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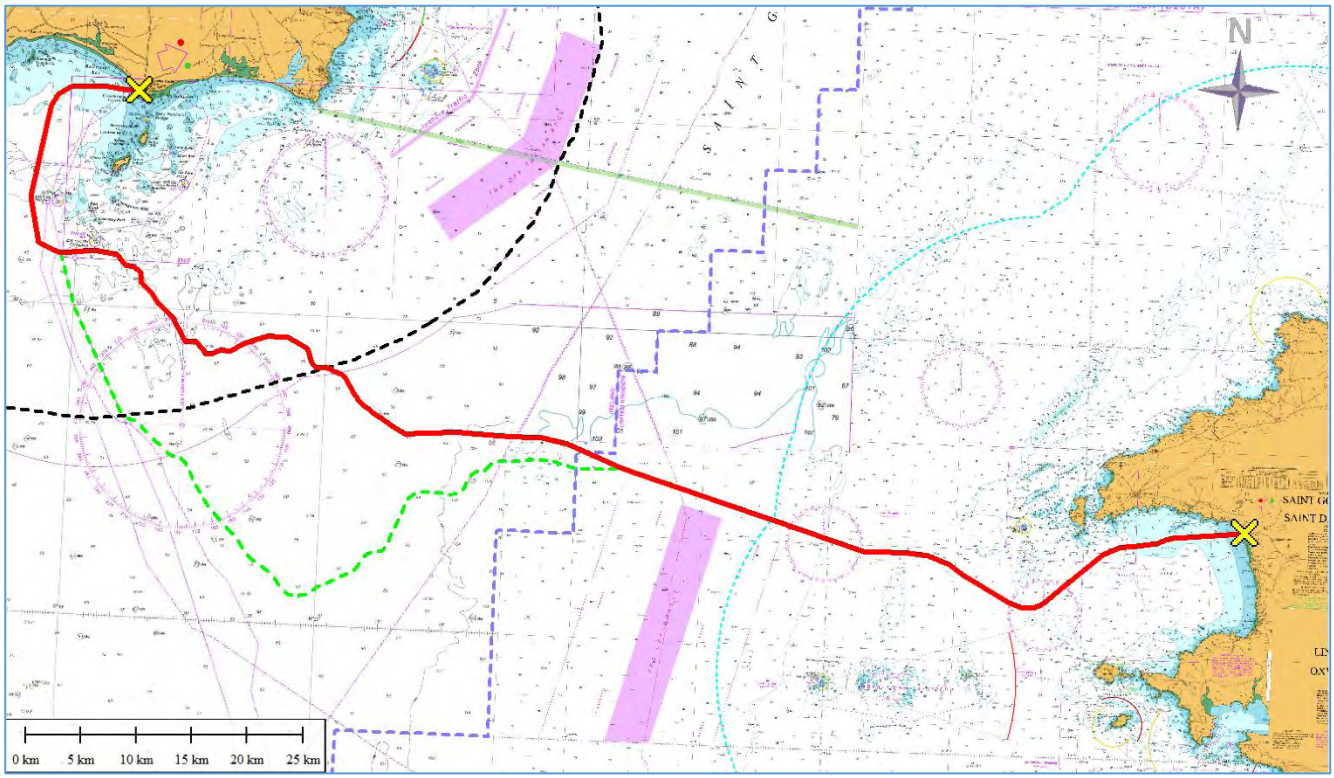
Marine & Environmental Consultancy

Ecological Impact Assessment (EcIA) for marine survey and site investigation works at Kilmore Quay, Co. Wexford.



23rd October 2023

Prepared by: [redacted] MCIEEM) of Altemar Ltd.
On behalf of: McMahon Design and Management Ltd.

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Project	Ecological Impact Assessment (EcIA) for marine survey and site investigation works at Kilmore Quay, Co. Wexford.		
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Introduction

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 McMahon Design and Management Ltd. The EcIA is accompanied by a AA Screening and a Natura Impact Statement (NIS).

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).

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. [redacted], the managing director of Altemar, is an Environmental Scientist and Marine Biologist with 28 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. [redacted] (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). [redacted] has been the lead ecologist on 11 marine fibre optic cable projects in Ireland and the UK.

Description of the Proposed Project

Background

The applicant plans to investigate the feasibility of constructing a new subsea telecoms cable system, TUSKAR, linking Ireland to the United Kingdom, from a landfall at Kilmore Quay to a landfall at Newgale on the South west coast of Wales as shown in Figure 1 below. This Works Methodology is produced in support of an application for a marine survey and site investigations licence under the Maritime Area Planning Act 2021, and should not be used for any other purpose apart from that expressly stated in this document. The applicant intends to undertake the survey campaign across the Licence Application Area within the IRL Exclusive Economic Zone (EEZ) in order to inform the location and design of the cable route and landfall.

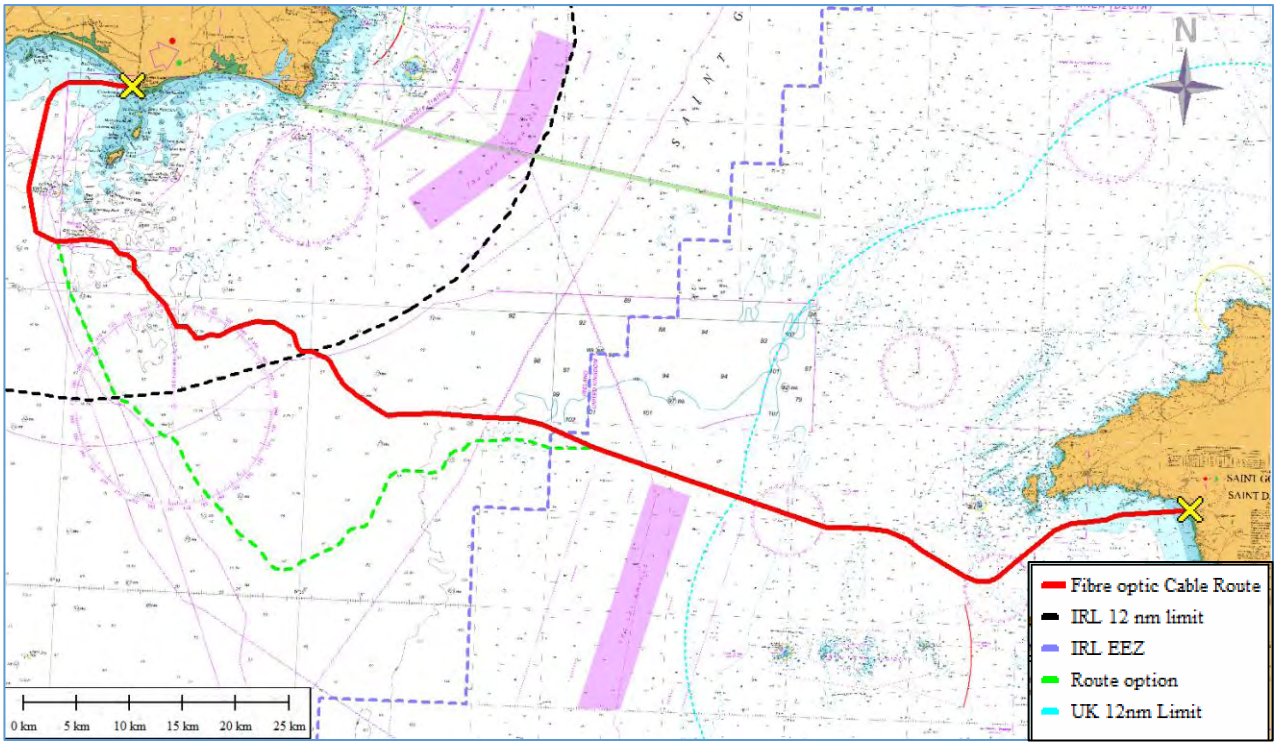


Figure 1. Proposed Telecoms Cable System

This Works Methodology has been prepared by McMahon Design and Management Ltd on behalf of the applicant and forms part of an application for a Licence for Marine Survey and Site Investigations for route and landfall options traversing the Celtic Sea and St Georges Channel. The works will be carried out predominantly by remote sensing seabed mapping techniques (geophysical survey) with some selective sampling of the upper layers of the seabed (geotechnical survey). Once the results of the survey are obtained and analysed a preferred route corridor will be determined, design and method statements will be developed and a final Route Position List (RPL) will be defined as part of further submissions for a Maritime Area Consent and Planning consent for the installation works.

