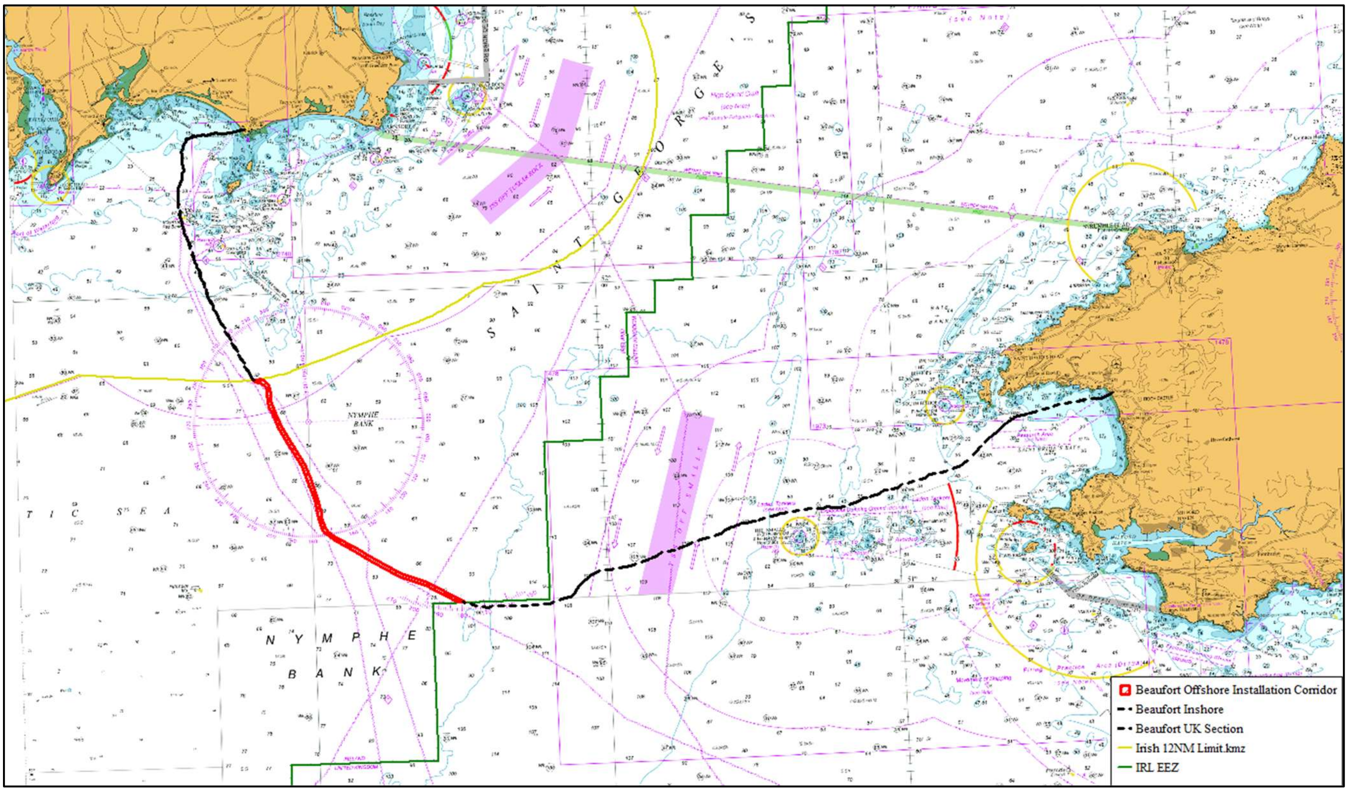
ALTEMAR
Marine & Environmental Consultancy

Ecological Impact Assessment (EcIA) for the Beaufort Subsea Fibre Optic Cable: Cable Installation Works from IRL 12nm to IRL EEZ Boundary.



31st March 2026

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Amazon MCS Ireland Limited.

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1. Introduction

1.1 Background

Ecological Impact Assessment (EcIA) has been defined as '*the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components*' (Treweek, 1999). "*The purpose of EcIA is to provide decision-makers with clear and concise information about the likely ecological effects associated with a project and their significance both directly and in a wider context. Protecting and enhancing biodiversity and landscapes and maintaining natural processes depends upon input from ecologists and other specialists at all stages in the decision-making and planning process; from the early design of a project through implementation to its decommissioning*" (IEEM, 2010).

The following EcIA has been prepared by Altemar Ltd. at the request of Amazon MCS Ireland Limited.

1.2 Study Objectives

The objectives of this EcIA are to:

1. Outline the project and any alternatives assessed;
2. Undertake a baseline ecological feature, resource and function assessment of the site and zone of influence;
3. Assess and define significance of the direct, indirect and cumulative ecological impacts of the project during its construction, lifetime and decommissioning stages;
4. Refine, where necessary, the project and propose mitigation measures to remove or reduce impacts through sustainable design and ecological planning; and
5. Suggest monitoring measures to follow up the implementation and success of mitigation measures and ecological outcomes.

The following guidelines have been used in preparation of this EcIA:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Draft Guidelines on the information to be contained in EIARs (2018);
- Guidelines for Ecological Impact Assessment (EcIA) (IEEM, 2019);
- Advice Notes on current practice in the preparation of EIS's (EPA, 2003);
- Institute of Ecology and Environmental Management Guidelines for EIA (IEEM, 2005).

1.3 Altemar Ltd.

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include: residential; infrastructural; renewable; oil & gas; private industry; Local Authorities; EC projects; and, State/semi-State Departments. Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with over 30 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture). Bryan has been involved in twelve international sub marine fibre optic cable projects, many of which involved Horizontal Directional Drills within designated sites and all works required ecological supervision.

2. Description of the Proposed Project

2.1 Background

Amazon MCS Ireland Limited is applying to land the new high-capacity Beaufort submarine fibre-optic cable system in Kilmore Quay, Co. Wexford; linking Ireland to the UK. The Beaufort system will be jointly developed and operated with Microsoft to provide next generation diverse connectivity between Ireland and the UK with onward connectivity to Continental Europe. When fully operational, the cable will support high quality, robust and resilient access to international telecommunications networks - a key driver in social, economic and industrial growth; supporting the development of the region and of Ireland as a whole as outlined in the National Marine Planning Framework.

The existing subsea cable systems in the Celtic Sea linking Ireland and the UK are approaching end of life as they date from the year 2000 and earlier. More recent cable builds between Ireland and the UK have focused on routing directly into Dublin from the Northeast of England and Wales. The new Beaufort system will help ensure the long-term security of communications and resilient connectivity for Ireland and the UK. The system will make use of existing infrastructure such as ducts and the cable landing compound in Kilmore Quay. The system will land in the UK at a landfall in Newgale, Wales.

The Beaufort subsea cable is approximately 33mm in diameter and will be "un-repeatered" (i.e. not powered). It is to be an industry-standard optical fibre cable. The cable will be double armoured in Irish waters.

Beaufort Cable System will re-use the existing ESAT-1 landfall infrastructure at Ballyteige Burrow to the northwest of Kilmore Quay. This includes the duct to sea beneath the dune system, the Beach Manhole, the fronthaul duct from the Beach Manhole to the Cable Landing Station and the Cable Landing Station.

Overall Route

Amazon MCS Ireland Limited is planning to construct a new subsea fibre optic cable system to replace an out-of-service cable and upgrade connectivity in the southern sea corridor between Ireland and the UK. The planned cable will extend from Kilmore Quay on the southeast coast of Wexford in Ireland to Newgale, Pembrokeshire on the southwest coast of Wales. The overall scheme is referred to as the Beaufort Cable System and the route configuration is shown in Figure 1.

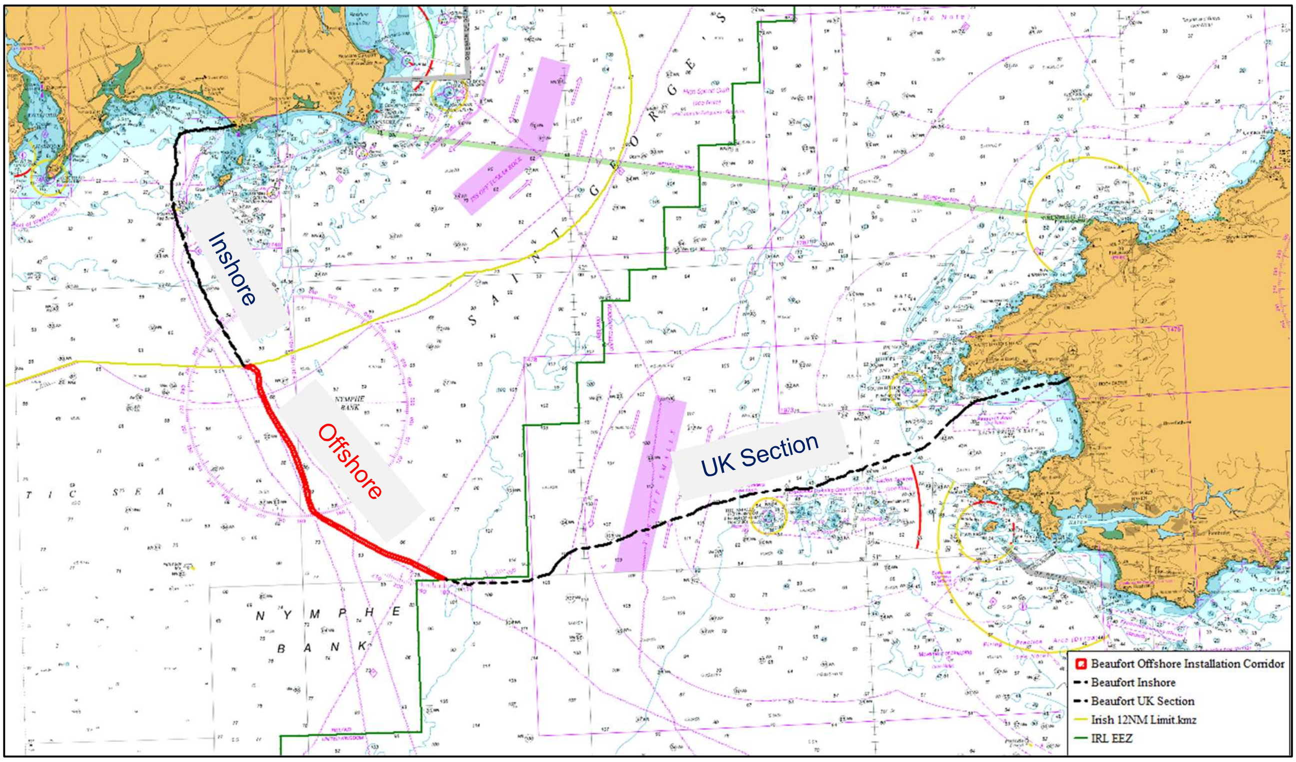


Figure 1. Beaufort Cable System (Source: MDM)

The planned system is comprised of three segments which are defined as follows:

Inshore:	Kilmore Quay to Irish 12nm Limit - Granted permission under Foreshore License FS007361 on 29/11/2023.
Offshore:	Irish 12nm Limit to Irish EEZ Boundary – This segment will be the primary focus of this report.
UK Section:	EEZ Boundary to Newgale - This segment is pending decision by UK authorities (application ref. CML2606).

Several cable systems linking Ireland and the UK have been constructed in the Celtic Sea in the past 25 years and these are shown in Figure 2. These cables include:

• Celtic	Kilmore Quay to Land's End	1994
• ESAT-1	Kilmore Quay to Land's End	1998
• UK - IRL Crossing 1	Kilmore Quay to Land's End	1999
• UK - IRL Crossing 2	Ballinesker to Bude	1999
• Solas	Kilmore Quay to South Wales	2000

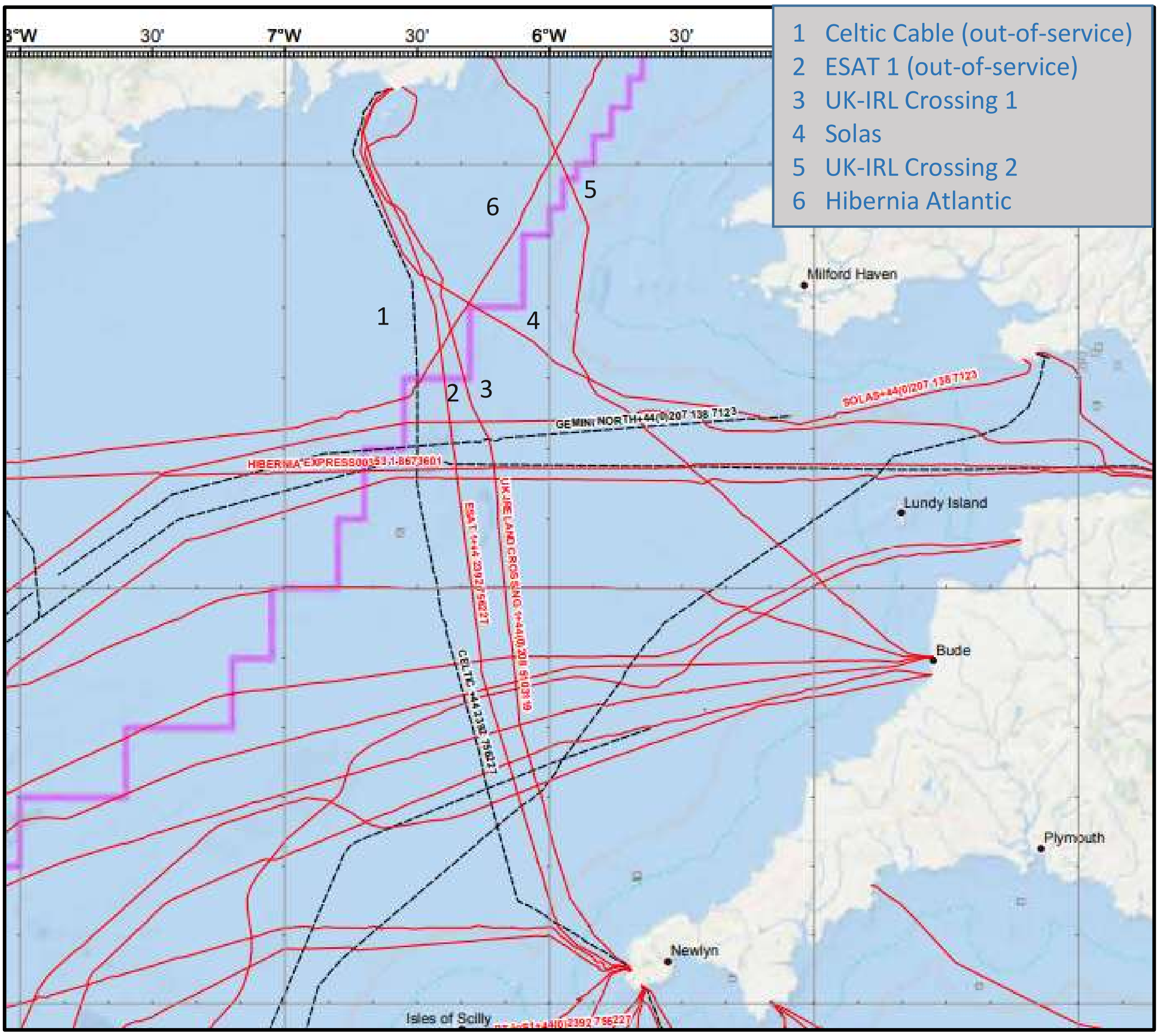


Figure 2. Existing Cable Systems (Source: MDM)

Celtic is an old Telecom Eireann / BT cable and has been taken out of service. ESAT-1 was installed in 1998 and has recently been taken out of service. UK-IRL Crossing 1 and UK-IRL Crossing 2 were both installed in 1999 and are relatively old in cable terms. Solas and Hibernia Atlantic installed in 2000 and 2001 respectively are also ageing cables.

The status of these existing cables leaves Ireland largely reliant on the subsea cables in the Dublin - Lancashire/Anglesey sector of the Irish Sea. This, together with increasing requirements for robustness, security, and resilience in overall network systems, establishes a need for a new and diverse cable system. The planned Beaufort Cable System is being developed to replace an out-of-service cable and upgrade the connectivity in the southern sea corridor from Ireland to the UK.

Significant turning points in the offshore section are listed as follows:

Irish 12 Mile Limit	KP – 39.3
Turning Point	KP – 60.0
Greenlink Interconnector Crossing:	KP – 58.8
EEZ Boundary	KP – 78.1

The overall route configuration is presented on an Admiralty Chart base map in Figure 3.

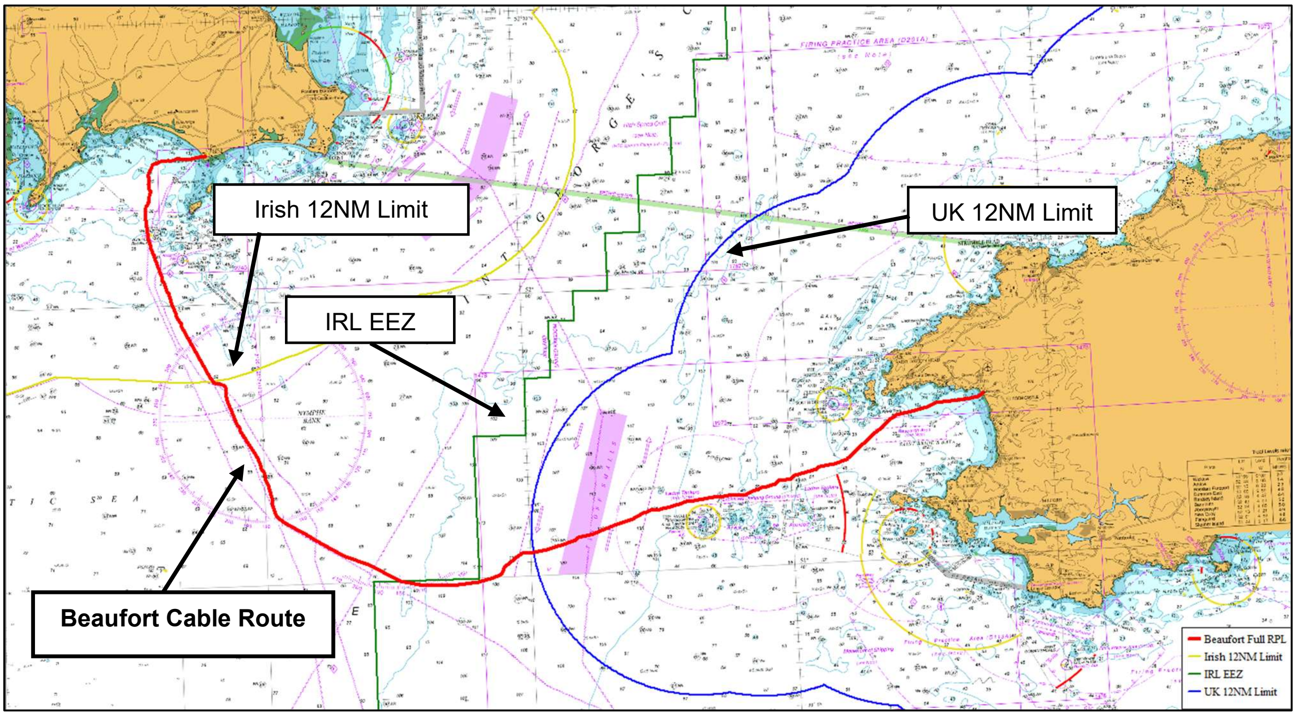


Figure 3. The Planned Beaufort Cable System Route (Source: MDM)

The Route Position List (RPL) corresponding to installation corridor of the Offshore Section of Beaufort (between the Irish 12nm limit to the EEZ boundary) is presented in Table 1. This corridor is 400m wide, 38.5 km in length and has a total area of approximately 15.38 km^2.

Table 1. Beaufort IRL Offshore Installation Corridor RPL			
ID	LATITUDE	LONGITUDE	COMMENT
1	51° 54' 35.3826" N	6° 35' 37.2180" W	IRL 12NM Limit
2	51° 54' 36.2943" N	6° 35' 21.7787" W	IRL 12NM Limit
3	51° 54' 37.7038" N	6° 35' 01.6170" W	IRL 12NM Limit
4	51° 54' 38.6017" N	6° 34' 50.6195" W	IRL 12NM Limit
5	51° 54' 34.5993" N	6° 34' 34.7132" W	
6	51° 54' 28.6861" N	6° 34' 19.0584" W	
7	51° 54' 20.9485" N	6° 34' 06.7819" W	
8	51° 54' 11.1139" N	6° 33' 57.6221" W	
9	51° 53' 59.5495" N	6° 33' 52.4391" W	
10	51° 53' 45.6884" N	6° 33' 51.0768" W	
	51° 53' 45.5170" N	6° 34' 01.9208" W	IRL – UK Crossing 1
11	51° 53' 14.1252" N	6° 33' 47.9203" W	
12	51° 52' 53.7233" N	6° 33' 40.7627" W	
13	51° 52' 37.1581" N	6° 33' 29.3758" W	
14	51° 52' 10.7185" N	6° 33' 11.4243" W	
15	51° 51' 33.3104" N	6° 32' 49.4773" W	
16	51° 49' 36.5792" N	6° 31' 03.5939" W	
17	51° 49' 05.5611" N	6° 30' 35.0001" W	
18	51° 48' 02.9995" N	6° 29' 57.0942" W	
19	51° 47' 06.0227" N	6° 29' 27.1952" W	
20	51° 46' 41.1144" N	6° 29' 16.3548" W	
21	51° 46' 00.1548" N	6° 29' 03.4950" W	
22	51° 45' 40.7520" N	6° 28' 59.8563" W	
23	51° 45' 21.0376" N	6° 28' 52.2292" W	
	51° 45' 20.6984" N	6° 29' 02.1085" W	Greenlink Interconnector
24	51° 45' 19.8445" N	6° 28' 51.7652" W	
25	51° 45' 02.1295" N	6° 28' 41.4627" W	
26	51° 44' 52.8960" N	6° 28' 31.8361" W	
27	51° 44' 44.7599" N	6° 28' 17.6373" W	
28	51° 44' 24.8686" N	6° 27' 34.0552" W	
29	51° 43' 39.8560" N	6° 25' 33.8987" W	
30	51° 43' 21.6075" N	6° 24' 47.6985" W	
31	51° 43' 10.3905" N	6° 24' 18.7566" W	
	51° 43' 04.2921" N	6° 24' 24.1696" W	IRL – UK Crossing 1
32	51° 42' 34.0198" N	6° 22' 44.9476" W	
33	51° 41' 59.0889" N	6° 21' 05.5635" W	
34	51° 41' 20.2014" N	6° 18' 29.8712" W	
35	51° 41' 04.2676" N	6° 17' 43.2754" W	
	51° 40' 59.1939" N	6° 17' 47.6817" W	Hibernia Atlantic Crossing
36	51° 40' 25.3143" N	6° 15' 49.1535" W	
37	51° 40' 22.5346" N	6° 15' 41.4168" W	
38	51° 40' 02.7628" N	6° 14' 41.4159" W	
39	51° 40' 00.1217" N	6° 14' 43.6674" W	IRL EEZ
40	51° 40' 00.1071" N	6° 15' 17.8010" W	IRL EEZ
41	51° 40' 11.2094" N	6° 15' 51.4998" W	
42	51° 40' 14.0380" N	6° 15' 59.3727" W	
43	51° 40' 52.9247" N	6° 17' 53.3022" W	
44	51° 41' 08.4850" N	6° 18' 38.8063" W	
45	51° 41' 47.4001" N	6° 21' 14.6130" W	

Table 1. Beaufort IRL Offshore Installation Corridor RPL			
46	51° 42' 22.8923" N	6° 22' 55.5957" W	
47	51° 42' 59.4103" N	6° 24' 29.7868" W	
48	51° 43' 10.6569" N	6° 24' 58.8060" W	
49	51° 43' 28.8536" N	6° 25' 44.8762" W	
50	51° 44' 14.0909" N	6° 27' 45.6363" W	
51	51° 44' 34.7597" N	6° 28' 30.9234" W	
52	51° 44' 44.4933" N	6° 28' 47.9111" W	
53	51° 44' 56.3414" N	6° 29' 00.2648" W	
54	51° 45' 16.1174" N	6° 29' 11.7682" W	
55	51° 45' 18.0082" N	6° 29' 12.5038" W	
56	51° 45' 38.4847" N	6° 29' 20.4284" W	
57	51° 45' 58.1664" N	6° 29' 24.1218" W	
58	51° 46' 38.1865" N	6° 29' 36.6917" W	
59	51° 47' 02.3312" N	6° 29' 47.2027" W	
60	51° 47' 58.7194" N	6° 30' 16.7997" W	
61	51° 49' 00.0404" N	6° 30' 53.9611" W	
62	51° 49' 30.2000" N	6° 31' 21.7671" W	
63	51° 51' 27.8940" N	6° 33' 08.5376" W	
64	51° 52' 05.9988" N	6° 33' 30.8978" W	
65	51° 52' 32.1171" N	6° 33' 48.6343" W	
66	51° 52' 49.7817" N	6° 34' 00.7791" W	
67	51° 53' 12.3418" N	6° 34' 08.6967" W	
68	51° 53' 44.8955" N	6° 34' 11.9564" W	
69	51° 53' 57.4039" N	6° 34' 13.1874" W	
70	51° 54' 06.0746" N	6° 34' 17.0746" W	
71	51° 54' 13.0597" N	6° 34' 23.5810" W	
72	51° 54' 18.4766" N	6° 34' 32.1761" W	
73	51° 54' 23.0070" N	6° 34' 44.1703" W	
74	51° 54' 26.3966" N	6° 34' 57.6414" W	
75	51° 54' 29.8986" N	6° 35' 18.9298" W	
76	51° 54' 30.3472" N	6° 35' 20.8519" W	
77	51° 54' 35.3826" N	6° 35' 37.2180" W	
78	51° 54' 35.3826" N	6° 35' 37.2180" W	

A MAC (ref: MAC240030) has been granted by the Maritime Area Regulatory Authority for the cable segment from IRL 12nm to IRL EEZ.

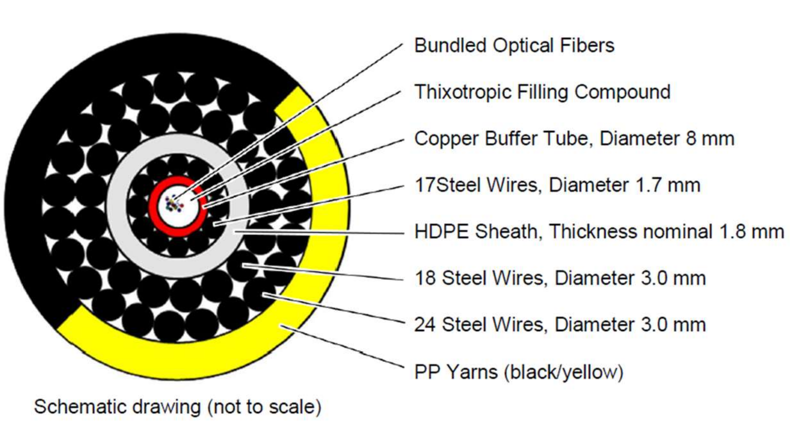
Provisional Timeline

The provisional timeline for the project is as follows:

Main-Lay	Q2/Q3 2027

Cable Specification

The NSW MINISUB DA 192 has been chosen for the Beaufort project. The fibre optic cable will be 33mm in diameter and will be “un-repeatered” (i.e. not powered). It is to be an industry-standard cable with the capability to transmit high-speed data and voice via light waves through the 72 optical fibre pairs contained within the core Unit Fibre Structure (UFS). The cable will be double armoured (DA) in Irish waters, and a cut-away section of the cable is shown in Figure 4.



Mechanical Characteristics

Outer diameter	nominal	33	mm
Fiber count	up to	192	Fibers
Weight in air	nominal	3150	kg/km
Weight in seawater	nominal	2550	kg/km
Specific gravity in seawater	nominal	5.2	
Minimum bending radius with load		1000	mm

Figure 4. NSW MINISUB DA 192 Specification (Source: MDM)

The UFS is the innermost element of the cable and consists of 72 optical fibre pairs embedded in a buffer gel material inside a copper buffer tube. The buffer gel is a thixotropic material that protects the optical fibres from shear stresses associated with movement inside the tube. Ultra-high strength steel wires are helically wrapped around the UFS and together they act as a pressure vessel that protects the UFS from stresses greater or equal to 100 MPa. The interstices between the steel wires are filled with a hydrophobic elastomeric water-blocking material which resists longitudinal water ingress. A thin layer of ethylene-acrylic and copolymer plastic resin and a thick layer of polyethylene insulating jacket are co-extruded over the copper sheath. This HDPE sheath provides insulation, abrasion resistance and corrosion protection.

The double armour, consisting of two layers of galvanised wire wrapped around the cable, is coated with hot-blown asphalt and wound with polypropylene yarn. The finished DA Cable has an outer diameter of 33 mm.

2.2 Subsea Crossings

The proposed route between the Irish 12nm limit and the EEZ boundary entails a total of 4 subsea crossings of existing in-service telecoms cables and an electrical interconnector. Further details of the crossings are shown in Table 2 below.

Name	Type	Position	Water Depth	Latitude	Longitude
UK-IRL Crossing 1	Telecom	KP 41.9	55m	51° 53' 45.5170" N	6° 34' 01.9208" W
Greenlink Interconnector	Electrical Interconnector	KP 58.8	60m	51° 45' 20.6984" N	6° 29' 02.1085" W
UK-IRL Crossing 1	Telecom	KP 65.8	66m	51° 43' 04.2921" N	6° 24' 24.1696" W
Hibernia Atlantic	Telecom	KP 74.4	76m	51° 40' 59.1939" N	6° 17' 47.6817" W

Table 2: Subsea Crossings

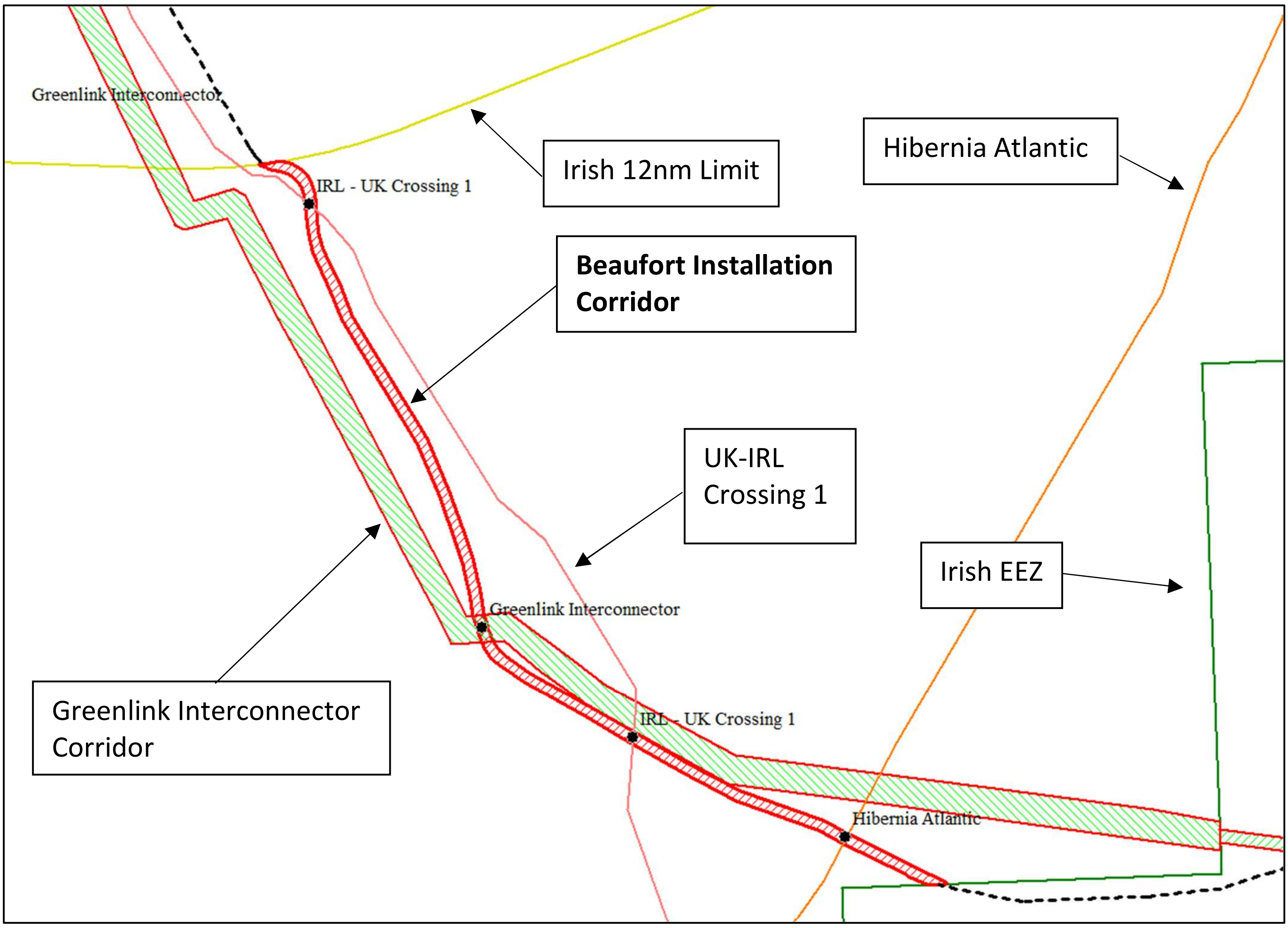


Figure 5: Beaufort Subsea Crossings

In-Service Telecoms Cables

As highlighted in Table 2, the Beaufort cable has 3 crossings over in-service telecoms cables between the Irish 12nm limit and the EEZ boundary, crossing the Ireland-UK Crossing 1 twice and Hibernia Atlantic Seg D once. Crossing agreements will be put in place with the respective cable owners to allow the in-service cables to be crossed directly with the jetting sword in free-float mode. This enables both the crossed cable and the installed cable to be jetted to depth and precludes the need for pre and post crossing works.

The following methodology will be implemented at the cable crossings: the cable lay speed will be reduced when the cable lay vessel is approaching the crossing. At 20 m from the crossing the sword will be put in the free-floating mode. In the free-floating mode, the sword is pointing 45 degrees downwards, it is not locked in this position, and it will slide over obstructions as illustrated in Figure 6 below. In this mode the sword will trench the cable and the crossed product to a burial depth of approximately 1 metre. CAPJET cannot damage the crossed cable as the trenching method used is high pressure, focussed, water jetting. If requested by the 3rd party asset owner, further cable protection such as cast-iron shells, Uraduct plastic shells or silicon sleeves can be installed from the installation vessel.

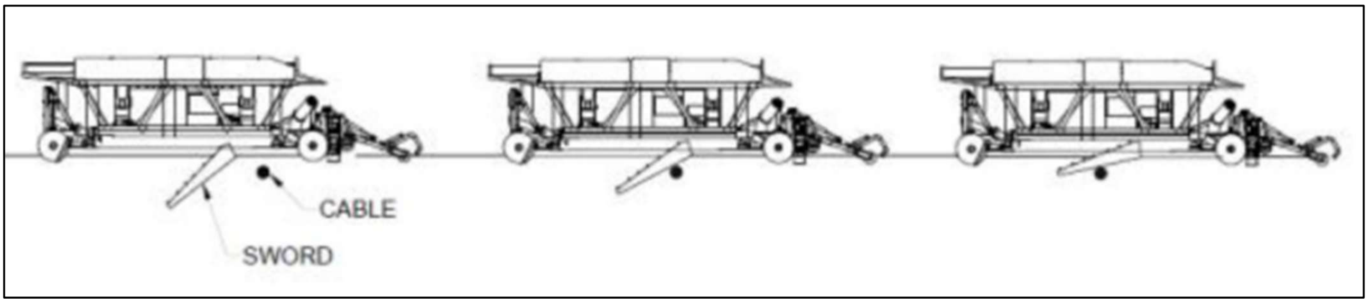


Figure 6: CAPJET in Free Floating Mode when Crossing a Cable

OOS Telecoms Cables

The Beaufort cable will not cross any out of service (OOS) cables between the Irish 12nm limit and the EEZ boundary.

Greenlink HVDC Interconnector Cable

The Greenlink Interconnector is a submarine power cable running from Baginbun Beach, Co. Wexford (east side of the Hook Peninsula) to Freshwater West, Pembrokeshire, Wales. It was installed in 2025, and its overall route is similar to that of Beaufort (shown in Figure 5). As shown in Table 1, The Beaufort cable route will cross the Greenlink Interconnector at: *51°45'20.6984"N, 6°29'02.1085"W.*

The preliminary crossing design for the Greenlink Interconnector intends to use the same Uraduct crossing cable protection and design as used in in-service telecom cable crossings. Should this not be agreeable with the Greenlink Interconnector owners, alternative forms of crossing protection will be explored. This may involve pre-lay crossing construction. This may involve the installation of an articulated concrete mattress over the crossing point of the interconnector cable (as shown in Figure 7) prior to the main lay cable installation. The interconnector cable is buried at the crossing location. The dimensions of a concrete mattress are 3.0m x 6.0m x 0.45m and the leading edge of each mattress is tapered for hydraulic stability and for cable installation (Figure 7). The Beaufort cable will then be laid over the concrete mattress. The exact crossing design will be confirmed following further consultation with the owners of the Greenlink Interconnector.

Figure 7: Example of Articulated Concrete Mattress

A summary of the pre-lay crossing construction works is as follows:

- It will be required to install additional protection on the Beaufort cable at the Greenlink crossing. This protection will be a product such as Uraduct, which is a specialized polyurethane ducting designed to wrap around the cable thus minimizing abrasion
- The concrete mattress will be installed on the seabed using the vessel crane and a mattress installation frame with touchdown monitoring. The installation location will also be verified via beacons mounted on the installation frame. The mattress installation frame slings will be released, and the frame recovered to the deck.
- It may also be required to install additional protection on the Beaufort cable at the Greenlink crossing. If required, This protection would likely be a product such as Uraduct, which is specialized polyurethane ducting designed to wrap around the cable thus minimizing abrasion.

