the projects in the regional area is low.

1.12.3.27 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station will not affect the findings of the CRNRA with regard to recreational craft passages and safety.

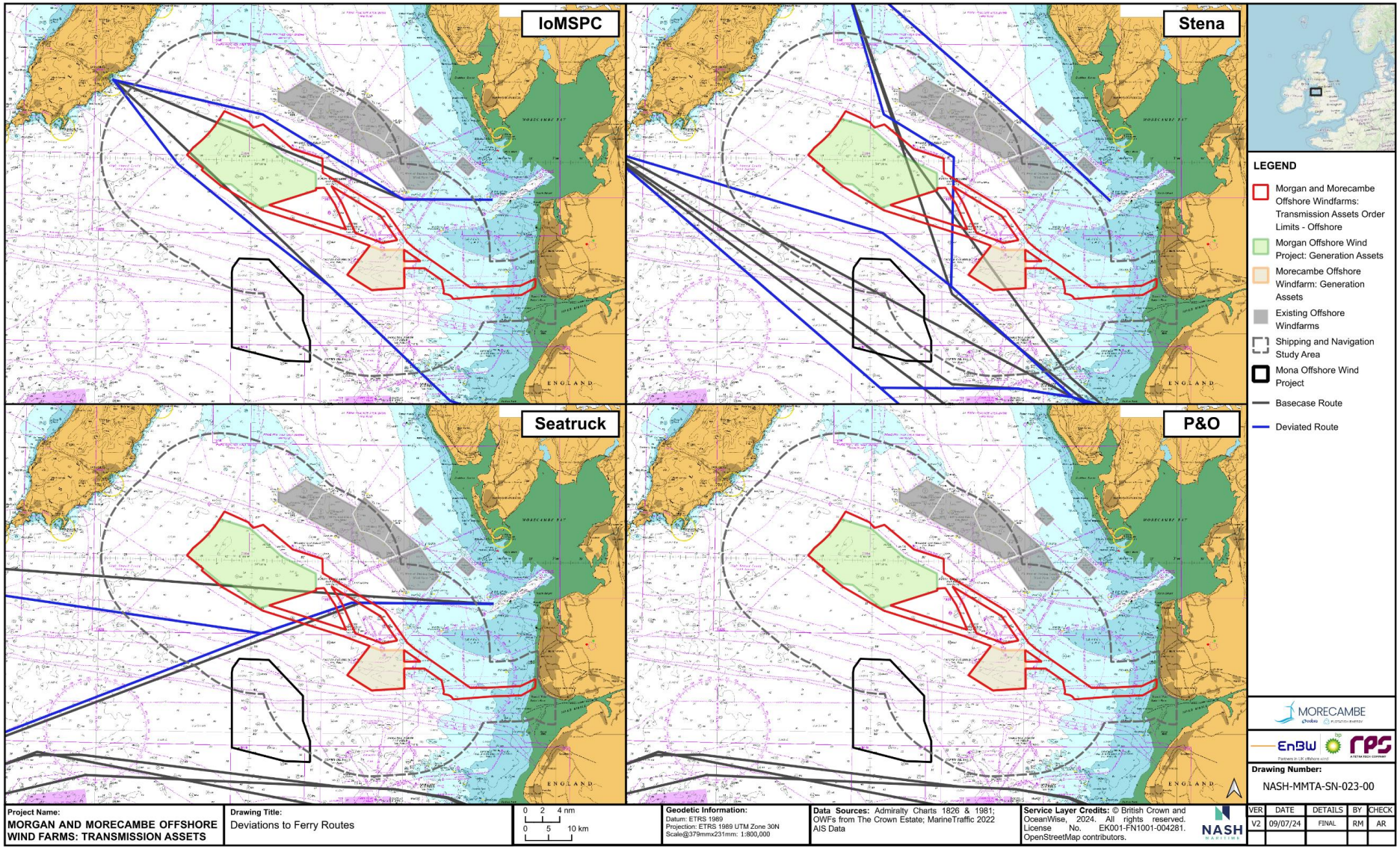

Figure 1.44: Deviations to ferry routes with Morecambe, Morgan and Mona Generation Assets and the Transmission Assets

Impact on snagging risk by vessel anchors or fishing gear

1.12.3.28 The subsea cables associated with the Transmission Assets and the other proposed offshore wind farms will introduce a risk of snagging, either with vessel anchors or fishing gear due to the presence of additional subsea infrastructure. Cable burial is planned where feasible and a CBRA will be undertaken as outlined in CoT45, **Table 1.10** (outline document reference: J14) and part of the CSIP (outline document reference: J15).

1.12.3.29 The Transmission Assets would not significantly increase the impact of snagging by vessel anchor or by fishing gear for reasons described in the Transmission Assets impact assessment in **section 1.10.10**. Snagging on cable protection could occur, however, protection is only required along a maximum of 10% of the export cables. The locations of cable routeing and necessary cable crossings will be marked on nautical charts (see CoT59, **Table 1.10**) and are not expected to have a notable impact on the risk level.

1.12.3.30 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station will have no material impact on the risk of vessel anchors and gear snagging.

Impact to oil and gas navigation, operations, safety and assets

1.12.3.31 As discussed in **section 1.9.4**, Irish Sea oil and gas platforms are progressively reaching end of life and it is understood that some platforms may be decommissioned or repurposed. The construction and early operation and maintenance phases may therefore be concurrent with these activities and Transmission Assets.

1.12.3.32 The potential impacts to oil and gas operators have been categorised as listed below.

- Navigation: potential increase in risk of collisions with oil and gas vessels (or decommissioning/asset repurposing vessels).
- Operations: potential impacts to existing field operations.
- Safety: potential impact to oil and gas safety systems and emergency response.
- Assets: potential increase in risk of allision of oil and gas platforms.

1.12.3.33 The CRNRA assessed the potential cumulative risk to oil and gas operations and assets through the hazard identification workshops, attended by key stakeholders including oil and gas operators, which found stakeholder consensus that all hazards were either Medium Risk – Tolerable if ALARP to Low Risk – Broadly Acceptable. An outcome of the CRNRA was that the layout of the Projects, in relation to shipping routes, and accounting for oil and gas decommissioning activities, would not appreciably increase the risk to oil and gas activities beyond the base case (current scenario).

1.12.3.34 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station will reduce the potential impacts that were discussed with oil and gas operators during stakeholder consultation. The overall findings of the CRNRA are therefore considered to remain the same or marginally reduced.

Impact on under keel clearance

1.12.3.35 The deviation of vessel routes due to the cumulative presence of the Transmission Assets, Generation Assets, Awel-y-Môr Offshore Wind Farm and Mona Offshore Wind Project is not expected to significantly increase grounding risk.

1.12.3.36 It is not anticipated that the export cable routes associated with the Transmission Assets, Generation Assets, and Mona Offshore Wind Project will pose a significant risk of snagging. This is because subsea cables are planned to be buried, and where burial is not feasible, external cable protection is to be installed.

1.12.3.37 Following design changes discussed in **section 1.5.4** the Transmission Assets now contains sub-surface infrastructure only. The removal of the Morgan Offshore Wind Project offshore booster station does not affect the risk of vessel snagging their anchor or gear.