PROPOSED SURVEY ROUTE AND SURVEY LICENCE APPLICATION AREA IN IRISH TERRITORIAL WATERS

Licence Application Area

The License Application Area is situated off the coast of Wexford (Figure 2). The survey corridor has total length of approx. 154 km and a total area of 10,191 hectares within EEZ limits. A cable route corridor of between 400m to 1500m in width will be surveyed within the licence application area.

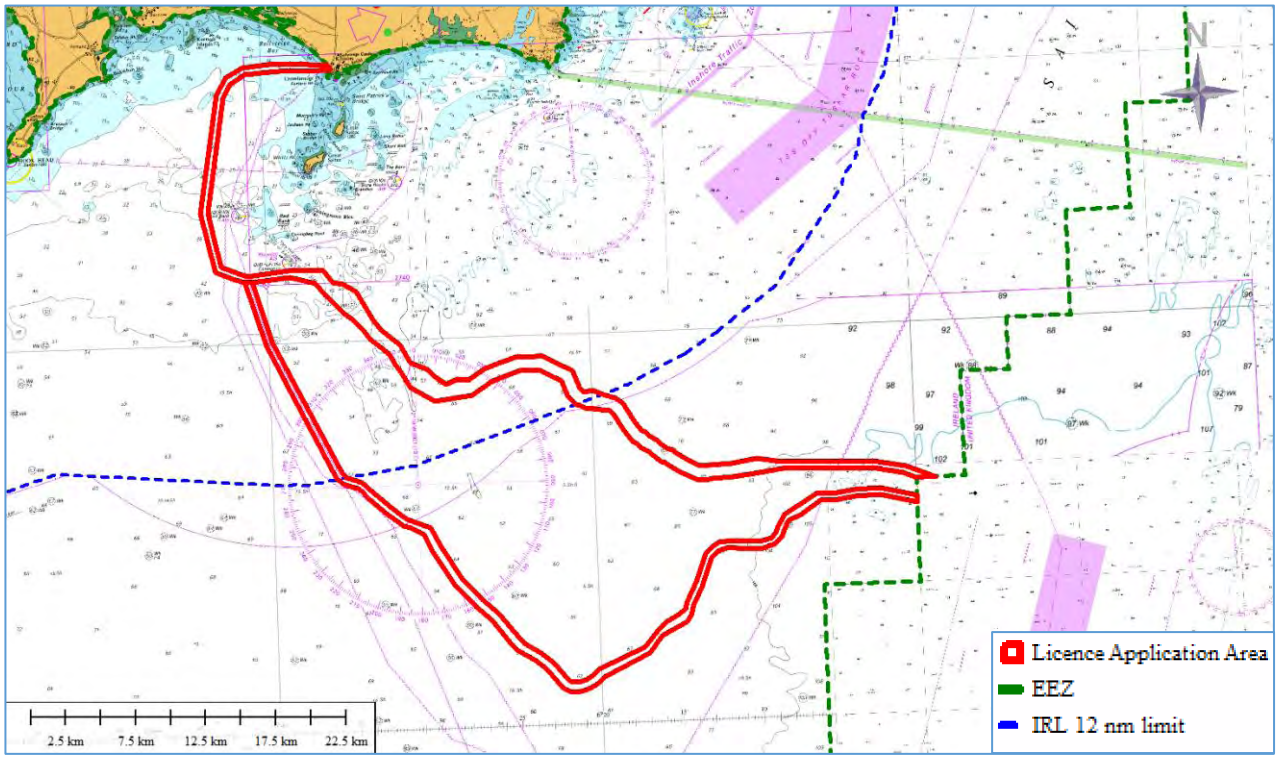


Figure 2. Proposed Survey Licence Application Area.

Figure 3. Landfall Location

Landfall & Inshore Survey Corridors

The licence application area covers the landfall at Kilmore Quay, with a survey corridor traversing the Celtic Sea and St Georges Channel to the East. The general location is shown in Figure 3.

Kilmore Quay

The licence application area covers a landfall at Kilmore Quay, Wexford. The landfall location is adjacent to the car park at Ballyteige Burrow / Crossfarnoge Beach. Any requirement for beach access for survey will be via the existing established tracks and paths from the car park.

The Route Position List for the Licence Application Area is presented in Table 1a+b below.

Idx	Latitude	Longitude	Idx	Latitude	Longitude
1	52° 02' 23.3446" N	6° 40' 57.8793" W	40	51° 54' 53.7596" N	6° 15' 30.6628" W
2	52° 02' 32.8829" N	6° 38' 35.6753" W	41	51° 54' 35.1228" N	6° 14' 43.3844" W
3	52° 02' 17.1398" N	6° 37' 00.7264" W	42	51° 54' 15.0215" N	6° 13' 44.0368" W
4	52° 01' 49.5663" N	6° 36' 25.1314" W	43	51° 54' 12.4897" N	6° 13' 06.7906" W
5	52° 01' 04.1131" N	6° 35' 11.3274" W	44	51° 54' 15.3307" N	6° 12' 42.8291" W
6	52° 00' 53.1912" N	6° 34' 50.1960" W	45	51° 54' 17.4672" N	6° 11' 23.2457" W
7	52° 00' 30.6172" N	6° 34' 13.9019" W	46	51° 54' 25.9228" N	6° 09' 46.9736" W
8	52° 00' 02.9839" N	6° 33' 41.5270" W	47	51° 54' 32.2832" N	6° 08' 20.3505" W
9	51° 59' 45.1542" N	6° 33' 05.1372" W	48	51° 54' 27.3403" N	6° 04' 51.2287" W
10	51° 59' 26.7036" N	6° 32' 31.8770" W	49	51° 54' 26.7803" N	6° 04' 24.0261" W
11	51° 59' 05.5327" N	6° 32' 13.6099" W	50	51° 54' 25.6371" N	6° 03' 38.1885" W
12	51° 58' 49.0776" N	6° 31' 57.0497" W	51	51° 54' 26.7474" N	6° 02' 44.5335" W
13	51° 58' 10.9375" N	6° 31' 17.8851" W	52	51° 54' 12.8490" N	6° 00' 48.2875" W
14	51° 57' 37.7383" N	6° 29' 46.6925" W	53	51° 53' 58.7080" N	5° 59' 59.9999" W
15	51° 57' 42.7364" N	6° 28' 47.8886" W	54	51° 54' 00.0000" N	5° 59' 59.9999" W
16	51° 57' 48.5467" N	6° 27' 29.7327" W	55	51° 54' 00.0048" N	5° 59' 33.7673" W
17	51° 58' 16.8343" N	6° 26' 16.1776" W	56	51° 54' 00.0091" N	5° 58' 49.6394" W
18	51° 58' 29.9473" N	6° 25' 19.1314" W	57	51° 54' 28.3451" N	6° 00' 40.0876" W
19	51° 58' 40.2175" N	6° 24' 26.2516" W	58	51° 54' 42.9766" N	6° 02' 42.4644" W
20	51° 58' 38.6061" N	6° 23' 43.3432" W	59	51° 54' 41.8255" N	6° 03' 38.0990" W
21	51° 58' 40.6220" N	6° 23' 14.8845" W	60	51° 54' 42.9470" N	6° 04' 23.0645" W
22	51° 58' 28.1103" N	6° 22' 39.5392" W	61	51° 54' 43.5074" N	6° 04' 50.2897" W
23	51° 58' 12.6828" N	6° 21' 51.9863" W	62	51° 54' 48.4521" N	6° 08' 19.4876" W
24	51° 57' 35.8701" N	6° 21' 29.1111" W	63	51° 54' 57.9573" N	6° 09' 54.3197" W
25	51° 57' 18.0120" N	6° 20' 58.0344" W	64	51° 54' 49.7234" N	6° 11' 28.0699" W
26	51° 57' 16.0585" N	6° 20' 45.7902" W	65	51° 54' 47.5522" N	6° 12' 48.9229" W
27	51° 57' 14.1587" N	6° 20' 41.4375" W	66	51° 54' 45.1834" N	6° 13' 08.9037" W
28	51° 57' 09.2239" N	6° 20' 27.2006" W	67	51° 54' 46.4821" N	6° 13' 28.0074" W
29	51° 57' 01.7540" N	6° 18' 58.7972" W	68	51° 55' 02.9843" N	6° 14' 16.7287" W
30	51° 56' 56.0106" N	6° 18' 45.3006" W	69	51° 55' 18.6315" N	6° 14' 56.4193" W
31	51° 56' 16.7561" N	6° 18' 08.1852" W	70	51° 55' 25.2915" N	6° 15' 06.0126" W
32	51° 55' 58.6513" N	6° 17' 46.6051" W	71	51° 55' 29.0134" N	6° 15' 26.4163" W
33	51° 55' 48.9250" N	6° 17' 36.0767" W	72	51° 55' 38.0212" N	6° 15' 45.3501" W
34	51° 55' 43.8438" N	6° 17' 21.4653" W	73	51° 55' 50.1538" N	6° 16' 07.2699" W
35	51° 55' 31.1703" N	6° 16' 59.9768" W	74	51° 55' 57.4789" N	6° 16' 28.7641" W
36	51° 55' 23.5941" N	6° 16' 37.7429" W	75	51° 56' 10.0534" N	6° 16' 50.0833" W
37	51° 55' 13.1119" N	6° 16' 18.8033" W	76	51° 56' 13.3364" N	6° 16' 59.5222" W
38	51° 54' 59.6885" N	6° 15' 50.5865" W	77	51° 56' 17.2511" N	6° 17' 03.7590" W
39	51° 54' 56.8728" N	6° 15' 35.1475" W	78	51° 56' 34.5614" N	6° 17' 24.3873" W