2.3 Cable Installation

The principal objective of the main lay installation works is to successfully deploy the fibre optic cable along the proposed route, obtaining the required burial depth to protect the system from external aggression and provide for a safe and secure system, with due regard for environmental, archaeological and ecological considerations.

Subsea Cable Installation

The Beaufort Cable System will feature a direct landing at Kilmore Quay. The Main Lay Vessel will bring the cable toward the shoreline until reaching the designated landing point. An inshore installation team will be in place to bring the cable ashore. Once the cable is securely landed, the required termination and testing activities will be completed onshore. The Main Lay Vessel will then proceed to deploy and bury the cable in the seabed. The burial tool is operated from and powered by the Main Lay Vessel and is designed to bury the cable at a depth such that the cable will be secure from fishing activities. The target burial depth of 1.5m is subject to reasonable endeavours and where the seabed geology allows.

Typical burial speed is generally of the order of 0.5 knots and is dependent on the stiffness of the seabed sediment. There is no significant noise generation during burial operations. Cable installation produces only a minor plume of suspension of seabed sediments in the water column, and this is transient and localised due to the nature of the burial and natural backfill activities.

Typical subsea cable burial tools used to simultaneously install and bury fibre optic cables in the seabed include cable plough (passive and jet assisted) or jetting trenchers (sled or self-propelled). The Nexans CAPJET jetting trencher will be deployed for the installation of the Beaufort cable system.

The Nexans CAPJET system is a remotely operated jetting trencher developed to bury subsea cables and pipelines into the seabed. It uses high-pressure focussed water jets to fluidize the sediment beneath the cable or pipeline, allowing it to settle into a trench without mechanical cutting. The CAPJET is capable of:

- Trenching to depths of up to 3 m, depending on soil conditions.
- Operating in waters up to 2,000 m deep.
- Performing in a variety of seabed types, from soft sediment to harder soils, with adjustable jet pressure (10–16 bar) and thrust.

It integrates multiple sensors (video cameras, sonar, gyros, pressure sensors) for precise control and real-time monitoring. The system’s modular design enables different trenching configurations — for flexible pipelines, steel flowlines, and cable burial.

In the context of this project the CAPJET will be used to simultaneously lay and bury the Beaufort cable by forming a narrow trench (approx. 150mm) of fluidised seabed using a bespoke jetting sword into which the cable is installed to the target depth through the cable depressor. The seabed sediment is displaced temporarily to form the trench during the burial operation and then allowed to re-form naturally and 'backfill' the trench after the passage of the jetting tool. The CAPJET will be powered and controlled from the cable installation vessel via electrical umbilical. A visual representation of the CAPJET system is shown in Figure 8.

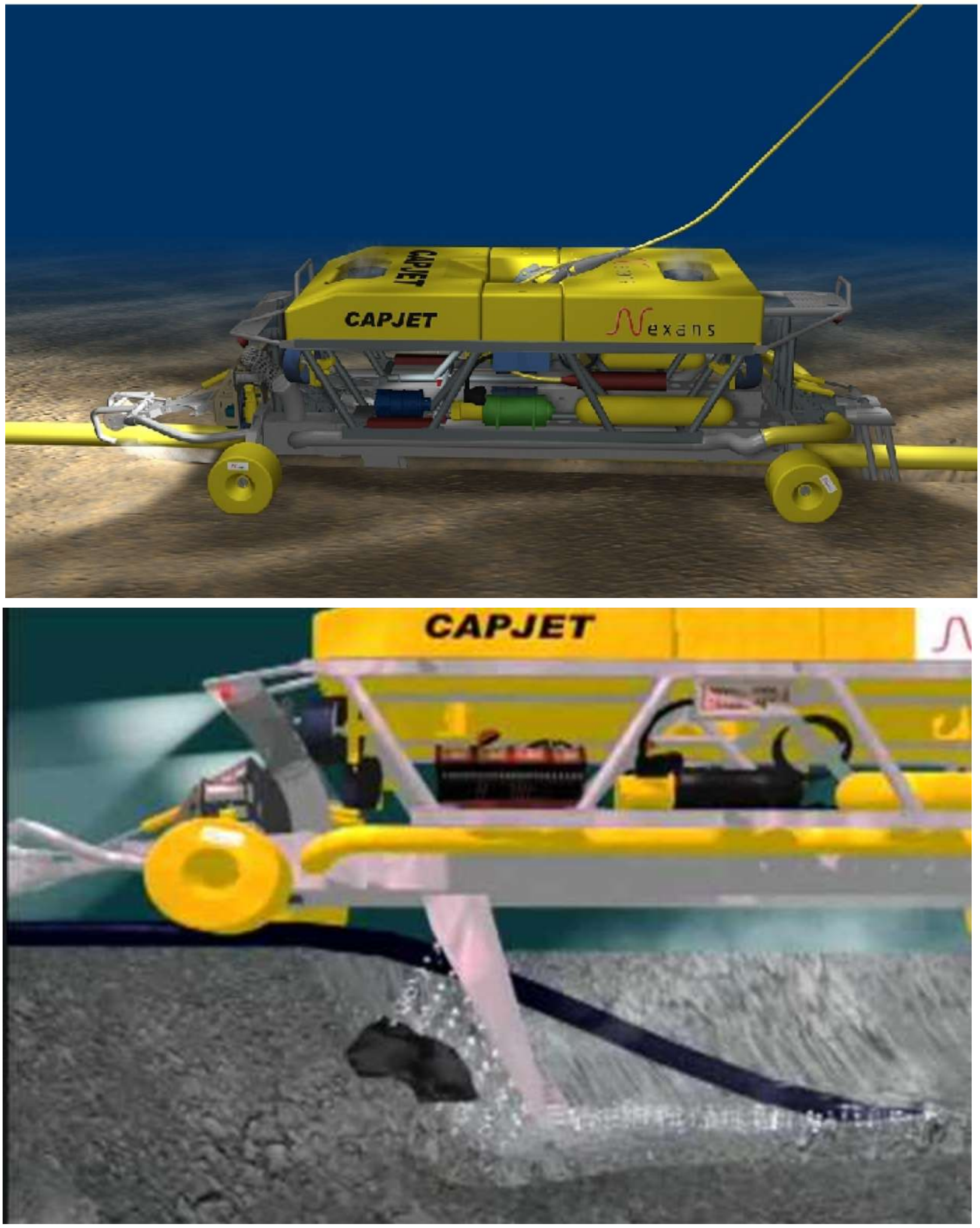


Figure 8: Nexans CAPJET Burial Tool

The target burial depth for the Beaufort cable system is 1.5 metres. In areas of stiff soil, the actual burial depth may be reduced but is planned to be still at a depth which will be protect the cable from fishing operations and generally not less than 1 metre. Where seabed geology prevents burial such as areas of rock or reef, the cable will be directly laid on the seabed surface.

Post Lay Operations

Following main lay operations, post-lay inspection and burial (PLIB) may be carried out in certain areas to inspect the proper laying and burial of the cable in the seabed. A post-lay burial operation may be performed in order to supplement the burial operations in the following instances:

- Planned recoveries of the burial tool.
- Initial and final splice positions within the buried sections – Post-Lay Inspection and Burial is planned for the initial splice location between the Pre-Lay Shore End and main lay section of the cable to 1.5 metre target burial depth.
- Unplanned recoveries due to burial tool breakdown, adverse weather , etc.
- Surface-laid sections due to burial tool malfunction where the burial tool is not brought back on board.

In limited areas requiring post-lay burial, the CAPJET system is also utilized. As described previously, the CAPJET uses a jetting burial tool to bury the cable to the required depth. The seabed is emulsified using high-pressure focussed water jets in the localised region of the burial, and a narrow trench is formed. The CAPJET system slowly moves along the seabed on the required cable track forming a narrow trench into which the cable is placed. The seabed sediment is displaced temporarily to form the trench during the burial operation and then allowed to re-form naturally and 'backfill' the trench after the passage of the CAPJET's burial tool.

It should be noted that the surrounding seawater is used for the jetting system, i.e. nothing alien is introduced into the environment. The burial tool does not remove any seabed materials from the area. The CAPJET burial operation is controlled from the main vessel and monitored in real time using high-definition video cameras and imaging sonar mounted on the vehicle.

Post-Lay Greenlink HVDC Interconnector Crossing Operations

If required, the Greenlink HVDC Interconnector crossing will be inspected following the Main Lay installation and necessary post lay burial activities within the Safety Zone will be undertaken. It is expected that, the Post-Lay Inspection and Burial will be undertaken using the Nexans CAPJET burial tool.

In summary, the Post-Lay Inspection and Burial (PLIB) works are as follows:

- The PLIB vessel will take position at the crossing location.
- The crossing will be inspected by ROV.
- The Nexans CAPJET will be docked on the Beaufort cable at the limit of the Jet Zone, and moving away from the HVDC cable will bury the temporarily surface laid section of the Beaufort cable at a target trenching speed of 400m/hr.

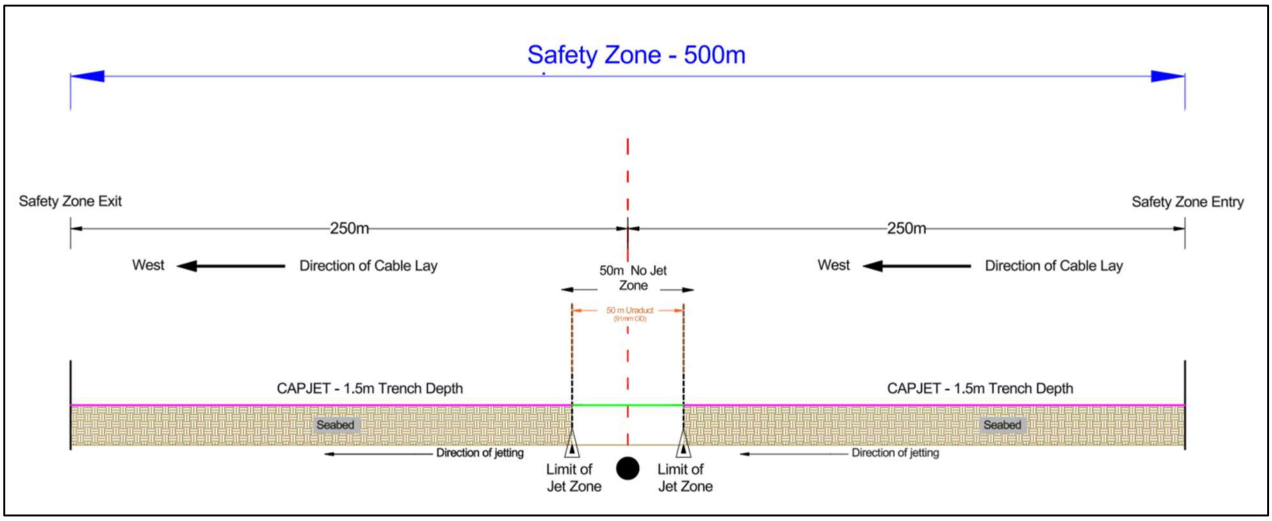


Figure 9: Greenlink HVDC Interconnector Crossing Safety Zone

Post-Lay Greenlink Interconnector Crossing Rock Berm Construction

Should the previously presented Post-Lay proposal not be agreeable with the Greenlink Interconnector owners, additional post-lay construction of a rock berm to protect the Beaufort cable may be required at the Greenlink HVDC Interconnector crossing.

If required, the rock berm will extend 13.5m along the interconnector axis, centred at the crossing location, and a berm depth of 0.8m. This will cover the pre-lay concrete mattress. The rock berm along the cable axis will be 64m (total length) x 1.5m (top width). (Figures 10-13).

The side slopes will be installed to a 1:3 ratio to provide hydraulic stability and protection from snagging of fishing gear etc. The area of the rock berm is 463m^2 (including sloped sides) with a total volume of rock of approximately 220m^3, accounting for a 10% loss in loose rock placement or discrepancies in the seabed geometry. The rock berm will be constructed with a mix of freshly crushed rock (granite/gneiss) with a maximum size of between 12 and 20 cm topped with a 20cm layer of smaller armourstone.

The height of the proposed rock berm will not interfere with navigation, and the crossing and rock placement is designed to be trawled over by fishing vessels.

A summary of the rock placement works is as follows:

i. The rock material will be loaded and positioned on the vessel in accordance with its grading and characteristics.
ii. The vessel hopper will be loaded with the rock.
iii. The vessel will transit to the crossing location, and the flexible fall pipe will be deployed.
iv. The vessel will take position over the crossing point and hold position using its Dynamic Positioning (DP) systems.
v. Rock placement will be undertaken in a controlled manner with the position of the fall pipe 'nozzle' above the seabed adjusted in real time to ensure accurate construction of the rock berm (Figure 10).
vi. The crossing will be surveyed by the observation ROV and, if successfully completed, the fall pipe will be recovered.

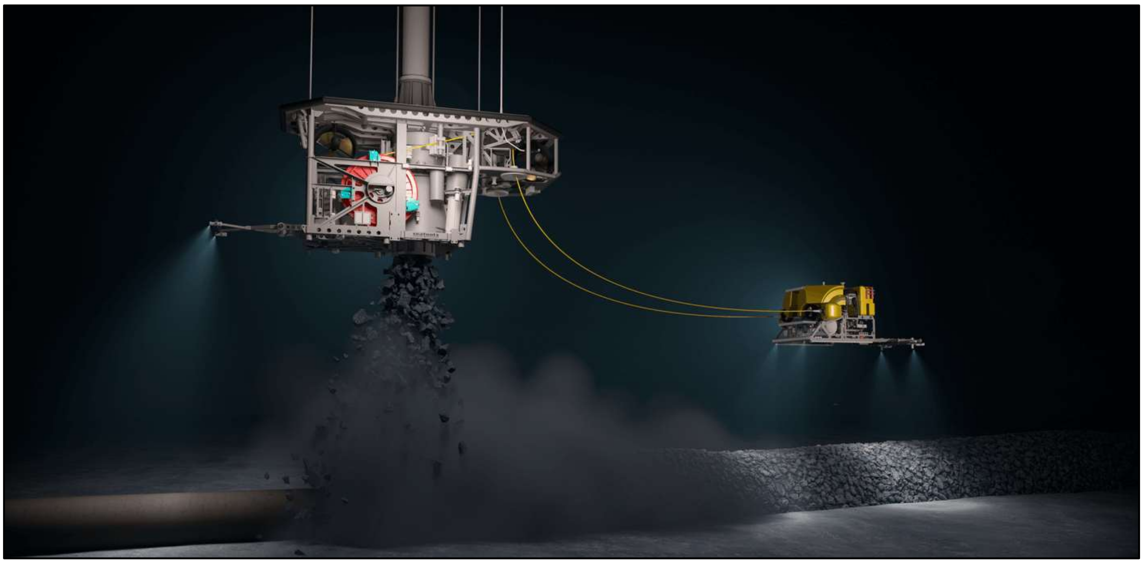


Figure 10: Fall Pipe Discharging Rock

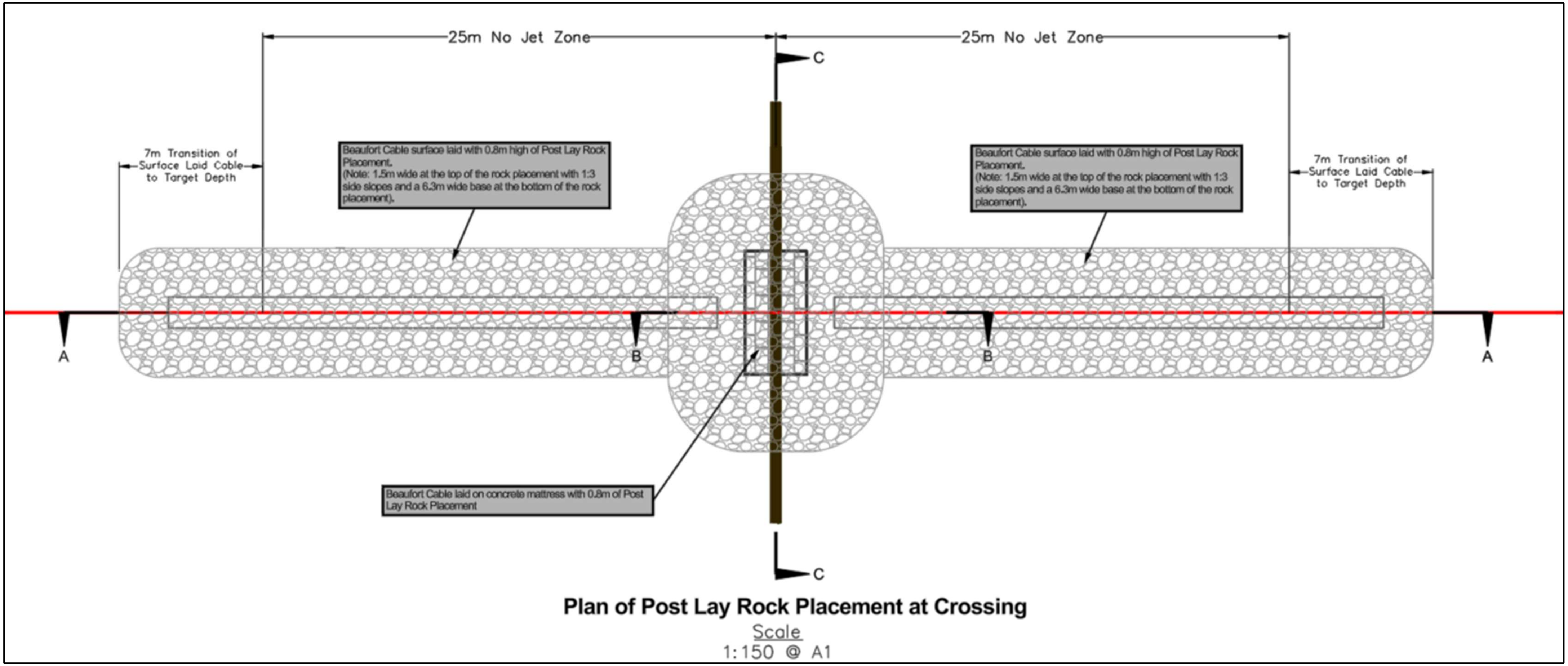


Figure 11: Plan View of Post Lay Rock Berm

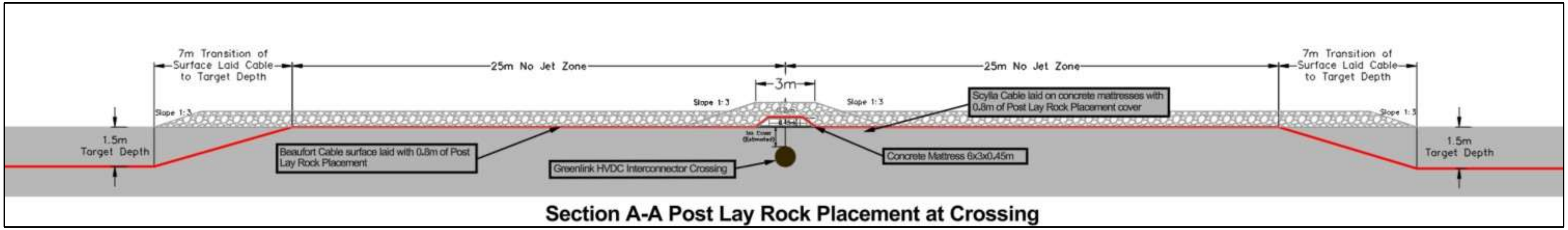


Figure 12: Cross Section A-A of Post Lay Rock Berm

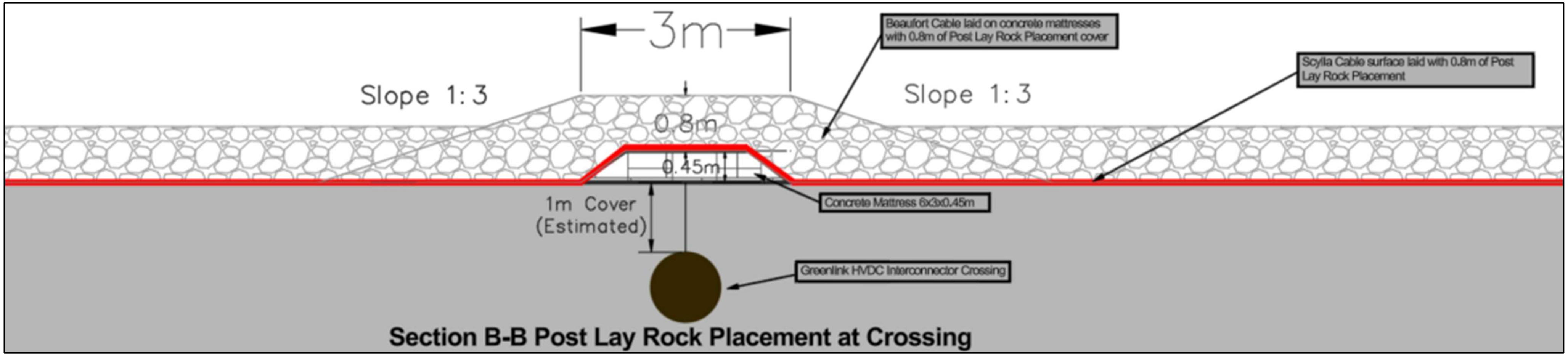


Figure 13: Cross Section B-B of Post Lay Rock Berm

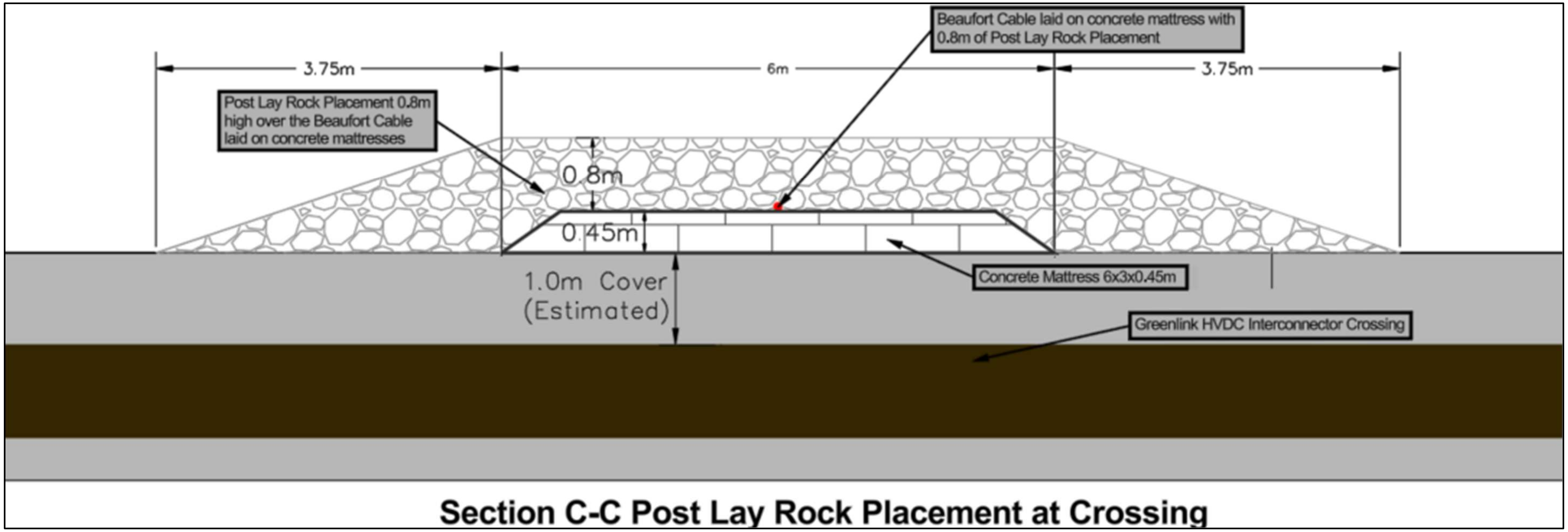


Figure 14: Cross Section C-C of Post Lay Rock Berm

Ultra-Short Baseline (USBL) Subsea Positioning

An Ultra-Short Baseline (USBL) is a subsea positioning system widely used by the offshore marine industry and scientific research vessels to accurately track the position of towed equipment and sensors. The USBL system consists of a transceiver mounted to the cable vessel, and transponders on the towed burial tool.

To calculate a subsea position, the USBL calculates both a range and an angle from the transceiver to the subsea beacon. Angles are measured by the transceiver, which contains an array of transducers. The transceiver emits an acoustic signal at predetermined periods (often 0.5 seconds) which is returned by the transponder and allows for the bearing and distance to be calculated.

USBL systems are designed for close range transmission and thus typically emit pulses of medium frequency sound (20 to 50 kHz). Manufacturers report SPL values of 194 to 207dB re 1µPa at 1m depending on the model used, taking as an example the higher range of USBL source (Kongsberg HiPAP) with a SPL of 207dB re 1µPa at 1m.

All works that involve the use of acoustic instrumentation such as the USBL will follow the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (Department of Arts, Heritage and Gaeltacht, 2014).

2.4 Cable Installation Vessel

The main lay installation vessel will consist of a dedicated marine spread which will be suitable for the scope of work required, the water depth and the anticipated seabed conditions of the cable route. The Cecon CLV will be used to carry out the installation works. It is a newly built vessel and is 100m in length, 21m in breadth and can accommodate 100 personnel (consisting of the ship's crew, cable installation personnel and client representatives). A visual representation of the Cecon CLV is shown below.

Figure 15: Cecon CLV

Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work. Prior to installation works taking place, both Project Supervisor for Design Process (PSDP) and Project Supervisor for Construction Stage (PSCS) will be appointed under the relevant legislation and project specific HSE plans will be put in place which will form part of the project execution plans.

Cable installation vessels will generate some subsea noise in the marine environment from engine noise and dynamic positioning thrusters. Shipping noise is typically within the 50-300 Hz frequency band and is the dominant noise source in deeper water (DECC, 2011). Propellers on vessels all have the potential to produce cavitation noise. This sound is caused by vacuum bubbles that were generated by the collapse of bubbles created by the spinning of the propellers.

Acoustic broadband source pressure levels typically increase with increasing vessel size, with smaller vessels (<50 m) having source pressure levels 160-175 dB (re 1µPa at 1m), medium size vessel (50-100 m) 165-180 dB (re 1µPa at 1m) and large vessels (>100 m) 180-190 dB (re 1µPa at 1m) (DECC, 2011). Every vessel has a unique noise signature and for each vessel this can change in response to several factors, including ship speed, operational status, vessel load, the condition of the vessel and even the properties of the water that the vessel is operating in.

2.5 Timeline and Duration of Cable Lay Activities

The intention is to commence the cable installation in Spring 2027 accounting for vessel availability, the overall cable installation programme, seasonality and suitable weather windows. The exact mobilisation dates will not be known until closer to the time and once all permits and authorisations are in place in Ireland and the UK. It is anticipated that the main lay operations within the offshore area between the Irish 12nm limit and the EEZ will take less than 2 weeks in total and will be completed over a 2 month period.

2.6 Decommissioning

Once the cable system is designated 'out of service', a decision will be made to decommission the cable. Reasonable endeavours will be made to remove the cable. In the first instance, winching and vessel pull will be employed to pull the cable from the seabed. If this is not successful and if there is a risk of breaking the cable a jetting tool may be employed to fluidise the seabed and aid recovery. Winching is expected to be effective for recovery where the cable burial is less than 1.5m and depending on the stiffness of the seabed. Use of a jetting tool in soft (sandy) sediments may allow successful recovery where the burial is buried up to 1.5m. If the cable is buried greater than such depths or in stiff sediments it may not be feasible to recover, with the cable breaking before it can be recovered. In such cases there may be no alternative but to leave the cable in-situ with any exposed cable ends secured on the seabed with clump weights in accordance with *ICPC Recommendation 1* and the location will be recorded in the decommissioning file.

3. Ecological Assessment Methodology

3.1 Desk Study

A desk study was undertaken to gather and assess ecological data. It should be noted that the proposed project is located within the offshore subtidal of Irish waters (between 12nm limit – Irish EEZ Boundary). Sources of datasets and information included:

- The National Parks and Wildlife Service
- National Biodiversity Data Centre
- Marine Institute
- INFOMAR (Lidar, backscatter and multibeam) (WMS data)
- Irish Whale and Dolphin Group
- Bord Iascaigh Mhara
- Environmental Protection Agency (Water Quality Data)
- Bing Maps (ArcGIS)
- EU marine habitat data (incl. EMODnet)

A provisional desk-based assessment of the potential subtidal habitats was carried out. This included a detailed assessment of INFOMAR data (backscatter, multibeam and LIDAR) in addition to Marine Strategy Framework Directive habitat mapping of the offshore area, Admiralty charts, NPWS Data, broadscale habitat data, and EUSEAMAP data.

3.2 Consultation

The National Parks and Wildlife Service (NPWS) were consulted in relation to the project, species data and sites of conservation interest. The National Biological Data Centre (NBDC) (Appendix I) and Irish Whale and Dolphin Group (IWDG) records were consulted for species of conservation significance.

3.3 Spatial Scope and Zone of Influence

IEEM (2006) defined the zone of influence as "*the areas/resources that may be affected by the biophysical changes caused by activities associated with a project*". In order to define the extent of the study area for ecological assessment, all elements of the project were assessed and reviewed in order to identify the spatial scale at which ecological features could be impacted. Due to the limited temporal and geographical scale of the project and the use of Best Available Techniques (BAT), the slow speed of the cable lay (0.5kn), it is considered that the potential impacts of the proposed Beaufort Offshore (12nm-Irish EEZ) Cable works could only extend beyond 500 m of the subtidal elements of the project due to noise generation and potential disturbance of sediment. However, as outlined in IEEM (2010) "*in the marine environment it is more difficult to define the geographical framework precisely and to accommodate all factors that should influence the definition of value, e.g. size or conservation status of populations or the quality of habitats*." As a result, "*it is very unlikely that the impacts on integrity can be evaluated without considering functions and processes acting outside the site's formal boundary*." It is important to note that unlike other maritime operations during main lay cable installation works, the installation vessel speed will be very slow (0.5 knots). In light of this, and based on the localised nature of the cable laying impacts (including maintenance and decommissioning works), the Zone of Influence in the subtidal was extended to 2 km either side of the cable route to take into account localised resuspension due to cable laying activity. It should be noted that the noise generated from the vessel laying activity is relatively minor, similar in nature to trawling activity. The proposed project is for main lay operations and not marine survey. However, despite the lack of extensive underwater acoustics that would be used in a traditional marine survey, the project has the potential to introduce noise into the marine environment particularly through the use of a USBL (Ultra Short Baseline) equipment used to locate underwater equipment e.g. jetting trencher and ROV's etc. which may extend the effects of the project beyond 2km.

Marine Mammals – Seals and Cetaceans

As outlined in NPWS[1] "*Cetaceans account for 48% of all the native species of mammals, both marine and terrestrial, recorded in Ireland and Irish waters are thought to contain important habitats for cetaceans within the northeast Atlantic. To date, 24 species of cetacean, or 28% of species described worldwide, have been recorded in Ireland. Irish cetaceans include six species of baleen whale and eighteen species of toothed whale, including five species of beaked whale. Twenty-two of these have been reported stranded ashore and 20 species observed at sea. Two species (Pygmy sperm whale and Gervais' beaked whale) are only known from stranded individuals and two species (Northern right whale and White whale/beluga) have only been recorded historically, with neither species occurring in the stranding record so far.*

Ireland also has two species of seals, the Common Seal (or Harbour Seal) and the Grey Seal. Whilst both species haul out on land for key stages of their life history, the majority of their time is spent in the marine environment.

In Ireland, the 1992 EC Habitats Directive as transposed by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) requires that both seal species and all cetaceans occurring in Ireland are maintained at favourable conservation status. Under Article 12 of the Directive, all cetaceans should receive strict protection within the Exclusive Economic Zone. Under Article 4 of the Directive, Special Areas of Conservation (SACs) must be proposed for the following species:"

- Bottlenose Dolphin
- Harbour Porpoise
- Common Seal
- Grey Seal

The protection afforded to marine mammals in Ireland is summarised below:

- Harbour Porpoise Annex II of EC Habitats Directive Annex IV of EC Habitats Directive/Protected species of Wildlife (Amendment) Act/OSPAR List of Threatened and Declining Species and Habitats
- Bottlenose Dolphin Annex II of EC Habitats Directive/Annex IV of EC Habitats Directive/Protected species of Wildlife (Amendment) Act
- All Cetacea Annex IV of EC Habitats Directive/Protected species of Wildlife (Amendment) Act
- Grey Seal/Harbour Seal Annex II of EC Habitats Directive/Protected species of Wildlife (Amendment) Act

Beaked whales (*Ziphiidae*) are a family of odontocete cetaceans that typically live in deep offshore waters and perform long, deep dives in search of their prey (Quick *et al.,* 2020; Hooker *et al.,* 2019). Due to their preference for deep waters and given that they perform long, deep dives, beaked whales are difficult to study and little information is available on their distribution and population structure (Rogan et al., 2017). Studies indicate that the distribution of these species is associated with steep continental slope habitats in the Northeast Atlantic and have been recorded in northwestern areas of Ireland's offshore waters[2]. Beaked whales are sensitive to anthropogenic noise (Barile et al., 2021), and their diving and hunting behaviours can be impacted by increased underwater noise. Beaked whale species recorded in Irish waters include Cuvier's beaked whale (*Ziphius cavirostris*), Sowerby's beaked whales (*Mesoplodon bidens*), True's beaked whales (*Mesoplodon mirus*), and Northern bottlenose whale (*Hyperoodon ampullatus*). Records of beaked whales in Irish waters are seen in Figures 33-37.

Recent research suggests that there is the foraging range for grey seals is 448km (Carter *et al*., 2022). Further, the foraging range for harbour seal is estimated at 273 km (Carter *et al*., 2022). There are a number of SACs designated for cetaceans (harbour porpoise and common dolphin) in Ireland. As these species are a highly mobile species and designated as qualifying interests of Natura 2000 sites outside the Irish EEZ, specific Management Units (MU) are utilised to assess the potential impacts of a proposed project on these species.

[1] https://www.npws.ie/marine/marine-species/cetaceans
[2] https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/biodiversity-status/marine-mammals/abundance-distribution-cetaceans/abundance-and-distribution-cetaceans/

Management Units are based on the JNCC Review of Management Unit boundaries for cetaceans in UK waters (2023) methodology[3]. The proposed project is located within the Celtic and Irish Seas MU for harbour porpoise, and the Offshore Channel, Celtic Sea & SW England MU for bottlenose dolphin (IAMMWG, 2015). The ZoI of the proposed project has been extended to include the potential for significant effects on grey seal, harbour seal, harbour porpoise and common bottlenose dolphin as there is potential for these mobile marine mammals to enter the ZoI from within the aforementioned MU's.

Otter

Otters are a semi-aquatic species who use the marine environment for foraging and are protected under Annex II and Annex IV of the Habitats Directive. As detailed by Reid *et al. (*2013), female otters have territories of 7.5 ± 1.5km in length along a riverine environment and 6.5 ± 1.0km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3km in length with a high degree of variability. However, given the spatial and temporal nature of the proposed works, and the fact that the nearest point of the Beaufort Offshore Cable Route to the Irish mainland is approximately 29km, the proposed project is considered too distant from Natura 2000 sites where otter is a feature of interest for any significant interaction to occur.

Migratory Fish

In relation to Atlantic salmon, it has been found that salmon populations from southeast Ireland appear to migrate towards the shelf edge before crossing the Atlantic towards Greenland for feeding (Rikardson et al., 2021). The recorded areas of salmon migration are demonstrated in Figure A.1 in Appendix I.

Twaite Shad is a rare red listed (vulnerable) species that have an affinity for coastal habitats (Maitland & Hatton-Ellis, 2003), with recent studies recording movement of this species up to 950km from the River Severn with one individual detected in the Blackwater Estuary (Davies *et al.*, 2020). However, based on King et al. (2011) The twaite shad is restricted to the lower reaches of a handful of rivers in the south, with evidence of recruitment only from the Barrow, Suir and Munster Blackwater. The primary conservation objectives for Natura 2000 sites along the south coast of Ireland for which Twaite Shad are a designated Qualifying Interest (Slaney River Valley SAC [000781]; River Barrow and River Nore SAC [002162]; Lower River Suir SAC [002137]; Blackwater River (Cork/Waterford) SAC [002170]) relate to the restoration of freshwater habitats for this species. The proposed works are located within the offshore subtidal (12nm – Irish EEZ Boundary) in an area of existing vessel and trawling activity. In the unlikely event that Twaite Shad may be present along the proposed Beaufort Offshore Cable Route, vessel speeds will be slow (0.5 knots) and operations are on a continual basis, therefore, the vessel and equipment would be easily avoided by this species if encountered. The proposed works will be isolated to the route corridor and will not impact on spawning grounds or migratory routes of this species.

Similarly, no likely significant effects on lamprey species are foreseen as a result of the proposed project. As outlined in King *et al*. 2011 '*juvenile river/brook lamprey (the two species are indistinguishable at juvenile stage) are widely distributed in catchments where suitable habitat is available and, on this basis, both river and brook lamprey have now been classified as of 'least concern'. The same survey programmes have also demonstrated that sea lamprey can be found in many of our larger river systems. However, these surveys have shown that sea lampreys are normally scarce, with low densities of juveniles where they do occur and a tendency for migrating adult fish to be concentrated downstream of major weirs in rivers. This species is now listed as Near Threatened*.' At sea, sea lamprey are widely dispersed and their movements are largely dictated by their host fish (Igoe et al, 2004). Within the marine environment, river lamprey inhabit estuarine and coastal waters (Igoe et al, 2004).