1.12.4 Consideration of cable activities on the cumulative assessment

1.12.4.1 The cumulative impacts **section 1.12.3** and the CRNRA (**Appendix C** of this document) identified that there are potentially significant cumulative impacts due to the Morgan Offshore Wind Farm: Generation Assets and the Mooir Vannin Offshore Wind Farm. This determined that the separation distance between offshore wind farms of approximately 2.5 nm did not meet the safe passage planning principles outlined in the guidance documents of MGN654 (MCA, 2021a) and PIANC (PAINC, 2018). It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA Marine Guidance Note (MGN) 654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore also assumed that these potential cumulative impacts, including impacts associated with the repair or maintenance of the IOM interconnector subsea cable which runs approximate mid-way between this separation, will be addressed by Mooir Vannin Offshore Wind Farm through the planning process.

1.12.4.2 The Offshore Order Limits also extends within the space between the two offshore wind farms; however, the final Transmission Assets export cable route is also still to be determined. It is recognised that if the cable were to be located in this area, there is a potential for cable maintenance, repair and possibly decommissioning activities that would require a cable lay/cable repair/SOV vessel stationed for the short term within this space. This section therefore intends to further consider the Transmission Assets in the event of these short term cable-related

activities during the operation and maintenance and, possibly, decommissioning phases (if cables are not left in-situ at end of life to avoid further environmental impacts). Consideration of cable activities during construction phase are not required due to the Mooir Vannin development following after the Transmission Assets.

1.12.4.3 The potential impacts that may arise due to cable works in this location are reviewed against the findings of the CRNRA related to the identified potential impacts of collision risk, commercial vessel and ferry routeing, and adverse weather routing. It should be noted that the overall operation and maintenance strategy will be finalised once the detailed design and technical specifications of the Transmission Assets offshore and intertidal infrastructure are known. Further information on operation and maintenance requirements for the offshore export cables are set out within an outline offshore operations and maintenance plan (document reference: J19).

1.12.4.4 The MDS for the Transmission Assets for the Morgan Offshore Wind Farm export cable assume the following.

- For cable repair, up to 14 total lifetime events (one per cable every 10 years with four cables for the Morgan Offshore Wind Farm) with up to two repairs in a single year.
- For cable reburials, up to one reburial event every five years is estimated with up to four reburials in a single year.
- The assumptions are based on the anticipated maximum frequency of occurrence throughout the entire cable route. It is anticipated that these would not repeatedly occur at the same location.

1.12.4.5 The overall likelihood of cable activities across the entire cable length is therefore low, in the order of once per one or two years. In the event of the cable route extending into the area between within the two windfarms, the maximum overall proportion of the cable route would be approximately 8% of the total offshore cable length. Therefore, given the relatively low frequency of repairs and reburials throughout the entire cable route, and the small portion of cable that would extend into the area between the two windfarms, the likelihood is considered to be significantly lower. Furthermore, once repaired or reburied, it is also considered highly unlikely that multiple repairs or reburials would be required at that location within another 10 years for repair and five years for reburial.

1.12.4.6 During cable repair, the vessel will be near stationary and regarded as vessel restricted in her ability to manoeuvre, in accordance with COLREGs (IMO, 1972) conventions. It will therefore be marked as such and will be identifiable and predictable for other navigating vessels. Whilst on site, maintenance works to rebury/replace and carry out repair works on offshore export cables generally takes between one to two weeks. Reburial activities are anticipated to be similar to construction, moving progressively during reburial and requiring less time in any one location.

1.12.4.7 Within this area the worst-case position for a vessel undertaking cable activities on the Transmission Assets would be at the closest point to

the Mooir Vannin Offshore Wind Farm. By assuming the scoping boundary as defined in Mooir Vannin Offshore Wind Farm Limited (2023), the minimum distance between the closest point on the Offshore Order Limits and the Mooir Vannin scoping boundary is approximately 2.6 nm (3 km). At the worst-case location of a cable repair vessel the clear distance is then 1.34 nm (2.5 km), as shown in **Figure 1.45**. The clear distances remain below the recommended distances for passage planning principles between windfarms; however, for these isolated periods, a passage of single vessel in typical weather conditions would be appropriate and, when considered with the risk controls already adopted, in compliance with COLREGs and the practice of good seamanship. The risk controls include the following (with reference to mitigations and relevant commitments made in **Table 1.10**).

- Promulgation such as Notice to Mariners (CoT112).
- Site marking and charting (CoT59).
- Safety zone statement (document reference: J33), advisory passing distances and guard vessels (CoT66).
- Appointment of Fisheries Liaison Officer (CoT52).
- Offshore EMPs including marine pollution contingency plan, chemical risk review and waste management and disposal arrangement (CoT65).
- Outline Fisheries Liaison And Coexistence Plan (CoT61).
- Offshore emergency and response and safety plan(s) (CoT70).
- Aids to navigation (marking and lighting) (CoT46).
- Outline CSIP (document reference: J15) and CBRA (outline document reference: J14) (CoT45).
- CMSs (CoT49).
- VTMP (outline document reference: J21) (CoT69).
- Vessel traffic monitoring and continuous watch (CoT72).
- Inspection and maintenance programme (CoT71).
- Operational best practice, including visual, radar and Very High Frequency (VHF) communication between all parties.

1.12.4.8 With the applied mitigations listed above, including guard vessel, COLREGs and active ongoing communication between vessels, it is considered that the risk of collision due to the Transmission Assets would not be greater than that determined by the CRNRA.

1.12.4.9 The impact to commercial vessel routing may be experienced due to single vessel passing, or at the discretion of the master, using an alternative route to the west of the Morgan Offshore Wind Farm: Generation Assets, or to the east of the Mooir Vannin Offshore Wind Farm. However, in these circumstances, it is not anticipated to render services unviable and due to the infrequency of cable activities is considered to remain similar to that determined by the CRNRA. Further,

as a result of these mitigation measures applied during these periods temporary of cable activity, passage of the regular Isle of Man Steam Packet ferry service between these two wind farms could therefore still be achieved to minimise disruption on this ferry route.

1.12.4.10 During adverse weather, cable repair works would have weather limitations, these being dependent on the vessel used and activities required. Specific limits are not known at this stage; however, subsea cable-related activities can be expected to avoid forecasted periods of adverse weather to minimise operational downtime and time required on site. It is unlikely that cable activities would then impact upon adverse weather routing due to the infrequency of cable activities combined with the unlikelihood of activities taking place in adverse weather. Impacts are therefore considered to remain similar to that determined by the CRNRA.