Table 1a. Licence Application Area RPL.

Idx	Latitude	Longitude	Idx	Latitude	Longitude
79	51° 57' 18.5634" N	6° 18' 05.9815" W	107	52° 02' 47.5993" N	6° 36' 32.9877" W
80	51° 57' 31.2462" N	6° 18' 35.7828" W	108	52° 02' 48.9378" N	6° 38' 38.8948" W
81	51° 57' 37.2614" N	6° 19' 07.7753" W	109	52° 02' 37.1365" N	6° 41' 13.3002" W
82	51° 57' 38.8675" N	6° 19' 19.1471" W	110	52° 02' 44.1627" N	6° 41' 42.9624" W
83	51° 57' 49.7688" N	6° 19' 56.6267" W	111	52° 02' 56.5277" N	6° 42' 31.0937" W
84	51° 57' 47.1873" N	6° 20' 29.9312" W	112	52° 03' 02.1040" N	6° 42' 50.8457" W
85	51° 57' 55.1307" N	6° 20' 44.9762" W	113	52° 04' 10.3813" N	6° 43' 15.4195" W
86	51° 58' 35.6542" N	6° 21' 10.1483" W	114	52° 05' 07.4447" N	6° 43' 35.3533" W
87	51° 58' 56.4762" N	6° 22' 14.3191" W	115	52° 09' 32.0507" N	6° 42' 23.3707" W
88	51° 59' 13.9760" N	6° 23' 03.7575" W	116	52° 10' 01.4739" N	6° 41' 56.5749" W
89	51° 59' 11.0735" N	6° 23' 44.7487" W	117	52° 10' 24.8532" N	6° 40' 59.9568" W
90	51° 59' 12.8748" N	6° 24' 32.7352" W	118	52° 10' 28.9533" N	6° 39' 29.7306" W
91	51° 59' 00.5607" N	6° 25' 36.1412" W	119	52° 10' 30.7484" N	6° 38' 09.2758" W
92	51° 58' 46.0204" N	6° 26' 39.3935" W	120	52° 10' 26.6462" N	6° 37' 01.2518" W
93	51° 58' 22.3917" N	6° 27' 40.8375" W	121	52° 10' 29.7494" N	6° 35' 38.2031" W
94	51° 58' 26.2128" N	6° 28' 19.9131" W	122	52° 10' 33.0429" N	6° 35' 40.5498" W
95	51° 58' 16.0810" N	6° 29' 04.6255" W	123	52° 10' 38.6148" N	6° 35' 46.5405" W
96	51° 58' 31.0430" N	6° 29' 41.3541" W	124	52° 10' 42.7960" N	6° 36' 59.5164" W
97	51° 58' 48.6985" N	6° 30' 08.0418" W	125	52° 10' 46.9537" N	6° 38' 08.4646" W
98	51° 59' 06.2787" N	6° 31' 12.6693" W	126	52° 10' 45.1084" N	6° 39' 31.1779" W
99	51° 59' 21.6927" N	6° 31' 28.1774" W	127	52° 10' 40.6911" N	6° 41' 08.3686" W
100	51° 59' 46.9511" N	6° 31' 49.9651" W	128	52° 10' 18.1722" N	6° 42' 11.5188" W
101	52° 00' 09.8793" N	6° 32' 31.2906" W	129	52° 09' 37.4989" N	6° 42' 48.5561" W
102	52° 00' 25.5525" N	6° 33' 03.2748" W	130	52° 05' 07.0628" N	6° 44' 02.0810" W
103	52° 00' 51.6142" N	6° 33' 33.8029" W	131	52° 04' 06.9265" N	6° 43' 41.0637" W
104	52° 01' 54.3087" N	6° 34' 30.0739" W	132	52° 02' 50.7445" N	6° 43' 13.6342" W
105	52° 02' 13.6137" N	6° 35' 18.2440" W	133	52° 02' 32.8980" N	6° 42' 08.5716" W
106	52° 02' 18.6973" N	6° 35' 55.6791" W	134	52° 02' 24.1218" N	6° 41' 25.7202" W

Table 2a. Licence Application Area RPL continued

Idx	Latitude	Longitude	Idx	Latitude	Longitude
1	52° 02' 24.1218" N	6° 41' 25.7202" W	40	51° 49' 01.9780" N	6° 14' 21.7401" W
2	51° 59' 56.9991" N	6° 40' 12.1957" W	41	51° 49' 11.3787" N	6° 14' 17.5127" W
3	51° 54' 49.8688" N	6° 36' 06.2746" W	42	51° 49' 28.0241" N	6° 14' 09.1037" W
4	51° 54' 42.9589" N	6° 35' 56.6458" W	43	51° 50' 11.5829" N	6° 13' 33.8675" W
5	51° 54' 40.7952" N	6° 35' 53.6052" W	44	51° 50' 14.8938" N	6° 13' 31.2745" W
6	51° 54' 33.8268" N	6° 35' 37.8633" W	45	51° 51' 12.8411" N	6° 12' 56.4795" W
7	51° 54' 28.5409" N	6° 35' 20.9124" W	46	51° 51' 28.4106" N	6° 12' 33.4783" W
8	51° 54' 24.8505" N	6° 34' 58.4741" W	47	51° 51' 34.6405" N	6° 12' 00.3037" W
9	51° 54' 21.5447" N	6° 34' 45.3233" W	48	51° 51' 34.4528" N	6° 11' 21.1545" W
10	51° 54' 17.1743" N	6° 34' 33.7429" W	49	51° 51' 30.0317" N	6° 09' 51.6052" W
11	51° 54' 12.0528" N	6° 34' 25.6317" W	50	51° 51' 39.2065" N	6° 08' 57.4074" W
12	51° 54' 04.6157" N	6° 34' 18.5426" W	51	51° 51' 55.5461" N	6° 08' 32.0898" W
13	51° 53' 22.8932" N	6° 33' 02.0452" W	52	51° 52' 12.2321" N	6° 08' 22.3574" W
14	51° 53' 02.3461" N	6° 32' 19.8370" W	53	51° 52' 32.6269" N	6° 08' 03.6885" W
15	51° 52' 52.1750" N	6° 31' 58.2450" W	54	51° 52' 45.7012" N	6° 07' 17.1342" W
16	51° 52' 46.4913" N	6° 31' 36.3291" W	55	51° 53' 15.3890" N	6° 06' 01.9427" W