Given the spatial and temporal nature of the proposed works (isolated to the works corridor within the offshore subtidal 12nm-EEZ), and given the minimum distance to Natura 2000 sites designated for sea and river lamprey (38.2 km to River Barrow and River Nore SAC), no likely significant effects on sea lamprey distribution or spawning habitats are foreseen as a result of the proposed project.

[3] https://data.jncc.gov.uk/data/b48b8332-349f-4358-b080-b4506384f4f7/jncc-report-734.pdf

Birds

The marine waters off the coast of County Wexford mark the boundary between the Irish and Celtic Seas. These waters constitute a valuable feeding resource for the seabirds that return every spring to Wexford's coastal and island colonies to breed. Outside of the summer months these relatively shallow coastal waters provide safe feeding and roosting opportunities for a range of marine birds overwintering here or on passage (NPWS, 2024). The proposed Beaufort Offshore Cable Route is located within the offshore subtidal (12nm-EEZ Boundary), proximate to Wexford's coastal waters. Given the location of the proposed works to these valuable waters, and given the potential for seabirds to utilise offshore waters within the proposed works corridor for transiting / feeding, the ZOI has been extended to include Natura 2000 Sites designated for seabirds which utilise this area; namely, Seas Off Wexford SPA and Saltee Islands SPA.

3.4 Impact Assessment Significance Criteria

This section of the EcIA examines the potential causes of impact that could result in likely significant effects to the species and habitats that occur within the ZOI of the proposed development. These impacts could arise during either the construction or operational phases of the proposed development. The following terms are derived from EPA EIAR Guidance (2022) and are used in the assessment to describe the predicted and potential residual impacts on the ecology by the construction and operation of the proposed development.

Magnitude of effect and typical descriptions

Magnitude of effect (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species or habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the site boundary

Quality of Potential Impacts on Biodiversity

Quality of Effects	Effect Description
Negative /Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Effect	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Significance of Effects

Significance of Effect	Description of Potential Effect
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Duration of Impacts

Duration and Frequency of Effect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Possibility of Impact

Describing the Probability of Effects	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

4. Results

4.1 Proximity to Designated Conservation Sites

The cable route, Irish 12 nautical mile limit, and Irish Exclusive Economic Zone are demonstrated in Figure 16. Onshore and offshore Special Areas of Conservation (SAC) proximate to the proposed Beaufort Offshore Cable Route are seen in Figure 17. The locations of onshore and offshore Special Protection Areas (SPA) are seen in Figure 18. The Offshore Beaufort Cable Route in relation to the 12 nm limit, Designated Irish Continental shelf and Offshore SAC's is demonstrated in Figure 19. IE, UK, & FR Sites designated for grey seal within 448km (foraging range for grey seal (Carter et al., 2022)) of the proposed Beaufort Offshore Cable Route is demonstrated in Figure 20. IE, UK, & FR Sites designated for harbour seal within 273km (foraging range for harbour seal (Carter et al., 2022)) of the proposed Beaufort Offshore Cable Route within the Irish EEZ is demonstrated in Figure 21. IE, UK, & FR Sites designated for bottlenose dolphin and harbour porpoise that are located in the same Management Unit's (MU) as the proposed Beaufort Offshore Cable Route (12nm - Irish EEZ) are demonstrated in Figures 22 & 23. Natural Heritage Areas (including Proposed NHAs) and Ramsar sites are seen in Figures 24 & 25.

Tables 3-5 outlines the designated conservation sites within 15km of the proposed route, and conservation sites designated for marine mammals that may be impacted by the proposed project (incl. IE, UK, & FR Sites).

4.2 Marine Survey and Desktop data

Habitats noted based on INFOMAR, MSFD, and EUSEAMAP marine survey data are seen in Figures 26-30. Habitats along the Beaufort Offshore Cable Route primarily consists of offshore circalittoral sand, muddy sand, and coarse sediment. The proposed cable route in relation to detailed Backscatter data is demonstrated in Figure 27. It should be noted that the routing of the cable has been designed to avoid any potential reef habitats. Further, as seen in Figure 27 (Infomar backscatter) the proposed route runs parallel to the main sand waves utilising a troughs for optimal burial and then turns to the east once the larger sand waves cease.

Coral records are seen in Figures 31 & 32. The Global Distribution of Cold-water Corals dataset shows of the global distribution of cold-water corals (UNEP, Cold Corals 2017). No records of cold water corals are noted along the proposed Beaufort Offshore Cable Route.

4.3 Marine Mammals

Marine mammals are afforded protection under the Habitats Directive. The proposed project has the potential to introduce noise into the marine environment and mitigation measures are required to protect marine mammals. Figure 33 shows all cetacean species in the vicinity of the proposed cable route, as recorded by IWDG sightings scheme. Cetacean activity has been seen in the vicinity of the cable route corridor, including Fin Whale (Balaenoptera physalus), common dolphin (*Delphinus delphis*), common bottlenose dolphin (*Tursiops truncatus*), Harbour porpoise (*Phocoena phocoena*), and minke whale (*Balaenoptera acutorostrata*). Records of beaked whales in Irish waters (including NBDC data) are seen in Figures 34-37. Records of beaked whales are concentrated along the continental shelf and are not located in proximity to the proposed cable route.

Table 3. Proximity to designated sites of conservation importance (IE)

Code	NATURA 2000 Site	Distance
Special Areas of Conservation		
IE000707	Saltee Islands SAC	16.5 km
IE000764	Hook Head SAC	20 km
IE002269	Carnsore Point SAC	27.2 km
IE000696	Ballyteige Burrow SAC	28.9 km
IE000781	Slaney River Valley SAC	44.4 km
IE003000	Rockabill to Dalkey Island SAC	152.4 km
IE000204	Lambay Island SAC	179 km
IE000101	Roaring Water Bay and Islands SAC	196.3 km
IE000090	Glengarriff Harbour and Woodland SAC	202.1 km
IE002158	Kenmare River SAC	205.8 km
IE000268	Galway Bay Complex SAC	209.3 km
IE002111	Kilkieran Bay And Islands SAC	250.1 km
IE002172	Blasket Islands SAC	265.7 km
IE000328	Slyne Head Islands SAC	294.3 km
IE000278	Inishbofin and Inishshark SAC	303.9 km
IE000190	Slieve Tooey / Tormore Island / Loughros Beg Bay SAC	338 km
IE000495	Duvillaun Islands SAC	338.5 km
IE000507	Inishkea Islands SAC	343.9 km
IE000147	Horn Head and Rinclevan SAC	372.7 km
Special Protection Areas		
IE004237	Seas Off Wexford SPA	1.1 km
IE004002	Saltee Islands SPA	21 km
IE004020	Ballyteige Burrow SPA	30.3 km
Ramsar Sites		
-	Bannow Bay	36.4 km
NHAs / pNHAs		
-	Saltee Islands pNHA	22.2 km
-	Ballyteige Burrow pNHA	29.1 km
-	Keeragh Islands NHA	33 km

Table 4. Proximity to designated sites of conservation importance (UK)

Designation	European Site	Distance
SAC	Pembrokeshire Marine / Sir Benfro Forol	34.1 km
SAC	West Wales Marine / Gorllewin Cymru Forol	44.7 km **(Within MU for Harbour Porpoise)**
SAC	Bristol Channel Approaches/Dynesfeydd Môr Hafren	80.6 km **(Within MU for Harbour Porpoise)**
SAC	Cardigan Bay / Bae Ceredigion	105.1 km
SAC	Lundy	118.4 km
SAC	Pen Llyn a’r Sarnau/Lleyn Peninsula and the Sarnau	148.8 km
SAC	North Anglesey Marine/Gogledd Môn Forol	182.3 km **(Within MU for Harbour Porpoise)**
SAC	Isles of Scilly Complex	184.4 km
SAC	Murlough	250.5 km
SAC	North Channel	263.1 km **(Within MU for Harbour Porpoise)**
SAC	The Maidens	357.6 km
SAC	Humber Estuary	427.8 km

Table 5. Proximity to designated sites of conservation importance (FR)

Code	Natura 2000 Site	Distance
SAC	Nord Bretagne DH	280 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Mers Celtiques – Talus du golfe de Gascogne	284.8 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Côte de Granit rose-Sept-Iles	342.4 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Abers – Côtes des légendes	353.6 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Trégor – Goëlo	356.8 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Baie de Morlaix	357.6 km **(Within MU for Harbour Porpoise)**
SAC	Ouessant-Molène	358.8 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Anse de Goulven, dunes de Keremma	360.4 km
SAC	Récifs et landes de la Hague	367.8 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Rivière Leguer, forêts de Beffou, Coat an Noz et Coat an Hay	375.2 km **(Within MU for Harbour Porpoise)**
SAC	Anse de Vauville	376.5 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Banc et récifs de Surtainville	386.4 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Rade de Brest, estuarie de l'Aulne	393 km
SAC	Côtes de Crozon	393.8 km **(Within MU for Harbour Porpoise)**
SAC	Récifs et marais arrière-littoraux du Cap Lévi à la Pointe de Saire	397.1 km **(Within MU for Bottlenose Dolphin)**
SAC	Chaussée de Sein	406.8 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Cap d'Erquy-Cap Fréhel	412.5 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Cap Sizun	415 km
SAC	Marais du Cotentin et du Bessin – Baie des Veys	418.3 km
SAC	Baie de Seine occidentale	421.4 km **(Within MU for Bottlenose Dolphin)**
SAC	Baie de Saint-Brieuc - Est	423.6 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Récifs du talus du golfe de Gascogne	424.9 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Chausey	428.9 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Baie d'Audieme	431.4 km

Code	Natura 2000 Site	Distance
SAC	Littoral Ouest du Cotentin de Bréhal à Pirou	432.7 km
SAC	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard	440 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Roches de Penmarch	444.8 km
SAC	Côte de Cancale á Parmè	449.4 km **(Within MU for Bottlenose Dolphin)**
SAC	Estuairie de la Rance	454.1 km **(Within MU for Harbour Porpoise)**
SAC	Baie du Mont Saint-Michel	457.2 km **(Within MU for Bottlenose Dolphin & Harbour Porpoise)**
SAC	Baie de Seine orientale	485.9 km **(Within MU for Bottlenose Dolphin)**
SAC	Littoral Cauchois	503 km **(Within MU for Bottlenose Dolphin)**
SAC	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant	552 km **(Within MU for Bottlenose Dolphin)**

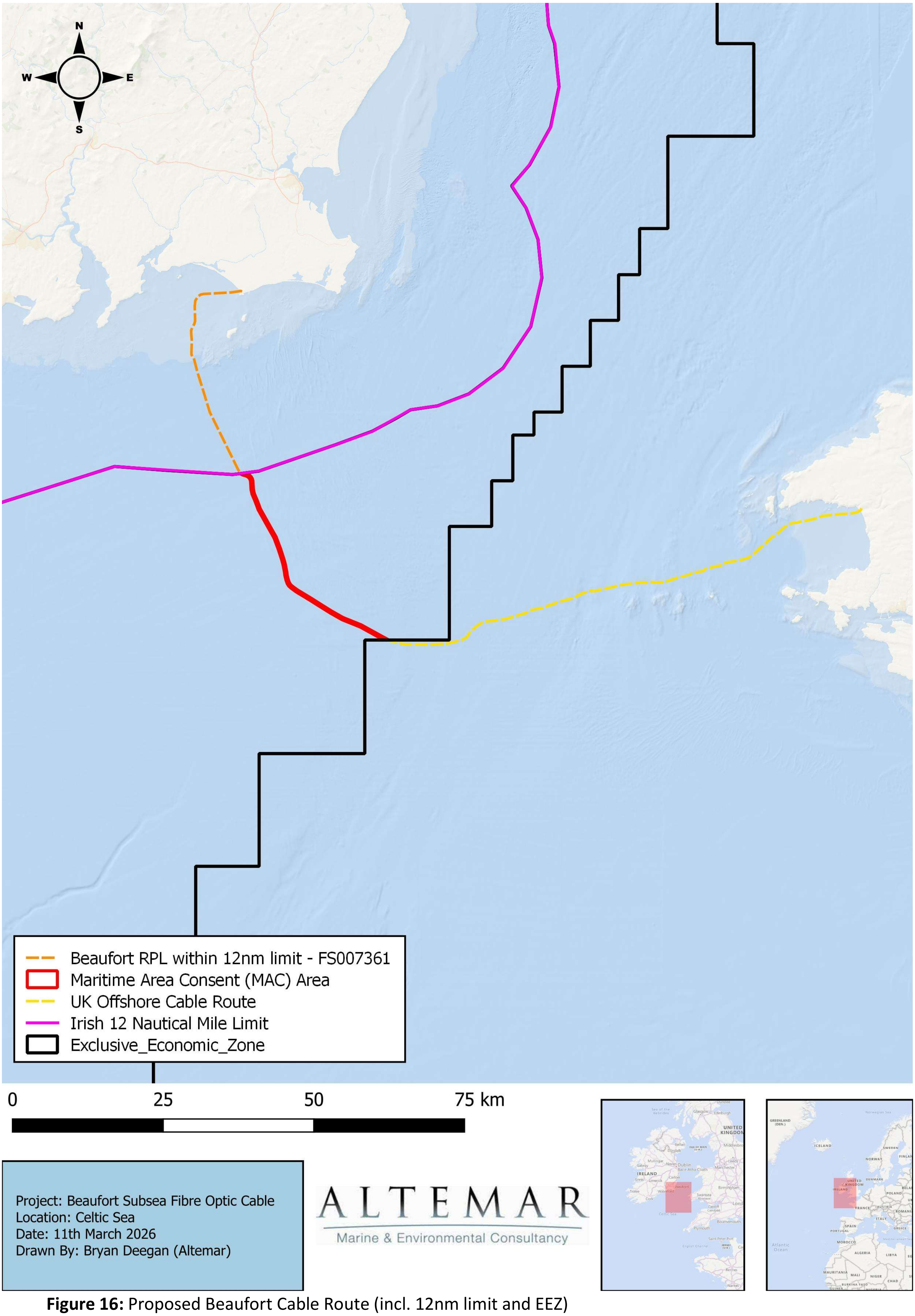


Figure 16: Proposed Beaufort Cable Route (incl. 12nm limit and EEZ)

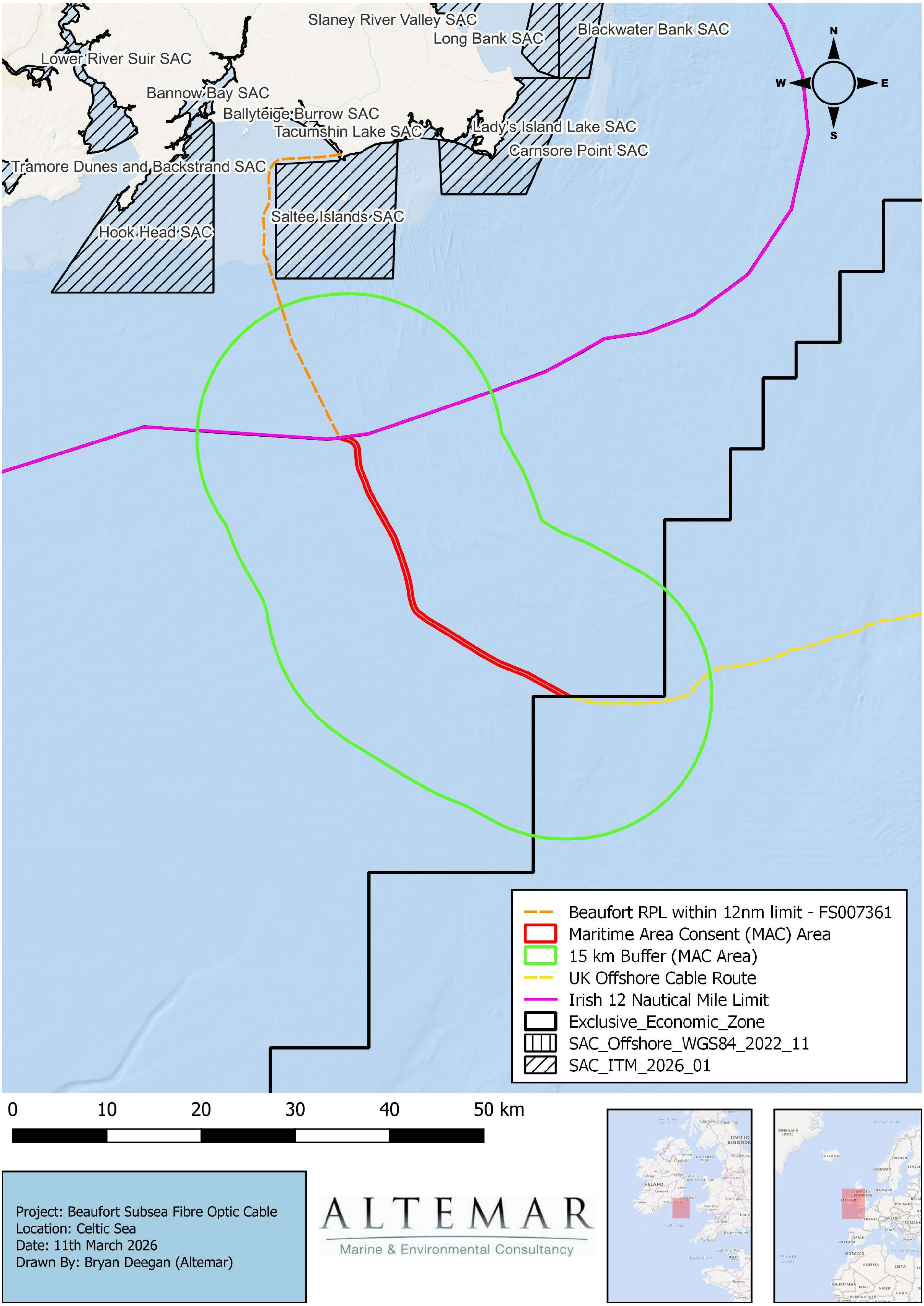


Figure 17: Special Areas of Conservation within 15 km of the Offshore Beaufort Cable.

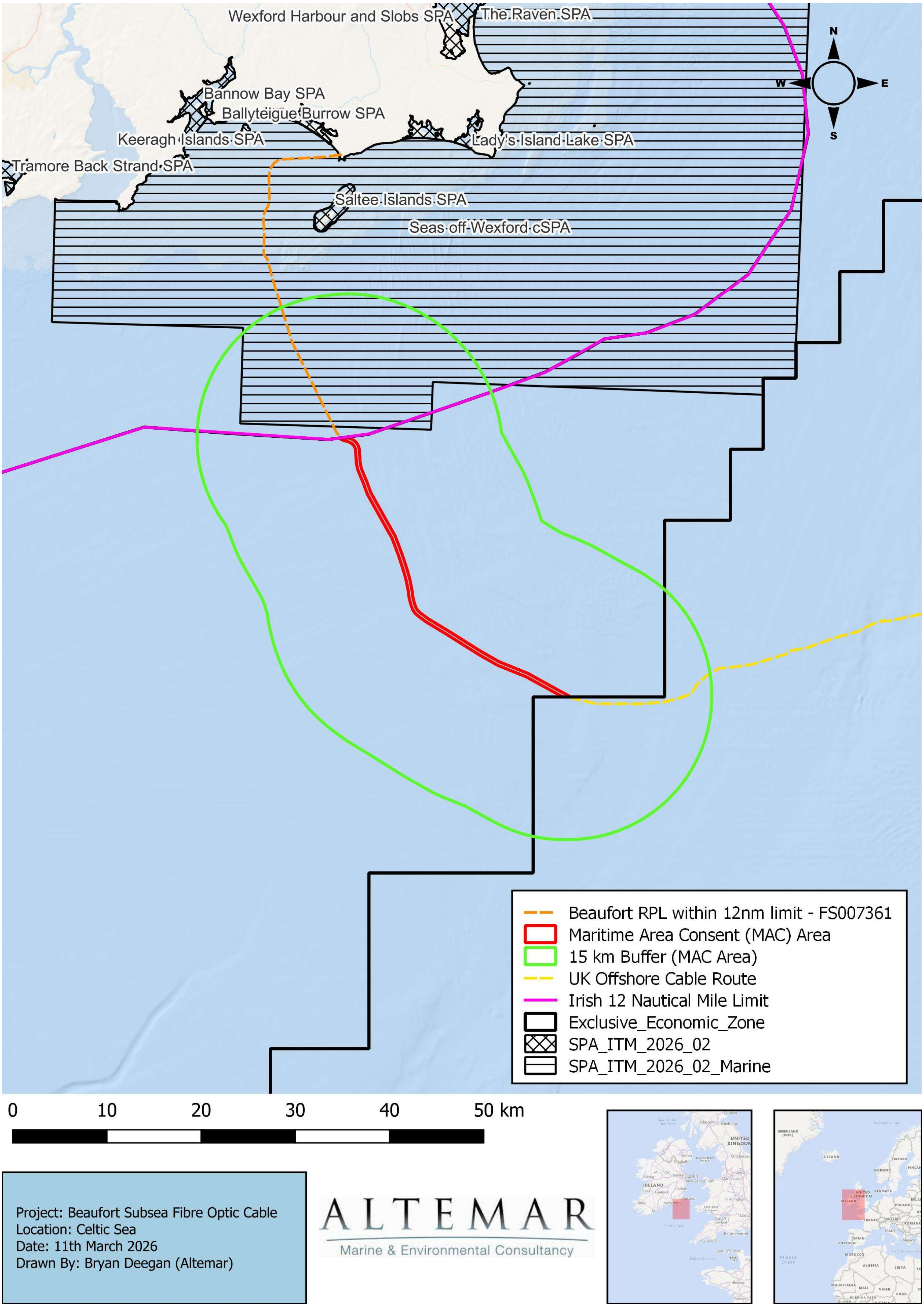


Figure 18: Special Protection Areas (incl. Marine SPAs) within 15 km of the Offshore Beaufort Cable.

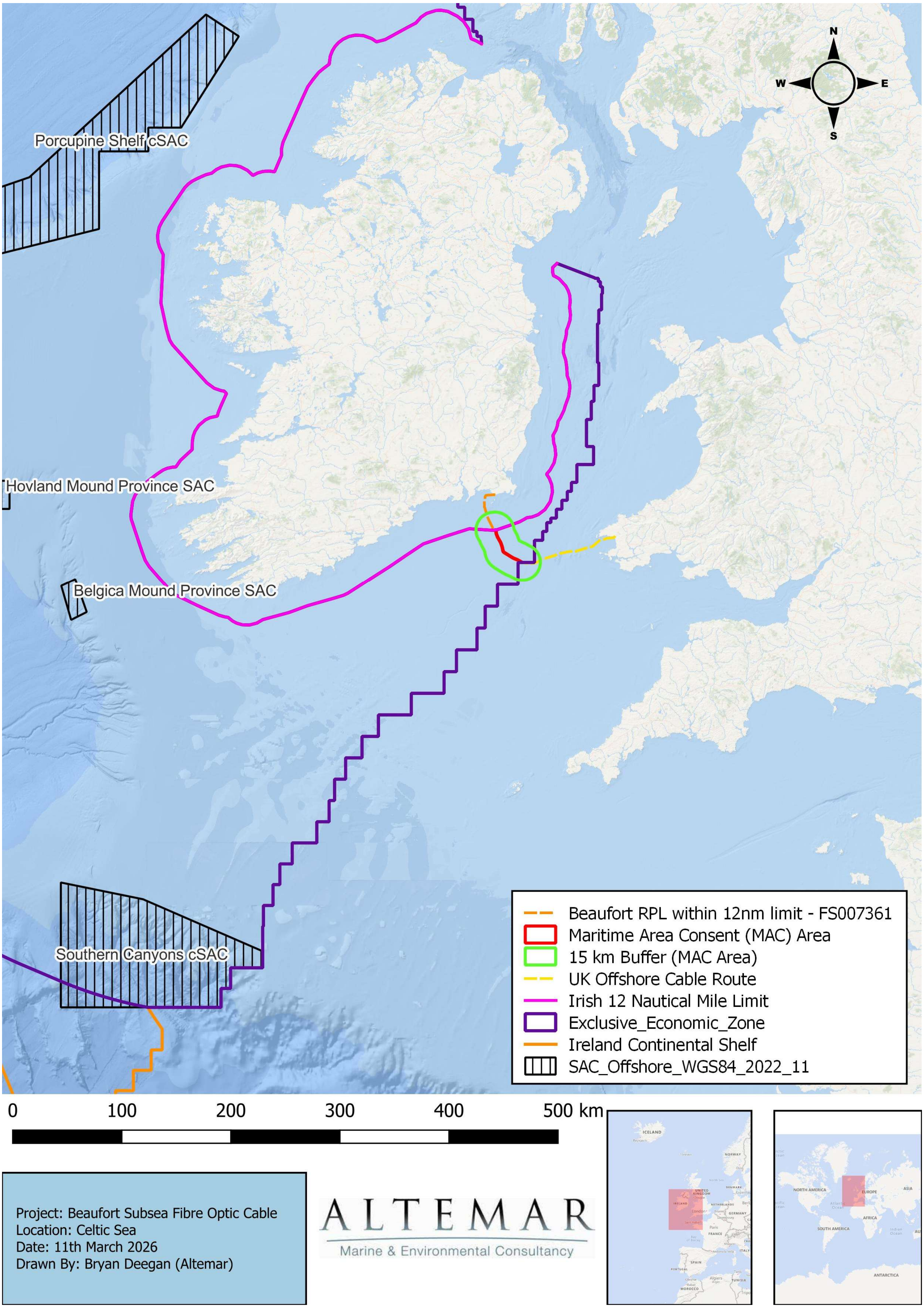


Figure 19: Offshore Beaufort Cable Route in relation to the 12 nm limit, Designated Irish Continental shelf and Offshore SAC's (no offshore SAC's in the area).

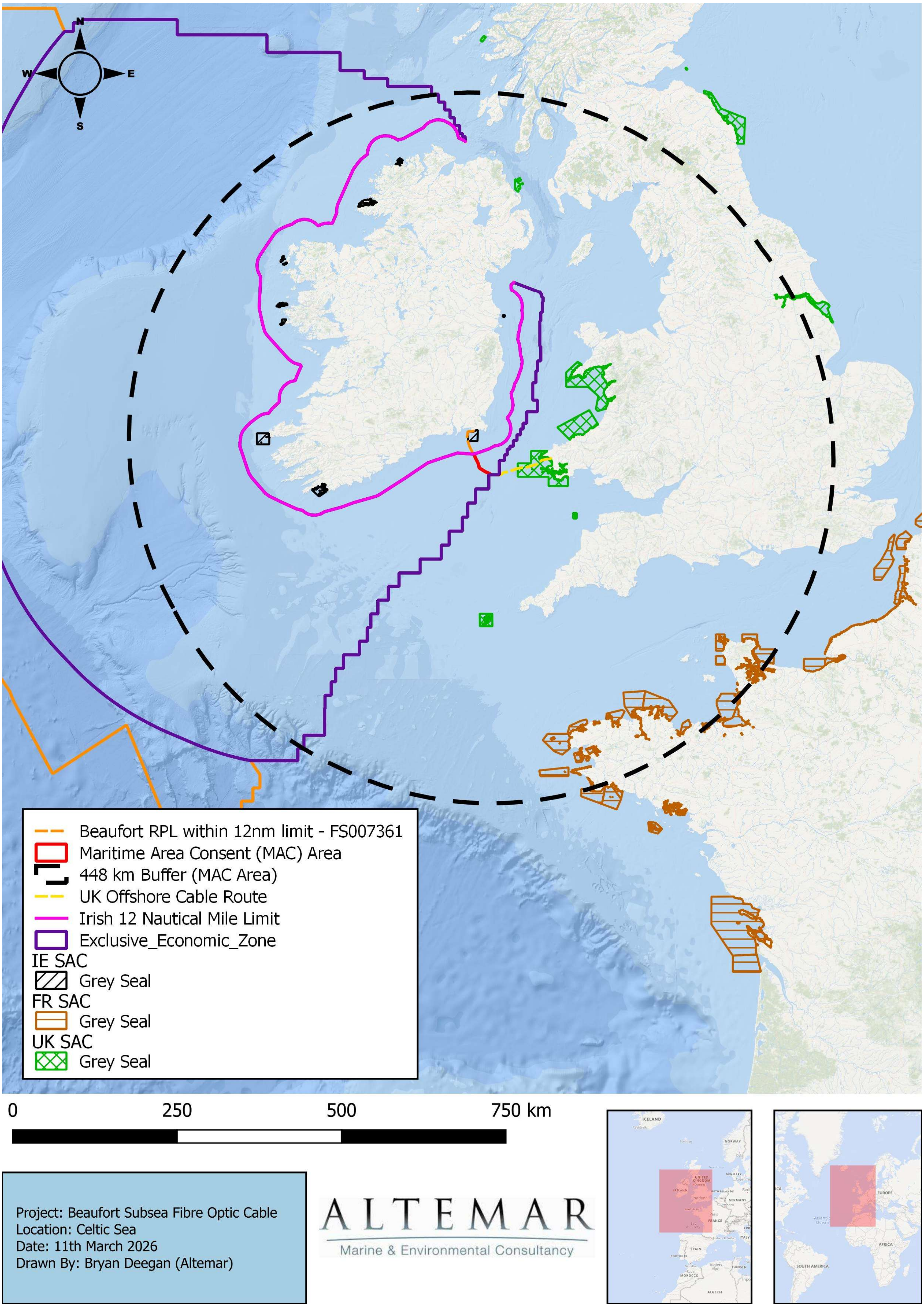
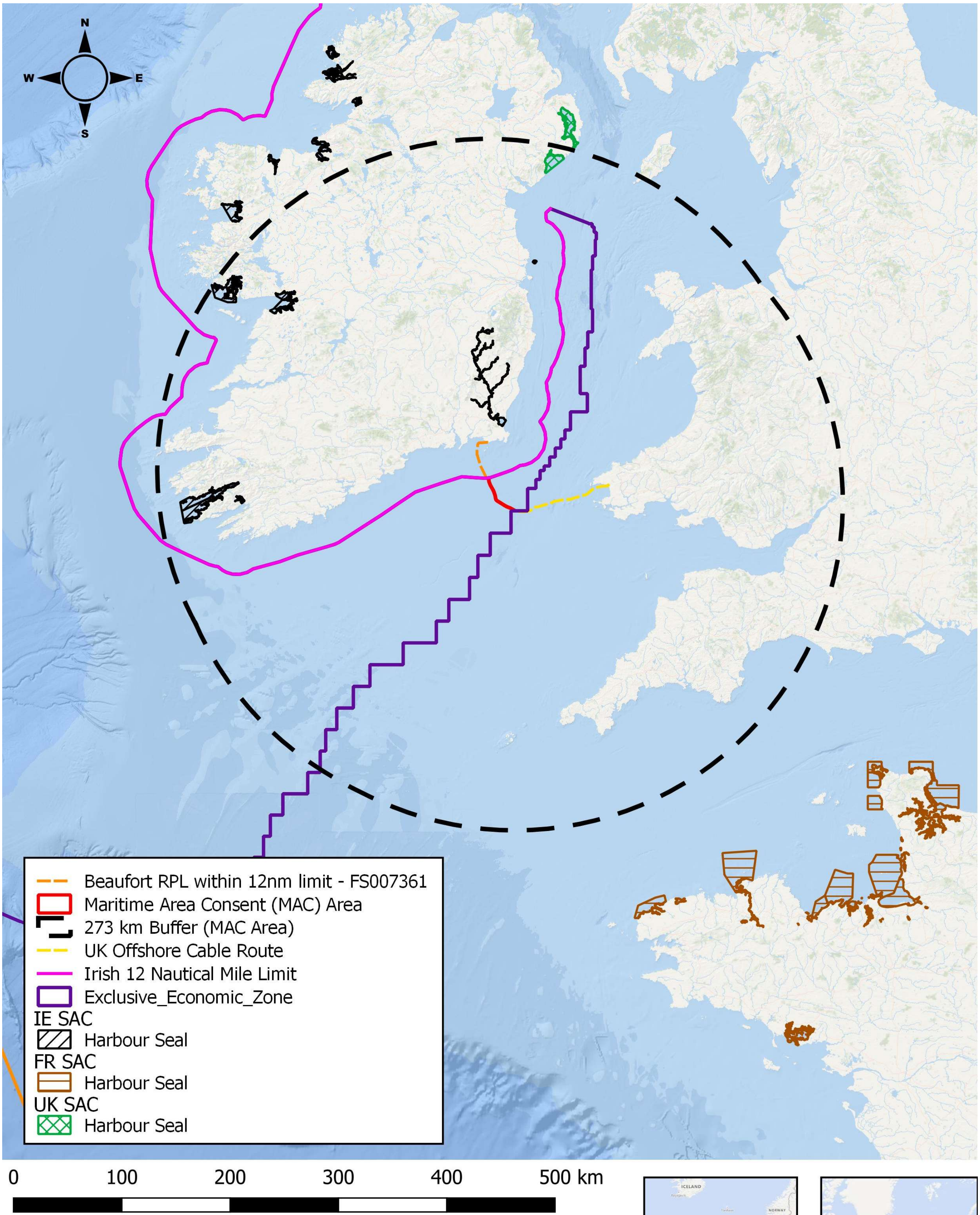


Figure 20: IE, FR, & UK SACs designated for Grey Seals (*Halichoerus grypus*) within 448km of the Offshore Beaufort Cable Route



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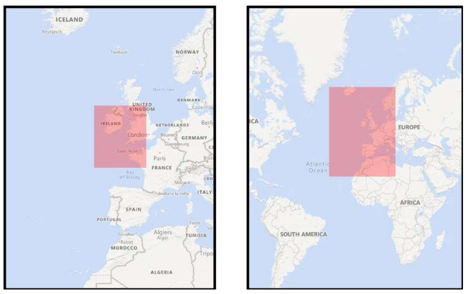


Figure 21: IE, FR, & UK SACs designated for Harbour Seals (*Phoca vitulina*) within 273km of the Proposed Offshore Beaufort Cable Route

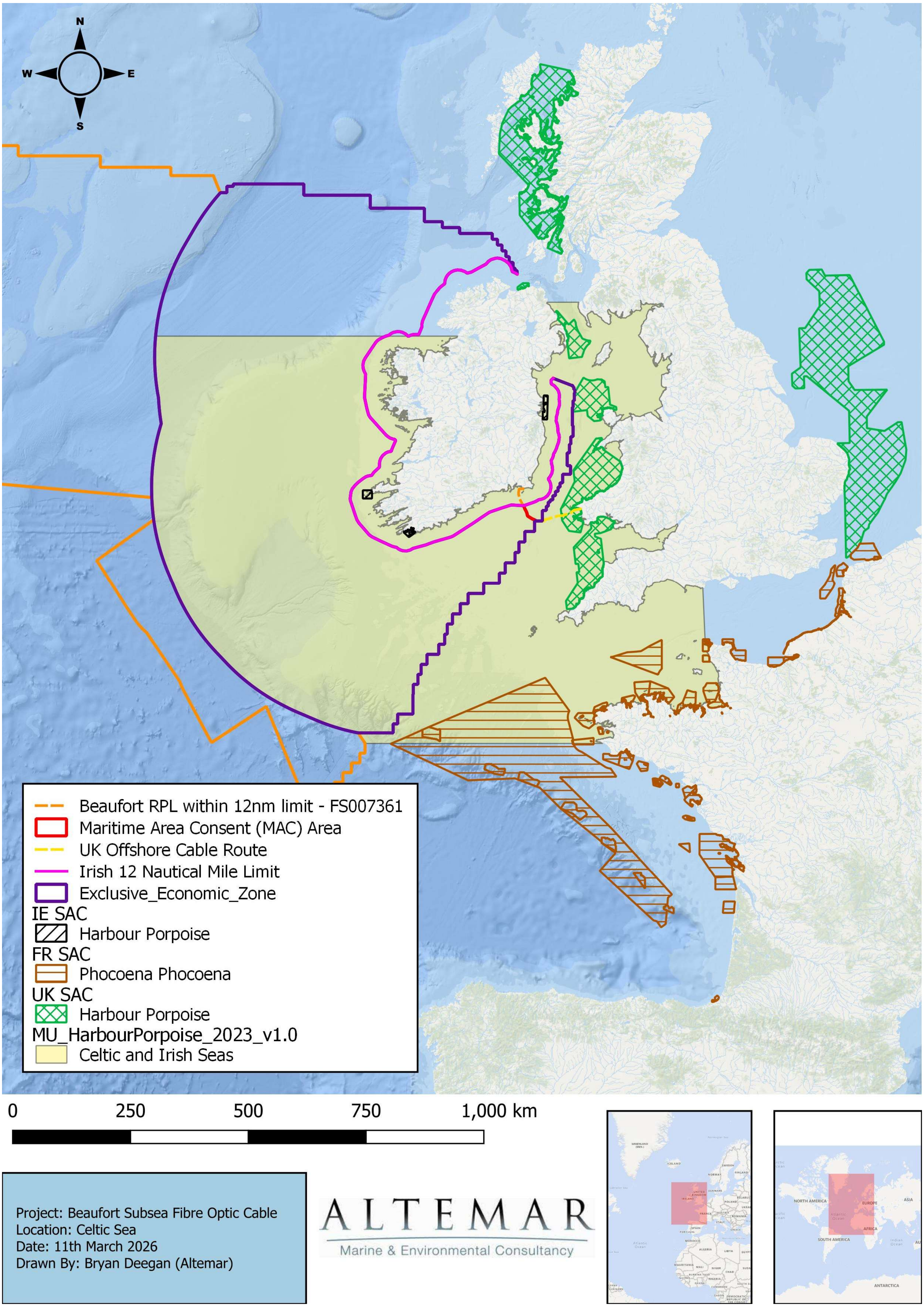


Figure 22: IE, FR, & UK SACs designated for Harbour Porpoise (*Phocoena phocoena*) within the Celtic and Irish Seas MU for Harbour Porpoise