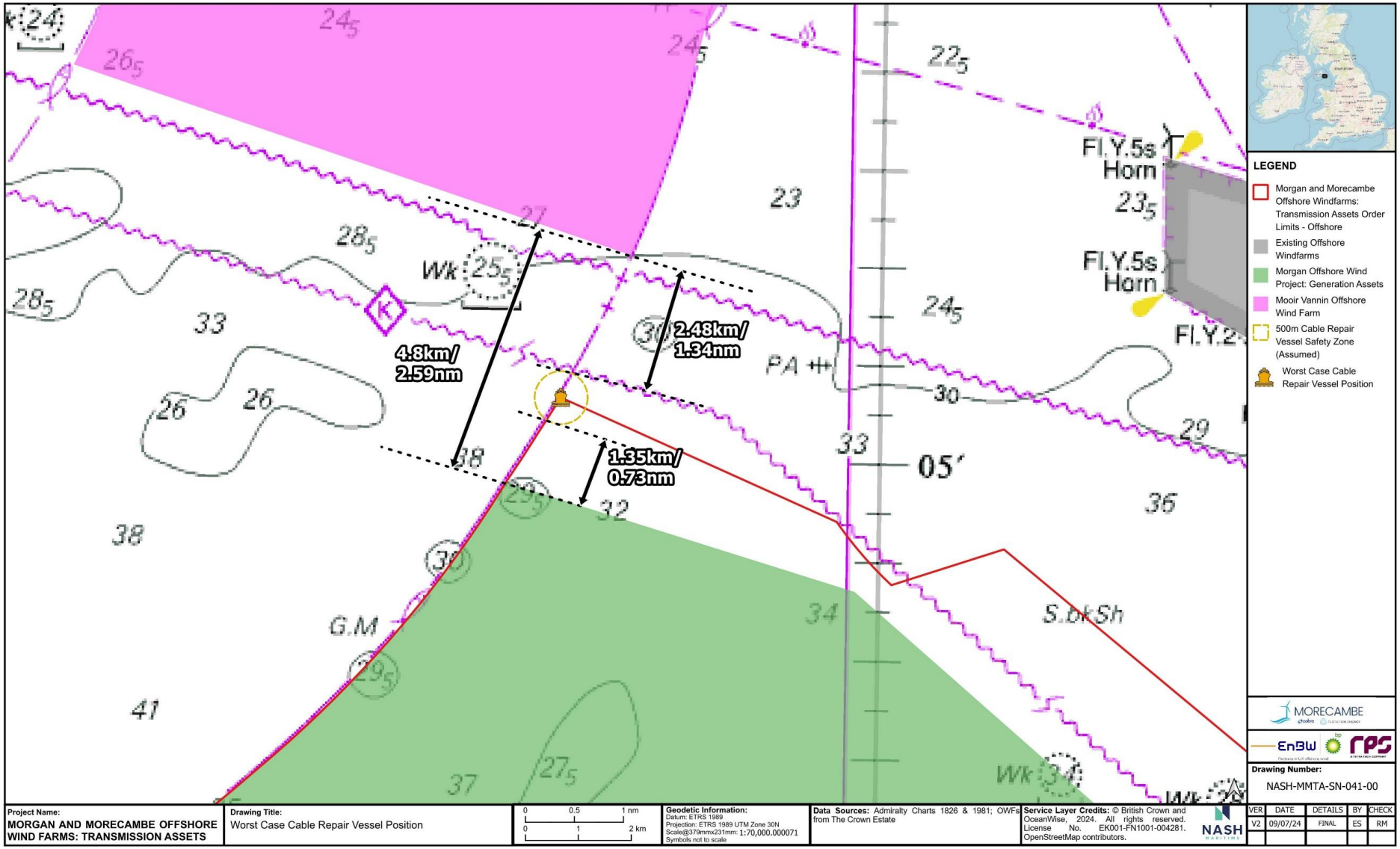

Figure 1.45: Review of adverse location for cable maintenance or repair activities (with assumed 500 m vessel safety zone)

1.12.5 Summary

1.12.5.1 In summary, the Transmission Assets, in combination with the Generation Assets, Mona Offshore Wind Project, and the Awel-y-Môr Offshore Wind Farm, is not anticipated to have material contribution to the findings of the CRNRA.

1.12.5.2 The CRNRA concluded that all hazards associated with these projects have been reduced to either Medium Risk – Tolerable if ALARP or Low Risk – Broadly Acceptable. Whilst it was recognised that the construction of the Projects in otherwise navigable waters would increase the risks of collision and allision for navigating vessels, a consensus was reached with stakeholders during the hazard workshop that these risks were not unacceptable. In particular, the increase in searoom between the offshore wind farms provides sufficient space for vessels to safely manoeuvre in complex realistic traffic situations and adverse weather in full compliance with the COLREGs and the practice of good seamanship. All hazards discussed in the CRNRA were determined in the hazard workshop to be ALARP without the need for additional mitigation. Therefore, the CRNRA concluded that all Medium Risks can be considered ALARP and therefore Tolerable and that no further risk controls were warranted.

1.12.5.3 Due to the release of the Scoping Report for the Mooir Vannin Offshore Wind Farm in October 2023 after the completion of many of the activities undertaken to inform the CRNRA, an addendum to the CRNRA was prepared to consider the additional cumulative risks that might result to vessel traffic identified within the CRNRA in combination with the Mooir Vannin Wind Farm Scoping Boundary (Appendix D of the CRNRA). It was concluded that with the addition of Mooir Vannin Offshore Wind Farm, there were likely to be impacts on ferry routes in typical and adverse conditions and unacceptable risk to navigation safety between the Morgan Offshore Wind Farm: Generation Assets and the Mooir Vannin Offshore Wind Farm. Due to the potential proximity of the Transmission Assets to the Morgan Offshore Wind Farm: Generation Assets and the Mooir Vannin Offshore Windfarm, these impacts were further considered (as outlined in **section 1.12.4**). The offshore components of the Transmission Assets are entirely sub-surface, hence the impacts to vessel routeing and navigational safety of the cable are isolated to short duration and localised effects during construction and major maintenance only. The impacts were therefore considered negligible and only apparent during short-term cable works if required, in which case they would be considered manageable. It is noted that Mooir Vannin also released a consultation document in July 2024 (Orsted, 2024).

1.13 Conclusions and recommendations

1.13.1.1 The NRA has been conducted in compliance with all relevant legislation, policy and guidance (**section 1.4** and **1.5**).

1.13.1.2 The study area includes extensive existing activities such as oil and gas, offshore wind and aggregate extraction, but is outside of direct port or harbour activities or limits (**section 1.7.1** and **1.7.2**).

1.13.1.3 The study area has predominately south westerly wind and wave conditions (**section 1.7.3**). Annual adverse weather events can exceed 4.2 m Hs and 50 kts. Reduced visibility typically occurs up to 43 days/year dependent on location within the study area.

1.13.1.4 SAR facilities, including RNLI stations and helicopter stations, are located immediately adjacent to the study area throughout the Welsh, English and Isle of Man coastlines (**section 1.7.4**).