Idx	Latitude	Longitude	Idx	Latitude	Longitude
17	51° 52' 43.5726" N	6° 31' 21.4643" W	56	51° 53' 16.7010" N	6° 04' 57.3153" W
18	51° 52' 30.5905" N	6° 30' 45.6709" W	57	51° 53' 22.3949" N	6° 03' 50.3577" W
19	51° 51' 51.4260" N	6° 30' 15.3993" W	58	51° 53' 24.3358" N	6° 02' 21.0594" W
20	51° 50' 34.2636" N	6° 29' 00.4505" W	59	51° 53' 02.5665" N	5° 59' 59.9986" W
21	51° 49' 39.8765" N	6° 27' 40.3549" W	60	51° 53' 19.3666" N	5° 59' 59.9989" W
22	51° 49' 07.4827" N	6° 26' 44.8038" W	61	51° 53' 40.5826" N	6° 02' 18.3155" W
23	51° 48' 17.1623" N	6° 25' 40.4491" W	62	51° 53' 38.5335" N	6° 03' 52.6022" W
24	51° 47' 54.9053" N	6° 25' 08.8330" W	63	51° 53' 32.7331" N	6° 05' 00.8150" W
25	51° 47' 31.4479" N	6° 24' 07.2856" W	64	51° 53' 31.2621" N	6° 06' 16.1896" W
26	51° 47' 08.8799" N	6° 23' 23.8852" W	65	51° 53' 21.4063" N	6° 06' 46.2596" W
27	51° 46' 26.9225" N	6° 22' 29.9130" W	66	51° 52' 46.2080" N	6° 08' 20.7885" W
28	51° 46' 20.5673" N	6° 22' 14.4117" W	67	51° 52' 18.2039" N	6° 08' 46.7545" W
29	51° 46' 16.1467" N	6° 21' 55.5449" W	68	51° 52' 06.3974" N	6° 08' 52.7038" W
30	51° 46' 15.1360" N	6° 21' 34.3271" W	69	51° 51' 53.3181" N	6° 09' 10.7172" W
31	51° 46' 18.7142" N	6° 21' 08.8681" W	70	51° 51' 46.4519" N	6° 09' 55.4660" W
32	51° 46' 23.1163" N	6° 20' 46.0589" W	71	51° 51' 50.7441" N	6° 11' 22.4241" W
33	51° 46' 31.7200" N	6° 20' 20.6643" W	72	51° 51' 50.8895" N	6° 12' 01.0802" W
34	51° 46' 48.3972" N	6° 19' 48.1403" W	73	51° 51' 48.3757" N	6° 12' 25.6075" W
35	51° 47' 39.9953" N	6° 16' 59.7287" W	74	51° 51' 42.3840" N	6° 12' 47.0439" W
36	51° 48' 16.6697" N	6° 16' 11.9729" W	75	51° 51' 22.5660" N	6° 13' 18.5118" W
37	51° 48' 21.7457" N	6° 16' 03.9973" W	76	51° 50' 20.5314" N	6° 13' 55.7528" W
38	51° 48' 37.6989" N	6° 15' 11.7672" W	77	51° 49' 34.1034" N	6° 14' 33.3896" W
39	51° 48' 47.7614" N	6° 14' 37.7216" W	78	51° 49' 17.6377" N	6° 14' 41.7055" W

Table 3b. Route option Area RPL.

vIdx	Latitude	Longitude	Idx	Latitude	Longitude
79	51° 49' 03.6720" N	6° 15' 09.2278" W	107	51° 50' 47.4368" N	6° 28' 31.7774" W
80	51° 48' 50.9943" N	6° 15' 49.5941" W	108	51° 52' 01.8728" N	6° 29' 44.0789" W
81	51° 48' 42.7322" N	6° 16' 07.4524" W	109	51° 52' 46.1669" N	6° 30' 18.3059" W
82	51° 48' 27.4182" N	6° 16' 31.5146" W	110	51° 52' 58.4453" N	6° 31' 10.7718" W
83	51° 47' 52.9261" N	6° 17' 16.4257" W	111	51° 53' 01.6921" N	6° 31' 27.3066" W
84	51° 47' 07.0055" N	6° 20' 07.5497" W	112	51° 53' 06.2977" N	6° 31' 45.0652" W
85	51° 46' 50.0270" N	6° 20' 40.6509" W	113	51° 53' 15.1401" N	6° 32' 03.8359" W
86	51° 46' 43.4841" N	6° 20' 59.9572" W	114	51° 53' 35.3272" N	6° 32' 45.3027" W
87	51° 46' 39.9773" N	6° 21' 18.0698" W	115	51° 54' 15.0497" N	6° 33' 58.1278" W
88	51° 46' 37.3238" N	6° 21' 36.9437" W	116	51° 54' 21.9661" N	6° 34' 04.7198" W
89	51° 46' 37.8320" N	6° 21' 47.7436" W	117	51° 54' 29.9343" N	6° 34' 17.3387" W
90	51° 46' 40.2813" N	6° 21' 58.1647" W	118	51° 54' 36.0376" N	6° 34' 33.5101" W
91	51° 46' 43.3741" N	6° 22' 05.6832" W	119	51° 54' 40.2221" N	6° 34' 50.1556" W
92	51° 47' 24.3295" N	6° 22' 58.3976" W	120	51° 54' 43.7431" N	6° 35' 11.5635" W
93	51° 47' 49.3615" N	6° 23' 46.4943" W	121	51° 54' 45.9283" N	6° 35' 24.3351" W
94	51° 48' 11.9208" N	6° 24' 45.7225" W	122	51° 54' 54.4209" N	6° 35' 36.3610" W
95	51° 48' 31.2687" N	6° 25' 13.2054" W	123	51° 54' 59.5153" N	6° 35' 44.8030" W
96	51° 49' 22.4130" N	6° 26' 18.5759" W	124	52° 00' 03.0094" N	6° 39' 47.7708" W
97	51° 49' 55.2545" N	6° 27' 14.9097" W	125	52° 02' 23.3446" N	6° 40' 57.8793" W

Table 4b. Route option Area RPL continued.