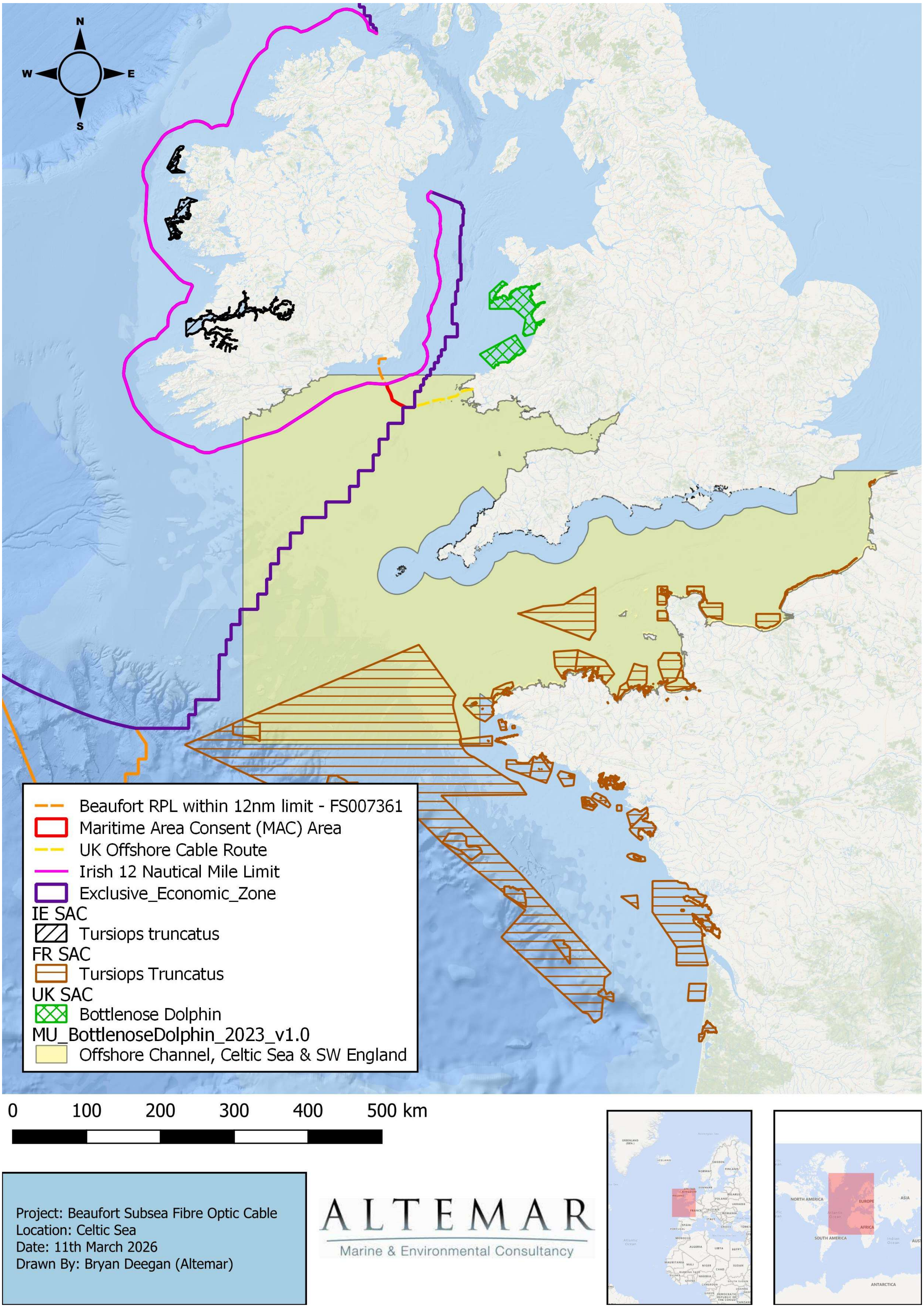


Figure 23: IE, FR, & UK SACs designated for Bottlenose Dolphin (*Tursiops truncatus*) within the Offshore Channel, Celtic Sea & SW England MU for Bottlenose Dolphin

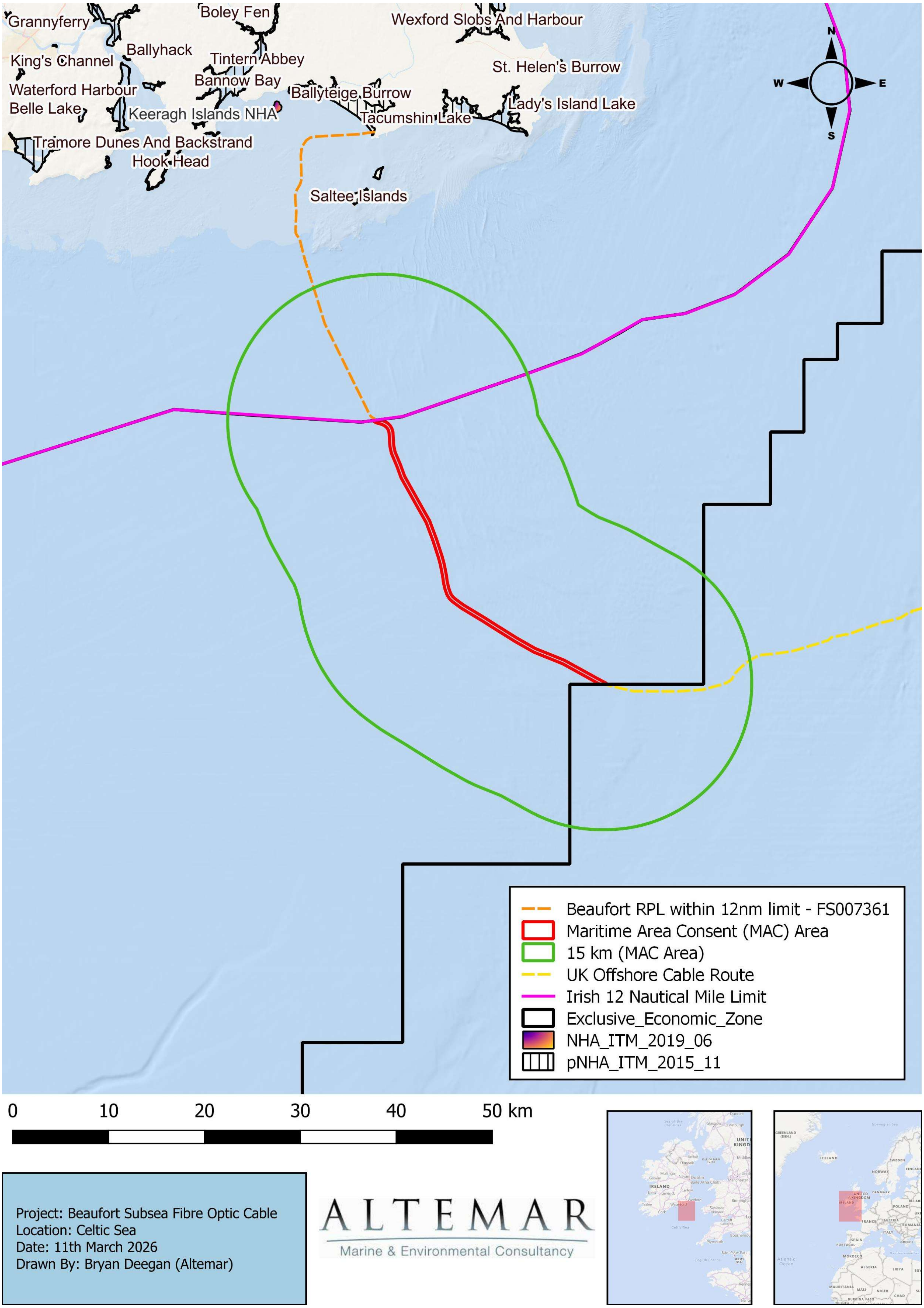


Figure 24: Proposed National Heritage Areas and Nation Heritage Areas (None) within 15 km of the Offshore Beaufort Cable

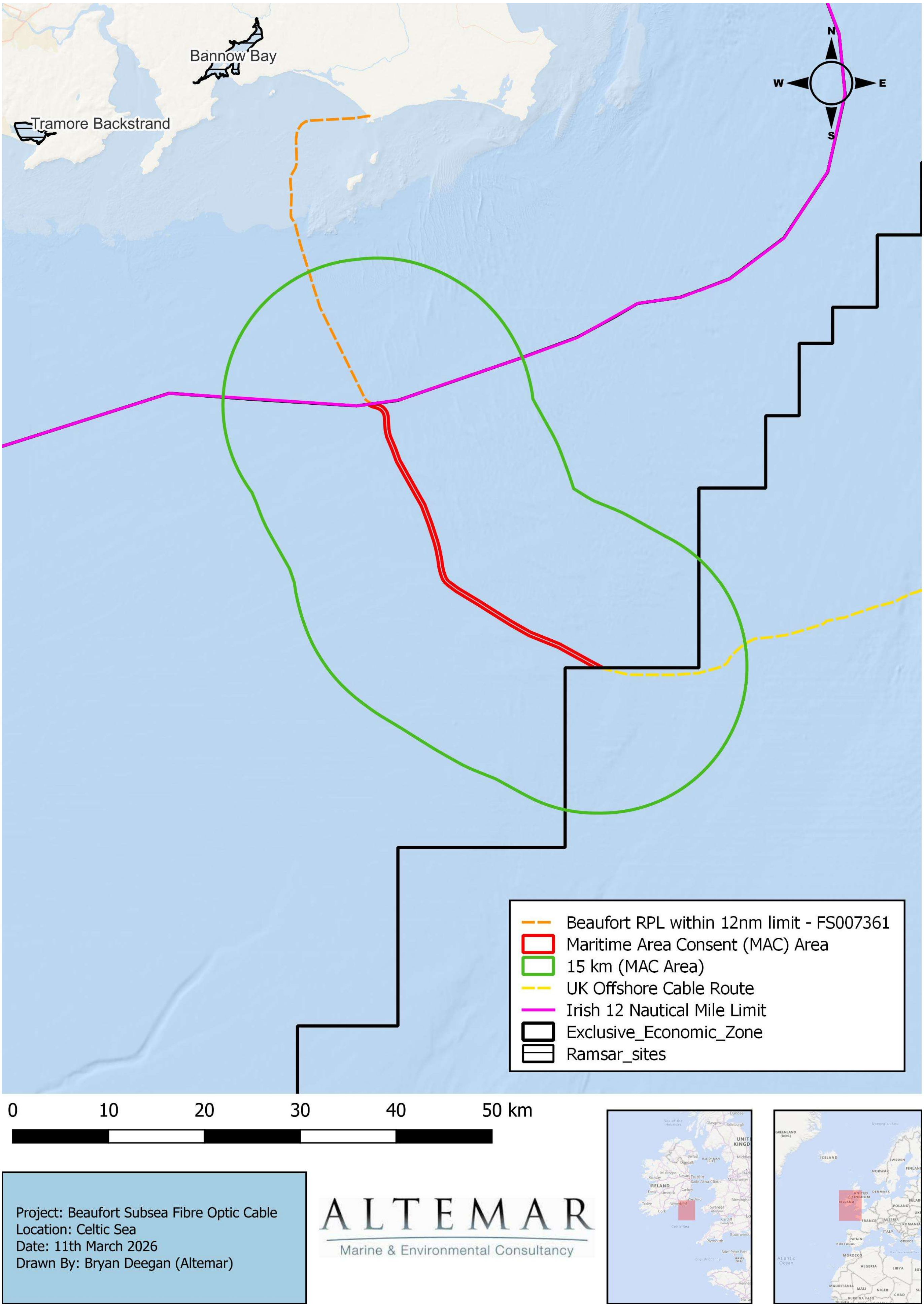


Figure 25. Ramsar sites within 15km of the Offshore Beaufort Cable

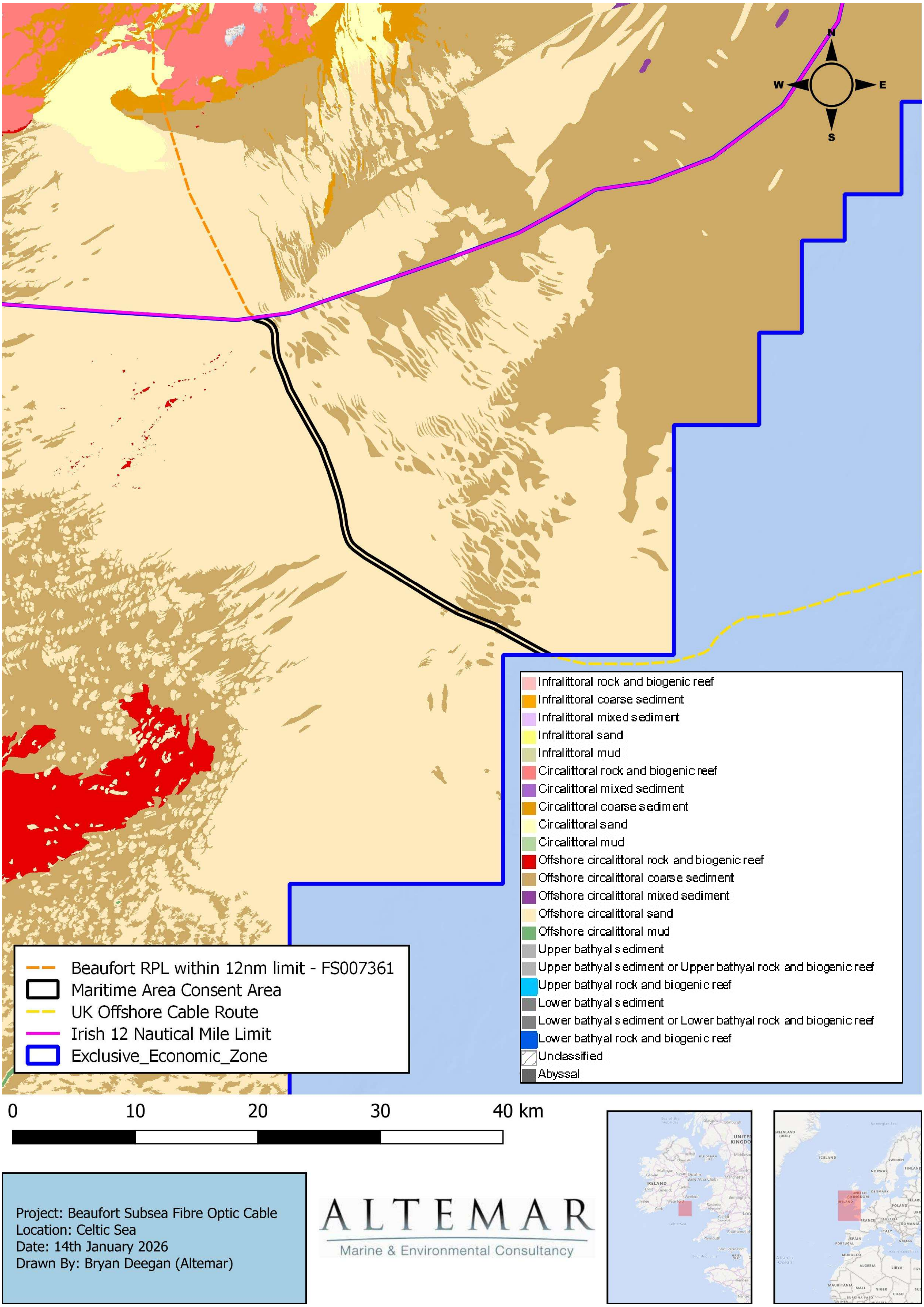


Figure 26. *MSFD Benthic Boad Habitat Types along the Offshore Beaufort Cable Route (Primarily offshore circalittoral sand)*

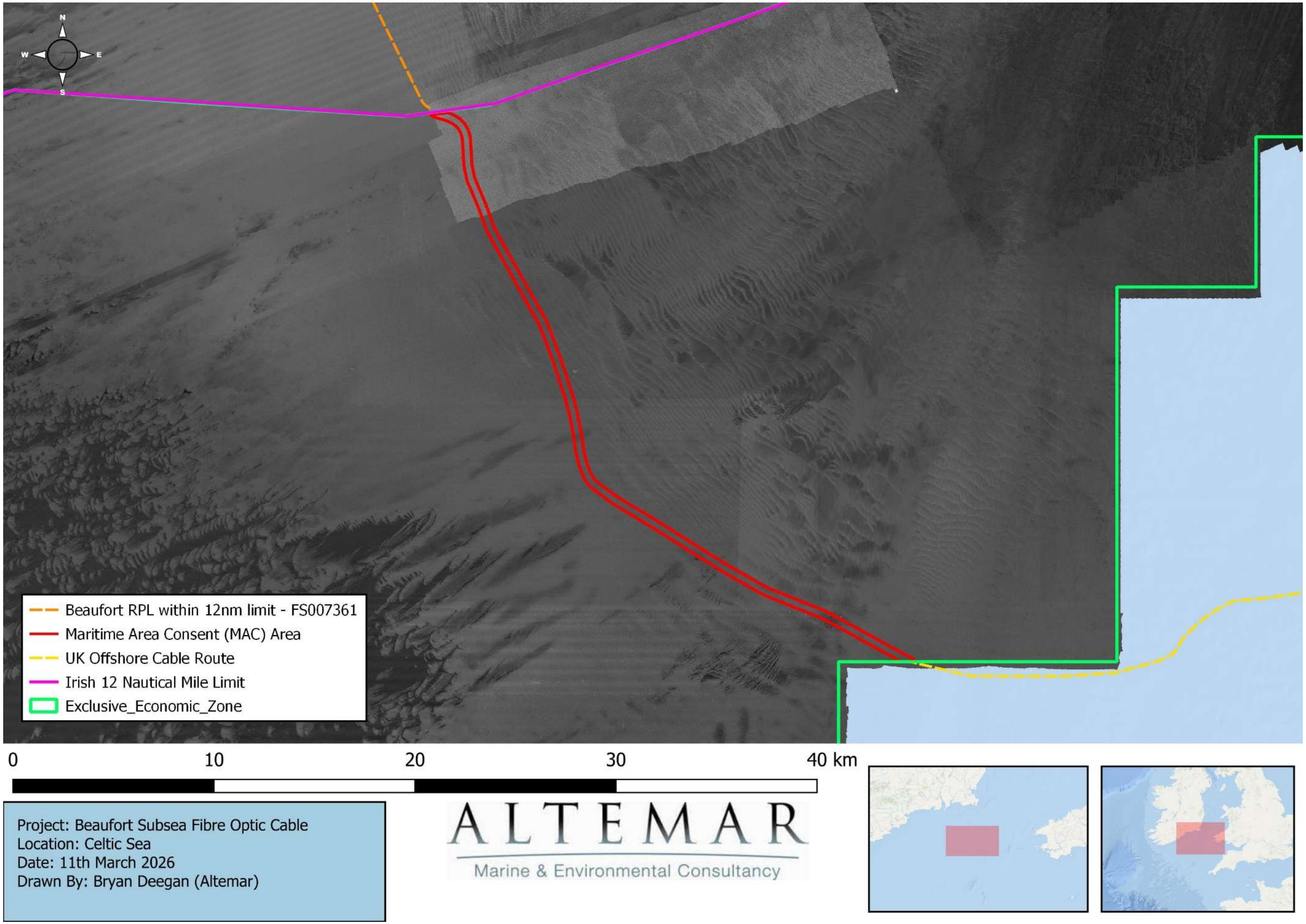


Figure 27. *INFOMAR Backscatter along the Offshore Beaufort Cable Route*

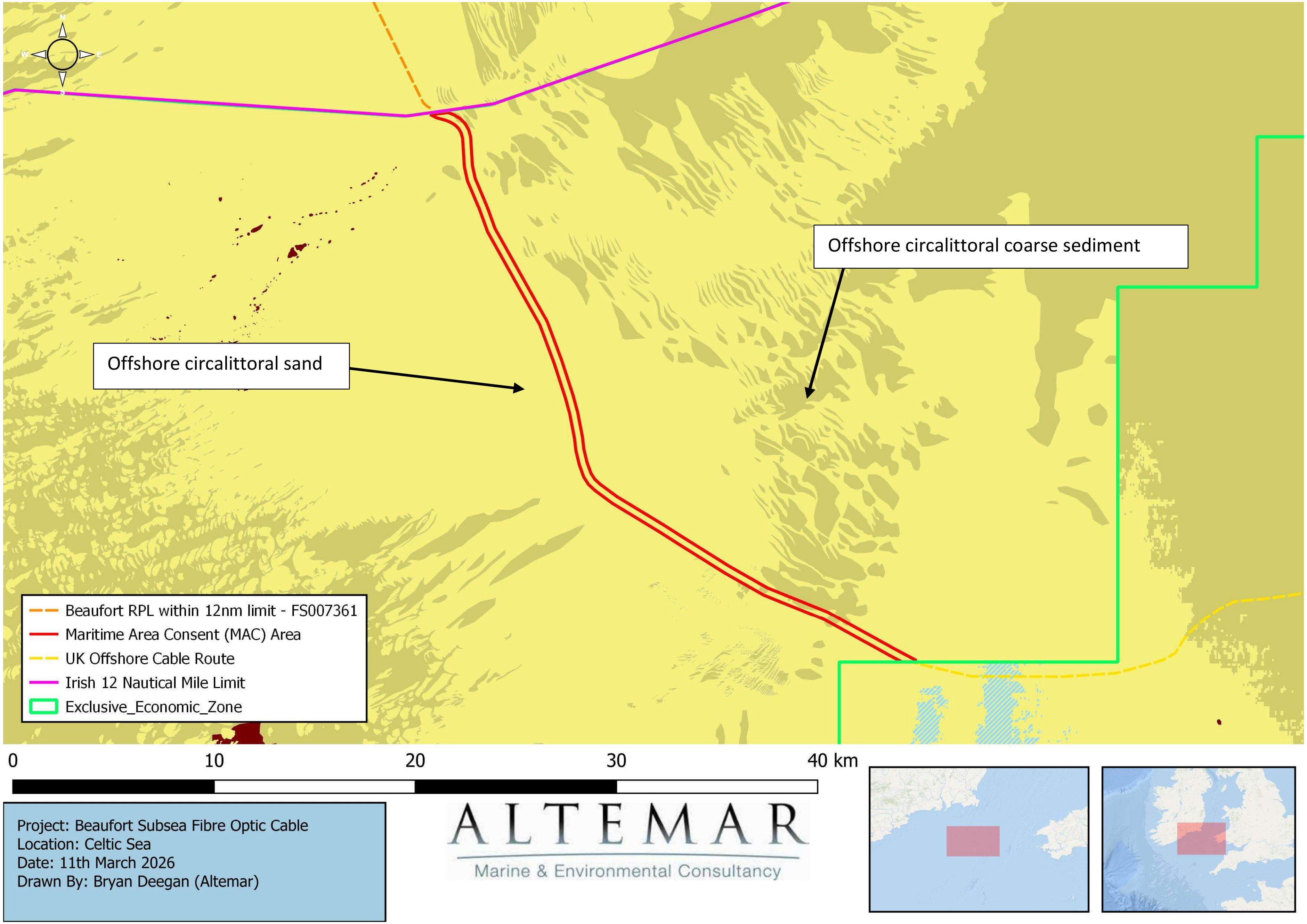


Figure 28. *EUSeaMap (2025) Broad Scale Predictive Habitat Map along the Offshore Beaufort Cable Route*

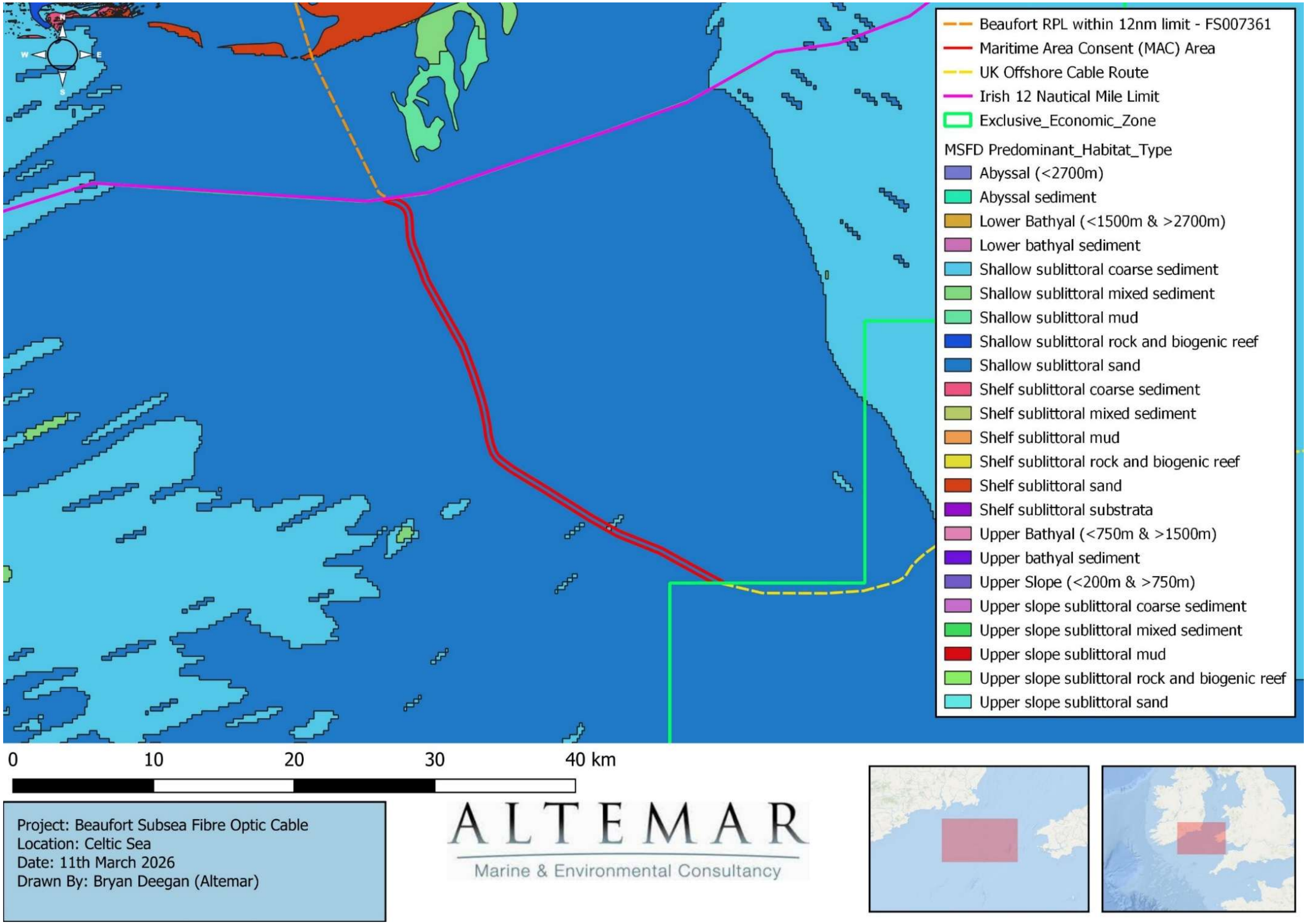


Figure 29. *MSFD Predominant Habitat Types along the Offshore Beaufort Cable Route (Primarily shallow sublittoral sand)*

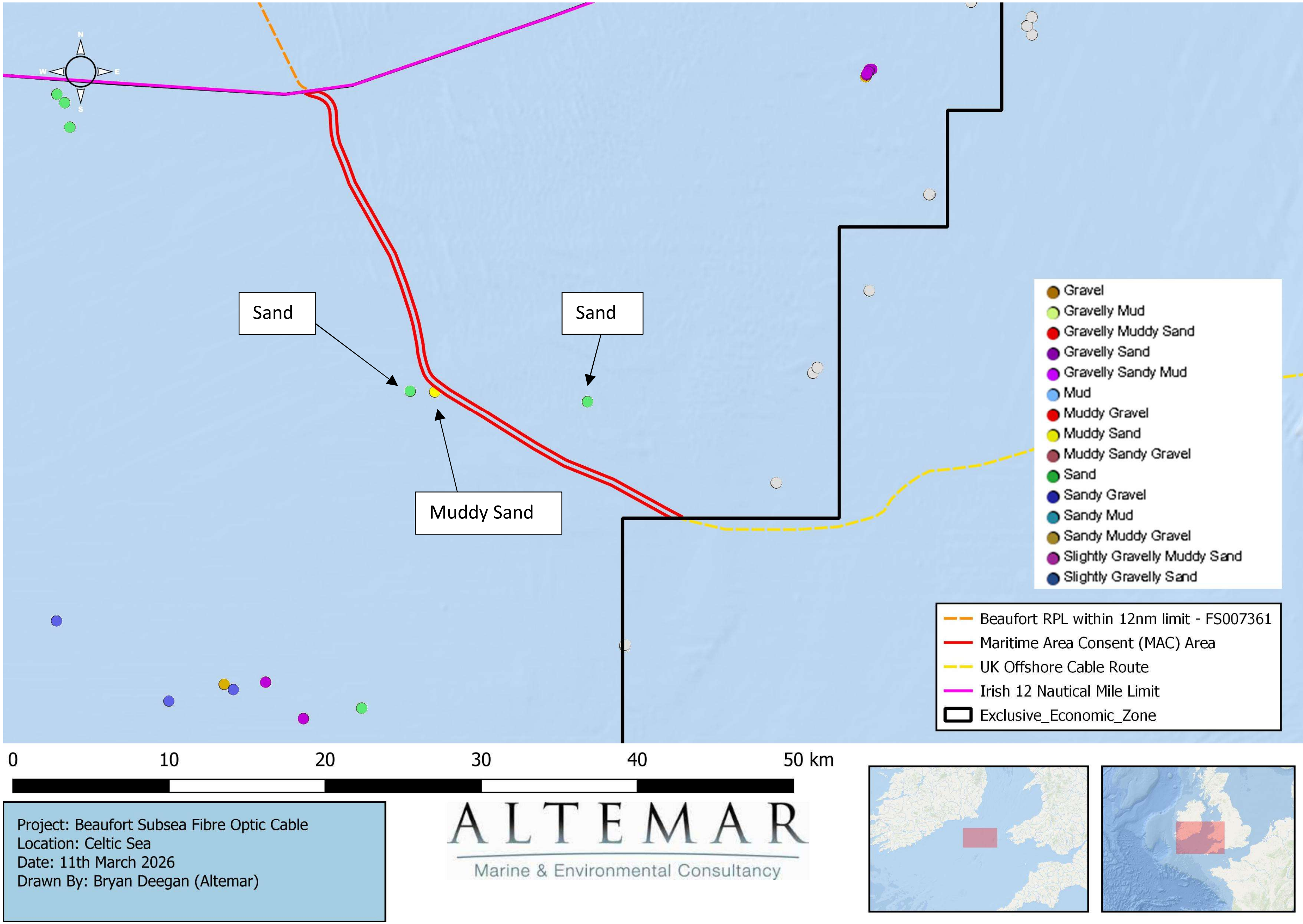


Figure 30. *INFOMAR Sediment Samples proximate to the Offshore Beaufort Cable Route*

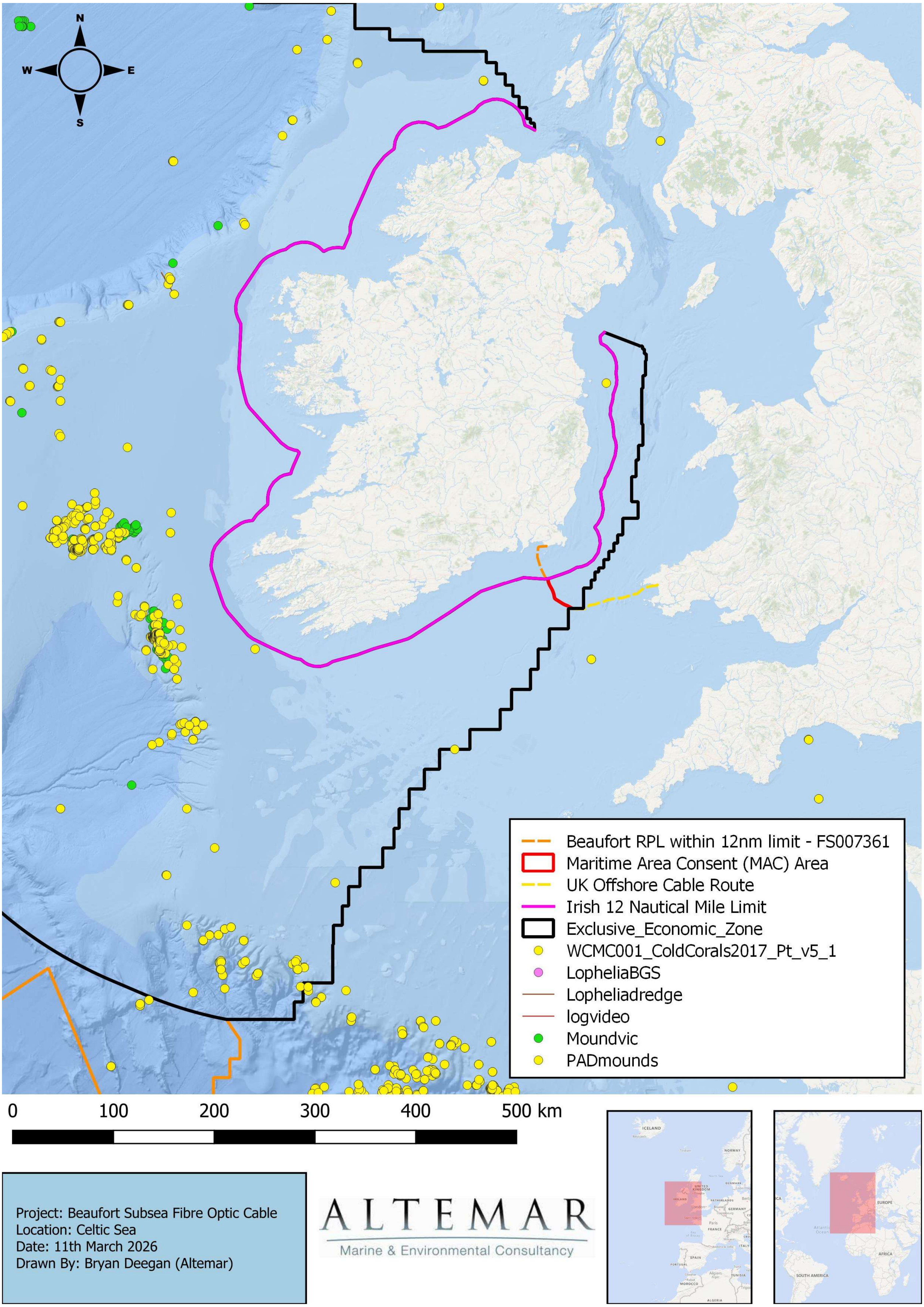


Figure 31: Position of offshore fibre optic route in relation to the Irish EEZ, Designated Irish Continental shelf, carbonate mounds or potential biogenic reefs in the offshore area

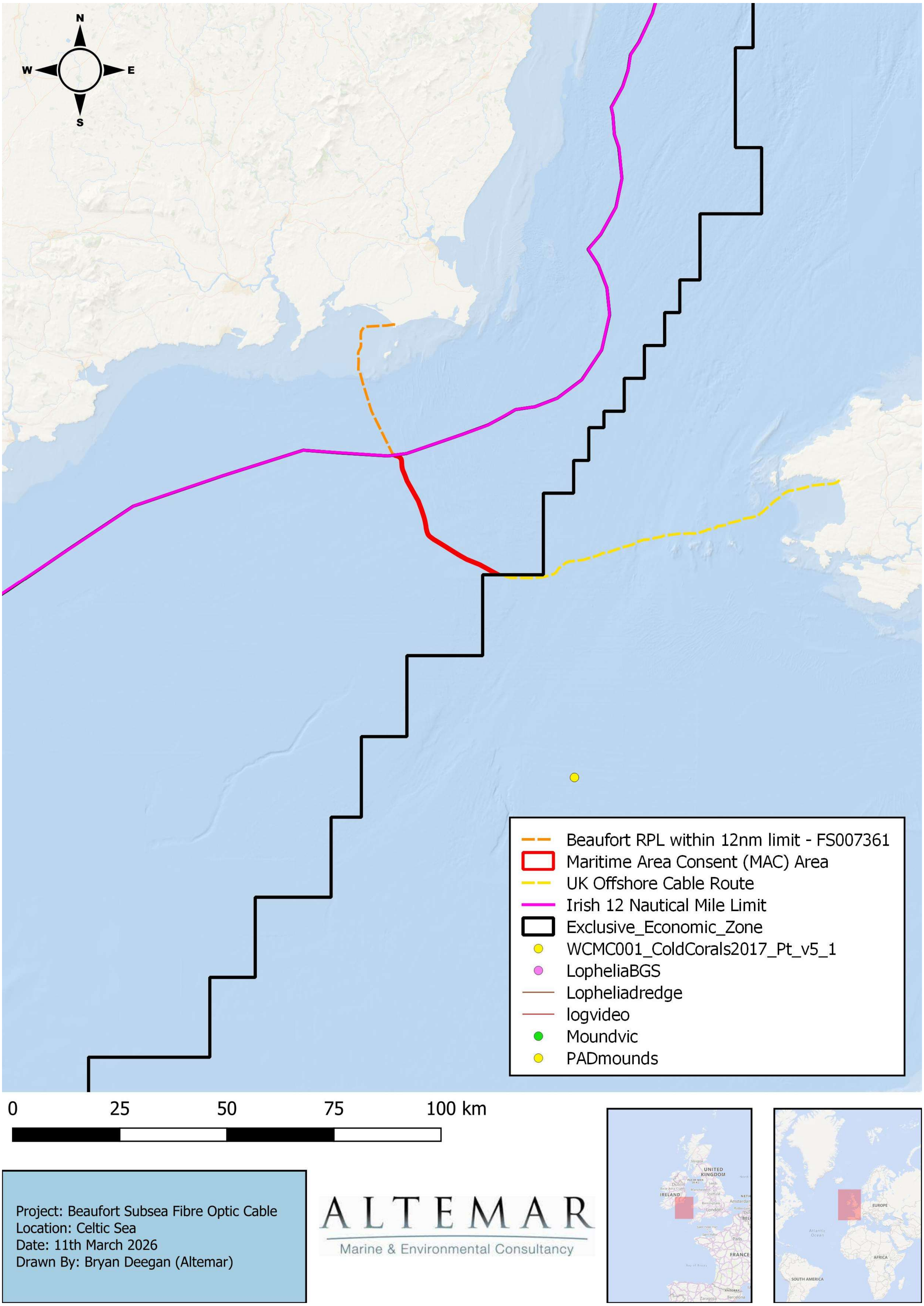


Figure 32: Position of offshore fibre optic route in relation to the Irish EEZ, carbonate mounds or potential biogenic reefs (proximate to MAC Area)