1.13.1.5 Analysis of historical vessel traffic data (**section 1.8**) identified the following.

- Commercial cargo and tanker shipping predominately pass south of the Offshore Order Limits and study area into the Port of Liverpool from the north west or west. Smaller tanker and general cargo traffic operating between Liverpool, Heysham/Barrow, Douglas and the east of the Isle of Man also pass north/south through the Offshore Order Limits; however, ship routes are typically of low frequency with less than one vessel per day.
- There is regular passenger vessel activity across the study area and the Offshore Order Limits, including ferry services between Liverpool, Heysham and Douglas with the island of Ireland. Cruise ship transits also occur, to a lesser extent, between Douglas and Liverpool.
- Recreational vessel traffic is concentrated along the coast, particularly along the Isle of Man and along the UK at the entrance to Liverpool and around Holyhead, Douglas and Rhyl. Cruising routes exist between Liverpool and Douglas, Heysham and the Welsh coast, and the Welsh Coast and Douglas. Little recreational traffic exists in the vicinity of the landfall with the majority being SAR vessels.
- There is static and mobile fishing across the study area, including both local and international based boats. Fishing activity is heightened in winter and spring during the scallop fishing season. Some fishing vessels are engaged in guard vessel duties or other survey works and account for some of the concentrations around oil and gas installations.
- Service vessels associated with existing offshore wind farms and oil and gas infrastructure account for a large proportion of vessel movements within the study area.

- Analysis of adverse weather routeing demonstrates that vessels may deviate from their usual routes frequently throughout the year (**section 1.8.2**).

1.13.1.6 Analysis of historical incident data identified that the majority of incidents within the study area occurred inshore and adjacent to the approaches to the key ports (**section 1.8.3**). Most incidents recorded offshore were mechanical failures aboard vessels or personal injury incidents near oil and gas infrastructure, whilst most incidents near shore were mechanical/damage. Analysis of incidents involving subsea infrastructure were primarily associated with fishing vessel snagging or vessel anchor drag occurrences. Analysis of incidents at other offshore wind farms around the UK show that most accidents involve project vessels contacting wind turbines or having incidents in transit between the array and operations and maintenance base.

1.13.1.7 An assessment of the future traffic profile within the study area (**section 1.9**) determined that an increase in commercial vessel numbers of 15% by 2035 would be a reasonable assumption. There was little evidence of large changes to recreational or fishing vessel numbers. It is anticipated that oil and gas decommissioning would reduce vessel numbers, although there is uncertainty around the timing at which this would occur.

1.13.1.8 An assessment of the impacts of the Transmission Assets on recognised sea lanes essential to international navigation determined that access to the TSSs in the study area would not be affected.

1.13.1.9 An assessment of the impacts of the Transmission Assets on ferry vessel routeing determined that there would be potential for temporary and minor deviation of IoMSPC, Stena and Seatruck routes during cable activities (such as cable laying, major maintenance including repair or cable reburial). The increase in transit time associated with the Transmission Assets is unlikely to make these services unviable.

1.13.1.10 An assessment of the impacts of the Transmission Assets on commercial ship routeing determined that the principal shipping routes into Liverpool would be unaffected. Less trafficked routes into Heysham and Douglas have potential to necessitate temporarily minor deviations during the cable activities, which but would not make such services unviable.

1.13.1.11 An assessment of the impacts on small craft routeing determined that there is sufficient space for manoeuvring during the cable activities to facilitate safe navigation for fishing and recreational craft.

1.13.1.12 An assessment of the impacts of the Transmission Assets on the likelihood of collision determined that a small increase in risk was likely, given that the temporary cable activities will take place in proximity to several ferry routes and additional traffic introduced by project vessels. However, the increase in risk due to the Transmission Assets would be minor and localised during cable activities only.

1.13.1.13 The risk to oil and gas activities in the area would not be substantially increased from present day by the presence of the Transmission Assets. Cable activities may contribute to minor temporary deviations of

oil and gas support vessels and activities in proximity to oil and gas assets may cause a temporary minor increase risk of allision, dependent on the final export cable route relative to vessel traffic and oil and gas infrastructure.

1.13.1.14 An assessment of the impacts of the Transmission Assets on communications, radar and positioning systems determined that the only likely impact to arise as a result of the offshore export cables are electromagnetic interference, the effects of which are deemed to be negligible.

1.13.1.15 A risk assessment was undertaken by the NRA team including master mariners, supported by engagement opportunities, feedback and consultation with representatives from ferry operators, regulators, commercial bodies, oil and gas operators, ports, fishing community and recreational users. The risk assessment for the Transmission Assets was also supported by the stakeholder feedback on key hazards and risks that was obtained during through the CRNRA. The risk assessment for the Transmission Assets with applied risk controls (see **section 1.6.5** for full wording and details on commitments) concluded as follows.

- 16 hazards were identified, split across different hazard types, vessel types and areas.
- No hazards were assessed as being High Risk – Unacceptable.
- 12 hazards were ranked as Low Risk – Broadly Acceptable.
- Four were ranked as Medium Risk – Tolerable and included large vessel collision with small craft, collision between small craft, snagging and allision with oil and gas infrastructure.

1.13.1.16 All of the hazards identified as Medium Risk are considered ALARP with the implementation of applied risk controls (see **section 1.6.5** for full details on risk control measures) and therefore are considered Tolerable.

1.13.1.17 A CRNRA was undertaken to assess the impacts on shipping and navigation of the Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, Mona Offshore Wind Project and Awel-y-Môr Offshore Wind Farm as well as the Transmission Assets surface piercing structures as was defined within the PEIR. Following stakeholder feedback received, and after the CRNRA's completion, the Applicants made design changes to remove the all surface piercing structures from within the Transmission Assets. This most notably included removal of the Morgan Offshore Wind Project offshore booster station (as discussed in **section 1.5.4**).

1.13.1.18 The CRNRA concluded that no hazards were High Risk – Unacceptable with Morgan Offshore Wind Project: Generation Assets, Morecambe Offshore Windfarm: Generation Assets, Mona Offshore Wind Project and Awel-y-Môr Offshore Wind Farm and Transmission Assets (at PEIR stage and including surface piercing structures). Through hazard workshops undertaken for the CRNRA, consensus was reached all

Medium Risk hazards identified were considered to be ALARP and thus tolerable.

1.13.1.19 The CRNRA's assessment has been reviewed for the updated Transmission Assets infrastructure (that is, removal of surface piercing structures and now consisting of only sub-surface infrastructure) and its associated construction, operation and maintenance, and decommissioning operations. These design changes are discussed in **section 1.5.4**. The consideration of these changes to the findings of the CRNRA as assessed for each impact in **section 1.12**. Changes to the Transmission Assets by the removal of the Morgan Offshore Wind Project offshore booster station have either reduced or have not changed the outcomes of the CRNRA.

1.13.1.20 Due to the release of the Scoping Report for the Mooir Vannin Offshore Wind Farm after the completion of many of the activities undertaken to inform the CRNRA, an addendum to the CRNRA was prepared to consider the additional cumulative risks that might result to vessel traffic identified within the CRNRA. It was concluded that with the addition of Mooir Vannin Offshore Wind Farm, there were likely to be impacts on ferry routes in typical and adverse conditions and unacceptable risk to navigation safety between the Morgan Offshore Wind Farm: Generation Assets and the Mooir Vannin Offshore Wind Farm. Depending on the final cable route, it is feasible that Transmission Assets cable activities could also occur in this vicinity, as discussed in **section 1.12.4**. This concluded that the impacts from the Transmission Assets were considered insubstantial compared to the effects of the two wind farms' array areas and would be isolated to short duration and localised effects from major maintenance or potential decommission activities only if required at all.