Figure 4. Landfall at Kilmore Quay

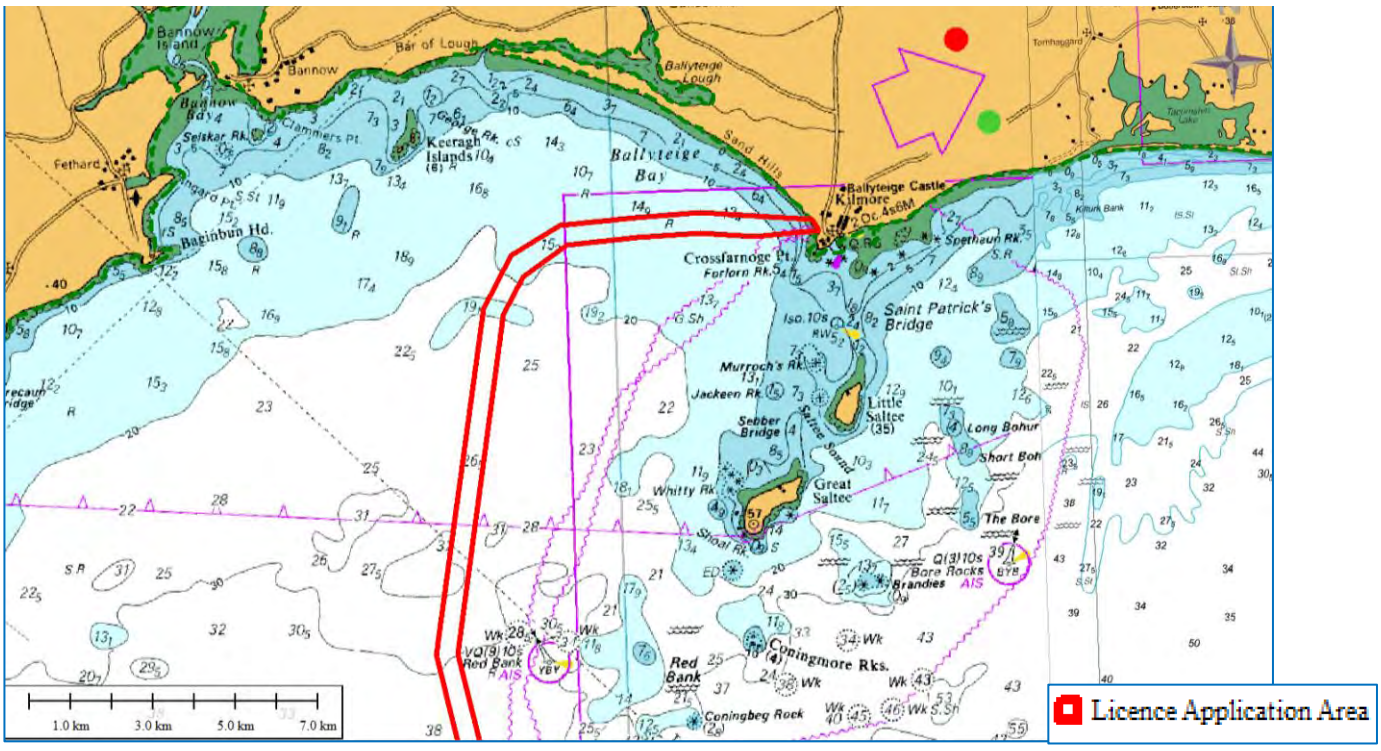


Figure 6. Inshore Survey Sections and Landfalls.

The general line of the inshore section of the survey route is shown on an Admiralty Chart base in Figure 6. The route heads west from the landfall, parallel to existing cables, before turning South and then easterly towards Wales, staying south of the Saltee Islands. Offshore, route options are explored to investigate the optimum route for cable installation.

The landfall location shown on Ordnance Survey Maps are provided in Drawing 1359-001 and included with the Licence Application.

MARINE SURVEY & SITE INVESTIGATIONS SCHEDULE OF WORKS

The principal objective of the Marine Survey & Site Investigations is to ascertain a feasible and safe route for cable system design, deployment, survivability and subsequent maintenance with due regard for environmental and ecological considerations. The survey will also enable decisions to be made on cable armouring and burial. The survey will identify the necessary water depths, route features, seabed obstructions, seabed geomorphology and cable hazards and will also provide detailed information on the seabed sediment, subsurface stratigraphy and upper sediment layers to support cable route and installation engineering. The site investigations will provide "ground-truthing" of the geophysical data along the route.

The objectives of the marine geophysical survey shall be:

- To collect up to date high-resolution bathymetry along a 400 – 1500m wide cable corridor within the License Application Area;
- To obtain information on the seabed surface (type, texture, variability, etc.) and in particular, to identify any seabed features that may be of interest.
- Identify any shallow geohazards and man-made hazards (including but not limited to outcropping, boulders, shallow gas, wrecks, debris etc.);
- Determine the stratigraphy of the upper layers of the seabed along the cable route and quantify the variability in the lateral and vertical extents to depths of 2-5m
- Identify any magnetic anomalies;
- Identify sensitive marine habitats which will need to be avoided during site investigations and sampling.

The survey operations will be broken down into separate but overlapping areas, with boundaries defined by water depth as specified in the technical requirements outlined below.

These water depth boundaries may be adjusted due to suitability of the survey vessel(s) and survey spread. The survey and survey line spacing will be designed to ensure adequate coverage and overlap of geophysical measurements.

- Landfall Survey – Intertidal Zone
- Inshore Survey – from 3m Chart Datum to 15m Chart Datum
- Offshore Survey – Water depths greater than 15m Chart Datum

In order to ensure data continuity, coverage between the survey areas is required with indicated overlap below;

- Landfall Survey to Inshore Survey – 50m overlap
- Inshore Survey to Offshore Survey – 500m overlap

Landfall Survey & Site Investigations

A non-intrusive topographic survey along the line of the cable route at the landfall is required to the low water mark. Intertidal and beach surveys (walkover survey) will be carried out on the beach by the project ecologist and the project archaeologist.

The topographical survey would typically be carried out by GPS Rover, Total Station or UAV Aerial Drone using photogrammetry or LiDAR techniques. The terrestrial geophysical survey will comprise remote sensing techniques such as Ground Penetrating Radar or Electrical Resistivity Tomography (ERT) to establish subsurface features and depth to bedrock and magnetometer or handheld marine metal detector to locate buried ferrous objects.

Landfall Site Investigations will be undertaken to establish the depth and nature of the sediment. The focus of the site investigations will be on the upper layers of sediment to assess the feasibility of cable burial and installation techniques. The following may be undertaken at the landfall:

- Bar probes on the intertidal at 10m spacing (approx. 8 to 10 at each landfall).
- Bar probes from the Low Water Line to the 3m water depth contour at 30m spacing. (approx. 8 to 10 at each landfall)
- 3 Trial Pits on the beach (target depth 2.5m).

The bar probes on the intertidal are manually driven to a depth of 2 metres simply to prove the depth of upper layers of sand, gravel or soft material.

The Trial Pits will be positioned at approximately 30 to 50m centres starting seaward of the High Water Mark. The Trial Pits will be excavated, logged, photographed and backfilled in a single tidal cycle. The trial pits will be backfilled with the original excavated materials in the sequence in which they are excavated.

A summary Method Statement for excavation of the Trial Pits is as follows;

- Excavate sand and place to one side.
- Excavate substrate and place separate from sand.
- Measure, log and photograph each Trial Pit.
- Backfill in sequence compacting with bucket of back-hoe as the backfilling proceeds.

Inshore Marine Survey

The area extending seaward from the low water mark at the landfall and inshore of the safe working draft limits of the primary survey vessel will be accurately surveyed with a small craft or Unmanned Survey Vessel (USV) using Multibeam Echosounder (MBES), sidescan sonar, marine magnetometer and sub-bottom profile equipment. Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 metres of seabed and will be used on a non-interfering basis with other sounding systems. A minimum of seven survey lines, based upon the Survey RPL, is required.

Features such as shallow reefs, surge channels, debris fields, archaeological features or anything that could be a hazard to the cable or installation team will be noted. General reconnaissance of the survey corridor beyond the planned survey lines and tie-lines may be necessary to describe the seabed as accurately as possible. A line plan showing number of survey lines as a function of depth will be determined prior to start of survey operations.

Survey Area	Depth Range	Survey Corridor Width	Min. # of Lines	Min. Overlap	Typical Survey Speed
Inshore	3m to 15m	400 - 500m	9	SSS: 100% MBES Bathy: 20%	4 knots

Table 5 Inshore Survey.

Offshore Marine Survey

The area extending seaward from the outer limits of the inshore survey to the EEZ limits will be surveyed by the primary survey vessel using Multibeam Echosounder (MBES), sidescan sonar, marine magnetometer and sub-bottom profiler equipment. A continuous bathymetric swathe along with side scan sonar imagery and sub-bottom traces will be obtained, centred on the preliminary route and along all wing lines needed to complete the route corridor coverage. A minimum of seven survey lines, based upon the Survey RPL, is required.

Sub-bottom profile equipment will be able to discern the nature and density of the upper 3 metres of seabed and will be used on a non-interfering basis with other sounding systems.

Survey Area	Depth Range	Survey Corridor Width	Min. # of Lines	Min. Overlap	Typical Survey Speed
Offshore	> 15m	500m - 1500	7	SSS: 100% MBES Bathy: 20%	4 knots

Table 6. Offshore Survey.

Marine Site Investigations and Seabed Sampling

The purpose of the marine site investigations and seabed sampling is to evaluate the physical properties of the superficial seabed sediments along the cable route. These methodologies will ensure that a full understanding of the subsurface is achieved, focussing on the upper 3 metres of sediment to subsequently develop a cable burial assessment, installation and burial plan.

The scheduled site investigations and seabed sampling within EEZ limits will comprise of the following techniques:

- Up to 26 CPTs (2m to 3m)
- Up to 19 Gravity Cores / Vibrocores (3m)
- Up to 17 Grab Samples

Indicative locations for the relevant site investigation activities (Gravity or Vibrocore and CPT's) are shown in Figure 7. Typically, individual sampling positions will be determined following initial interpretation of the geophysical survey data. The positioning of individual site investigation locations will also take into consideration environmental constraints such as the position of sensitive habitats or archaeological features.