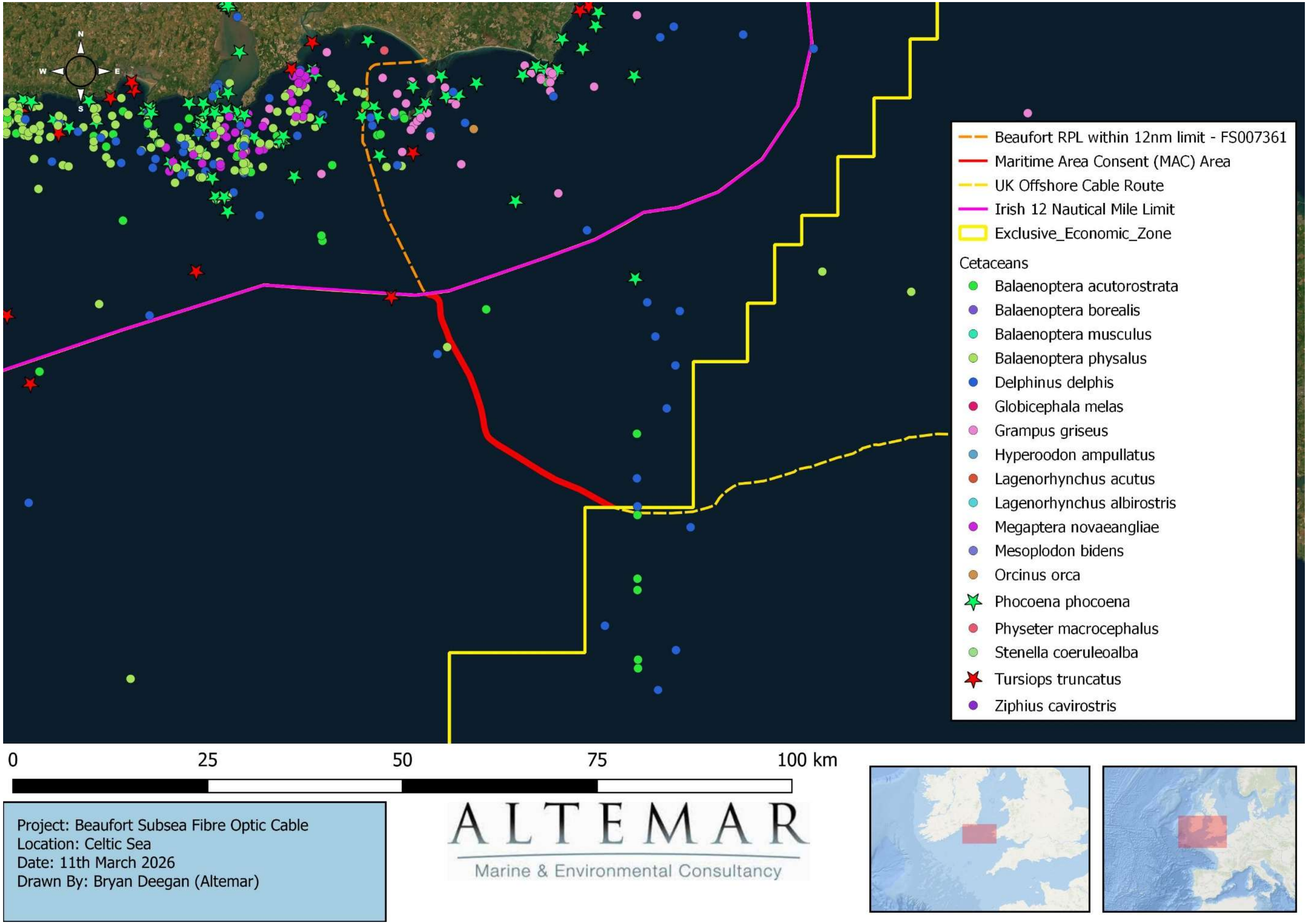


Figure 33. Recorded Cetacean species sightings (Source NBDC sightings data) proximate Beaufort Offshore Cable Route

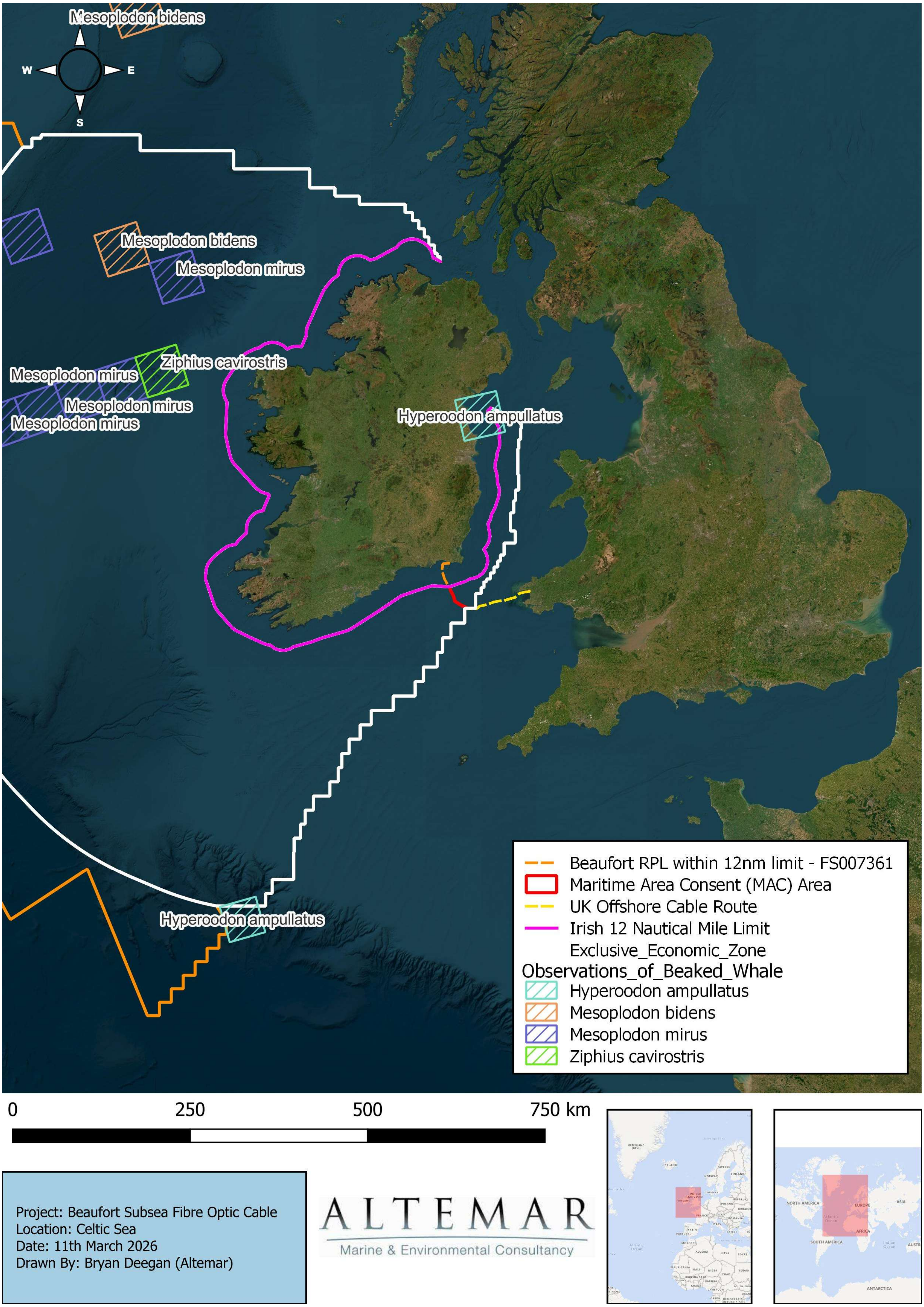
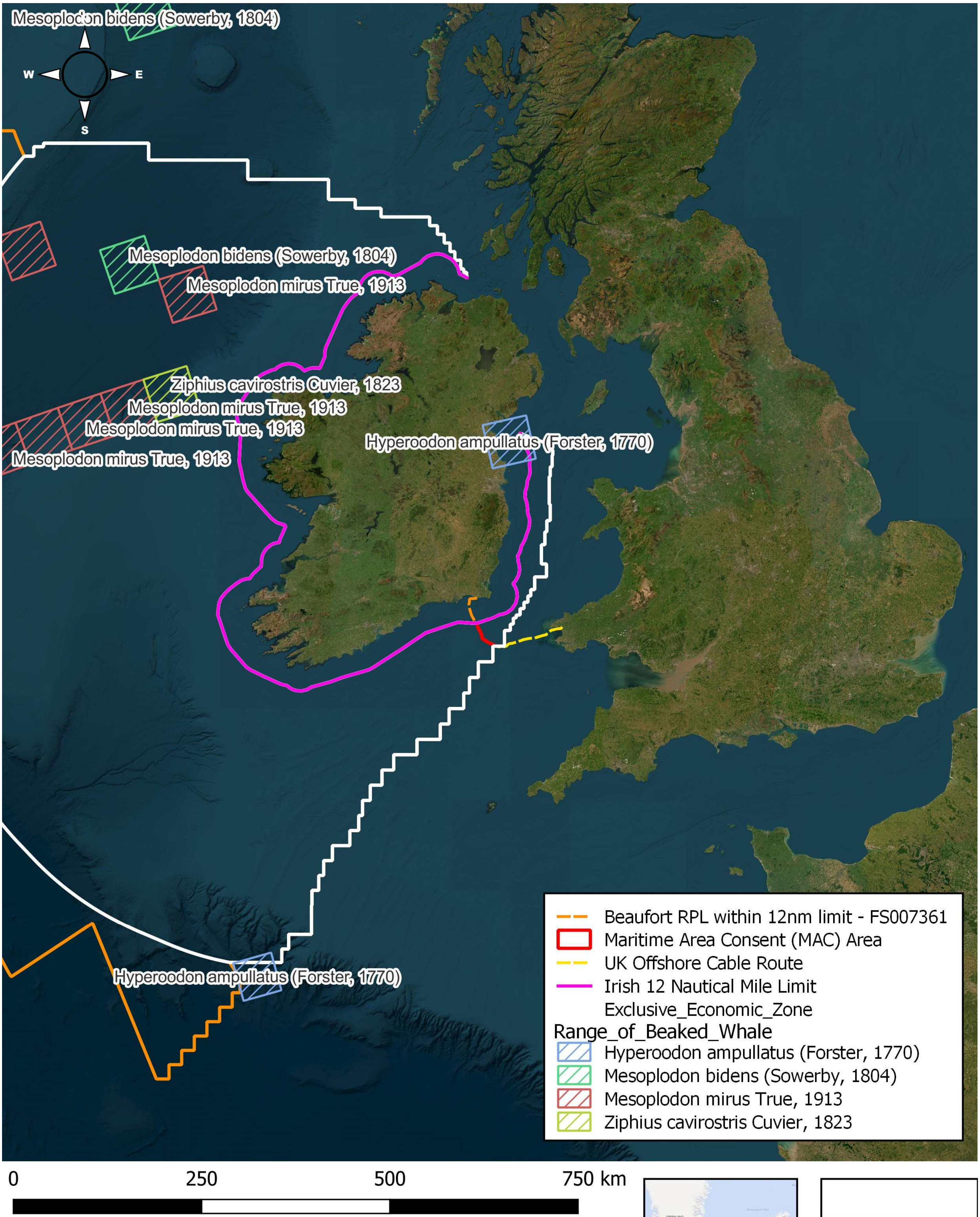


Figure 34. *Observations of Beaked Whales (Marine Institute data)*



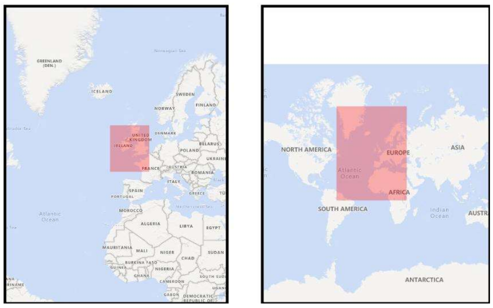


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Figure 35. *Range of Beaked Whales (Marine Institute data)*

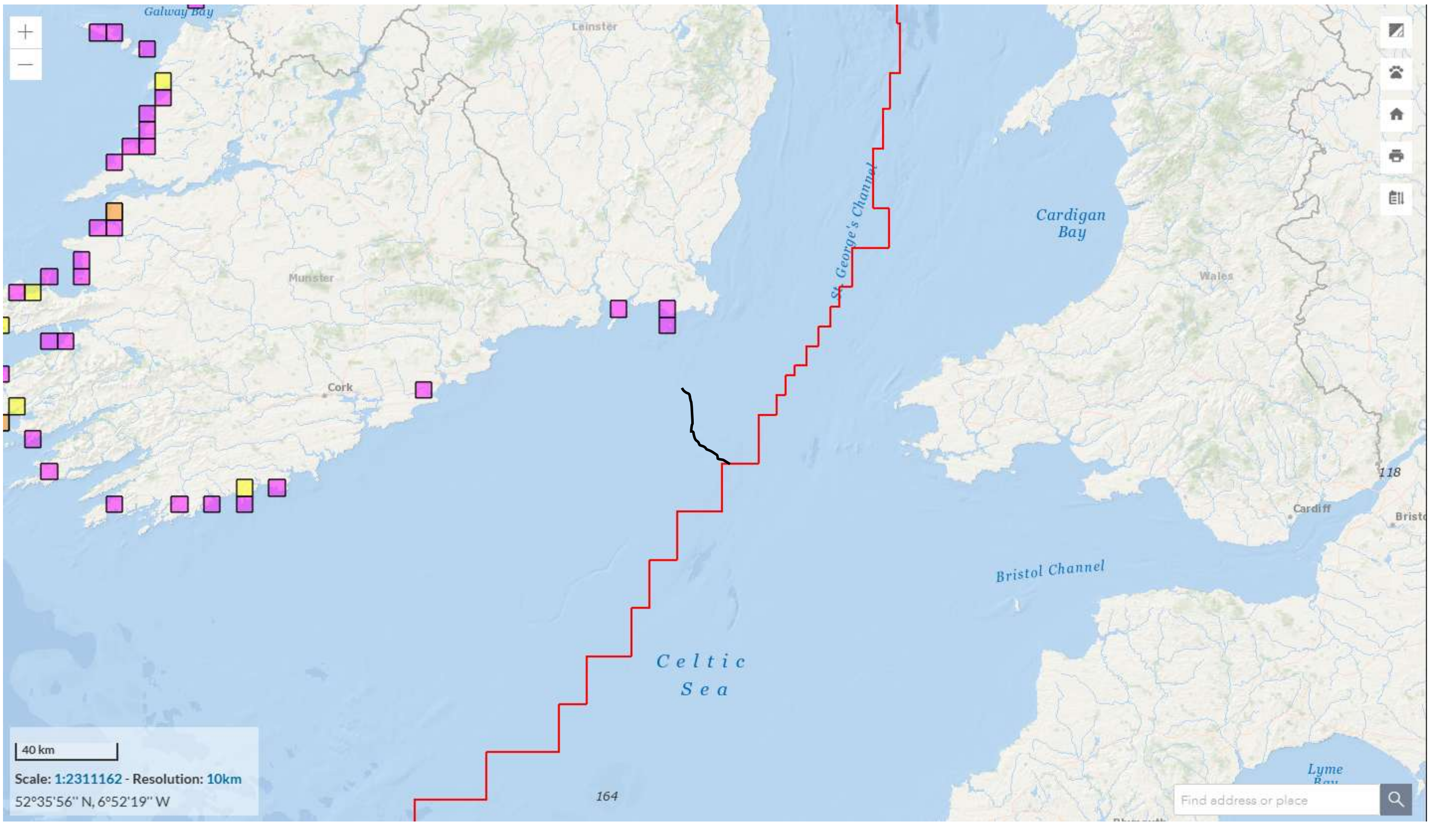

Figure 36. Cuvier's beaked whale (Ziphius cavirostris) (purple) and True's beaked whale (Mesoplodon mirus) (yellow) (Source: NBDC) (Approx. cable route: Black line)

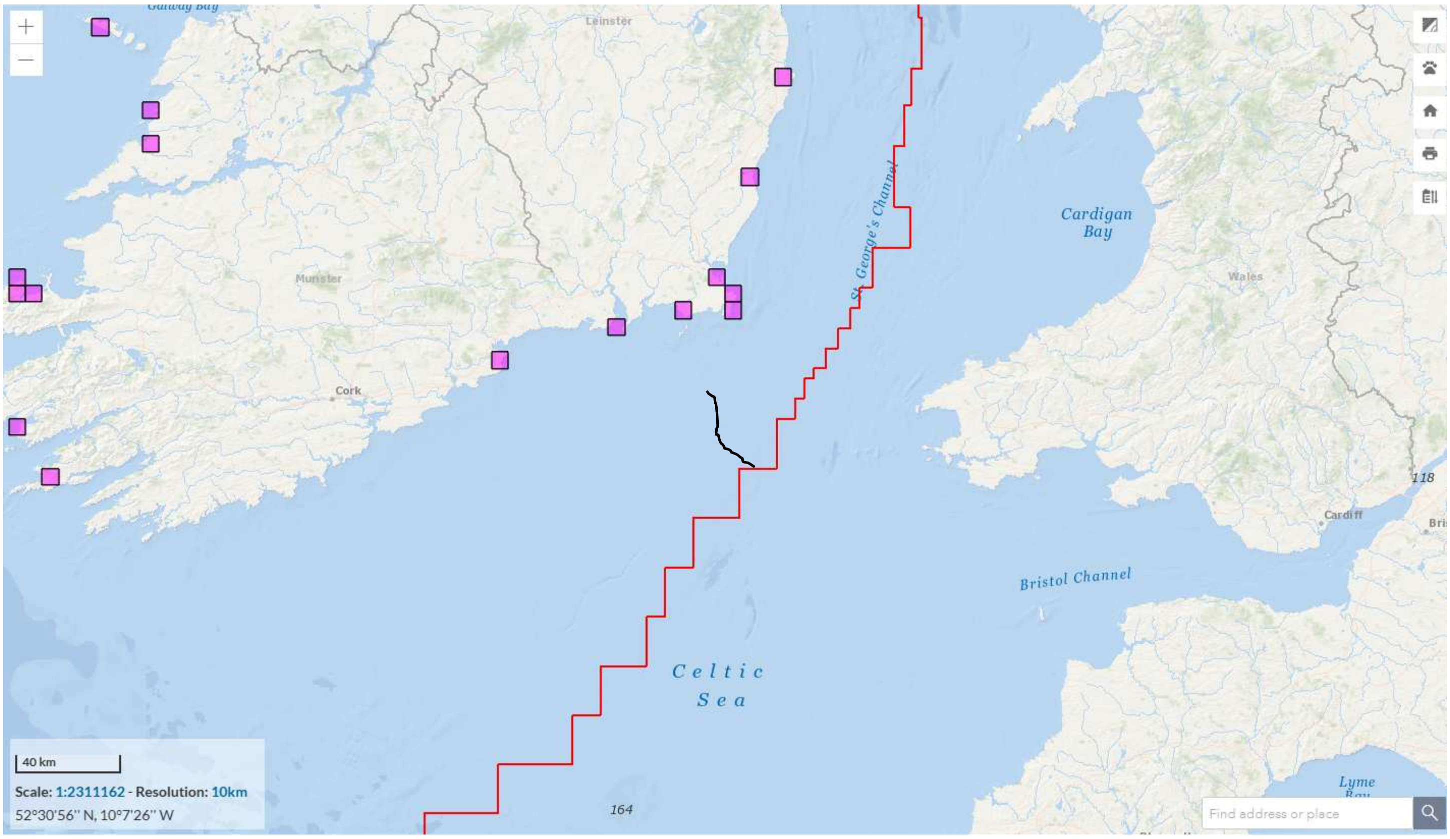

Figure 37. Sowerby's beaked whale (*Mesoplodon bidens*) (purple) (Source: NBDC) (Approx. cable route: Black line)

4.4 Additional information on species/habitats

Harbour Seals and Grey Seals

As can be seen from Figure 38, the proposed cable route is not in the immediate vicinity of resting, moulting or breeding sites. However, it is noted that as outlined in NPWS 2013 "*in acknowledging the limited understanding of aquatic habitat use by the species within the site, it should be noted that all suitable aquatic habitat is considered relevant to the species range and ecological requirements at the site and is therefore of potential use by harbour seals*." As a result, despite the location of the cable route outside key activity areas, the cable laying teams will need to be cognisant of this and take into account due diligence in relation to seal disturbance when deploying and recovering equipment.

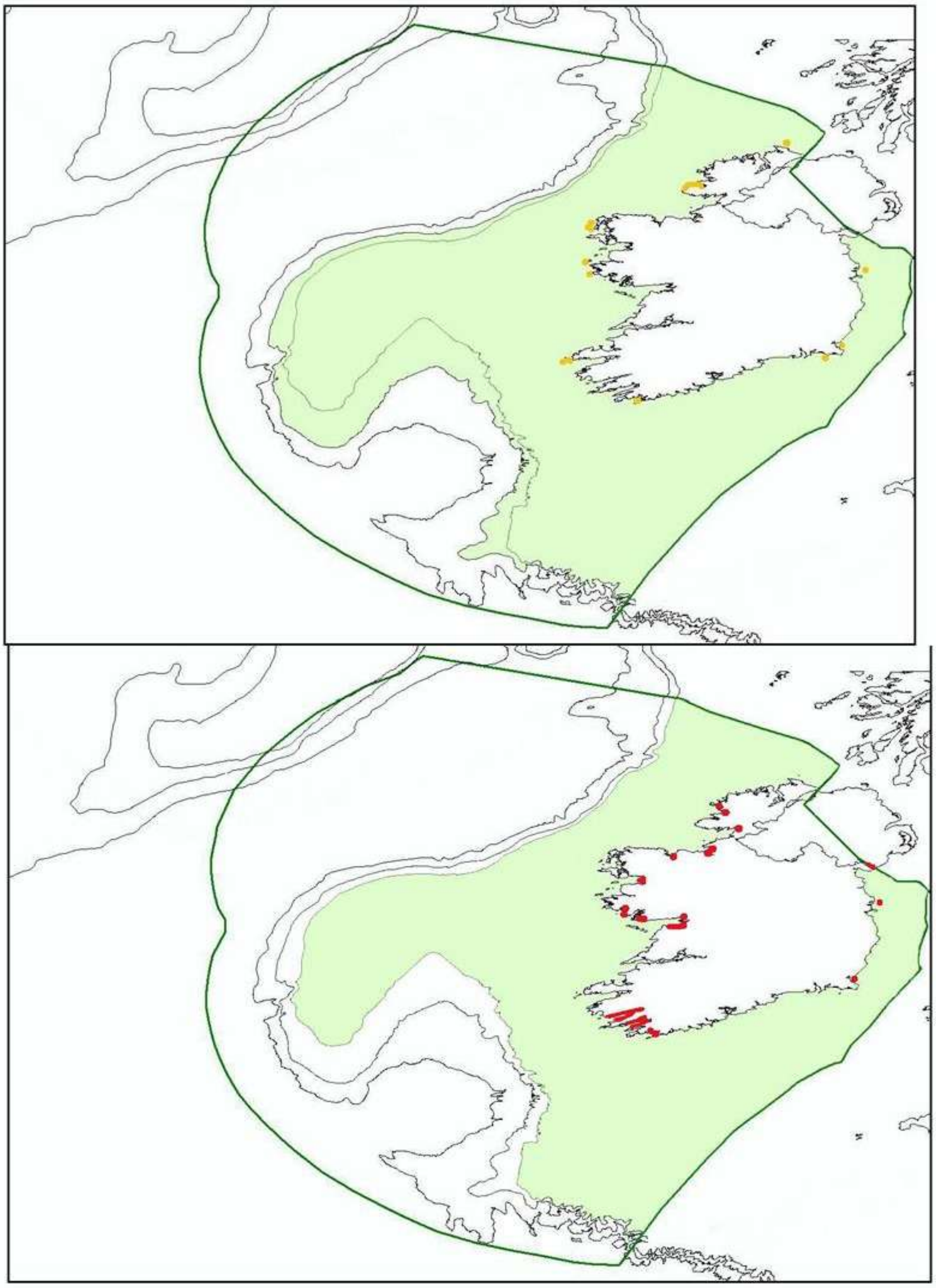

Figure 38. Harbour seal (red) and grey seal (yellow) distribution (green) and haul-out sites in the inshore area.

National Biodiversity Data Centre

The National Biodiversity Data Centre's online viewer was consulted in order to determine the extent of biodiversity and/or species of interest in the area. Species observations in proximity to the proposed cable route is demonstrated in Appendix II.

5. Potential Effects

The installation of a deep sea fibre-optic cable is a complex and challenging procedure. From the beginning of the planning stage to the final installation of the cable, careful thought has gone into ensuring the longevity of the cable and uninterrupted service. This, in tandem with licencing and environmental legislation, results in the placement of the cable in as stable an environment as possible that will have minimal impact on the environment and threat of anthropogenic disturbance. In summary, within the Irish EEZ, the laying of the cable, with the exception of the crossing point at the Greenlink Interconnector, will involve cable burial to a depth of 1.5m.

During the initial baseline assessment of the route, discussions took place in relation to sensitive habitats/designations that may be present along the proposed cable route. No designated conservation sites are located along the proposed Beaufort Offshore Cable Route. The proposed route is considered to be the optimal route for a fibre optic cable from an ecological and logistical perspective. It is important to note that the cable route was designed to avoid boulders, where possible, and areas of bedrock reef. No bedrock was noted along the 12nm limit – EEZ route within Irish waters.

5.1 Construction Impacts

Cable burial will take place within Irish waters between the 12nm limit and Irish EEZ Boundary. In addition, several cable crossings are noted along this section of the route, including the Greenlink Interconnector. Cable burial will involve the temporal disturbance of the seabed. Immediate backfilling is a feature of the trencher to be used. This process will involve a ship moving at a speed of approximately 0.5 kn and generating acoustic noise akin to dredging activity. A plume of sediment will be generated. However, due to the speeds and equipment involved, this plume will be very localised. ROV burial at cable crossings involve localised ROV jetting.

It is important to note that when equipment is deployed e.g. trencher (for burial) or ROV (for burial at cable crossings) a USBL is required so that the ship can locate the position of the equipment. This does emit underwater noise that could potentially impact on marine mammals. Further details are provided in Section 5.3.

Disturbance of cetaceans may occur due to the presence of the vessel and USBL. However, at the speeds involved (0.5kn during burial works), injury to marine mammals is unlikely. There is only little information on potential noise impacts due to the installation (or removal) and operation of sub-sea cables (OSPAR 2008a). Sound emissions associated with the installation, removal or operation of submarine cables are considered as less harmful compared to activities such as seismic surveys, military activities or construction work involving pile driving. Generally, maximum sound pressure levels related to the installation or operation of cables are moderate to low (OSPAR, 2012). Though modern equipment and installation techniques can reduce the re-suspension of sediment during cable burial or removal, remaining suspended sediment may nonetheless - depending on percentage of silt fraction and background levels - obstruct the filtration mechanisms of some benthic and pelagic organisms at least temporarily (OSPAR 2009). It can also affect the growth of the macrobenthos and may have a lethal effect on some species. Some mobile benthic species (for example, crabs) are able to avoid most disturbance, whereas sessile (bivalves, tubeworms etc.) and sensitive species (such as slower growing or fragile species) will be more impacted (OSPAR, 2012). Contamination arising from seabed disturbance is only a risk in heavily contaminated locations (OSPAR 2009, COOPER et al. 2007a, 2007b). It should be noted that best available data relating to sightings of cold corals (including *Lophelia pertusa*) have been examined, and no recordings of cold corals were identified along the proposed cable route.

Localised impacts would be foreseen in the vicinity of the trencher burial areas. The proposed route has been designed to avoid boulders where possible. However, there is potential for marine mammals to be in the vicinity of the proposed works. Mitigation measures for the protection of marine mammals are required. Additional information on Marine mammals and noise is outlined in the accompanying NIS and in Section 5.3. Potential impacts on habitats and species and the extent of these impacts that could potentially be encountered during the construction phase are seen in Table 6a (habitats) and 6b (species). Mitigation measures are proposed.

A rock berm will be constructed along the crossing point of the Beaufort Offshore Cable and Greenlink Interconnector. The rock berm will extend 13.5m along the interconnector axis, centred at the crossing location, and a berm depth of 0.8m. This will cover the pre-lay concrete mattress. The rock berm along the cable axis will be 64m (total length) x 1.5m (top width). The rock berm will be constructed with a mix of freshly crushed rock (granite/gneiss) with a maximum size of between 12 and 20 cm topped with a 20cm layer of smaller armourstone. Potential impacts associated with the construction of this rock berm are minor and localised in nature.

5.2 Operation Impacts

The cable will be laid in the deep offshore subtidal within the Irish EEZ, buried in marine sediment. The cable will be inert, "un-repeatered" (i.e. not powered), and will not generate acoustic noise. Invertebrate biodiversity may be negatively impacted in the short term during any potential maintenance / decommissioning works. However, operational works will be isolated to specific areas along the cable route. No significant impacts on offshore circalittoral sandy / course sediment habitats are foreseen in the absence of mitigation.

Out of an abundance of caution, there is the potential for minor disturbance impacts to seabirds (visual) and marine mammals (acoustics from repair / decommissioning vessel) which may be present along the route during maintenance / decommissioning works. Mitigation measures are required.

Table 6a. Potential impacts on habitats during construction.

Habitat	Fossitt	Habitats Directive	Rating	Potential effects	Impact Significance in the absence of mitigation.
Circalittoral gravels and Sands	SS5		D	Trencher will occur in this area offshore. A temporary alteration in sediment layering would follow the trenching process. Infauna may be damaged or displaced in the vicinity of the trencher. No mitigation is required.	Minor Adverse/ localised/short-term/not significant.
Circalittoral Mixed sediments	SS8		D	Trenching will occur in this area offshore. A temporary alteration in sediment layering would follow the trenching process. Infauna may be damaged or displaced in the vicinity of the trencher. No mitigation is required.	Minor Adverse/ localised/short-term/not significant.

Table 6b. Potential impacts on species during construction.

Species	Rating	Potential Effect	Impact Significance
Mammal-Cetaceans	A	Subtidal cable laying works may be carried out in vicinity of cetaceans. Localised disturbance may occur due to the presence of the vessel and acoustic noise generated from cable laying activities on the sea floor (see Section 5.2 for further details). Mitigation measures are required.	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required.
Mammal-Seals	A	Subtidal cable laying may be carried out in vicinity of seals. Localised disturbance may occur due to the presence of the vessel and acoustic noise generated from cable laying activities. Cable laying is to be carried out outside of breeding and haul out areas for Grey Seal and Harbour seals. Localised disturbance may occur due to the presence of the vessel and acoustic noise generated from cable laying activities on the sea floor (see Section 5.2 for further details). Mitigation measures are required.	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required.
Mammal-Bats	A	The offshore subtidal is not a suitable habitat for Irish bat species. The proposed development will not impact on bat species within Ireland's terrestrial habitats. No bat foraging or roosting habitats will be impacted by the proposed works. No impacts on bat species are foreseen as a result of the proposed works.	Neutral
Mammals-Terrestrial	A-D	The proposed works are located within the deep offshore subtidal of the Irish EEZ. Given that the proposed offshore cable route is located a minimum of 29km from the Irish shoreline at its nearest point, no otter species are expected to be located within the vicinity of the proposed cable route. No impacts on terrestrial mammal species are foreseen as a result of the proposed project.	Neutral

Species	Rating	Potential Effect	Impact Significance
Birds	A	The proposed Beaufort Offshore Cable Route is located in waters identified to support feeding opportunities for seabirds, particularly the Seas Off Wexford SPA (1.1km from cable route) and Saltee Islands SPA (16.5km from cable route). The proposed cable route is within an area of existing vessel traffic and fishing activity. However, out of an abundance of caution, despite the limited temporal and geographic scale of the proposed project, it is considered that there is the potential for visual and acoustic disturbance (via the works vessel) impacts on seabirds protected as SCIs of these SPAs which may be feeding / resting in waters along the proposed Beaufort Offshore Cable Route in the absence of mitigation. Mitigation measures are required.	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required.
Amphibians-Frogs	B	The offshore subtidal is not a suitable habitat for amphibian species. No amphibians are expected to be proximate to the proposed works. No impacts on amphibian species are foreseen from the proposed development.	Neutral
Terrestrial Flora	A-D	The offshore subtidal is not a suitable habitat for terrestrial flora. The proposed development will not impact on flora species within Ireland's terrestrial habitats.	Neutral
Marine algae	D	Subtidal marine algae are primarily associated with hard substrata and will not be impacted by the proposed works. No marine algae was identified along the proposed offshore cable route.	Neutral
Fish Species	A	Localised disturbance of fish species may occur due to trenching and ROV based burial activities. Vessel speeds are very slow and no significant impacts on fish are expected. Post lay, fish may be attracted to the area due to the disturbed sediment. A Fisheries Impact Report is outlined in Appendix II.	Minor Adverse/ localised/short-term. No mitigation measures are required.

Table 6c. Potential impacts on habitats during operation.

Habitat	Fossitt	Habitats Directive	Rating	Potential effects	Impact Significance in the absence of mitigation.
Circalittoral gravels and Sands	SS5		D	The cable will be buried in the marine sediment and no long term impacts are foreseen. Invertebrate biodiversity may be negatively impacted in the short term during any potential maintenance / decommissioning works. However, operational works will be isolated to specific areas along the cable route. No significant impacts on this habitat are foreseen in the absence of mitigation.	Neutral
Circalittoral Mixed sediments	SS8		D	The cable will be buried in the marine sediment and no long term impacts are foreseen. Invertebrate biodiversity may be negatively impacted in the short term during any potential maintenance / decommissioning works. However, operational works will be isolated to specific areas along the cable route. No significant impacts on this habitat are foreseen in the absence of mitigation.	Neutral

Table 6d. Potential impacts on species during construction.

Species	Rating	Potential Effect	Impact Significance
Mammal-Cetaceans	A	No acoustic noise is generated from the (unrepeatered) cable whilst in operation. Studies have shown that the danger of entanglement in modern cables is extremely remote due to the use of BAT in burial and cable design. Operational works will be isolated to specific areas along the cable route.	Neutral. Mitigation measures are required for maintenance / decommissioning works.
Mammal-Seals	A	No acoustic noise is generated from the cable whilst in operation. Studies have shown that the danger of entanglement in modern cables is extremely remote due to the use of BAT in burial and cable design. Operational works will be isolated to specific areas along the cable route.	Neutral. Mitigation measures are required for maintenance / decommissioning works.
Mammal-Bats	A	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen.	Neutral
Mammals-Terrestrial	A-D	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen.	Neutral

Species	Rating	Potential Effect	Impact Significance
Birds	A	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen from the operation of the proposed cable. There is the potential for minor disturbance impacts to seabirds which may be present along the route during maintenance / decommissioning works.	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required for maintenance / decommissioning works.
Amphibians-Frogs	B	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen.	Neutral
Terrestrial Flora	A-D	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen.	Neutral
Marine algae	D	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen.	Neutral
Fish Species	A	The cable will be laid in the deep offshore subtidal within the Irish EEZ. No impact is foreseen.	Neutral

5.3 Potential Acoustic Impacts on Cetaceans and Pinnipeds

All cetaceans are listed under Annex IV of the Habitats Directive, which means that they are protected wherever they occur. Bottle-nosed Dolphin and Harbour Porpoise are also listed under Annex II of the Directive. Annex II species require that core areas of their habitat are designated as sites of Community importance. Grey seals and Harbour seals are also listed under Annex II & Annex IV of the Habitats Directive.

The proposed cable lay would be expected to impact on marine mammals primarily through the emission of noise due to the vessel and acoustics from the USBL (Ultra Short Baseline) equipment. It should be noted that, given the slow speed (0.5 knots) of the vessel, no collision impacts with the proposed works vessel and equipment are foreseen as a result of the proposed works. USBL is a method of underwater acoustic positioning. It is used to track subsea targets such as ROVs/trencher. USBL positioning is used from shallow to deep waters (down to 10,000m and more) and its accuracy is proportional to the distance, typical from 1-2% of the slant distance for basic equipment and up to 0.06% for the ultimate USBL systems.

USBL positioning is suitable for a wide range of applications, including subsea asset tracking, subsea structure placement, LBL array calibration, UXO survey, IMR (Inspection, Maintenance and Repair). For metrology and sub-decimetric deep water applications LBL solutions will be more suitable. As outlined by O'Brien (2005), "*sound travels 4.5 times faster in water than in air and low frequency sounds travel farther underwater than high frequency sounds*."

Southall *et al*. (2019) outlined in their publication "*Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects*" revised the marine mammal hearing groups, which are seen in Table 7.