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Appendix A: Hazard log

ID	Risk rank	Project phase	Area	Hazard type	Vessel type	Hazard title	Realistic most likely scenario	Realistic most likely scores					Realistic worst credible scenario	Realistic worst credible scores					Baseline risk score	Baseline risk rating
								People	Property	Environment	Business	Frequency		People	Property	Environment	Business	Frequency		
1	6	C/O/D	1, 2 & 3	Collision	Ferry/Passenger ICW. Cargo/Tanker or Ferry/Passenger	Collision - Ferry/Passenger ICW. Cargo/Tanker or Ferry/Passenger	Multiple major injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity; Short term interruption to ferry services.	3	3	2	3	2	Multiple fatalities; Constructive Loss; Serious pollution (Tier 2); International adverse publicity. Ferry out of service.	5	5	4	5	1	5.3	Low Risk - Broadly Acceptable
2	8	C/O/D	1, 2 & 3	Collision	Cargo/Tanker ICW. Cargo/Tanker	Collision - Cargo/Tanker ICW. Cargo/Tanker	Multiple minor injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity; Vessel requires drydock.	2	3	2	3	2	Single fatality; Constructive Loss; Major pollution incident (Tier 3); National adverse publicity.	4	5	5	4	1	5.1	Low Risk - Broadly Acceptable
3	1	C/O/D	1, 2 & 3	Collision	Ferry/Passenger or Cargo/Tanker ICW. Small Craft	Collision - Ferry/Passenger or Cargo/Tanker ICW. Small Craft	Multiple major injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity; Short term interruption to ferry services.	3	3	2	3	2	Multiple fatalities; Loss of small craft; Moderate damage to vessel; Moderate pollution incident (Tier 2); National adverse publicity; Ferry out of service.	5	3	3	4	2	7.3	Medium Risk - Tolerable (if ALARP)

ID	Risk rank	Project phase	Area	Hazard type	Vessel type	Hazard title	Realistic most likely scenario	Realistic most likely scores					Realistic worst credible scenario	Realistic worst credible scores					Baseline risk score	Baseline risk rating
								People	Property	Environment	Business	Frequency		People	Property	Environment	Business	Frequency		
4	2	C/O/D	1, 2 & 3	Collision	Small Craft ICW. Small Craft	Collision - Small Craft ICW. Small Craft	Multiple minor injuries; Moderate damage to small craft; No pollution; Minor adverse publicity.	2	2	1	2	3	Single fatality; Loss of small craft; Moderate damage to vessel; Moderate pollution incident (Tier 2); National adverse publicity.	4	3	3	4	2	6.6	Medium Risk - Tolerable (if ALARP)
5	6	C/D	1, 2 & 3	Collision	Large Project Vessel ICW. Ferry/Passenger	Collision - Large Project Vessel ICW. Ferry/Passenger	Multiple major injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity; Short term interruption to ferry services.	3	3	2	3	2	Multiple fatalities; Constructive Loss; Serious pollution (Tier 2); International adverse publicity. Ferry out of service.	5	5	4	5	1	5.3	Low Risk - Broadly Acceptable
6	8	C/D	1, 2 & 3	Collision	Large Project Vessel ICW. Cargo/Tanker	Collision - Large Project Vessel ICW. Cargo/Tanker	Multiple minor injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity; Vessel requires drydock.	2	3	2	3	2	Single fatality; Constructive Loss; Major pollution incident (Tier 3); National adverse publicity.	4	5	5	4	1	5.1	Low Risk - Broadly Acceptable
7	11	C/D	1, 2 & 3	Collision	Large Project Vessel ICW. Small Craft	Collision - Large Project Vessel ICW. Small Craft	Multiple major injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity;	3	3	2	2	2	Multiple fatalities; Loss of small craft; Moderate damage to vessel; Moderate pollution incident (Tier 2); National adverse publicity.	5	3	3	4	1	4.9	Low Risk - Broadly Acceptable

ID	Risk rank	Project phase	Area	Hazard type	Vessel type	Hazard title	Realistic most likely scenario	Realistic most likely scores					Realistic worst credible scenario	Realistic worst credible scores					Baseline risk score	Baseline risk rating
								People	Property	Environment	Business	Frequency		People	Property	Environment	Business	Frequency		
8	2	C/O/D	1, 2 & 3	Snagging	Fishing	Snagging - Fishing	Minor injuries; Minor damage to gear; No pollution; Cable inspection; Minor adverse publicity.	2	2	1	2	3	Single fatalities Loss of small craft; Minor pollution; Significant cable damage.	4	4	2	4	2	6.6	Medium Risk - Tolerable (if ALARP)
9	15	C/O/D	1, 2 & 3	Snagging	Recreational or Tug/Service	Snagging - Recreational or Tug/Service	Minor injuries; Minor damage; No pollution; Cable inspection; Minor adverse publicity.	1	2	1	2	2	Single fatalities Loss of small craft; Minor pollution; Significant cable damage.	4	3	2	4	1	3.6	Negligible Risk - Broadly Acceptable
10	5	C/O/D	1, 2 & 3	Snagging	Cargo/Tanker or Ferry/Passenger	Snagging - Cargo/Tanker or Ferry/Passenger	No injuries; No property damage; No pollution; Cable damage requiring repairs.	1	1	1	3	2	No injuries; Loss of the vessel's anchor No pollution; Cable out of service.	1	2	1	5	2	5.9	Low Risk - Broadly Acceptable
11	15	C/O/D	1, 2 & 3	Snagging	Large or Small Project Vessel	Snagging - Large or Small Project Vessel	Minor injuries; Minor damage; No pollution; Cable inspection; Minor adverse publicity.	1	2	1	2	2	Single fatality; Loss of small craft; Minor pollution; Significant cable damage.	4	3	2	4	1	3.6	Negligible Risk - Broadly Acceptable
12	13	C/O/D	1	Grounding	Small Craft	Grounding - Small Craft	Minor injuries; No pollution; Cable inspection; Minor adverse publicity.	2	2	1	2	2	Single fatality; Loss of small craft; Minor pollution; Significant cable damage.	4	4	2	4	1	3.8	Negligible Risk - Broadly Acceptable