Two or more attempts may be made at each location to acquire a suitable sample. If an acceptable sample is achieved on the first attempt, there is no need to perform a second attempt.

An acceptable sample is defined as;

- Grab Sample – recovery of approximately a full bucket of sediment. Recovery of large size granular material may be taken as indication of a hard seabed.
- Gravity Core / Vibrocore – recovery of < 3m core of soil. If stiff or hard soils are encountered and are clearly indicated in the sample, it sample may be deemed acceptable. Any sample site yielding less than 1m of recovery must be investigated a second or third time unless there is obvious damage to the coring equipment indicating a hard or rocky substrate.
- CPT – Penetration to the 2m target depth or refusal. Any push resulting in less than 2m penetration will warrant a second attempt.

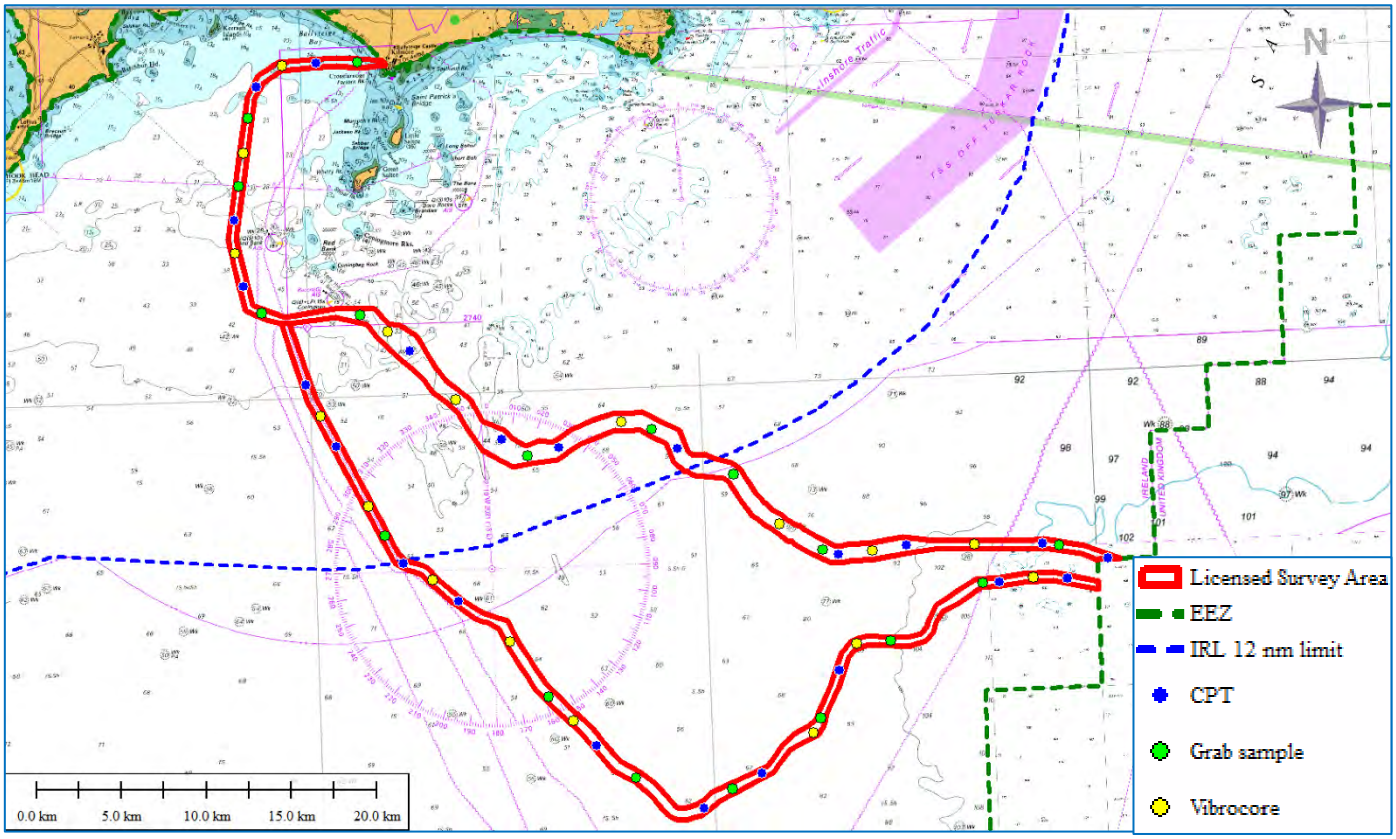


Figure 7. Indicative CPT and Vibrocore Locations.

Seabed Sampling

The total overall scope of the Site Investigations is as follows:

- Bar Probes — 10 No. on the intertidal
- Trial Pits — 3 No. on the beach
- Bar Probes — 10 No. from Low Water to 3m contour.
- Grab Samples — 17 No. along the route corridor.
- Gravity Cores / Vibrocores — 19 No. along the route corridor.
- Cone Penetration Tests — 26 No. along the route corridor.

Underwater Video Survey

Underwater video camera system may be used for inspections of the seabed to investigate seabed obstructions, marine archaeology or benthic habitats. An underwater drop-down camera system or similar may be used in a series of video transects which would be georeferenced and later mapped in GIS.

Archaeological Survey

The survey specification takes into account archaeological data acquisition to enable professional archaeological interpretation and analysis of data. The survey equipment deployed and data acquisition and processing shall comply with the requirements of the National Monuments Service, Underwater Archaeology Unit.

All archaeological assessments will be carried out under by a suitably qualified and experienced marine archaeologist to determine the location of all known archaeological features in advance of the intrusive site investigations and seabed sampling. The data collected will be used to support the archaeological assessments.

SURVEY EQUIPMENT PARAMETERS

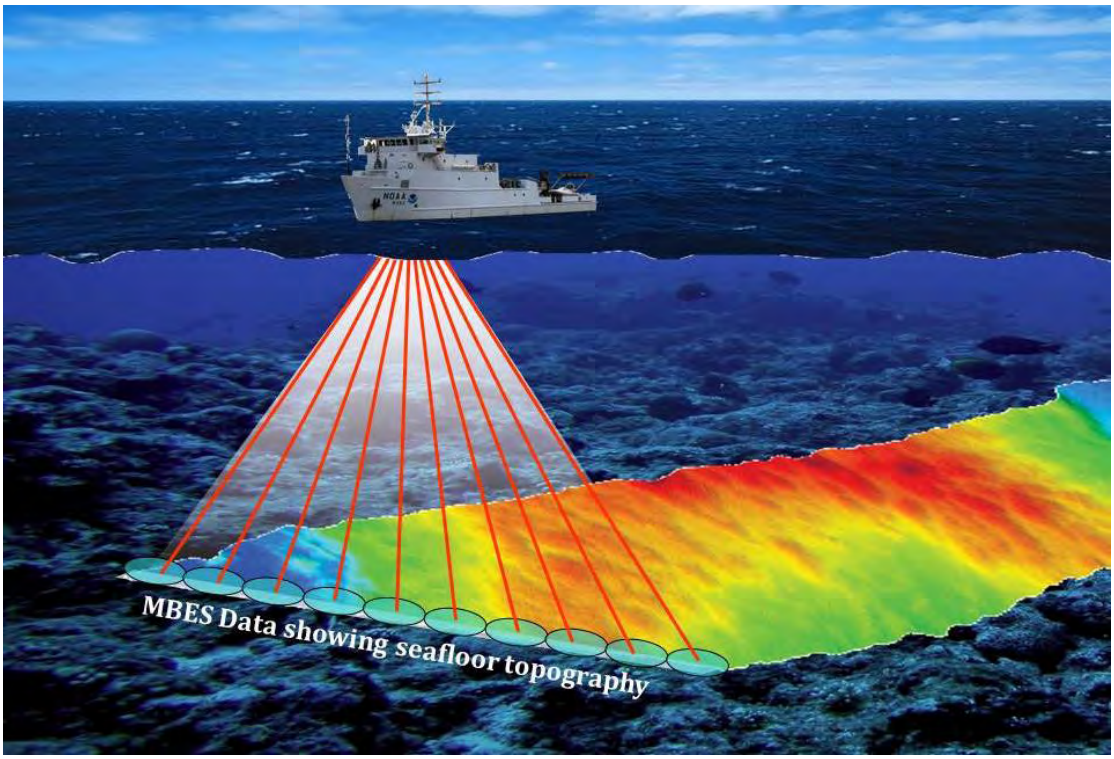
Multibeam Echosounder (MBES)

Echo-sounders are a diverse group of acoustic sources used to collect information on bathymetry, seabed features and objects in the water column (e.g. Multi beam echosounder, scientific echo-sounders/ fish-finders). They measure water depth by emitting rapid pulses of sound towards the seabed and measuring the sound reflected back.