Table 7. *Marine Mammal Functional Hearing Groups and Estimated Functional Hearing groups Proposed by Southall et al. (2019)*

Marine mammal hearing group	Auditory weighting function	Genera (or species) included
Low-frequency cetaceans	LF	*Balaenidae (Balaena, Eubalaenidae spp.); Balaenopteridae (Balaenoptera physalus, B. musculus)*
		Balaenopteridae (Balaenoptera acutorostrata, B. bonaerensis, B. borealis, 1 B. edeni, B. omurai; Megaptera novaeangliae); Neobalenidae (Caperea);Eschrichtiidae (Eschrichtius)
High-frequency cetaceans	HF	*Physeteridae (Physeter); Ziphiidae (Berardius spp., Hyperoodon spp., Indopacetus, Mesoplodon spp., Tasmacetus, Ziphius); Delphinidae (Orcinus)*
		Delphinidae (Delphinus, Feresa, Globicephala spp., Grampus, 2 Lagenodelphis, Lagenorhynchus acutus, L. albirostris, L. obliquidens, L. obscurus, Lissodelphis spp., Orcaella spp., Peponocephala, Pseudorca, Sotalia spp., Sousa spp., Stenella spp., Steno, Tursiops spp.); Montodontidae (Delphinapterus, Monodon); Plantanistidae (Plantanista)
Very high frequency cetaceans	VHF	*Delphinidae (Cephalorhynchus spp.; Lagenorhynchus cruciger, L. austrailis); Phocoenidae (Neophocaena spp., Phocoena spp., Phocoenoides); Iniidae (Inia); Kogiidae (Kogia); Lipotidae (Lipotes); Pontoporiidae (Pontoporia)*
Phocid carnivores in water	PCW	*Phocidae (Cystophora, Erignathus, Halichoerus, Histriophoca, Hydrurga,Leptonychotes, Lobodon, Mirounga spp., Monachus, Neomonachus, Ommatophoca, Pagophilus, Phoca spp., Pusa spp.)*

The Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NOAA, 2018) outlined the hearing groups of marine mammals including the generalised hearing range of these cetacean groups (Table 8). They also noted that "*Exposures exceeding the specified respective criteria level for any exposure metric are interpreted as resulting in predicted temporary threshold shift (TTS) or permanent threshold shift (PTS) onset*." The onset of PTS on marine mammals was also outlined in NOAA 2018 (Table 9). The updated figures for PTS and TTS for are outlined in Table 10.

Table 8. Hearing Groups of Marine Mammals (NOAA, 2018)

Hearing Group	**Generalized Hearing Range***
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, Lagenorhynchus cruciger & L. australis)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

* Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007) and PW pinniped (approximation).

Table 9. Onset of PTS in Marine mammals

	PTS Onset Thresholds (Received Level)	
Hearing Group	Impulsive[1]	Non-impulsive[2]
Low-Frequency (LF) Cetaceans	Cell 1 *Lpk,flat:* 219 dB *LE,LF,24h:* 183 dB	Cell 2 *LE,LF,24h:* 199 dB
Mid-Frequency (MF) Cetaceans	Cell 3 *Lpk,flat*: 230 dB *LE,MF,24h:* 185 dB	Cell 4 *LE,MF,24h*: 198 dB
High-Frequency (HF) Cetaceans	Cell 5 *Lpk,flat:* 202 dB *LE,HF,24h:* 155 dB	Cell 6 *LE,HF,24h:* 173 dB
Phocid Pinnipeds (PW) (Underwater)	Cell 7 *Lpk,flat:* 218 dB *LE,PW,24h*: 185 dB	Cell 8 *LE,PW*,24h: 201 dB
Otariid Pinnipeds (OW) (Underwater)	Cell 9 *Lpk,flat:* 232 dB *LE,OW,24h:* 203 dB	Cell 10 *LE,OW,24h:* 219 dB

[1]Impulsive: produce sounds that are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI 1986; NIOSH 1998; ANSI 2005).
[2]Non-impulsive: produce sounds that can be broadband, narrowband or tonal, brief or prolonged, continuous or intermittent) and typically do not have a high peak sound pressure with rapid rise/decay time that impulsive sounds do (ANSI 1995; NIOSH 1998).

Table 10. Southall *et al.* (2019) TTS- and PTS-onset thresholds for marine mammals exposed to impulsive noise: SEL thresholds in dB re 1 µPa^{2}s under water and dB re (20 µPa)^{2}s; and peak SPL thresholds in dB re 1 µPa under water.

Hearing Group	**Impulsive Noise**		**Non-impulsive Noise**
	Unweighted SPLpeak(dB re 1 µPa)	Weighted SELcum (dB re 1 µPa^{2}s)	Weighted SELcum (dB re 1 µPa^{2}s)
	PTS Criteria		
Low-frequency (LF) cetaceans	219	183	199
High-frequency (HF) cetaceans	230	185	198
Very-High frequency cetaceans (VHF)	202	155	173
Phocid carnivores in water (PCW)	218	185	201
	TTS Criteria		
Low-frequency cetaceans	213	168	179
High-frequency cetaceans	224	170	178
Very high-frequency cetaceans	196	140	153
Phocid carnivores in water	212	170	181

The hearing ranges and sensitivity of marine mammals differ from one species to another depending on their audiogram. "*For example, harbour porpoises are sensitive from 3 kHz to 130 kHz, with peak sensitivity at 125-130 kHz, and bottlenose dolphins from 5-110 kHz, with peak sensitivity at 40 and 60-116 kHz*" (Southall *et al.*, 2007). Common seals are sensitive 4-45 kHz (peak sensitivity at 32 kHz) and grey seals 8-40 kHz. Humans are sensitive only to frequencies from 20 Hz to 16-18 kHz but with peak sensitivity from 2-4 kHz. Most small cetaceans, excluding harbour porpoise, have an auditory bandwidth of 150 HZ to – 160 kHz, while harbour porpoise have an auditory bandwidth within 200 Hz to 180 kHz. Pinnipeds in water are thought to have an auditory bandwidth of between of 75 Hz to 75 kHz and from 75 Hz to 30 kHz in air (Southall et al. 2007)."

The proposed USBL equipment and the noise frequency emissions are seen in Table 11.

Table 11. Details of the potential sources of acoustic noise

Equipment Type	Typical Source Pressure Level (dB re 1 µPa @ 1 m)	Potential for auditory injury?	Typical Frequency Range (kHz)
USBL System	194 - 207	Potential risk	20-50
Large Vessel (>100m)	Approx. 180	Potential risk	50-300 (DECC, 2011)

The low frequencies emitted from the USBL equipment (20-50 kHz) are below the auditory range of high and very high frequency cetaceans, but are within the hearing range of low frequency cetaceans that would be seen on the cable route. Conversely, frequencies emitted by the cable-laying vessel are outside the auditory range of low frequency cetaceans, but within the auditory range of high and very high frequency cetaceans. It should be noted that, due to the slow speed of the vessel during cable burial (0.5 knots), acoustic noise emitted from the main lay vessel is expected to be low.

The noise emitted from a USBL is below the TTS- and PTS-onset threshold injury levels indicated by Southall *et al.* (2019), negative impacts may be foreseen if Low Frequency Cetaceans are close enough to the equipment to receive sound levels above this indicative threshold.

The operations would comply with the NPWS (2014) "*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*". These guidelines would be deemed adequate to mitigate the negative impacts of the proposed works. Marine mammals in the vicinity of the vessel during start up procedures would be given ample time to leave the site with the due to the slow launch/recovery procedures of the subsea ROV trencher outlined in the guidelines. In addition, vessel speeds are extremely slow which would give marine mammals ample opportunity to move from the area.

The Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing

Southall (2019) outlined the main differences between their publication and previous publications including NOAA (2018) which was referenced as NMFS (2018) in Southall (2019). Southall (2019) states that "*The noise criteria here represent the next step in a sequential process of evolution of the criteria proposed by Southall et al. (2007), substantially modified with new analytical methods by Finneran (2016), and recently adopted as U.S. regulatory guidance by the NMFS (2016, 2018). While the quantitative process described herein and the resulting exposure criteria here are based on, and in many respects are identical to, those derived by Finneran (2016) and adopted by the NMFS (2016, 2018), there are a number of significant distinctions. The exposure criteria here appear in a peer-reviewed publication and include all marine mammal species for all noise exposures, both under water and in air for amphibious species. NMFS (2016, 2018) provides regulatory guidance only for the subset of marine mammals under their jurisdiction and do not include criteria for aerial noise exposures, an important consideration in many locations for which some earlier assessments were made (Finneran & Jenkins, 2012). The exposure criteria here, while based on the Finneran (2016) quantitative method and consistent with the NMFS (2016, 2018) guidance where they overlap, are thus more broadly relevant, peer-reviewed, and less subject to potential changes in national regulatory policy*."

Southall (2019) also stated that "*It should be noted that this results in some proposed differences in the terminology of hearing groups relative to those used in Finneran (2016) and NMFS (2016, 2018). These proposed differences in nomenclature may be confusing, but we believe they are justified (see the "Marine Mammal Hearing Groups and Estimated Group Audiograms" section and Appendices 1-6) and will support future criteria as new information emerges*."

The difference in nomenclature between NOAA 2018 and Southall (2019) is that NOAA (2018)[4] classified cetaceans as Low-frequency (LF) cetaceans (baleen whales), Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales) and High-frequency (HF) cetaceans (true porpoises, Kogia, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* & *L. aust*ralis) while Southall reclassified these groups to Low-frequency cetaceans, High-frequency cetaceans, Very high-frequency cetaceans. As outlined in Southall (2019) "*The distinction between HF and VHF cetacean groups (as opposed to mid- and high-frequency) reflects the regions of best hearing sensitivities within these groups, often including frequencies approaching or exceeding 100 kHz; these frequencies would be more appropriately described within marine bioacoustics as high to very high. Further, as discussed in more detail below, a number of anatomical and sound production properties suggest a potential distinction of very low-(VLF) and LF cetaceans among mysticetes. Some evidence also suggests a potential segregation of mid-frequency (MF) and HF cetaceans in addition to the distinction of HF and VHF cetaceans*." This is in effect a relabelling of Mid-Frequency (MF) Cetaceans and High-Frequency (HF) Cetaceans to High-frequency cetaceans and Very high-frequency cetaceans respectively. It should be clearly noted that the PTS values within the updated groups were identical between NOAA, 2018 and Southall 2019 and it was in effect a renaming of the groups.

Lurton (2016) modelled the sound field radiated by multibeam echosounders for acoustical impact assessment. Lurton (2016) stated that "*considering the injury criteria, the results illustrate that injury hazards are possible only at very short distances from the source: e.g. about 5 m for maximum Sound Pressure Level and 12 m for cumulative Sound Exposure Level in the case of a 240-dB source level, considering cetaceans. For behavioural response criteria, the corresponding values are 9 m and 70 m.*"

Based on these data, it is concluded that an underwater source noise level of 207dB (which the proposed main lay will not exceed) does not result in injury hazards once a minimum separation distance of 12 metres is maintained between the source of the noise and a cetacean. Equally there is no behavioural response once a minimum separation distance of 70 metres is maintained between the source of the noise and a cetacean. The proposed survey guidelines (DAHG, 2014) require a 1000m distance between the vessel and cetaceans prior to the commencement of vessel operations.

The operations would comply with the NPWS (2014) "*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*" http://www.npws.ie/sites/default/files/general/Underwater sound guidance Jan 2014.pdf. These guidelines would be deemed adequate to mitigate the negative impacts of the proposed works. Cetaceans in the vicinity of the vessel during start up procedures would be given ample time to leave the site with the soft start procedures outlined in the guidelines. It should be noted that the vessel will be operating at a very slow speed on a 24 hour basis with a MMO on board. It is considered that due to the fact that the ship will be operating on this basis, a MMO will be onboard operating to MMO guidance procedures, it will be providing significant time for cetaceans to leave the area. In addition, vessel speeds are extremely slow which would give marine mammals ample opportunity to move from the area.

[4] NOAA 2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. NOAA Technical Memorandum NMFS-OPR-59 April 2018.

Note: in relation to consistency between Southall (2019) and NOAA (2018)

The Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NOAA, 2018) (or National Marine Fisheries Service, 2018 (as quoted in Southall 2019)), outlines the hearing groups of marine mammals including the generalised hearing range of these cetacean groups (Annex II). NOAA (2018) also noted that "*Exposures exceeding the specified respective criteria level for any exposure metric are interpreted as resulting in predicted temporary threshold shift (TTS) or permanent threshold shift (PTS) onset.*" The thresholds for the onset of PTS on marine mammals were also outlined in NOAA 2018. The updated Southall (2019) figures for PTS and TTS for are outlined in Annex IV.

Southall (2019) outlined the main differences between their publication and previous publications including NOAA (2018) which was referenced as NMFS (2018) in Southall (2019). Southall (2019) states that "The noise criteria here represent the next step in a sequential process of evolution of the criteria proposed by Southall et al. (2007), substantially modified with new analytical methods by Finneran (2016), and recently adopted as U.S. regulatory guidance by the NMFS (2016, 2018). While the quantitative process described herein and the resulting exposure criteria here are based on, and in many respects are identical to, those derived by Finneran (2016) and adopted by the NMFS (2016, 2018), there are a number of significant distinctions. The exposure criteria here appear in a peer-reviewed publication and include all marine mammal species for all noise exposures, both under water and in air for amphibious species. NMFS (2016, 2018) provides regulatory guidance only for the subset of marine mammals under their jurisdiction and do not include criteria for aerial noise exposures, an important consideration in many locations for which some earlier assessments were made (Finneran & Jenkins, 2012). The exposure criteria here, while based on the Finneran (2016) quantitative method and consistent with the NMFS (2016, 2018) guidance where they overlap, are thus more broadly relevant, peer-reviewed, and less subject to potential changes in national regulatory policy."

Southall (2019) also stated that "It should be noted that this results in some proposed differences in the terminology of hearing groups relative to those used in Finneran (2016) and NMFS (2016, 2018). These proposed differences in nomenclature may be confusing, but we believe they are justified (see the "Marine Mammal Hearing Groups and Estimated Group Audiograms" section and Appendices 1-6) and will support future criteria as new information emerges."

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6. Cumulative Effects

As outlined by (OSPAR, 2012) "*Cumulative effects, the combined effect of more than one activity, may reinforce the impacts of a single activity due to temporal and/or spatial overlaps*". The potential for cumulative effects within the ZoI that may occur as a result of the proposed project, during and post works has been assessed.

6.1 Geographic Boundaries and the Timeline for Assessment

It should be noted that no terrestrial works are proposed on the Irish mainland as part of this application, which exclusively relates to the Beaufort Offshore Cable Route located between the 12 nautical mile limit and the Irish EEZ. The proposed cable installation works within the Irish EEZ associated with the proposed project are located exclusively in the offshore subtidal, approx. 29km from the Irish shoreline at its nearest point. The potential ZoI for cumulative effects for this assessment has been deemed to be projects located proximate to the proposed Beaufort Offshore Cable Route within the Irish EEZ, in addition to subtidal elements relating to underwater noise. The geographic boundaries of assessment were expanded to include coastal and offshore marine projects located proximate to the Beaufort Offshore Cable Route within the Irish EEZ.

MARA licencing in Ireland relates to licence applications out to the Irish EEZ limit. In order to assess the potential trans-boundary effects details of designated sites within UK waters were investigated. The cable routes within UK waters are subject to this UK permitting process and the potential impacts on designated sites are subject to a separate application process assessed by UK authorities. For the UK element of the proposed cable lay to proceed, it has to be approved by UK authorities and the reporting conclude that, following the implementation of appropriate mitigation, the proposed project would not adversely affect the integrity of UK designated sites, alone or cumulatively with other projects.

In relation to the timeline for assessment, given the short temporal nature of the proposed works, and the fact that the proposed works will be isolated to the cable route extents with potential for noise to extend beyond the cable route, the most recent projects located within the vicinity of the proposed works area have been examined for potential cumulative effects.

6.2 Identification of Plans/Projects that could act In Combination

Foreshore Applications, Maritime Area Consent (MAC) Applications, Maritime Usage Licence (MUL) Applications, EIA portal, and An Coimisiún Pleanála (ACP) Applications were examined for projects in proximity to the proposed Beaufort Offshore Cable route. Projects within the potential ZOI of the proposed Beaufort Offshore Cable Route are outlined in Tables 12-14. No projects of significance located within the ZOI of the proposed development were identified within the EIA portal / ACP Application search.

Table 12. Foreshore licence applications in vicinity of Beaufort Offshore Cable Route

Reference	Title	Year	Location	Activity	Status
FS007445	Blackwater Offshore Wind – Marine Surveys	2022	Wexford	Marine Surveys	Applied
FS007436	Voyage Offshore Array Limited Site Investigations for proposed Wind Farm	2022	Waterford and Wexford	Site Investigations	Applied
FS007509	Rosslare Europort Offshore Wind Hub Site Investigations	2022	Wexford	Site Investigations	Determination
FS007361	Beaufort Subsea Fibre Optic Cable	2022	Off Wexford Coast	Installation of Subsea Fibre Optic Cable	Determination
FS007318	RWE Renewables Ireland East Celtic Ltd. Site Investigations for proposed East Celtic Offshore Wind Park	2022	Wexford and Waterford	Site Investigations	Applied

Reference	Title	Year	Location	Activity	Status
FS007224	Rosslare Europort Berth 3 Extension	2022	Wexford	Extension of Existing Berth 3	Determination
FS007219	Rosslare Europort Maintenance Dredging	2022	Wexford	Maintenance Dredging	Determination
FS007038	Lady's Island Pipeline	2022	Wexford	Installation of 2 no. pipes and a flow control structure	Determination
FS007351	GDG Ltd. Deployment of 3 ADCP off the coast of Wicklow and Deployment of 1 ADCP off the coast of Wexford	2021	Wexford & Wicklow	Four Acoustic Doppler Current Profiler (ADCP) Trawl Resistant Bottom Mount (TRBM) units to be deployed on the seabed in the Irish Sea for a duration of 35 days to collect data on current speed and direction at each location.	Determination
FS007222	Rosslare Europort Site Investigation	2021	Wexford	Site Investigation	Determination
FS007050	Greenlink Interconnector Wexford	2019	Wexford	Subsea and underground electricity interconnector cable	Determination
FS006982	Energia - Application for Site Investigation Licence for Windfarm off Helvick Head	2019	Waterford	Site investigations for Offshore Wind Farm	Determination
FS007038	Lady's Island Pipeline	2021	Wexford	Installation of 2 no. pipes and a flow control structure	Determination

Table 13. *Maritime Area Consent (MAC) applications proximate to the proposed Beaufort Offshore Cable Route within the Irish EEZ (Accessed 15/03/2026)*

Reference	Year	Location	Activity	Status
MAC240057	2025	Tonn Nua, off the coast of Co. Waterford	The development of a 900 megawatt (MW) offshore windfarm	Applied
MAC20240006	2025	Courtown, Co. Wexford	The restoration of the north beach and construction of beach retaining coastal defence structures and the installation of a new marina and necessary supporting structures	Applied
MAC20230005	2024	Rosslare Europort, Co. Wexford.	Port Facilities to support the ORE Sector	Determined
MAC240016	2025	Duncannon, Co. Wexford and Crooke, Co. Waterford	Laying of a Fibre Optic Cable and auxiliary works	Applied
MAC250029	2025	Bray Head to Greystones North Beach, Co. Wicklow	Coastal Protection Works	Determined
MAC250031	2025	Newcastle to Wicklow Murrough, Co. Wicklow	Coastal Protection Works	Determined
MAC250030	2025	Kilcoole to Newcastle, Co. Wicklow	Coastal Protection Works	Determined
2022-MAC-006	2024	Off Wicklow Coast	Offshore Windfarm	Determined
2022-MAC-002	2022	Off Wicklow Coast	Offshore Windfarm	Determined

Table 14. *Maritime Usage Licence (MUL) applications proximate to the proposed Beaufort Offshore Cable Route within the Irish EEZ (Accessed 15/03/2026)*

Reference	Year	Location	Activity	Status
LIC230033	2023	Irish EEZ	Proposed installation and operation of the 2Africa Submarine Cable System within the Irish Exclusive Economic Zone (EEZ). The planned cable will extend from Widemouth Bay in Cornwall to a number of countries in Europe, Africa, and the Middle East.	Determined
MUL240036	2024	South Coast of Ireland	The maritime usage proposed is for marine site investigation (SI) works to inform the engineering design and environmental assessments for two offshore substations (OSS) in the Tonn Nua Area A (as identified in the South Coast Designated Maritime Area Plan), potential offshore transmission cable corridors, approaches to seven potential landfall zones, and seven landfall zones.	Determination
LIC240006	2024	Off the coasts of counties Wexford, Waterford and Cork	Deployment of the Marine Institute's R.V. to undertake a geophysical survey in the South Coast DMAP to inform future offshore renewable energy development.	Determined
MUL250019	2025	South Waterford - Maritime Area A – Tonn Nua	The proposed site investigation (SI) works are activities required to characterise the physical, biological, and environmental conditions of Maritime Area A - Tonn Nua. The data collected will underpin project design, environmental assessment, and consenting, for any future offshore wind development within Maritime Area A – Tonn Nua	Consultation Open
MUL240026	2024	South East Coast	To conduct a strategic modelling study of water currents and bathymetry along the Southeast Coast of Ireland	Minded To
MUL230026	2024	Wicklow Port, Co. Wicklow	Maintenance dredging of the navigation channel, turning basin and berths within Wicklow Port.	Applied

In addition to the above projects, the following plans and policies were reviewed and considered for possible in-combination effects with the Proposed Development:

- The South Coast Designated Maritime Area Plan for Offshore Renewable Energy (SC-DMAP)
- Project Ireland 2040: National Marine Planning Framework
- Project Ireland 2040: National Planning Framework

6.3 Impact Identification

The potential impacts of the proposed cable laying are Temporary (i.e. Effects lasting less than a year) and primarily to occur during the brief construction period (with the presence of boats, machinery and personnel in the vicinity of the works) as sediments redistribute over the cable. Impacts on infauna would be deemed to be temporary (i.e. Effects lasting less than a year). Maintenance works associated with the proposed project are Temporary in nature (i.e. Effects lasting less than a year) and will be isolated to specific areas along the cable route. In the event that the offshore cable is decommissioned, decommissioning works would be Temporary in nature (i.e. Effects lasting less than a year) and produce minor sediment dispersal that would diffuse and dilute within the expansive marine environment.

The proposed Beaufort Offshore Cable Route will cross the UK-IRL Crossing 1 and Hibernia Atlantic telecoms cables. The proposed Beaufort cable laying methodology has been designed to protect existing cables and thereby minimise any potential environmental impacts that may arise from the proposed works (see Section 4.2 for full details). In particular, the use of a CAPJET will ensure that the crossed cable will not be damaged and enable the burial of the Beaufort offshore cable at these crossings. The Beaufort Offshore Cable Route will also cross the Greenlink HVDC Interconnector cable, permitted and laid under **FS007050**. Similarly, the proposed Beaufort cable laying methodology has been designed to protect the Greenlink HVDC Interconnector cable through the pre-lay installation of articulated concrete mattresses at the crossing point (on which the Beaufort Cable will be laid) and construction of a rock berm over the Beaufort cable at this crossing point (see Section 4.2.1 for further details). As a result, the proposed Beaufort cable laying methodology has been designed to prevent any potential cumulative effects with existing subtidal cables within the Irish EEZ.

It is noted that there is potential for proposed plans and projects within the offshore subtidal waters between 12nm limit and Irish EEZ Boundary to have cumulative, negative impacts on marine mammals and seabirds via disturbance impacts. However, the core strategy, policies and objectives of the above SC-DMAP and Planning Frameworks have been developed to anticipate and avoid the need for developments that would be likely to significantly affect the integrity of any European site. Furthermore, such developments are required to conform to the relevant regulatory provisions and implement mitigation for the prevention of pollution, nuisance or other environmental effects likely to significant affect the integrity of European sites. In addition, sustainable development is inherent in the objectives of all development plans within Irish waters in addition to compliance within the Habitats and Birds Directives.

6.4 Pathway Identification

In the marine offshore subtidal of the Irish EEZ, there is a potential pathway for disturbance impacts to bird species protected as SCIs of Seas Off Wexford SPA and underwater noise to impact on marine mammals (protected as qualifying interests of proximate designated sites) through the use of main-lay equipment. As a result, given the nature and location of the proposed works, and out of an abundance of caution, it is considered that there is the potential for cumulative effects with the approved Beaufort Subsea Fibre Optic Cable project (**FS007361**), which entails the installation of Subsea Fibre Optic Cable from Kilmore Quay to the Irish 12 nautical mile limit, via noise and visual disturbance to marine mammals and protected seabirds.

There are no other projects, identified within the Foreshore Licence applications, or MARA planning records, that have been granted planning or currently under construction, proximate to the proposed Beaufort Offshore Cable Route within the Irish EEZ, that could potentially cause significant cumulative effects on European sites via the identified pathways.

6.5 Prediction

The proposed works would not be seen to have a significant impact on water quality of the area, including impacting the water quality status. A Natura Impact Statement was prepared by Altemar Ltd. to accompany the **FS007361** licence application. This report outlines mitigation measures to prevent significant disturbance impacts on marine mammals and seabirds. This report concludes with the following: '*On the basis of the content of this report, the competent authority is enabled to conduct an Appropriate Assessment and consider whether, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites conservation objectives, will adversely affect the integrity of the European site.* ***The***

proposed project will not adversely affect the integrity of the European site.' Out of an abundance of caution, given the proximity of the proposed Beaufort Offshore Cable Route to the approved **FS007361** project, mitigation measures specific to marine mammals and protected seabirds are required to prevent cumulative effects.

Additionally, out of an abundance of caution, it is considered that there is the potential for cumulative effects with the UK element of the Beaufort subsea cable. Mitigation measures specific to marine mammals and protected seabirds are required to prevent cumulative effects.

Given the scale and the temporal nature of the proposed works, no significant cumulative effects with other identified plans or projects are foreseen. Any potential impacts from a pathway that the proposed project may share with other projects identified in Tables 12-14 are considered to be minimal, and no significant cumulative effects on designated conservation sites are foreseen.

6.6 Assessment

Out of an abundance of caution, it is considered that, in the absence of mitigation measures, there is the potential for cumulative effects with the approved FS007361 project and UK element of the Beaufort subsea cable. All other projects outlined above are either completed or, are currently going through planning stages and are not expected to be carried out concurrently or are not at a scale or location where cumulative effects are foreseen with the proposed project. This report pertains to the cable laying for a marine fibre optic cable in subtidal habitats. As can be seen from using the Best Available Techniques and mitigation measures during cable laying considerable effort has gone into minimising the potential environmental impact of the project. "*Generally all mitigation measures applied for individual cables also contribute to reduction of cumulative impacts*" (OSPAR, 2012). There is the potential for cumulative effects with FS007361 and UK element of the Beaufort subsea cable on protected marine mammals and seabirds.

7. Mitigation Measures & Monitoring

Specific controls incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (ZoI) within / proximate to the subject site are outlined below.

Minor short-term impacts may result as a consequence of the project, but these are believed not to be at the scale to impact on designated conservation sites, species or the site-specific conservation objectives. However, following the precautionary principle, mitigation measures have been developed to minimise the ecological impacts of the project, in relation to Natura 2000 Annex habitats and species. This is primarily as a result of the potential for noise and visual disturbance within the marine environment.

Pre cable laying mitigation

Route Planning

A strict route selection process was carried out to assess the optimal route from the 12nm limit to the Irish EEZ, taking into account the lowest environmental impact and highest resource efficiency on the basis of sound and comparable data. This included addressing engineering issues as well as environmental concerns which included assessing existing infrastructure.

Cable works mitigation measures

Mitigation impacts are primarily concerned with the cable laying as minimal impacts are foreseen during the operation phase, with the exception of human intervention in relation to a break or fault in the cable. Impacts in a decommissioning stage are similar to those of the cable laying phase. Repairing the cable may involve several scenarios, such as the use of a grapnel to lift the cable on board so that repairs can be carried out at sea. As a result, the following mitigation measures will be implemented:

1 During all cable operations within Irish waters, the cable lay vessel will be operating at idle /minimal wake speeds which reduces potential collision risk with marine mammals. ROV trenching operations will typically not exceed 0.5kn.

2 A certified Marine Mammal Observer (MMO) will be onboard the vessel at all times in Irish waters to implement standard NPWS marine mammal mitigation measures. “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters” (NPWS, 2014) will be applied to ensure noise introduced into the marine environment have minimum effect. ROV trencher launch, seabed trenching and trencher recoveries will be conducted in consultation with the MMO.

3 In line with “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters” (NPWS, 2014) “Sound-producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible” and “in waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO”.

4 A project ecologist (separate to the MMO) with sufficient ornithological expertise in the identification of diving seabirds will be onboard. Where the ecologist observes a significant cluster of actively diving birds in the works corridor, within 500 m of the vessel works will be mitigated based on the instruction of the ecologist. This could include slowing vessel cable laying or pausing works if there is potential for significant effect on birds.

5 Sufficient resources will be made immediately available on the vessel to deal with accidental oil spills, including hydraulic hoses bursting etc. and reported to the on board ecologist.

6 Ballast water discharges from project vessels will be managed under the International Convention for the Control and Management of Ships' Ballast Water and Sediments standard (International Maritime Law: Ballast Water Management Convention).

Reinstatement

Reinstatement of the subtidal habitats should be carried out to pre-construction conditions. Any concerns in relation to the works process or resulting reinstatement of subtidal habitats to pre-works conditions will be raised with NPWS by the project ecologist prior to the removal of personnel from the site.

Post-lay Monitoring

Given the location of the cable, buried in marine sediments, physical monitoring of the cable would pose an impact on the marine environment. Underwater cables by their nature are passive on/within the seabed. It is not expected that the cable will move, deteriorate or impact on marine habitats over time, unless impacted by anthropogenic /storm influence. As outlined by Carter *et al.* (2009) '*Unless a cable fault develops, the seabed may not be disturbed again within the system's design life.*' Problems, if they arise would be expected to result in a loss of signal and subsequent location of the break/damage and repair. The optical fibres and electrical supply in the cable are monitored 24hours a day from the terminal station, as this is a fundamental function of the cable.

Decommissioning

Once decommissioned, the Beaufort Offshore Cable will be addressed in line with guidance and permissions at that time. It may remain buried in-situ within the subtidal seabed or be removed in line with guidance and consultation. Any works required to decommission this cable will be minor and isolated in nature. All mitigation measures relevant to cable-laying works (including an onboard MMO and ornithological expert) will be implemented at a minimum, during any required decommissioning works.

In-Combination Effects with Identified Projects

As the identified inshore (**FS007361**) and UK elements element of the Beaufort Cable project is likely to result in very similar underwater noise/disturbance effects, the implementation of the proposed subtidal mitigation measures outlined above, and within in the NIS prepared for **FS007361,** will act to eliminate any potential for in-combination effects on the qualifying interests and SCIs of European Sites within the Zone of Interest of the project. These measures will be in place for the entire cable lay. It should be noted that, following obtention of all appropriate permissions, the full length of the cable will be laid by a single vessel with mitigation measures in place.

8. Adverse Effects likely to occur from the project (post mitigation)

Standard and specific mitigation measures are proposed. These would ensure that the proposed works do not adversely affect any of the habitats, or fauna inhabiting them, throughout the duration of the works. However, early implementation of ecological supervision and consultation with NPWS, prior to works associated with this project, is seen as an important element to the project.

With the successful implementation of standard and specific mitigation measures to limit impacts on the biodiversity, no significant impacts are foreseen from the proposed works on aquatic ecology. Residual impacts of the proposed project will be localised to the immediate vicinity of the proposed works.

The mitigation proposed for the development satisfactorily addresses the mitigation of potential impacts on aquatic biodiversity through the application of the standard controls as outlined above. In particular, mitigation measures to ensure compliance with the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. It is essential that these measures outlined are complied with, to ensure that the proposed project does not have environmental impacts and significant impacts on local biodiversity.

Residual effect: Minor / localised/short-term/Not significant.

9. Residual Impacts and Conclusion

The mitigation proposed for the Beaufort Offshore Cable satisfactorily addresses the mitigation of potential impacts on the sensitive receptors through the application of standard controls. The overall impact on the ecology of the proposed works will result in a short term / minor / not significant residual effect on the ecology of the area and locality overall.

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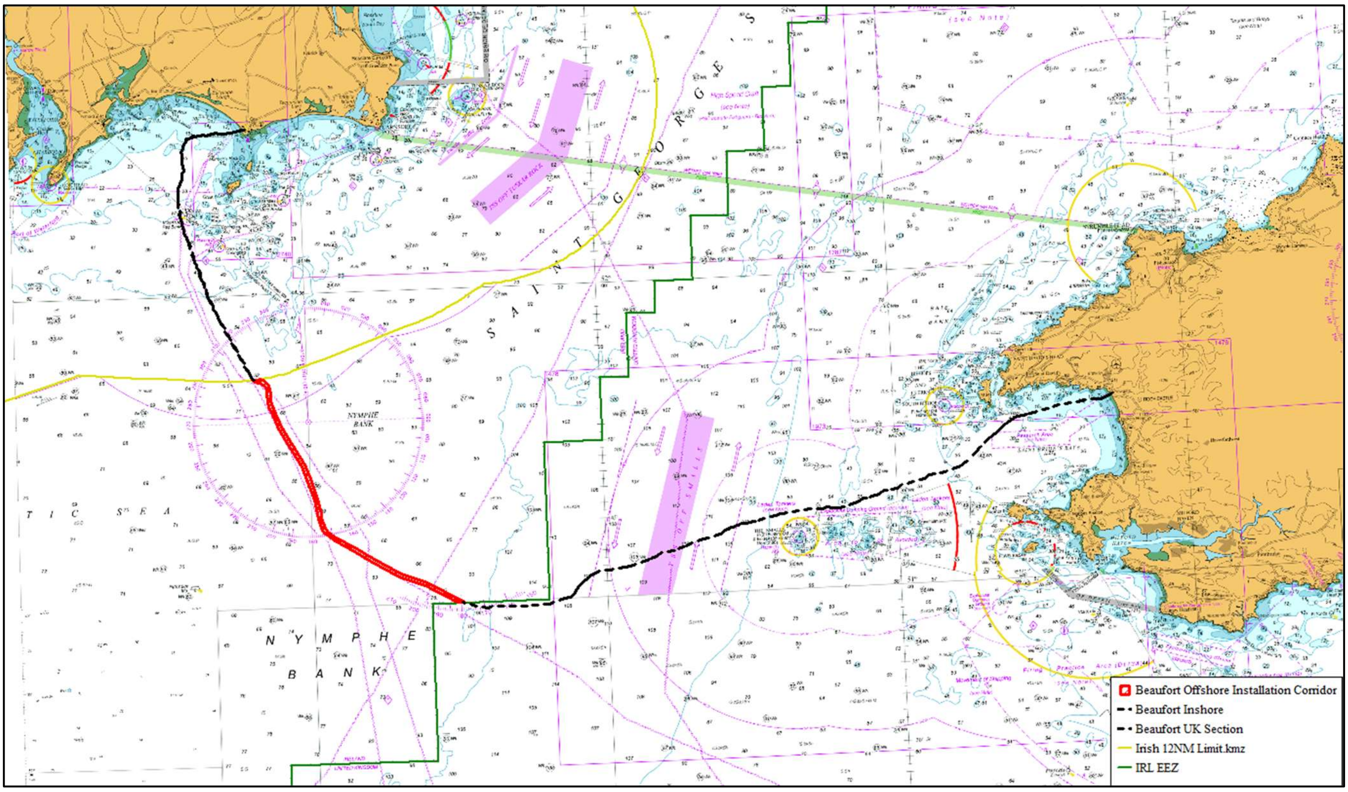
Appendix I-Recorded species, and associated designations, along MAC Area (NBDC Data)

Species name	***Title of dataset***	***Designation***
Auks (Alcidae)	*ObSERVE II Aerial Surveys for Seabirds and Cetaceans in the Irish Atlantic Margin*	
Black-headed Gull (Chroicocephalus ridibundus)	*eBIRD Bird Records for Ireland*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Blonde Ray (Raja brachyura)	*Chondrichthyans Of Ireland*	*Threatened Species: Near threatened*
Common Dolphin (Delphinus delphis)	*IWDG Casual Cetacean Sightings*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Common Guillemot (Uria aalge)	*European Seabirds at Sea (ESAS) bird sightings 1980-2023*	*Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Porpoise (Phocoena phocoena)	*ObSERVE II Aerial Surveys for Seabirds and Cetaceans in the Irish Atlantic Margin*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention*
Cuckoo Ray (Leucoraja naevus)	*Chondrichthyans Of Ireland*	*Threatened Species: Vulnerable*
Fin Whale (Balaenoptera physalus)	*IWDG Casual Cetacean Sightings*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Fulmar (Fulmarus glacialis)	*European Seabirds at Sea (ESAS) bird sightings 1980-2023*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Gannet (Morus bassanus)	*European Seabirds at Sea (ESAS) bird sightings 1980-2023*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Black-backed Gull (Larus marinus)	*eBIRD Bird Records for Ireland*	
Grey Seal (Halichoerus grypus)	*Grey Seal (Halichoerus grypus) Distribution 2009-2014*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Herring Gull (Larus argentatus)	*eBIRD Bird Records for Ireland*	*Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Kittiwake (Rissa tridactyla)	*European Seabirds at Sea (ESAS) bird sightings 1980-2023*	*Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*

Species name	***Title of dataset***	***Designation***
Lesser Black-backed Gull (Larus fuscus)	*eBIRD Bird Records for Ireland*	*Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Spotted Dogfish (Scyliorhinus canicula)	*Chondrichthyans Of Ireland*	
Manx Shearwater (Puffinus puffinus)	*European Seabirds at Sea (ESAS) bird sightings 1980-2023*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Minke Whale (Balaenoptera acutorostrata)	*European Seabirds and Sea (ESAS) Cetacean Sightings 1980-2023*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Nursehound (Scyliorhinus stellaris)	*Chondrichthyans Of Ireland*	
Razorbill (Alca torda)	*eBIRD Bird Records for Ireland*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Sooty Shearwater (Ardenna grisea)	*eBIRD Bird Records for Ireland*	*Protected Species: Wildlife Acts*
Spotted Ray (Raja montagui)	*Chondrichthyans Of Ireland*	*Threatened Species: OSPAR Convention*
Spurdog (Squalus acanthias)	*Chondrichthyans Of Ireland*	*Threatened Species: OSPAR Convention || Threatened Species: Endangered*
Starry Smooth Hound (Mustelus asterias)	*Chondrichthyans Of Ireland*	
Storm Petrel (Hydrobates pelagicus)	*European Seabirds at Sea (ESAS) bird sightings 1980-2023*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Sun-fish (Mola mola)	*ObSERVE Aerial Surveys for Seabirds and Cetaceans in the Irish Atlantic Margin*	
Thornback Ray (Raja clavata)	*Chondrichthyans Of Ireland*	
Tope (Galeorhinus galeus)	*Chondrichthyans Of Ireland*	*Threatened Species: Vulnerable*
Undulate Ray (Raja undulata)	*Chondrichthyans Of Ireland*	*Threatened Species: Endangered*

Fisheries Impact Report for Installation of the Proposed Beaufort Cable System between the Irish 12 Nautical Mile Limit & Exclusive Economic Zone.