ID	Risk rank	Project phase	Area	Hazard type	Vessel type	Hazard title	Realistic most likely scenario	Realistic most likely scores					Realistic worst credible scenario	Realistic worst credible scores					Baseline risk score	Baseline risk rating
								People	Property	Environment	Business	Frequency		People	Property	Environment	Business	Frequency		
13	13	C/O/D	1	Grounding	Large or Small Project Vessel	Grounding - Large or Small Project Vessel	Minor injuries; Minor damage; No pollution; Cable inspection; Minor adverse publicity.	2	2	1	2	2	Single fatality; Loss of small craft; Minor pollution; Significant cable damage.	4	4	2	4	1	3.8	Negligible Risk - Broadly Acceptable
14	12	C/O/D	1	Grounding	Ferry/Passenger or Cargo/Tanker	Grounding - Ferry/Passenger or Cargo/Tanker	Minor injuries; Minor damage; No pollution; Cable inspection; Minor adverse publicity.	2	2	1	2	2	Single fatality; Significant damage to vessel; Moderate pollution; Significant cable damage.	4	4	3	4	1	3.8	Negligible Risk - Broadly Acceptable
15	5	C/O/D	2 & 3	Allision (O&G)	Ferry/Passenger or Cargo/Tanker or Large Project Vessel	Allision (O&G) - Ferry/Passenger or Cargo/Tanker or Large Project Vessel	Multiple major injuries; Serious damage to vessel; Moderate pollution (Tier 2); National adverse publicity; Long term halt in oil/gas production.	3	4	3	4	2	Multiple fatalities; Serious pollution incident (Tier 3); International adverse publicity; Permanent interruption of production at oil/gas platform.	5	5	5	5	1	6.3	Medium Risk - Tolerable (if ALARP)
16	8	C/O/D	2 & 3	Allision (O&G)	Small craft	Allision (O&G) - Small craft	Multiple minor injuries; Moderate damage to vessel; Minor pollution; Widespread adverse publicity; Repairs to O&G asset.	2	3	2	3	2	Multiple fatalities; Serious pollution incident (Tier 3); International adverse publicity; Permanent interruption of production at oil/gas platform.	5	5	5	5	1	5.3	Low Risk - Broadly Acceptable

Appendix B: MGN 654 Checklist

Issue	Compliance	Reference and comments
4. Planning Stage – Prior to Consent		
4.5 Site and Installation 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 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 (ETRS89) datum.		
4.6 Traffic Survey – includes:		
All vessel types	✓	**Section 1.8**: Vessel traffic analysis All vessel types are considered within specific breakdowns by vessel type given for the study area, including the Offshore Order Limits, the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets.
At least 28 days duration, within either 12 or 24 months prior to submission of the EIA Report	✓	**Section 1.8.1**: Introduction and data sources A total of 32 full days (of which 28 days is within validity) of vessel traffic survey data from 14 days in February 2022, 14 days in July/August 2022 and 14 days in November 2023 at the Morecambe Offshore Windfarm: Generation Assets. A total of 32 full days (of which 28 are within validity) from 14 days in November/December 2021, 14 days in July 2022 and 14 days in November 2023 at the Morgan Offshore Wind Project: Generation Assets were used to assess vessel traffic within the study area. A further 14 days was obtained for the Transmission Assets in August 2023.
Multiple data sources	✓	**Section 1.8.1**: Introduction and data sources **Section 1.5.5**: Summary of data sources and information gathering Vessel traffic data sources inclluded vessel traffic surveys conducted to consider AIS and Radar data, in addition to visual observations. One full year of AIS was also used, as well as additional fishing datasets, RYA Coastal Atlas, MMO anonymised data and EMODnet vessel density.

Issue	Compliance	Reference and comments
Seasonal variations	✓	**Section 1.8.1**: Introduction and data sources **Section 1.8.2**: Vessel traffic analysis (subsection Vessel traffic counts and seasonality) For vessel traffic surveys, a total of 32 full days (of which 28 days is within validity) of vessel traffic survey data from 14 days in February 2022, 14 days in July/August 2022 and 14 days in November 2023 at the Morecambe Offshore Windfarm: Generation Assets. A total of 32 full days (of which 28 are within validity) from 14 days in November/December 2021, 14 days in July 2022 and 14 days in November 2023 at the Morgan Offshore Wind Project: Generation Assets were used to assess vessel traffic within the study area. A further 14 days was obtained for the Transmission Assets in August 2023.
MCA consultation	✓	**Section 1.5.5**: Summary of data sources and information gathering The MCA was consulted on the 31 May 2023 as part of the NRA process. The responses and consultations relevant to the Transmission Assets are described in **Table 1.7.** This includes responses to the shipping and navigation section of the Transmission Assets Scoping Report (RPS, 2022). These consultees were also invited to participate in the MNEF meetings.
General Lighthouse Authority consultation	✓	**Section 1.5.5**: Summary of data sources and information gathering Trinity House was consulted on the 31 May 2023 as part of the NRA process and through statutory consultation feedback. The responses and consultations relevant to the Transmission Assets are described in **Table 1.7.** This includes responses to the shipping and navigation section of the Transmission Assets Scoping Report (RPS, 2022). These consultees were also invited to participate in the MNEF meetings.
Chamber of Shipping and shipping company consultation	✓	**Section 1.5.5**: Summary of data sources and information gathering The Chamber of Shipping was consulted on the 31 May 2023 as part of the NRA process and through statutory consultation feedback. The responses and consultations relevant to the Transmission Assets are described in **Table 1.7**. This includes responses to the shipping and navigation section of the Transmission Assets Scoping Report (RPS, 2022). These consultees were also invited to participate in the MNEF meetings.
Recreational and fishing vessel organisations consultation	✓	**Section 1.5.5**: Summary of data sources and information gathering The RYA was consulted on the 6 June 2023 and local fishing representatives provided feedback as part of the NRA process during the stakeholder meeting on 7 June 2023. The responses and consultations relevant to the Transmission Assets are described in **Table 1.7**. This includes responses to the shipping and navigation section of the Transmission Assets Scoping Report (RPS, 2022). These consultees were also invited to participate in the MNEF meetings.

Issue	Compliance	Reference and comments
Port and navigation authorities consultation, as appropriate	✓	**Section 1.5.5**: Summary of data sources and information gathering Ports and navigation authorities received the stakeholder consultation letter with request for responses and opportunity for further consultation if required. These consultees were also invited to participate in the MNEF meetings.
4.6.d 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 1.8**: Vessel traffic analysis Vessel traffic data in proximity to the Transmission Assets has been analysed. **Section 1.10.1**: Impact identification The effects of the Transmission Assets have been identified for each of the phases.
ii. Numbers, types and sizes of vessels presently using such areas	✓	**Section 1.8**: Vessel traffic analysis Vessel traffic data in proximity to the Transmission Assets has been analysed and includes breakdowns of daily 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 1.8**: Vessel traffic analysis Non-transit users were identified in the vessel traffic survey data and included vessels at anchor. Vessel traffic surveys undertaken observed non-AIS vessels including fishing and recreational craft within the survey areas. **Section 1.7**: Description of the marine environment The navigational features section identifies features impacting non-transiting activities, such as oil and gas platforms and aggregate dredging areas.
iv. Whether these areas contain transit routes used by coastal, deep-draught or international scheduled vessels on passage	✓	**Section 1.8**: Vessel traffic analysis Main routes have been identified using the principles set out in MGN 654 in proximity to the Transmission Assets, taking into account coastal, deep-draught and internationally scheduled vessels.
v. Alignment and proximity of the site relative to adjacent shipping routes	✓	There are no surface structures associated with the Transmission Assets.
vi. Whether the nearby area contains prescribed routeing schemes or precautionary areas	✓	**Section 1.7**: Description of the marine environment