Multibeam Echosounder (MBES) will be used during the marine survey to provide detailed 3 dimensional bathymetric mapping of the cable route corridor using multiple beams elongated in the across-track direction to cover a fan-shaped sector (or swath) (Figure 8). Measurements of the across-track beam from MBES showed 3 dB beam widths of 150-160°; in the along-track orientation beam width is narrow, typically ~1.5-3.0° (Crocker & Fratantonio 2016).

MBES is non-intrusive and does not interact with the seabed. The MBES system will be used will be confirmed following the appointment of a survey contractor but typical systems which can be taken as examples would be the R2 Sonic 2024, Kongsberg EM2040 or Teledyne Seabat T50 which would be hull mounted on the survey vessel.

Figure 8. Graphic of MBES survey in operation



The acoustic signal emitted by MBES systems is short duration, typically of a few milliseconds or less, and can be configured to within the range 0.05-10 ms for certain systems. Repetition rates are highly customisable, varying with signal frequency and water depth. Ping rates of up to 10-20 pings per second may be used in very high frequency systems, whereas there may be several seconds between pings in low-frequency deep-water applications.

For collecting information on the seabed, emitted sound frequencies are typically between 12 – 400 kHz depending on water depth, with surveys in continental shelf applications operating at between 70 to 150 kHz, and in shallower waters of less than 200 m using multi-beam echosounders operating at between 200 and 500 kHz The typical operating frequencies for the cable route survey within the licence application area will be in the range of 200kHz to 500kHz. (Danson 2005, Hopkins 2007, Lurton and DeReutier 2011)

Maximum sound source pressure levels of MBES have been reported as ranging from 210-245 dB re 1µPa at 1m with the highest levels corresponding to the lowest frequency systems (DECC 2011, Lurton and DeReutier 2011, Lurton 2016, BEIS 2020). The highest measured source levels among three MBES systems when operated at maximum power for central operating frequencies of ≥100 kHz was between Lp,pk 225-228 dB re 1µPa at 1m (LE,p 181-197 dB re 1µPa^2 s at 1m (Crocker & Fratantonio 2016).

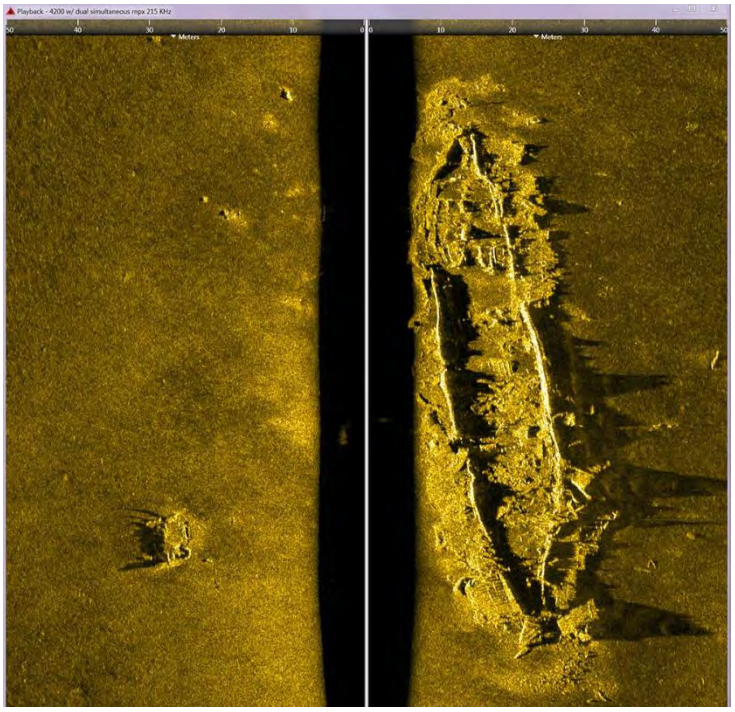
Side-scan Sonar

Side-scan sonar (SSS) is a seabed imaging technique used to provide high-resolution and detailed 2 dimensional imagery of the seabed for a variety of purposes. SSS involves the use of an acoustic beam to obtain an accurate image over a narrow area of seabed to either side of the instrument.

Piezoelectric transducers in the SSS generate high-frequency acoustic pulses which are directed either side of the tow fish. The transducers are oriented such that the acoustic signal covers a wide angle perpendicular to the path of the tow fish through the water, providing information on a strip either side of the device (port and starboard). The intensity of the acoustic reflections from the seafloor is recorded in a series of cross-track images. When stitched together along the direction of motion, these images form a waterfall view of the sea floor within the swath of the beam. The range (swath width) is dependent upon the frequency, power and other source configurations, but is typically between 50-300 m on both sides.

Analysis of SSS data can aid identification of seafloor sediment, surficial bedrock outcrops and geomorphology mapping. Obstacles rising proud of the seafloor, such as shipwrecks, boulders, pipelines, outfalls, exposed cables, fishing gear etc. can cast shadows on the resulting seafloor image where no acoustic signal is returned. The size of the shadow can be used to determine the size of the feature casting it (Figure 9).

Figure 9. SSS image of shipwreck on seabed and nadir gap.



SSS is non-intrusive and does not interact with the seabed. The SSS system will be used will be confirmed following the appointment of a survey contractor but typical systems which can be taken as examples would be the Klein 3000 or Edgetech 4200 (Figure 10). The SSS may be hull mounted but is typically towed at depth behind the survey vessel on an armoured tow cable.

Figure 10. Deployment of Edgetech 4200 Tow fish.

Acoustic signal durations of SSS systems are short (0.4ms – 1.0ms), but vary between models and configurations with longer signal durations are required to survey greater ranges. Repetition rates are highly customisable with ping rates of up to several tens of pings per second (Crocker & Fratantonio 2016).

The frequencies used by side-scan sonar are relatively very high, typically between 100 and 900 kHz. Most SSS systems offer real-time dual frequency operation which allows acquisition of both frequencies across a swath independently and simultaneously. The higher frequency produces higher resolution data and sharper images but with a narrow swath width while the lower frequency results in wider seabed coverage at lower resolutions.

SSS typically offer a selection of two operational frequencies in the range of 100-500 kHz, or may operate both simultaneously. Some models may offer an upper frequency of up to 900 kHz for applications requiring the highest resolution data. Across-track resolutions vary between 1-8 cm with finer resolution at higher operating frequencies. The typical operating frequencies for the cable route survey within the licence application area will be between 200 to 700 kHz.

The line spacing for the survey will be determined after consideration of all factors including water depth and prevailing conditions at time of survey. Generally for SSS, full coverage requires two passes with 100% overlap over a given area of sea-floor, with the two passes each insonifying the sea-floor from opposite directions to ensure targets are adequately imaged. This also ensures that the 'nadir gap' or the centre of the image directly under the path of the towfish is fully covered (Figure 9).

Sound source pressure levels of SSS systems have been reported typically in the range Lp,pk 200-240 dB re 1µPa at 1m. (BOEM 2016, BEIS 2020, DAHG 2014). Maximum calibrated source levels, (sound pressure) measured by Crocker & Fratantonio (2016) were Lp, pk 227 dB re 1µPa at 1m for a 0.1 ms pulse, whereas the highest energy source level of LE, p 205 dB re 1µPa^2 s at 1m corresponded to a longer pulse of 1.1 ms at lower maximum pressure (Lp, pk 210 dB re 1µPa at 1m).

Marine Magnetometer

A marine magnetometer is a passive towed sensor used to measure magnetic field strength and to detect variations in the total magnetic field of the underlying seafloor. The magnetometer does not transmit any signals into the marine environment.