20TH MARCH 2026

PREPARED BY:

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On behalf of:

Amazon MCS Ireland Limited

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1. Introduction

The Fisheries Impact Report has been prepared by Altemar Ltd. at the request of Amazon MCS Ireland Limited in relation to the proposed Beaufort Subsea Fibre Optic Cable installation works from IRL 12nm to IRL EEZ Boundary.

The following report provides additional information to the findings of the Ecological Impact Assessment and AIMU report and considers further detail on the proposed methodology, duration and scale of the proposed project in the context of the total available spawning areas and timings of the subject species of concern. It also provides details on the potential impacts of the equipment used to complete the proposed works on commercial fish stocks whose spawning areas overlap with the works corridor.

It should be noted that the subject matter of the response is in relation to timing of works within commercial fish spawning areas and is not related to Appropriate Assessment or the Habitats Directive / Annex IV species / Annex habitats.

2. Background to Altemar Ltd.

Since its inception in 2001, Altemar has been delivering ecological and environmental services to a broad range of clients. Operational areas include residential, infrastructural, renewable, oil & gas, private industry, local authorities, EC projects and State/semi-State Departments.

Bryan Deegan, the managing director of Altemar, is an Environmental Scientist and Marine Biologist with over 30 years' experience working in Irish terrestrial and aquatic environments, providing services to the State, Semi-State and industry. He is currently contracted to Inland Fisheries Ireland as the sole "External Expert" to environmentally assess internal and external projects. Bryan Deegan (MCIEEM) holds a MSc in Environmental Science, BSc (Hons.) in Applied Marine Biology, NCEA National Diploma in Applied Aquatic Science and a NCEA National Certificate in Science (Aquaculture). Bryan has been involved in twelve international sub marine fibre optic cable projects, many of which involved Horizontal Directional Drills within designated sites and all works required ecological supervision.

Frank Spellman (author) holds a BSc in Zoology from University College Dublin and a research-based MSc from the department of Zoology at Trinity College Dublin. He has had previous experience with governmental bodies, aquaculture settings, and academic research. He also contributes to a number of citizen science programs. At Altemar, Frank has been lead ecologist on numerous development projects within Ireland, carrying out full non-avian mammal, ornithological, bat, Fossitt, freshwater, invasive species, and fisheries impact assessments on a diverse array of marine, freshwater and terrestrial sites and projects.

3. Potential impacts on known spawning/nursery areas of commercially important fish species

The following sections detail the potential effects of carrying out the proposed works within the area located between the Irish 12 Nautical Mile Limit and Irish Exclusive Economic Zone. The works corridor, spawning areas and Marine Institute survey data are seen in Figures 1-13.

Spawning/nursery areas overlapping with Beaufort Offshore Cable Route

Spawning Grounds

As outlined by Ellis et al. (2012)[1] "*There are numerous modes of reproduction in fishes, and broadcast spawning, which involves shedding the eggs and sperm into the water column, is one of the more frequent strategies (Balon, 1984). Such species may have more extensive spawning grounds than those species which deposit eggs on the sea floor or on biogenic structures. The presence of eggs and larvae of broadcast spawners can be indicative of spawning grounds, although it should be noted that later larval stages may have been advected away from the spawning site. Mature fish with running eggs or sperm can also be indicative of spawning grounds, although these data were not used in the current project, as not all areas have surveys at the right time of year in order to assess the spawning state*."

Nursery Grounds

As outlined by Ellis et al. (2012)[1] "*The grounds where juveniles are found are termed nursery grounds. It has been suggested that nursery grounds are those sites where juveniles occur at higher densities, have reduced rates of predation and have faster growth rates than in other habitats, which should result in nursery grounds providing a greater relative contribution to adult recruitment in comparison to non-nursery ground habitats (see Beck et al., 2003; Heupel et al., 2007). Whilst field data are available to highlight areas where juveniles occur at higher densities, comparable data to confirm that they avoid predation more successfully, have enhanced growth rates and provide greater relative contributions to recruitment are generally lacking*."

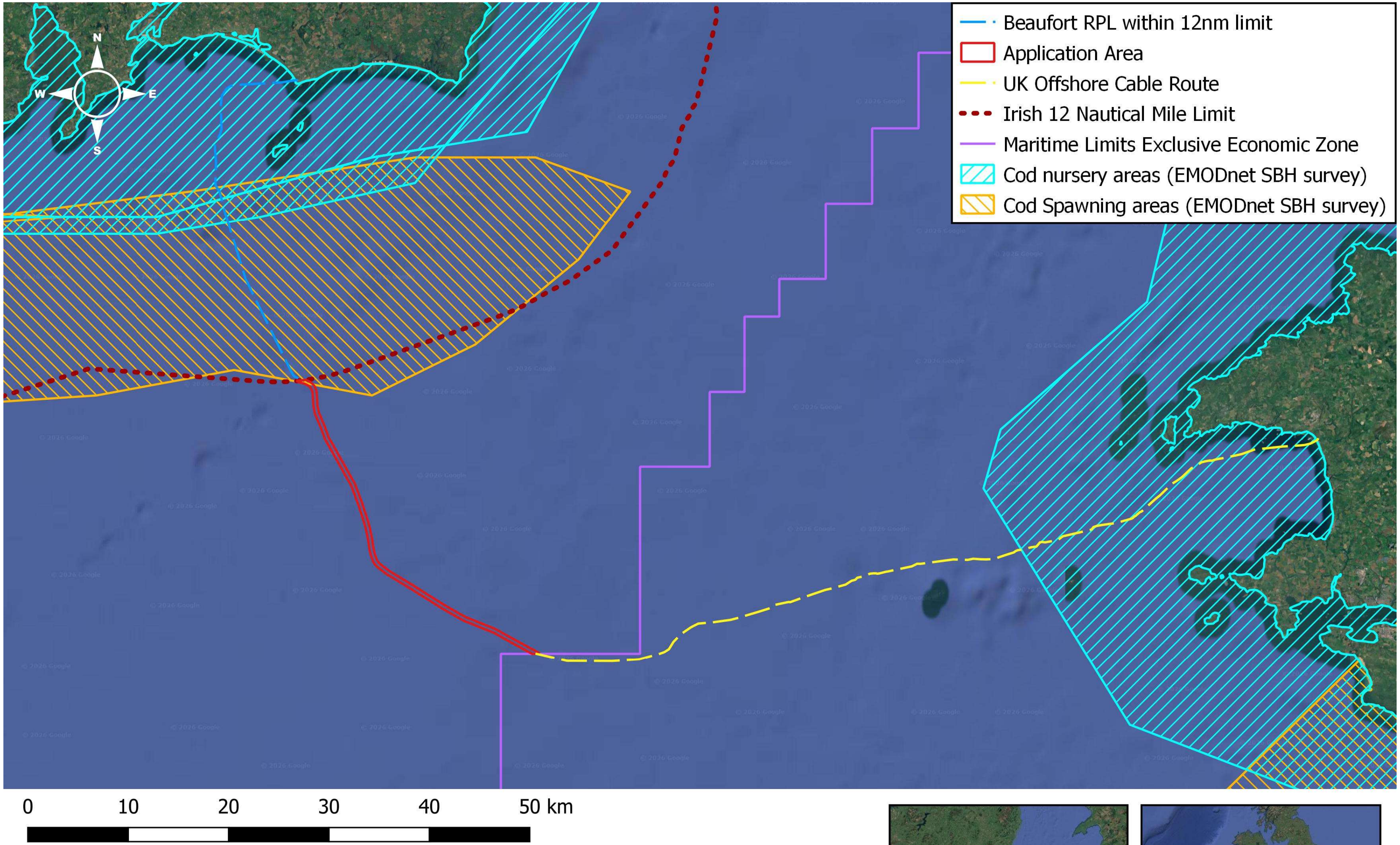
The Beaufort Offshore Cable Route overlaps with the known spawning and/or nursery areas of several commercial fish species:

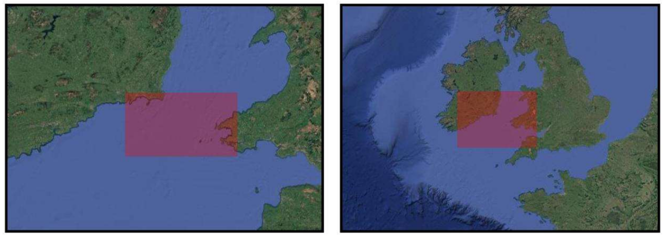
Cod

The proposed Beaufort Offshore Cable Route passes through known cod (*Gadus morhua*) spawning grounds (*Figure 1*). These spawning grounds span large areas off the east and southeast coasts of Ireland, and so any potential disturbances to spawning activity due to pre/main/post-lay works within the proposed Beaufort Offshore Cable Route would be minimal, short-term, and not likely to have any significant effect. The proposed Application Area does not pass overlap with known cod nursery areas.

The spawning area of concern for cod constitutes a sea area of approximately 2,215 km^2, of a total of 24,818 km^2 known spawning areas within Irish and UK waters. The total area of the subject spawning area potentially impacted by the proposed works is 0.5 km^2, equating to approximately 0.02% of the subject spawning area and approximately 0.002% of the total known spawning areas in Irish and UK waters. Based on estimated works timelines (2 weeks total over a 2 month period) it is predicted that main lay activities would be carried out in this spawning area over approximately eight hours. Assuming pre/post-lay activities occur over a similar duration of time, it is estimated that proposed works would occur within this spawning area over approximately 24 hours in total in three phases across two months.

The spawning period for cod peaks in February and March. Based on the proposed Spring 2027 commencement, the works period would potentially overlap with known cod spawning areas during peak spawning season. However, based on the total area potentially impacted in relation to the overall non-impacted known spawning area (approximately 0.002%), the duration of time over which the works are estimated to take place (2 weeks total over a 2 month period) and the amount of time pre/main/post-lay efforts are estimated to occur in any particular area within known spawning grounds (approximately 24 hours in total in three phases across two months), in the event of direct overlap of works with peak spawning season, the potential impact on spawning cod is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.





Project: Beaufort Subsea Fibre Optic Cable
Location: Celtic Sea
Date: 19th January 2026
Drawn By: Frank Spellman (Altemar)

ALTEMAR
Marine & Environmental Consultancy

Figure 1. *Cod nursery and spawning areas proximate to the Beaufort Offshore Cable Route.*

Horse mackerel

The proposed Beaufort Offshore Cable Route passes through known horse mackerel (*Trachurus trachurus*) nursery grounds (*Figure 2*). These known nursery grounds span over the majority of waters within the Irish EEZ between the coast and continental shelf, including the entirety of the Celtic Sea and Irish Sea. Due to the expansive nursery range, pelagic nature and lack of specific habitat features sensitive to disturbance, any disturbances to juveniles from pre/main/post-lay activities within the proposed Beaufort Offshore Cable Route would not be significant.

The proposed Application Area does not pass through or adjacent to any known horse mackerel spawning areas.

Based on the total area potentially impacted in relation to the overall non-impacted known nursery areas, limited time over which works are estimated to take place, the amount of time works are likely to occur in any particular area within known nursery grounds and the pelagic nature of this species, the potential impact on juvenile horse mackerel is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

Haddock

The proposed Beaufort Offshore Cable Route passes through known haddock (*Melanogrammus aeglefinus*) spawning grounds (*Figure 3*). These spawning grounds span large areas off the west, northwest, east and south coasts of Ireland, and so any disturbances to spawning activity due to pre/main/post-lay activities within the proposed Beaufort Offshore Cable Route would be minimal, short-term, and not likely to have any significant effect.

The spawning area of concern for haddock constitutes a sea area of approximately 23,369 km^2, of a total of 31,542 km^2 known spawning areas within Irish waters. The total area of the subject spawning area potentially impacted by the proposed Application Area is 15 km^2, equating to approximately 0.06% of the subject spawning area and 0.05% of the total known spawning areas in Irish waters. Based on estimated timelines, it is predicted that main lay activities would be carried out in this spawning area over approximately two weeks. Assuming pre/post-lay activities occur over a similar duration of time, it is estimated that proposed works would occur within this spawning area over approximately six weeks in total over three phases across two months. This equates to an estimated 0.002% of the specific spawning area and 0.001% of total spawning areas for haddock potentially impacted per day of operation.

The spawning period for haddock peaks in March and April. Based on the proposed Spring 2027 commencement, the works period would potentially overlap with known haddock spawning areas during peak spawning season. However, based on the total area potentially impacted in relation to the overall non-impacted known spawning area, the duration of time over which the works are estimated to take place and the amount of time pre/main/post-lay efforts are estimated to occur in any particular area within known spawning grounds, in the event of direct overlap of works with peak spawning season, the potential impact on spawning haddock is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

Haddock nursery areas span similarly expansive areas to spawning areas and are located in geographically similar locations across Irish waters. Therefore, potential impacts on haddock nursery area are predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

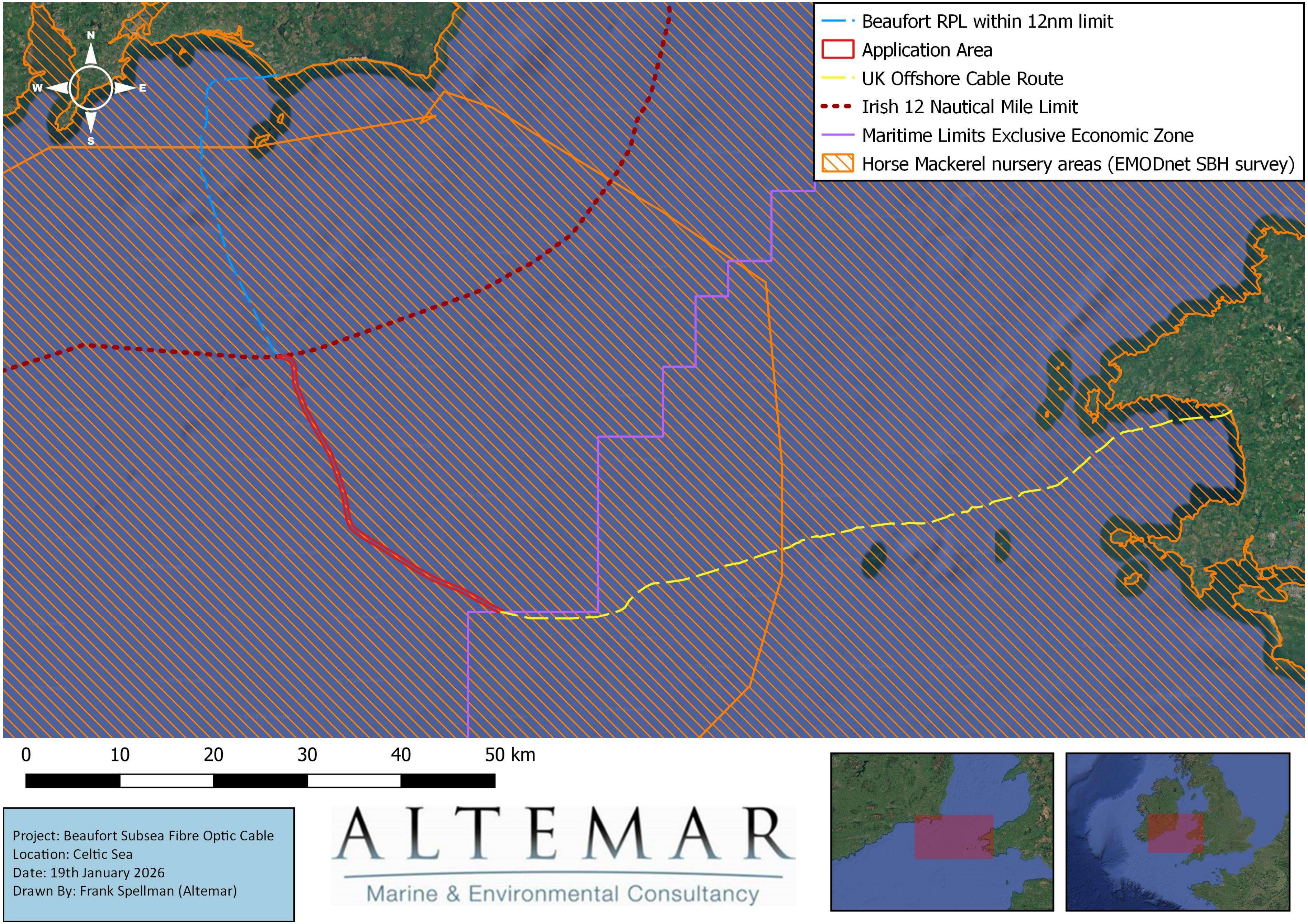


Figure 2. *Horse mackerel nursery areas proximate to the Beaufort Offshore Cable Route.*

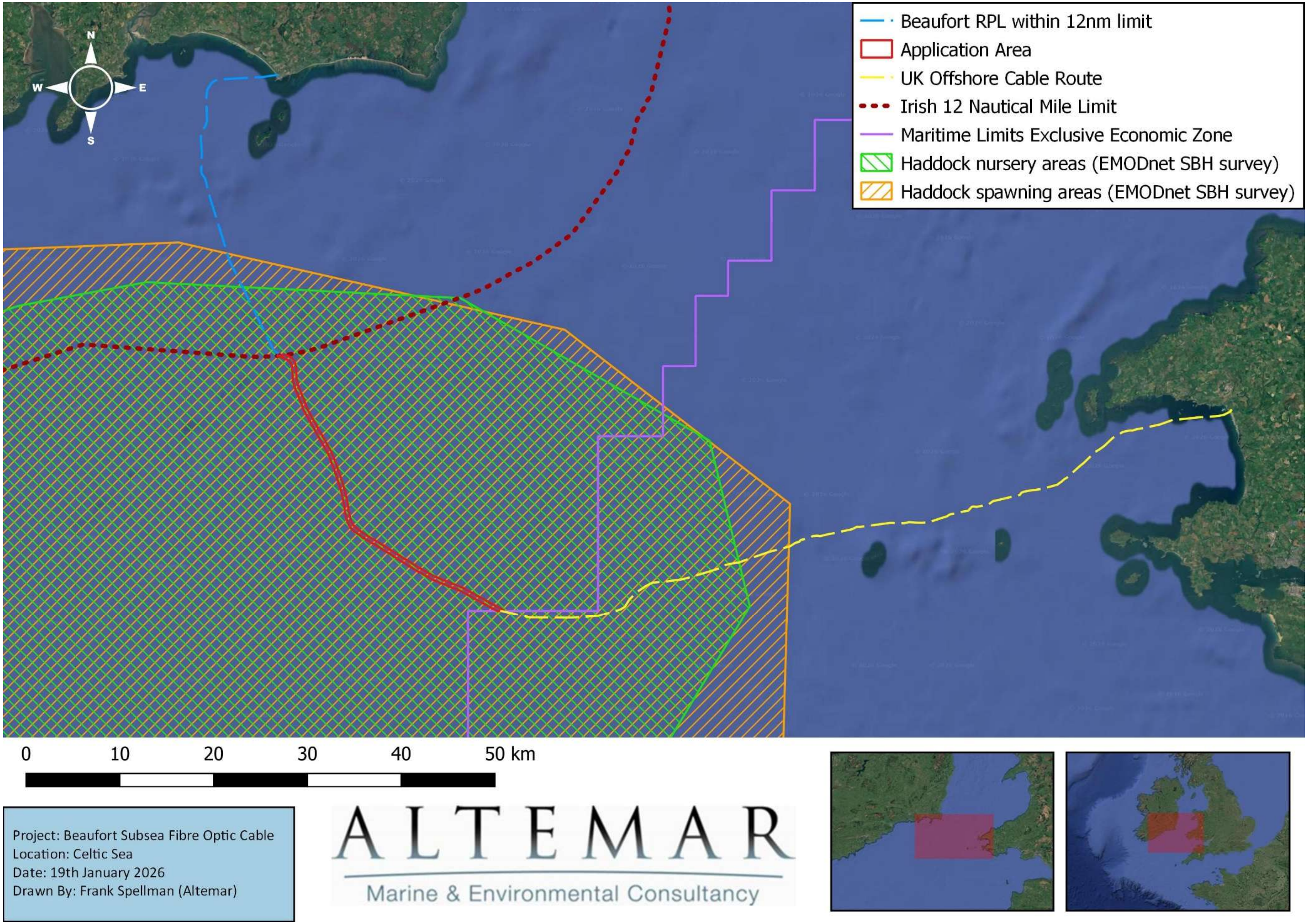


Figure 3. *Haddock spawning and nursery areas proximate to the Beaufort Offshore Cable Route.*

Hake

The proposed Beaufort Offshore Cable Route passes through known hake (*Merluccius merluccius*) nursery grounds (*Figure 4*). These known nursery grounds span vast swathes of the continental shelf off the west and south of the Irish coast. Due to the expansive nursery range, any disturbances to juveniles from pre/main/post-lay activities within the proposed Beaufort Offshore Cable Route would not be significant on a population level.

The proposed Application Area does not pass through or adjacent to any known hake spawning areas.

Based on the minute total area potentially impacted in relation to the overall non-impacted known nursery areas, limited time over which works are estimated to take place and the amount of time works are likely to occur in any particular area within known nursery grounds, the potential impact on juvenile hake is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

Megrim

The proposed Beaufort Offshore Cable Route passes through known megrim (*epidorhombus whiffiagonis*) nursery grounds (*Figure 5*). These known nursery grounds span vast swathes of the continental shelf off the north, west and south of the Irish coast. Due to the expansive nursery range, any disturbances to juveniles from pre/main/post-lay activities within the proposed Beaufort Offshore Cable Route would not be significant on a population level.

The proposed Application Area does not pass through or adjacent to any known megrim spawning areas.

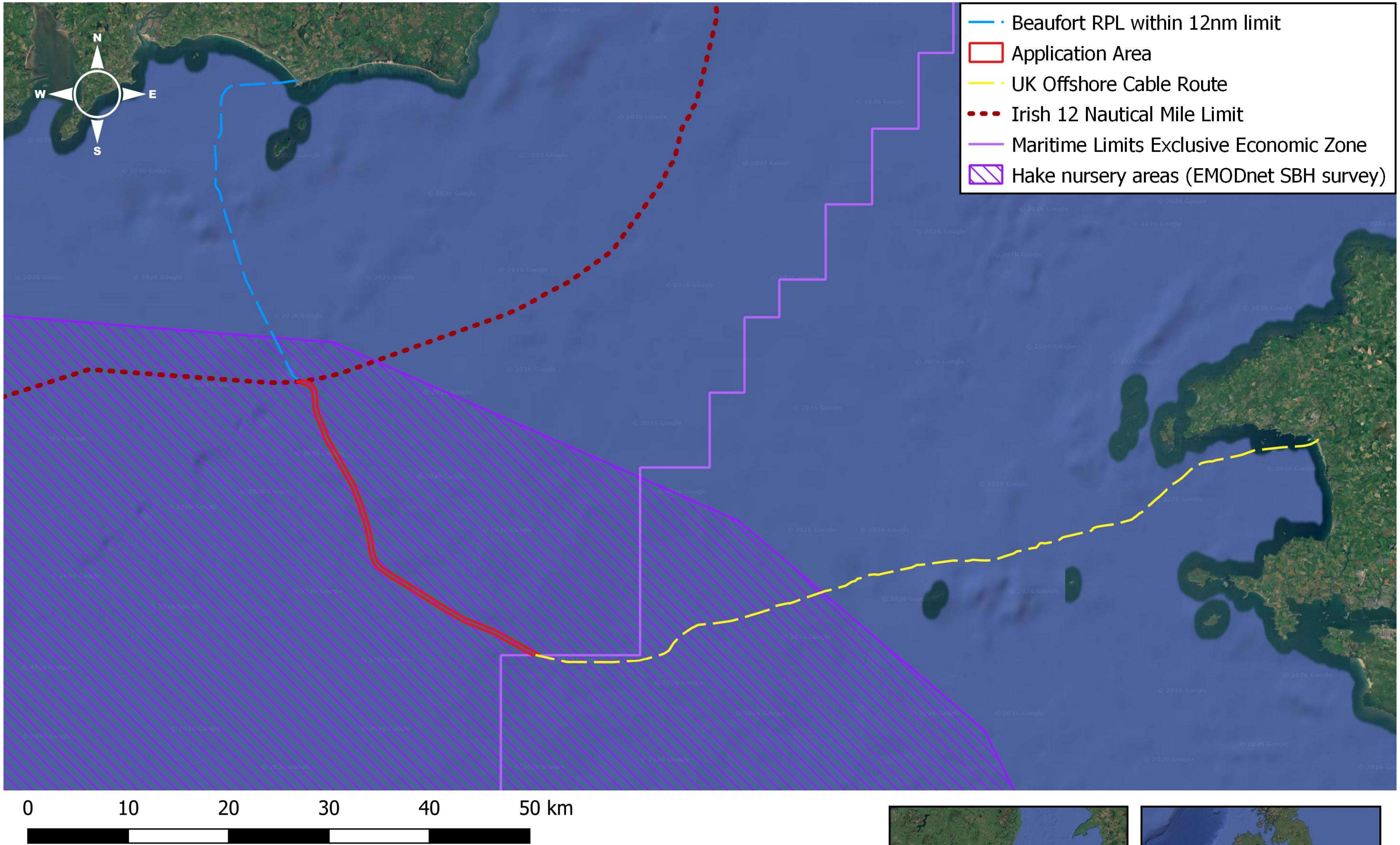
Based on the minute total area potentially impacted in relation to the overall non-impacted known nursery areas, limited time over which works are estimated to take place and the amount of time works are likely to occur in any particular area within known nursery grounds, the potential impact on juvenile megrim is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

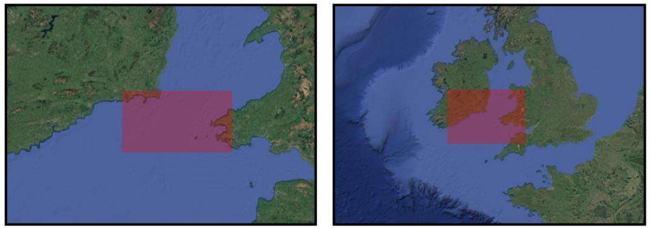
Mackerel

The proposed Beaufort Offshore Cable Route passes through known mackerel (*Scomber scombrus*) nursery grounds (Figure 6). These known nursery grounds span the full length of the Irish coast, effectively covering the entirety of the 12 nm limit, Irish Sea, and much of the Celtic Sea. Due to the expansive nursery range, any disturbances to juveniles from pre/main/post-lay activities within the proposed Beaufort Offshore Cable Route would not be significant on a population level.

The proposed Application Area does not pass through or adjacent to any known mackerel spawning areas.

Based on the minute total area potentially impacted in relation to the overall non-impacted known nursery areas, limited time over which works are estimated to take place and the amount of time works are likely to occur in any particular area within known nursery grounds, the potential impact on juvenile mackerel is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.





Project: Beaufort Subsea Fibre Optic Cable
Location: Celtic Sea
Date: 19th January 2026
Drawn By: Frank Spellman (Altemar)

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Figure 4. *Hake spawn areas proximate to the Beaufort Offshore Cable Route.*

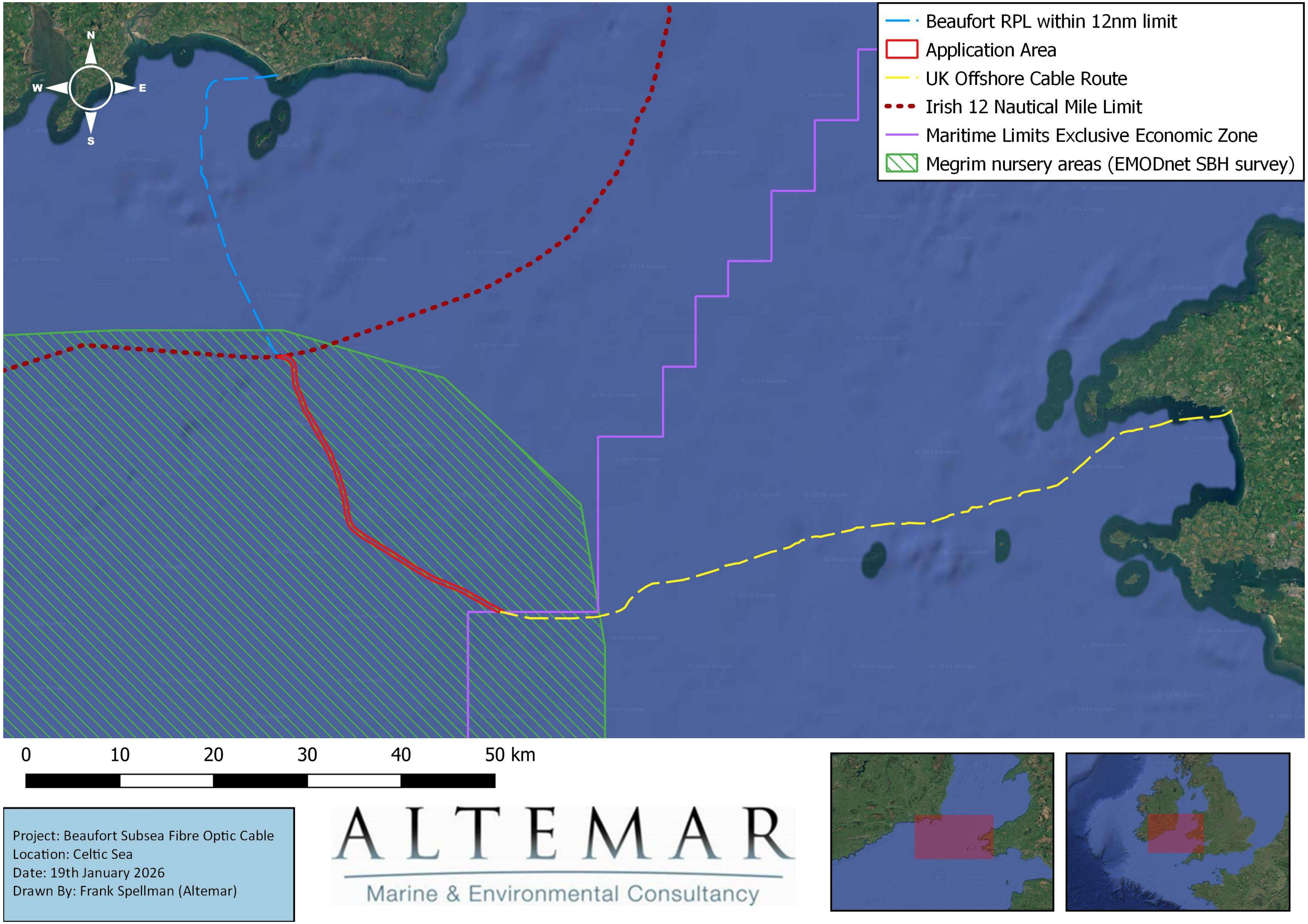


Figure 5. *Megrim nursery areas proximate to the Beaufort Offshore Cable Route.*

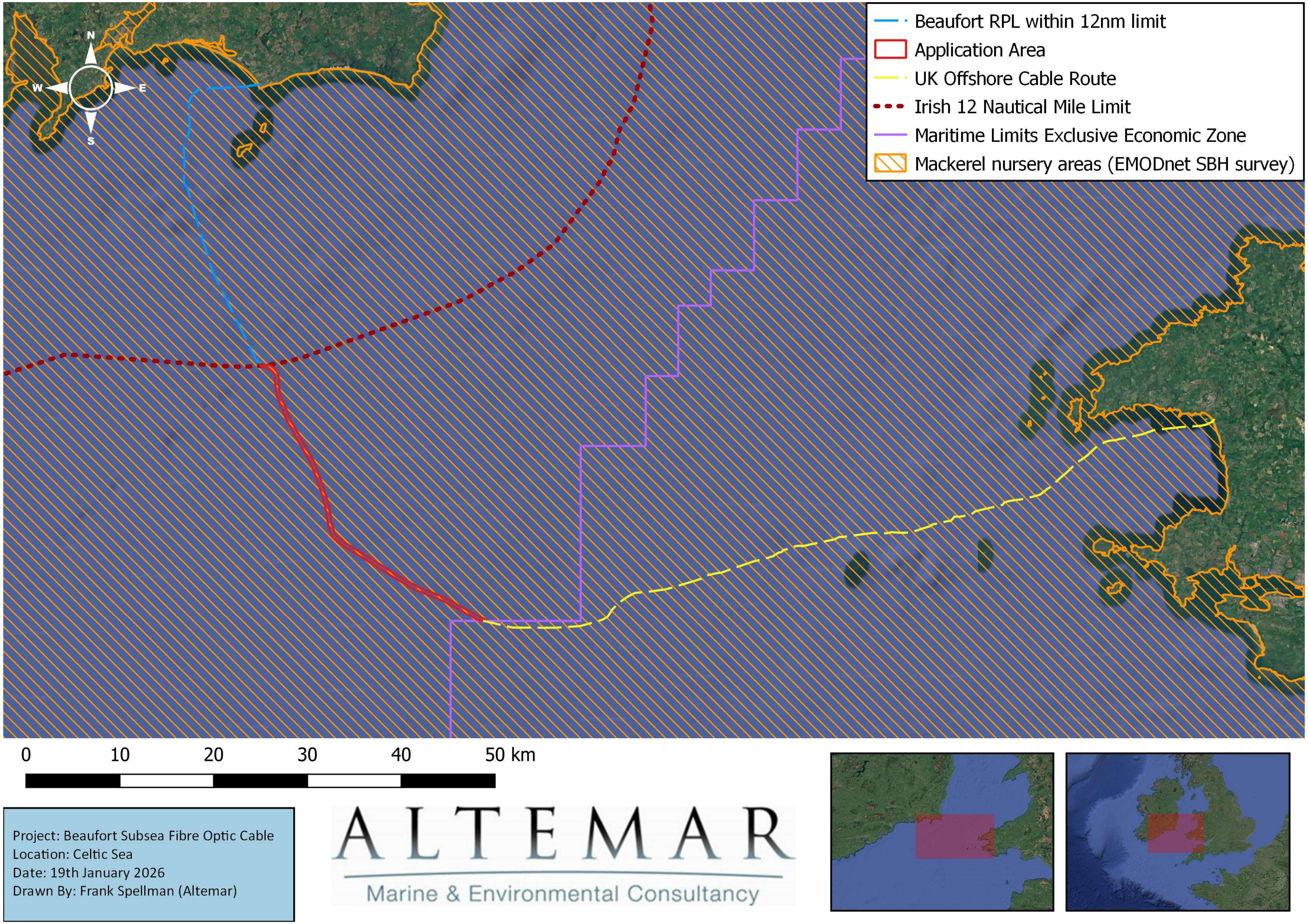


Figure 6. *Mackerel nursery areas proximate to the Beaufort Offshore Cable*

Whiting

The proposed Beaufort Offshore Cable Route passes through known whiting (*Merlangius merlangus*) spawning grounds (*Figure 7*). These spawning grounds span large areas off the west, northwest, east and south coasts of Ireland, and so any disturbances to spawning activity due to pre/main/post-lay activities within the proposed Beaufort Offshore Cable Route would be minimal, short-term, and not likely to have any significant effect.

The spawning area of concern for whiting constitutes a sea area of approximately 27,965 km^2, of a total of 59,512 km^2 known spawning areas within and adjacent to Irish waters. The total area of the subject spawning area potentially impacted by the proposed Application Area is 15 km^2, equating to approximately 0.05% of the subject spawning area and 0.03% of the total known spawning areas in Irish waters. Based on estimated timelines it is predicted that main lay activities would be carried out in this spawning area in approximately two weeks over a 2 month period. Assuming pre/post-lay activities occur over a similar duration of time, it is estimated that proposed works would occur within this spawning area over approximately six weeks in total over three phases across two months. This equates to an estimated 0.001% of the specific spawning area and 0.001% of total spawning areas for whiting potentially impacted per day of operation.

The spawning period for whiting peaks from February to June. Based on the proposed Spring 2027 commencement, the works period would potentially overlap with known haddock spawning areas during peak spawning season. However, based on the total area potentially impacted in relation to the overall non-impacted known spawning area, the duration of time over which works are estimated to take place, the amount of time pre/main/post-lay efforts are estimated to occur in any particular area within known spawning grounds and duration of time over which spawning activities may occur, in the unlikely event of direct overlap of works with spawning whiting during peak spawning season, the potential impact on spawning whiting is predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

Whiting nursery areas span similarly expansive areas to spawning areas and are located in geographically similar locations across Irish waters (apart from the northwest coast where known nursery areas are absent). Therefore, similar to spawning areas, potential impacts on whiting nursery areas are predicted to be negligible-adverse/local/not significant/brief. The probability of effects is unlikely.