Issue	Compliance	Reference and comments
		This section identifies IMO routeing measures in proximity to the Transmission Assets, as well as any existing precautionary areas to be adhered to.
vii. Proximity of the site to areas used for anchorage (charted or uncharted), safe haven, port approaches and pilot boarding or landing areas.	✓	**Section 1.7**: Description of the marine environment This section identifies such features, including designated anchorages and ports in proximity to the Transmission Assets.
viii. Whether the site lies within the jurisdiction of a port and/or navigation authority.	✓	**Section 1.7**: Description of the marine environment This section ports and their limits in proximity to the Transmission Assets.
ix. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✓	**Section 1.8**: Vessel traffic analysis Fishing vessel movements are considered within the baseline vessel traffic analysis.
x. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✓	**Section 1.7**: Description of the marine environment This section identifies any military and practice exercise areas in proximity to the Transmission Assets.
xi. Proximity of the site to existing or proposed submarine cables or pipelines, offshore oil/gas platform, marine aggregate dredging, marine archaeological sites or wrecks, Marine Protected Area or other exploration/exploitation sites	✓	**Section 1.7**: Description of the marine environmentThis section details all such navigational features in proximity to the Transmission Assets. **Section 1.9**: Future case traffic profile This section contains the future case profile for proposed developments and regional operations.
xii. Proximity of the site to existing or proposed OREI developments, in co-operation with other relevant developers, within each round of lease awards.	✓	**Section 1.7**: Description of the marine environment This section details existing and proposed OREI developments in proximity to the Transmission Assets. **Section 1.9**: Future case traffic profile This section contains the future case profile for proposed developments and regional operations.
xiii. Proximity of the site relative to any designated areas for the disposal of dredging spoil or other dumping ground	✓	**Section 1.7**: Description of the marine environment This section details existing and proposed OREI developments in proximity to the Transmission Assets.

Issue	Compliance	Reference and comments
xiv. Proximity of the site to aids to navigation and/or VTS in or adjacent to the area and any impact thereon.	✓	**Section 1.7**: Description of the marine environment This section details all such navigational features in proximity to the Transmission Assets.
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.	✓	**Section 1.10**: Transmission Assets impact assessment This section discusses commercial and small vessel routeing due to the Transmission Assets. **Section 1.12**: Cumulative assessment This section discusses the cumulative route impacts with reference to the CRNRA (see **Appendix C**) carried out for regional local offshore wind projects.
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 1.8.3**: Incident analysis **Section 1.10**: Transmission Assets: Identification of potential impacts **Section 1.12.3:** Cumulative impacts Historic incidents within the study area have been analysed, as well as the consequences of such incidents, it is bearing on impacts.
xvii. Proximity of the site to areas used for recreation which depend on specific features of the area.	✓	**Section 1.8**: Vessel traffic analysis Recreational traffic was analysed within the vessel traffic analysis section and was shown to be low in proximity to the Transmission Assets.
4.7 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.	✓	There are no surface structures associated with the Transmission Assets. In relation to subsea assets of the Transmission Assets, **Section 1.10**: Transmission Assets impact assessment
b. The width of a corridor between sites or OREIs to allow safe passage of shipping.	✓	There are no surface structures associated with the Transmission Assets. In relation to subsea assets of the Transmission Assets, **Section 1.10**: Transmission Assets impact assessment **Section 1.12**: Cumulative assessment

Issue	Compliance	Reference and comments
		A cumulative assessment was carried out for the Transmission Assets. The potential future impact to navigation corridors was assessed within the cumulative assessment.
4.8. OREI Structures – the following should be determined:		
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 1.10**: Transmission Assets impact assessment Based upon the baseline data and consultation undertaken impacts have been identified and fed into the impact assessment.
b. Clearances of fixed or floating wind turbine blades above the sea surface are *not less than 22 metres (*above MHWS for fixed). Floating turbines allow for degrees of motion.	✓	**Section 1.6**: Project description and MDS The Transmission Assets design envelope does not include any turbines, floating or otherwise.
c. Underwater devices i. changes to charted depth ii. maximum height above seabed iii. Under Keel Clearance	✓	**Section 1.6**: Project description and MDS Export cable specifications are included in the MDS
d. Whether structure block or hinder the view of other vessels or other navigational features.	✓	There are no surface structures associated with the Transmission Assets.
4.9 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 installation is situated at various states of the tide i.e. whether the installation could pose problems at high water which do not exist at low water conditions, and vice versa.	✓	**Section 1.6**: Project description and MDS The MDS specifies the requirements for cable protection for the export cables. **Section 1.7.3**: MetOcean conditions MetOcean conditions in proximity to the Transmission Assets are described, including tide. **Section 1.8.2**: Vessel traffic analysis Vessel traffic data in proximity to the Transmission Assets has been analysed.

Issue	Compliance	Reference and comments
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.	✓	**Section 1.7.3**: MetOcean conditions MetOcean conditions in proximity to the Transmission Assets are described, including tide.
c. The maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.	✓	
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.	✓	**Section 1.7.3**: MetOcean conditions MetOcean conditions in proximity to the Transmission Assets are described, including tide.
f. The structures themselves could cause changes in the set and rate of the tidal stream.	✓	There are no surface structures associated with the Transmission Assets.
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	✓	There are no surface structures associated with the Transmission Assets.
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.	✓	**Section 1.7.3**: MetOcean conditions MetOcean conditions in proximity to the Transmission Assets are described, including weather and visibility. **Section 1.8.2**: Vessel traffic analysis Vessel traffic data in proximity to the Transmission Assets has been analysed including recreational vessels. **Section 1.8.2**: Vessel traffic analysis Alternative routeing used by regular vessels on defined routes during periods of adverse weather have been identified. **Section 1.10**: Transmission Assets impact assessment

Issue	Compliance	Reference and comments
		Based upon the baseline data and consultation undertaken impacts have been identified and fed into the impact assessment undertaken.
i. The structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.	✓	There are no surface structures associated with the Transmission Assets.
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.	✓	**Section 1.7.3**: MetOcean conditions MetOcean conditions in proximity to the Transmission Assets are described, including wind and tidal conditions. **Section 1.10**: Transmission Assets impact assessment Collision and allision risk have been assessed within the impact assessment.
4.10 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, or	✓	**Section 1.5.5**: Summary of data sources and information gathering Consultation with regular operators in the area was undertaken following the vessel traffic surveys. **Section 1.8.2**: Vessel traffic analysis Alternative routeing used by regular vessels on defined routes during periods of adverse weather have been identified. **Section 1.10:** Transmission Assets impact assessment Impacts have been identified and assessed within the impact assessment, taking into account the feedback from stakeholder consultation.
ii. for specified vessel types, operations and/or sizes	✓	
iii. in all directions or areas, or iv.	✓	
v. in specified directions or areas.	✓	
vi. in specified tidal, weather or other conditions	✓	
b. Navigation in and/or near the site should be prohibited or restricted:		
i. for specified vessels types, operations and/or sizes.	✓	**Section 1.10**: Transmission Assets impact assessment Potential impacts on navigation of the different communications and position fixing devices used in and around offshore structures are assessed.
ii. in respect of specific activities'	✓	
iii. in all areas or directions, or	✓	
iv. in specified areas or directions, or	✓	