Atlantic Salmon

The proposed Application Area passes through the range of wild Atlantic salmon (*Salmo salar*) (*Figure 8*). Salmon native to catchments in Ireland, other European countries, and the UK utilise Irish waters as transitional habitat. Atlantic salmon will be present within the proposed offshore cable route year-round, peaking in June when out-migrating smolts overlap with adults returning to spawn. Due to the extent of the range of Atlantic salmon and transitory nature of the species in this region, the area within the proposed works corridor is not of specific importance to this species. Based on the proposed Spring 2027 commencement and two-month period from commencement to completion of pre/main/post-lay activities, the works period would not likely overlap with peak periods of Atlantic salmon numbers within the subject area. Therefore, potential impacts on Atlantic salmon are predicted to be negligible-neutral/local/not significant/brief. The probability of effects is unlikely.

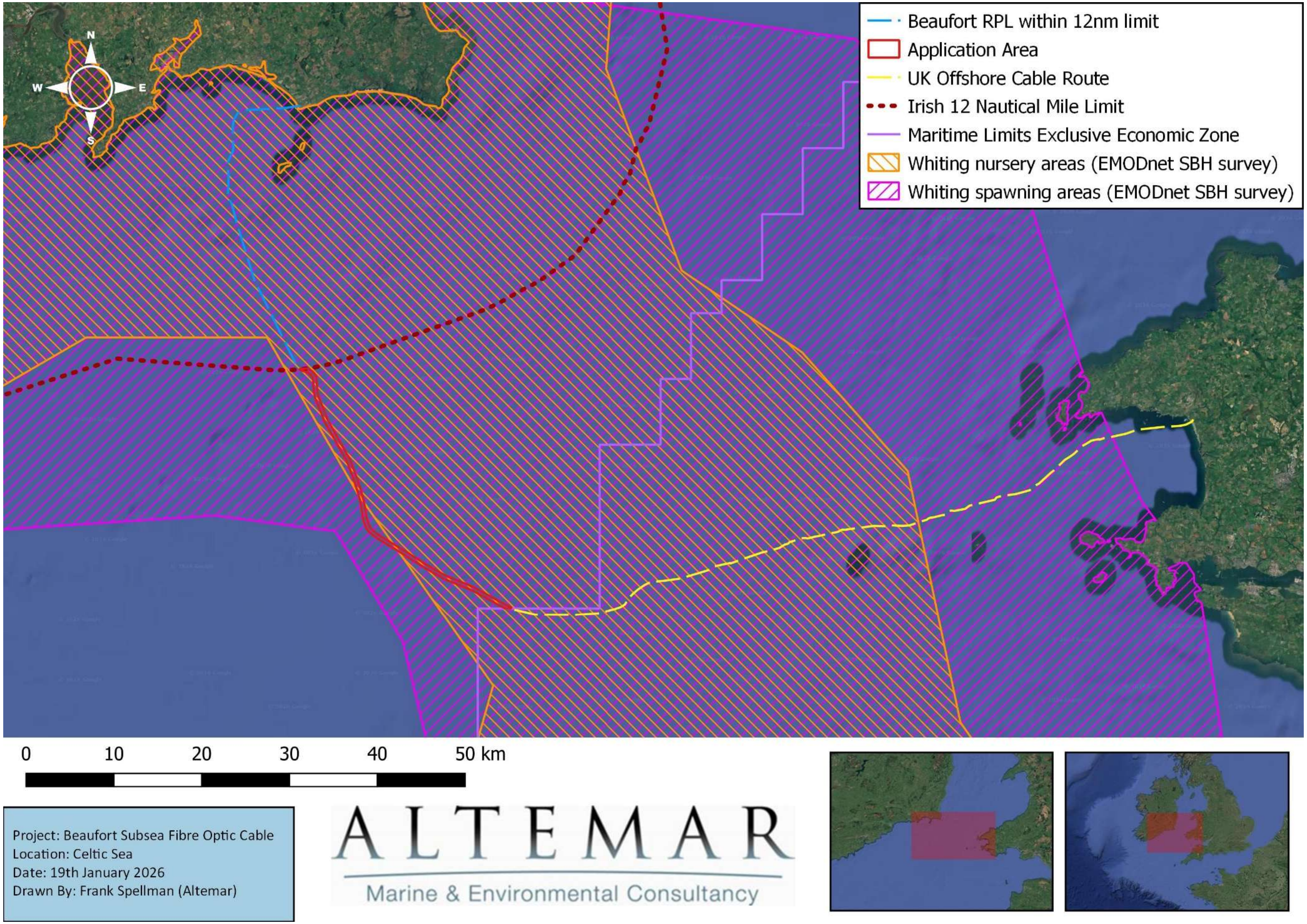
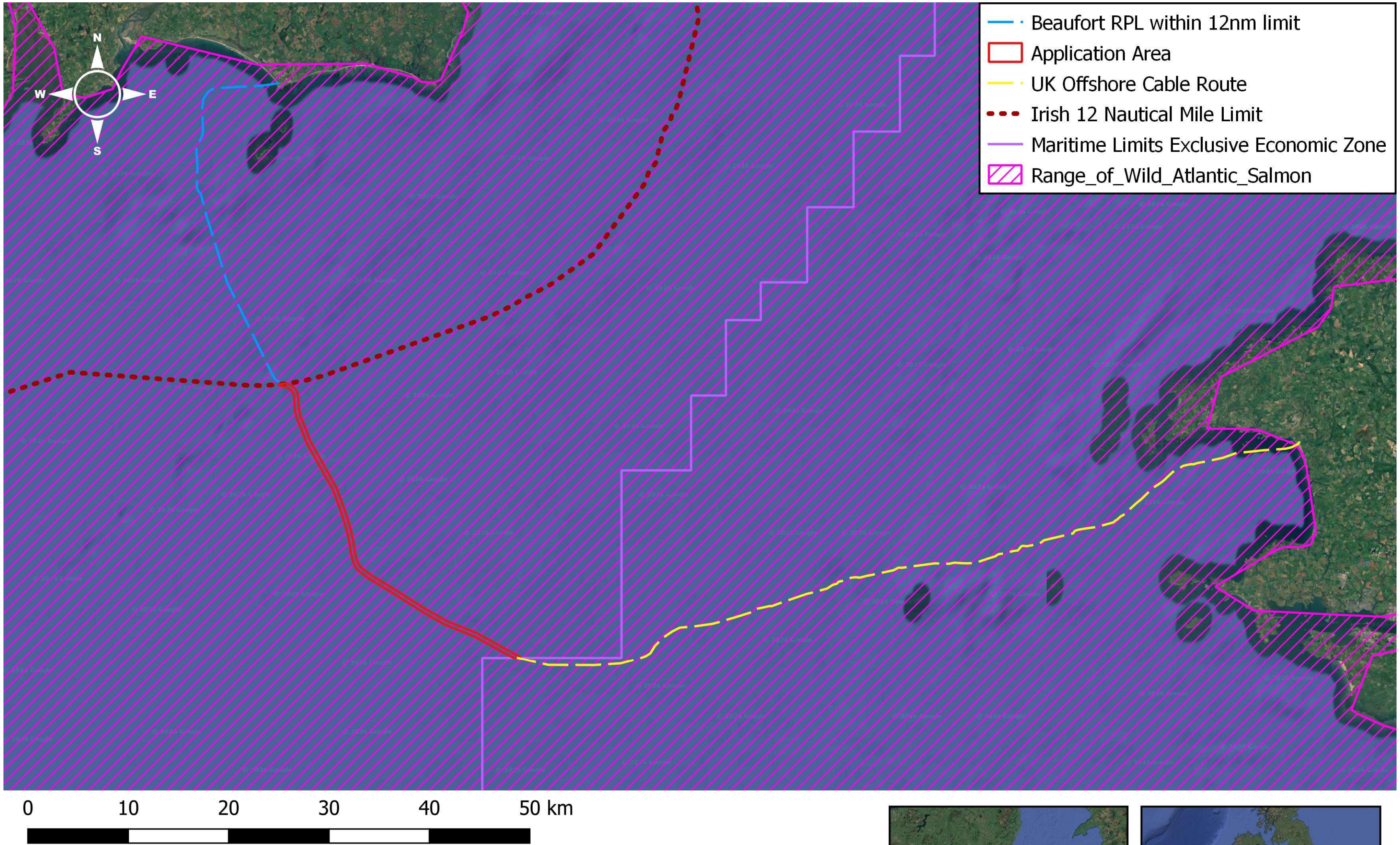


Figure 7. *Whiting spawning and nursery areas proximate to the Beaufort Offshore Cable Route.*



Project: Beaufort Subsea Fibre Optic Cable
Location: Celtic Sea
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ALTEMAR
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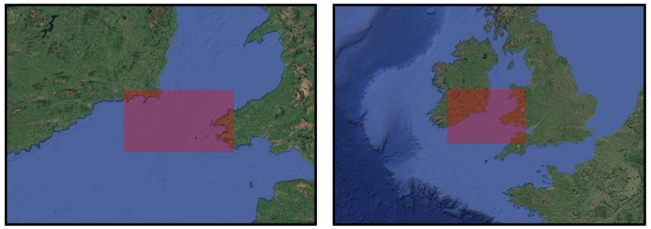

Figure 8. *Range of Atlantic salmon in relation to the Beaufort Offshore Cable*

4. Potential impacts on commercial fishing effort

The proposed Application Area does not pass through any areas designated for activity by the inshore fishing fleet, or under any aquaculture licenses.

The proposed Application Area does pass through areas of beam trawl activity by offshore fishing fleets (*Figure 9*). The Application Area also passes through areas of insignificant levels of gill net, pelagic trawl and offshore seine fishing activity, and less than 10 km from areas of significant dredge fishing activity (*Figures 10-13*). There is therefore the potential for overlap with vessels actively engaged in fishing activity, as well as vessels in transit to/from fishing grounds. Due to the scale and nature of the proposed works within the proposed Beaufort Offshore Cable Route in relation to the areas of fishing activity, no significant impact on the target species for these fisheries is foreseen. However, there is the potential for minor disruption by pre/main/post-lay activities on offshore fishing activity, and of fishing activity disrupting cable laying activity. Furthermore, considering many of the fishing activities being undertaken in the surrounding areas involve contact with the seabed, this should be taken into consideration for proposed activities along the proposed cable route.

Consultation with fisheries representatives, engagement with EU fleets and issuance of Marine Notices should be carried out prior to the proposed works to avoid disruption to fisheries and prevent a direct overlap with fishing activity that may cause interruptions to proposed pre/main/post-lay activities.

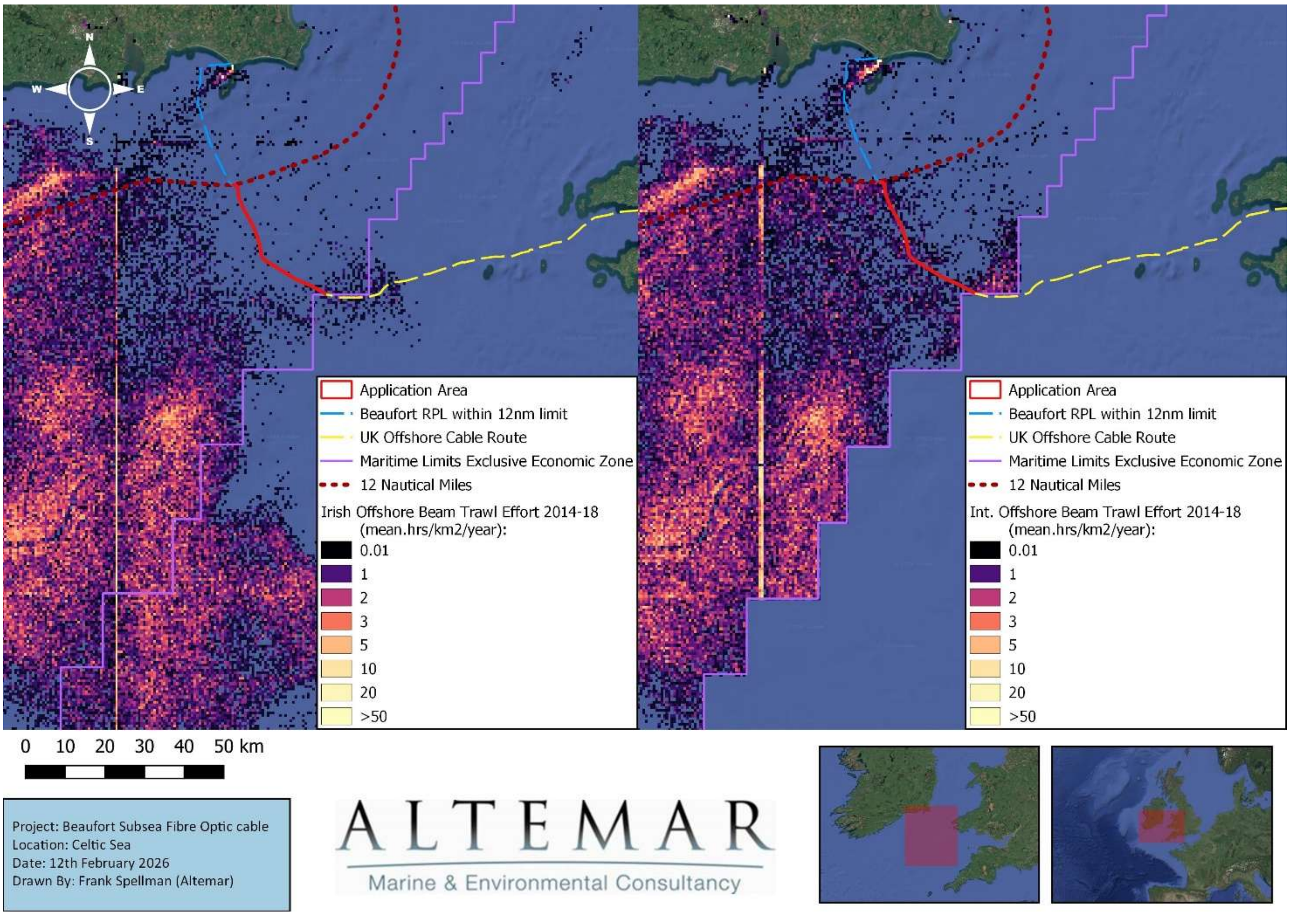

Figure 9. *Irish Offshore Beam Trawl Activity to the Beaufort Offshore Cable Route.*

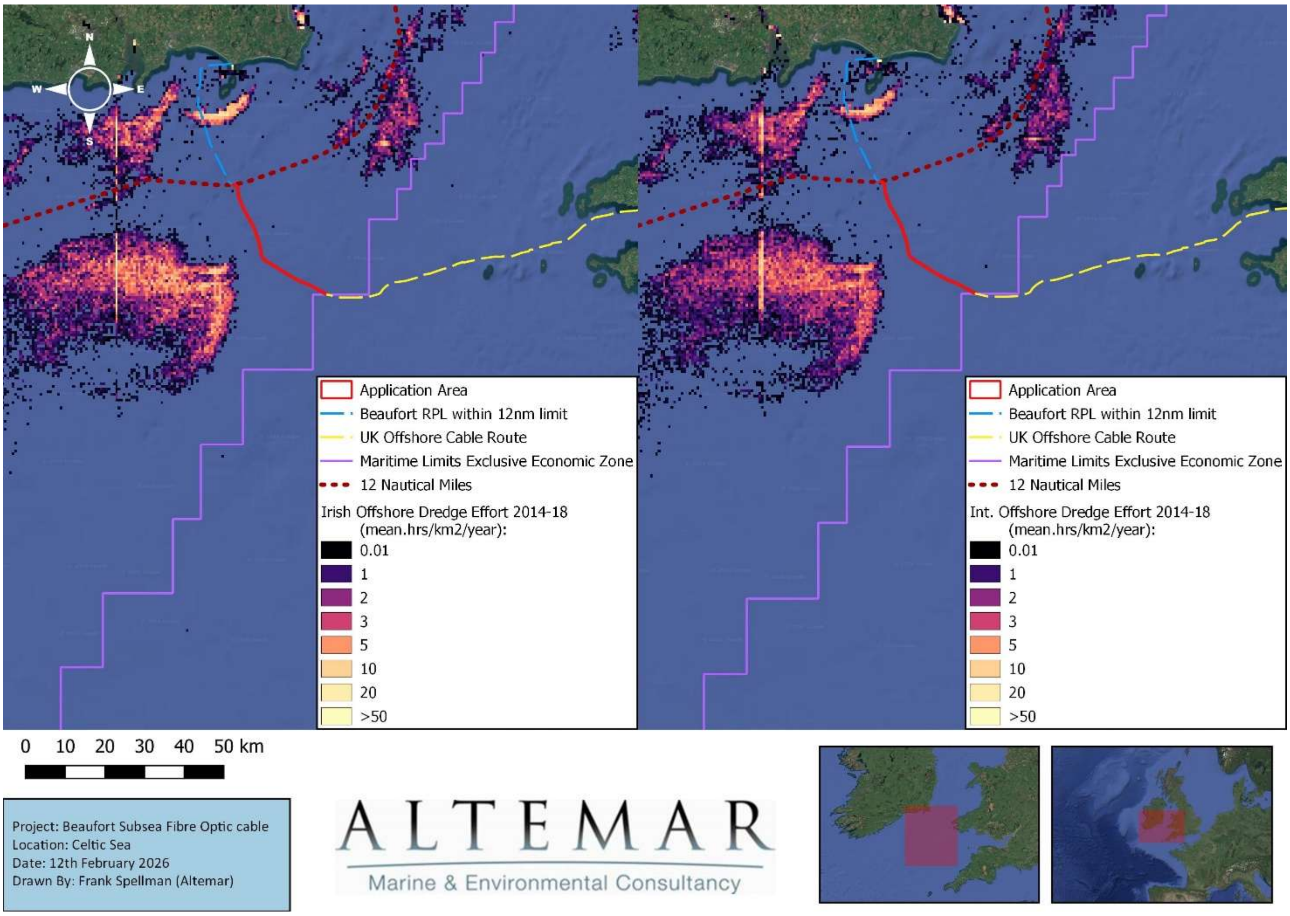

Figure 10. *Irish Offshore Dredge Effort in relation to the Beaufort Offshore Cable Route.*

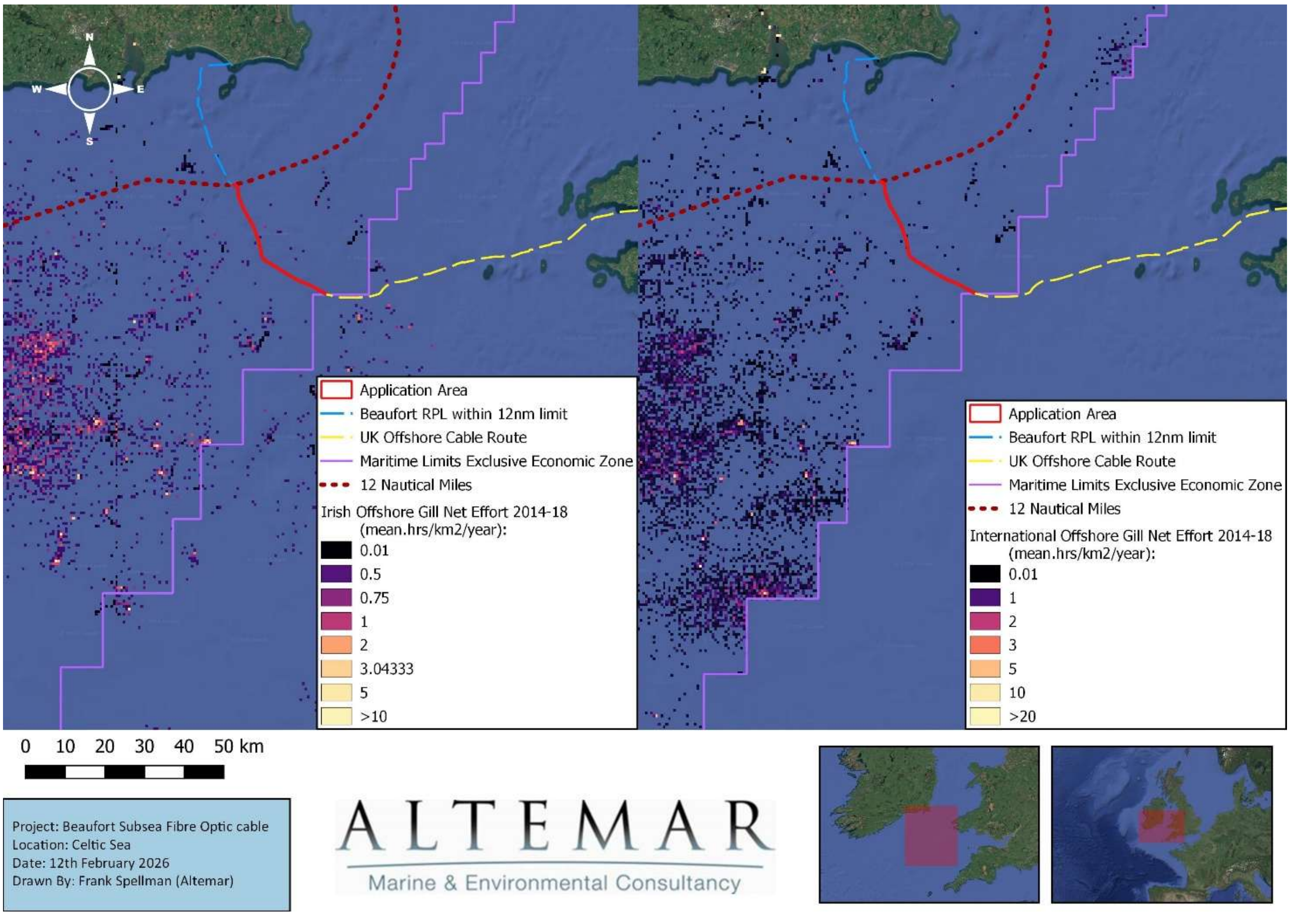

Figure 11. *Irish Offshore Gill Net Effort in relation to the Beaufort Offshore Cable Route.*

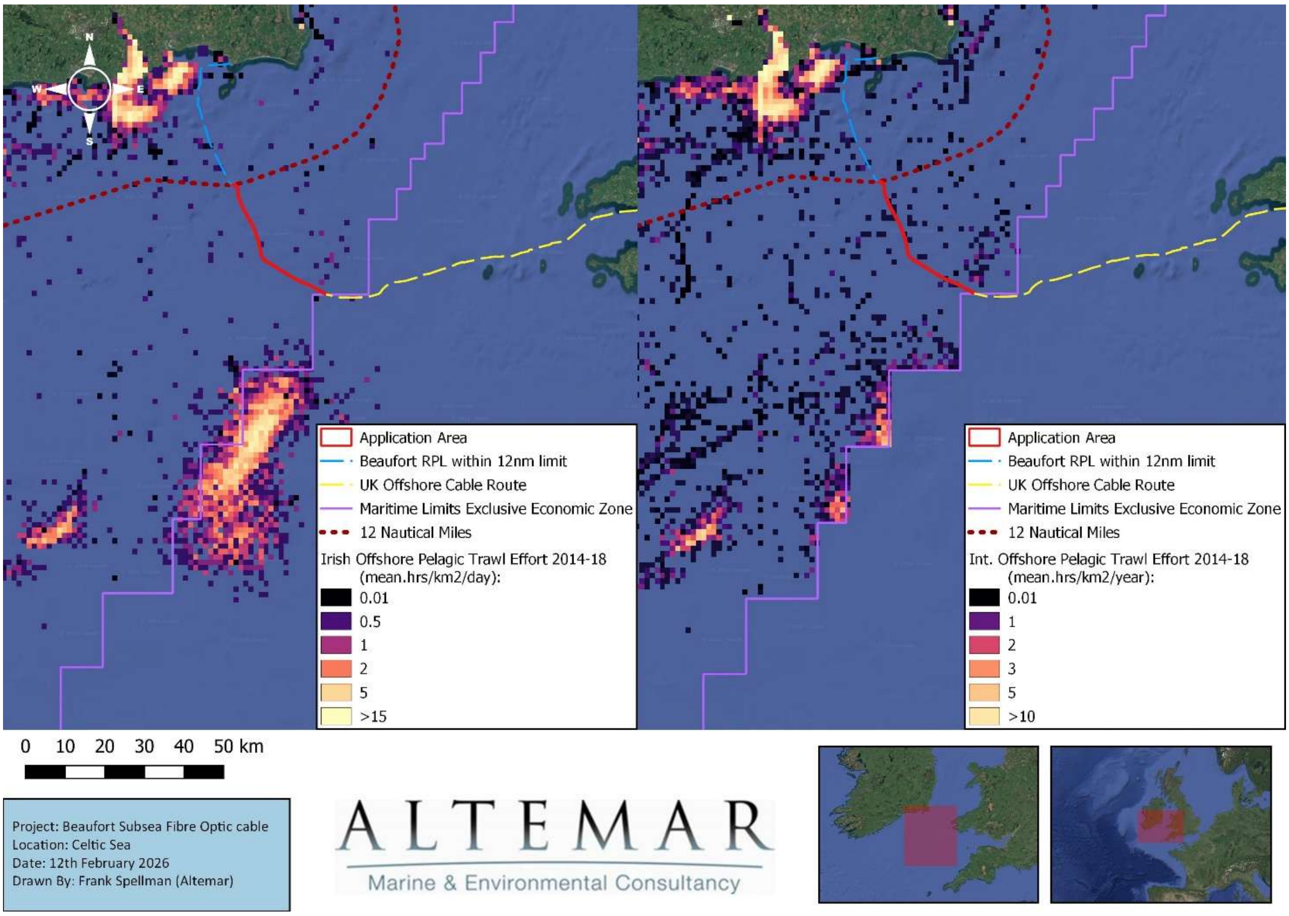

Figure 12. *Irish Offshore Pelagic Trawl Effort in relation to the Beaufort Offshore Cable Route.*

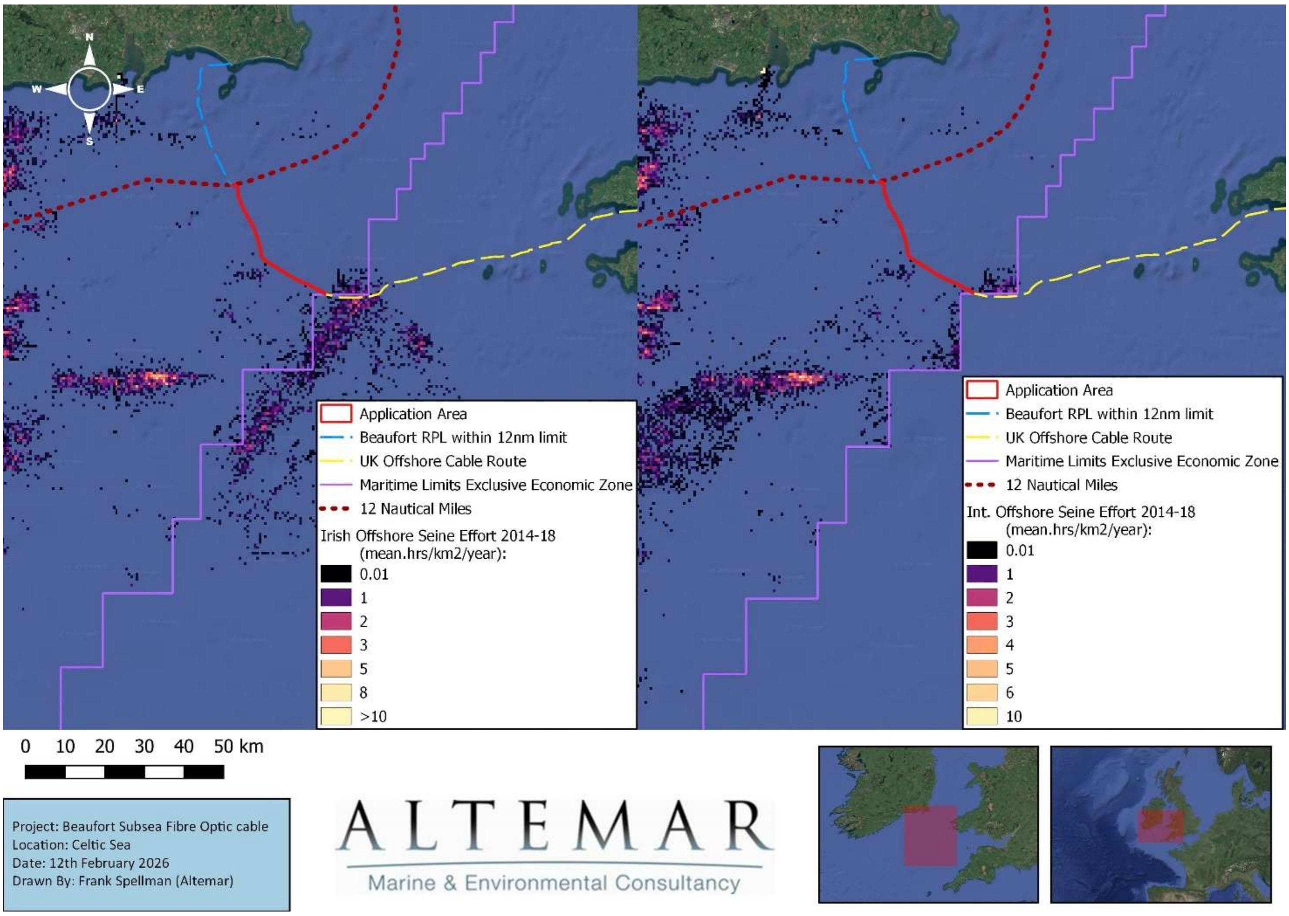

Figure 13. *Irish Offshore Seine Effort in relation to the Beaufort Offshore Cable Route.*

5. Cable Installation vessel

The main lay installation vessel will consist of a dedicated marine spread which will be suitable for the scope of work required, the water depth and the anticipated seabed conditions of the cable route. The Cecon CLV will be used to carry out the installation works. It is a newly built vessel and is 100m in length, 21m in breadth and can accommodate 100 personnel (consisting of the ship's crew, cable installation personnel and client representatives). Technical Specifications of the Cecon CLV are shown in figures 14-16.

Cable installation vessels will generate some subsea noise in the marine environment from engine noise and dynamic positioning thrusters. Shipping noise is typically within the 50-300 Hz frequency band and is the dominant noise source in deeper water (DECC, 2011). Propellers on vessels all have the potential to produce cavitation noise. This sound is caused by vacuum bubbles that were generated by the collapse of bubbles created by the spinning of the propellers.

Acoustic broadband source pressure levels typically increase with increasing vessel size, with smaller vessels (<50 m) having source pressure levels 160-175 dB (re 1µPa at 1m), medium size vessel (50-100 m) 165-180 dB (re 1µPa at 1m) and large vessels (>100 m) 180-190 dB (re 1µPa at 1m) (DECC, 2011). Every vessel has a unique noise signature and for each vessel this can change in response to several factors, including ship speed, operational status, vessel load, the condition of the vessel and even the properties of the water that the vessel is operating in.

6. Conclusions

The proposed Application Area pre-lay, main-lay and post-lay activities are not anticipated to have significant effects on the spawning or nursery grounds of commercially important fish stocks or have significant interaction with commercial fishing efforts. Where the timing of the works could potentially interact with spawning species, a more detailed review was carried out. In areas where the spawning coincided with the proposed works, the maximum area covered was 0.06 % of a fish species spawning area (haddock, 0.05% of overall combined spawning areas) over a maximum of six weeks duration in total (haddock and whiting). The proposed works area short term in nature and would have minimal impact on fish spawning even if the works overlapped with peak spawning activity of fish species who's spawning grounds are spanned by the proposed Application Area. In the absence of mitigation measures, no significant impact on fisheries are foreseen as a result of the proposed project.

Figure 14. *CECON CLV Technical Specification sheet 1.*

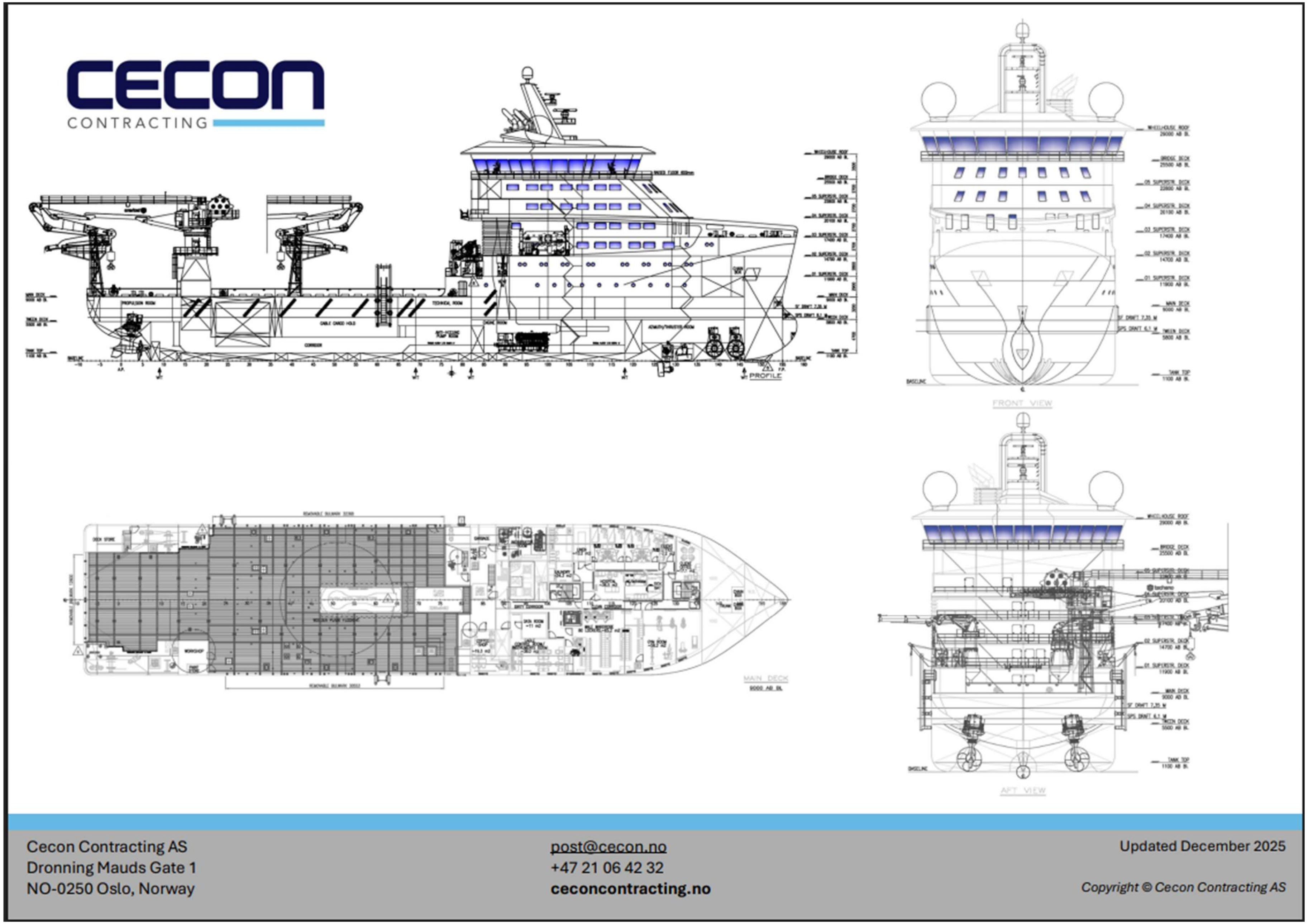

Figure 15. *CECON CLV Technical Specification sheet 2.*

CECON
CONTRACTING

MAIN DIMENSIONS

Length overall	99.90 m
Length between p.p.	92.90 m
Breadth moulded	21.00 m
Depth main deck	9.00 m
Design draft, SPS	6.10 m
Max draft, SF approx	7.35 m
Min draft (Lightship)	4.00 m

CLASSIFICATION

DNV Class + 1A / Cable Lay Support Vessel - SF - E0
Strengthened (dk) - Clean Design / NAUTOSV(A) COMF V(3)
C(3) / DYNPOS AUTR CB / SPS - BIS
Battery Power - LFL FUELLED / ER(SCR, Tier III)
LCS - BIS– BMW(T)
DPCAP L1(8,6,7,5)
NIS flag

CAPACITIES

Cable cargo hold capacity	2650 T
Fuel oil	1300 m^3
Methanol	700 m^3
Freshwater	400 m^3
UREA	80 m^3
Deck capacity	10 T/m^2
Deck load (COG 1 m above deck)	2365 T
Deadweight 6.1 m draft, approx.	4000 T
Deadweight max draft, approx.	6000 T

MACHINERY

Genset, TIER III	4x1500 kWe
Emergency genset incinerator	300 kW
Battery, redundant connection	1367 kW with discharge rate 2C

PROPULSION SYSTEM

MAIN PROPULSION SYSTEM:

2 x Pulling azimuth thrusters 2200 kW each
FP, Frequency controlled speed

MANOEUVRING THRUSTERS:

2x1100 kW Tunnel thrusters
1x1000 kW swing-up/retractable azimuth

ACCOMMODATION

100 persons accommodation SPS, 66 Single/22 Double.
Large and modern galley and mess.
Project offices, day room and conference room.
Gym/sauna and wardrobes.

CARGO PREPARATIONS

Cable tank below main deck.
AHC Crane, 70T (12–30 m reach), Subsea, Topside and 3D Compensation.
2x Guerra Service Cranes (~12T@6m to ~3T@23m).
Cargo area for 2x 20' containers below deck.
Deck layout with fixing points for quick mobilisation of cable laying spread.
IKM Merlin 150hp WROV with LARS and 3300m umbilical.
230/440/690V 3 phase power available on deck.
Large deadweight capacity when operating as offshore vessel SF stability.

OPTIONS

Reel drive system or deck carousel for Power Cable, Umbilical and Flexible Flowline installation, recovery and repair.
2x Boat landing positions.
AHC gangway with direct access from superstructure.

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Updated December 2025

Figure 16. *CECON CLV Technical Specification sheet 3.*

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