Issue	Compliance	Reference and comments
v. in specified tidal or weather conditions.	✓	**Section 1.10**: Transmission Assets impact assessment Impacts have been identified and assessed within the impact assessment, taking into account the feedback from stakeholder consultation.
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	✓	**Section 1.10**: Transmission Assets impact assessment Impacts have been identified and assessed within the impact assessment, taking into account the feedback from stakeholder consultation.
d. Guidance on the calculation of safe distance of OREI boundaries from shipping routes has been considered	✓	There are no surface structures associated with the Transmission Assets.
4.11 Search and rescue, maritime assistance service, counter pollution and salvage incident response.		
The MCA, through HM Coastguard, is required to provide Search and Rescue and emergency response within the sea area occupied by all offshore renewable energy installations (OREIs) in UK waters. To ensure that such operations can be safely and effectively conducted, certain requirements must be met by developers and operators.		
a. An Emergency Response and Co-Operation Plan will be developed for the construction, operation and decommissioning phases of the OREI.	✓	**Section 1.6.5**: Applied mitigations Applied mitigations have been proposed and are summarised, which includes the requirement of offshore emergency and response and safety plan(s). (CoT70, Volume 1, Annex 5.3: Commitments Register of the ES)
b. The MCA's guidance document *Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response* for the design, equipment and operation requirements will be followed.	✓	**Section 1.6.5**: Applied mitigations Applied mitigations have been proposed and are summarised, which includes the requirement of offshore emergency and response and safety plan(s). (CoT70, Volume 1, Annex 5.3: Commitments Register of the ES)
c. A SAR checklist will be completed to record discussions regarding the requirements, recommendations and considerations outlined in the above document (to be agreed with MCA)	✓	**Section 1.6.5**: Applied mitigations Applied mitigations have been proposed and are summarised, which includes the requirement of a completed SAR checklist. (CoT70, Volume 1, Annex 5.3: Commitments Register of the ES)

Issue	Compliance	Reference and comments
4.12 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	P	**Section 1.6.5:** Applied mitigations Applied mitigations have been proposed and are summarised, including compliance with MGN 654, which expects the SAR checklist to be completed. (CoT70, Volume 1, Annex 5.3: Commitments Register of the ES)
ii. On a pre-established periodicity during the life of the development	✓	
ii. Post-construction: Cable route(s)	✓	
iii. Post-decommissioning of all or part of the development: the installed generating assets area and cable route	✓	
4.13 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 Global Maritime Distress and Safety System (GMDSS) and AIS, whether ship borne, ashore or fitted to any of the proposed structures, to:		
i. Vessels operating at a safe navigational distance	✓	**Section 1.10**: Transmission Assets impact assessment Potential impacts on navigation of the different communications and position fixing devices used around structures are assessed.
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;		There are no surface structures associated with the Transmission Assets.
ii. Vessel to shore;	✓	
iii. VTS radar to vessel	✓	

Issue	Compliance	Reference and comments
iv. Racon to/from vessel	✓	
c. The structures and generators might produce sonar interference affecting fishing, industrial or military systems used in the area.	✓	There are no surface structures associated with the Transmission Assets.
d. The site might produce acoustic noise which could mask prescribed sound signals.	✓	There are no surface structures associated with the Transmission Assets.
e. Generators and the seabed cabling within the site and onshore might produce electromagnetic fields affecting compasses and other navigation systems.	✓	There are no surface structures associated with the Transmission Assets.
4.14 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, the SOLAS Convention - Chapter V, IMO Resolution A.572 (14)[3] and Resolution A.671(16)[4] and **could include any or all** of the following:		
i. Promulgation of information and warnings through notices to mariners and other appropriate maritime safety information (MSI) dissemination methods.	✓	**Section 1.6.5**: Applied mitigations Commitments included as part of the Transmission Assets are summarised, including the promulgation of information. (CoT112, Volume 1, Annex 5.3: Commitments Register of the ES)
ii. Continuous watch by multi-channel VHF, including Digital Selective Calling.	✓	**Section 1.6.5**: Applied mitigations Commitments included as part of the Transmission Assets are summarised, including marine coordination. (CoT72, Volume 1, Annex 5.3: Commitments Register of the ES)
iii. Safety zones of appropriate configuration, extent and application to specified vessels[10]	✓	**Section 1.6.5**: Applied mitigations Commitments included as part of the Transmission Assets are summarised, including a safety zone statement. (CoT66, Volume 1, Annex 5.3: Commitments Register of the ES)
iv. Designation of the site as an area to be avoided (ATBA).	✓	It is not planned that there will be any ATBAs as a result of the Transmission Assets.

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

Issue	Compliance	Reference and comments
v. Provision of AtoN as determined by the GLA	✓	**Section 1.6.5**: Applied mitigations Commitments included as part of the Transmission Assets are summarised, including the provision of AtoNs in accordance with Trinity House and MCA requirements. (CoT46, Volume 1, Annex 5.3: Commitments Register of the ES)
vi. Implementation of routeing measures within or near to the development.	✓	It is not planned to implement any new routeing measures within or near to the Transmission Assets.
vii. Monitoring by radar, AIS, CCTV or other agreed means	✓	**Section 1.6.5**: Applied mitigations The Applicants will ensure compliance with MGN654 for vessel traffic monitoring and continuous watch, where appropriate, in consultation with the MCA. (CoT72, Volume 1, Annex 5.3: Commitments Register of the ES)
viii. Appropriate means for OREI operators to notify, and provide evidence of, the infringement of safety zones.	✓	Means for notifying and providing evidence of the infringement of Safety Zones will be provided in the Safety Zone Statement, submitted post consent. (CoT66, Volume 1, Annex 5.3: Commitments Register of the ES)
ix. Creation of an Emergency Response Co-operation Plan with the MCA's Search and Rescue Branch for the construction phase onwards.	✓	**Section 1.6.5**: Applied mitigations Applied mitigations have been proposed and are summarised, which includes the requirement of offshore emergency and response and safety plan(s). (CoT70, Volume 1, Annex 5.3: Commitments Register of the ES)
x. Use of guard vessels, where appropriate	✓	**Section 1.6.5**: Applied mitigations Applied mitigations have been proposed and are summarised, which includes the use of guard vessels where appropriate. (CoT66, Volume 1, Annex 5.3: Commitments Register of the ES)
xi. Update NRAs every two years e.g. at testing sites.	✓	**Section 1.6.5**: Applied mitigations Transmission Assets NRA not anticipated to require such updates.
xii. Device-specific or array-specific NRAs	✓	**Section 1.6**: Project description and MDS All offshore elements of the Transmission Assets are outlined. **Section 1.6.5**: Applied mitigations Applied mitigations have been proposed and are summarised, including a CBRA (outline document reference: J14) undertaken prior to construction which will serve as additional assessment relating to shipping and navigation. (CoT45, Volume 1, Annex 5.3: Commitments Register of the ES)

Issue	Compliance	Reference and comments
xiii. Design of OREI structures to minimise risk to contacting vessels or craft	✓	There are no surface structures associated with the Transmission Assets.
xiv. Any other measures and procedures considered appropriate in consultation with other stakeholders.	✓	**Section 1.11.6**: Potential additional risk controls Additional mitigations identified through consultation with stakeholders are summarised in **Table 1.37 and Table 1.7**. The table also details which were adopted by the Transmission Assets.