Usually, the increased magnetization is caused by the presence of ferrous (unoxidized) iron on the seafloor or buried below the surface, whether from a shipwrecked vessel made of steel or from natural rock formations containing grains of magnetite. After corrections are made to measurements of the total magnetic field, magnetic data is used to locate existing infrastructure such as buried pipelines, undersea cables and to identify shipwrecks and potential unexploded ordnance.

Marine magnetometers are non-intrusive and do not interact with the seabed. They are towed at depth at least two and a half ship-lengths behind the survey vessel, so that the ship's magnetic field does not interfere with magnetic measurements. The marine magnetometer may be integrated and towed in tandem with the SSS. The marine magnetometer will be of the Caesium Vapour type and capable of recording variations in magnetic field strength during survey to an accuracy of ±0.5nT.

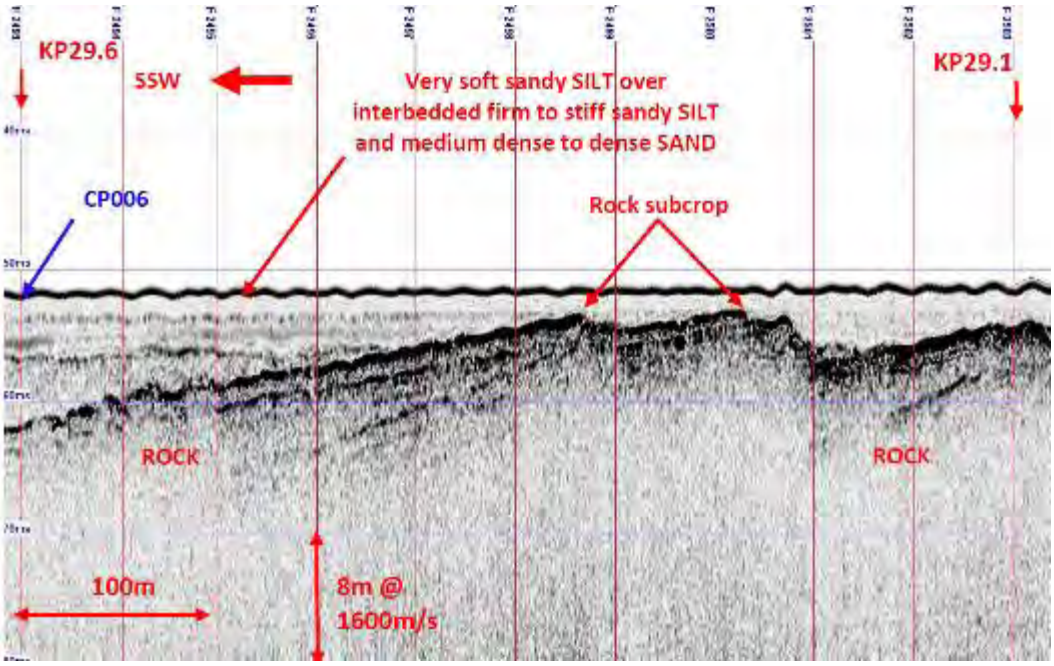
The marine magnetometer system to be used will be confirmed following the appointment of a survey contractor but typical systems which can be taken as examples would be the Geometrics G-882 or Marine Magnetics SeaSpy (Figure 11). The line spacing and coverage will generally match the SSS as they are towed in tandem and the parameters of the survey may be determined by the requirements of the Underwater Archaeology Unit of the National Monuments Service.

Figure 11. Marine Magnetics SeaSpy towfish.

Sub-bottom profiler

Sub-bottom profilers (SBPs) encompass a range of acoustic systems which are designed to collect information on the characteristics of strata below the seabed, establish changes in sediments and detect and image structures buried within the sediments (Figure 12). Shallow Sub-bottom profiling can penetrate the seabed to a range of depths, from a few metres to tens of metres depending on the geological conditions encountered, and with vertical resolutions from a few centimetres to a few metres. Most are towed behind a survey vessel, either at/near the surface or at depth, whereas some smaller devices may be hull-mounted or lowered over the side of a vessel on a pole mount.

Figure 12. Interpreted SBP seabed profile



Pulsed waveform SBPs generate an acoustic signal either through the impulsive physical processes of electrostatic discharge, as in sparkers, or electromechanically via accelerated water mass, as in boomers. All periodic waveform SBPs i.e. pingers, chirpers and parametric SBPs are electromechanical sources which employ piezoelectric transducers to generate an acoustic waveform by converting electrical energy into mechanical movement i.e. vibrations. Through the reverse of this process, the transducers can also detect sound. As such, these sources are highly customisable; in many cases, the signal is modulated in frequency and/or amplitude to improve its detectability and performance.

The systems most commonly used for high-resolution surveying are the boomer (such as the Applied Acoustics S-Boom), pinger (such as the Kongsberg GeoPulse), chirp (such as the Edgetech SB-424, Figure 13) and parametric chirp systems (such as the Innomar SES-2000). Whereas the boomer system provides best results for coarser sediments, the pinger and chirp systems deliver detail for finer sediments.

The objective of the SBP cable route survey is to investigate the upper layers of the seabed sediments for cable burial potential and installation risk from seabed obstructions such as subcropping rock formations and is not focussed on deep seabed conditions such as required for investigation of offshore wind farm foundations or deepwater seismic surveys carried out by Oil and Gas Exploration. The SBP system used for the survey will be confirmed following the appointment of a survey contractor and the most appropriate system chosen depending on the seabed, anticipated geological environment and the survey vessel capabilities.

Sound source pressure levels of various SBP systems have been reported typically in the range Lp,pk 185-247 dB re 1µPa at 1m. (Hartley Anderson 2020, Crocker & Fratantonio 2016). A summary of the Maximum Sound Pressure Levels for SBP systems is described in Table 4 below. The SBP survey is non-intrusive therefore does not interact with the seabed.

Figure 13. Edgetech SB-424 tow body.

Equipment Type	Frequency Range	Duration	*Maximum* Source Pressure Level (re 1µPa at 1 m)	Reference
Sub-bottom Profiler (SBP) - Pinger	2 kHz to 15 kHz	0.5 - 30 ms	214 dB.	Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Chirper	2 kHz to 13 kHz	5 - 40 ms	185 - 215 dB.	Crocker & Fratantonio 2016, Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Boomer	500 Hz to 15 kHz	0.5 - 1.0 ms	205 - 215 dB.	Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Parametric	4 to 15 kHz, 85 to 115 kHz	0.2 - 30 ms	238 - 247 dB. 200 - 206 dB.	Hartley Anderson 2020

Table 7. Typical SBP specifications.

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 survey vessel, and transponders on the towed equipment.

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.

Cone Penetration Test (CPT)

The survey vessel will position itself over the target position to carry out the CPT. The seabed CPT rig (such as a Neptune 3000, Figure 14) is deployed to the seabed from the vessel crane, A-frame or dedicated Launch and Recovery System (LARS). Once on the seabed, in a stable position, a steel rod with a conical tip (typically an apex angle of 60° and a diameter of 35.7 mm) is pushed at a steady rate into the seabed until it reaches target penetration depth of 3 to 6m or refusal. The penetration resistance at the tip and along a section of the shaft (friction sleeve) is measured and recorded for later analysis.

Refusal is indicated by peak system thrust, excessive load on the tip or excessive inclination of the cone. If target penetration depth is not met, the CPT rig may be moved to a nearby position on the seabed and the test repeated. The time taken to complete a shallow CPT is typically less than 10 minutes but the total time in the water from deployment to recovery may be 1 to 2 hours at each position, depending on water depth and sea state.

There is very little published information on the sound pressure levels generated from CPT equipment, collected either from field experimentation or from manufactures specifications. Data from a similar device, deep boring, indicates that sound pressure source levels are typically within the range 118 - 145 decibels (dB) (BOEM 2012, EIRGRID 2014).

Figure 14 Neptune 3000 CPT rig.

Gravity Core

Gravity corers (Figure 15) provide a rapid means of obtaining a continuous core sample in water depths from a few metres down to several thousand metres. A gravity corer consists of a steel tube in which is inserted a plastic liner to hold the core sample. Gravity corers are commonly used for cable route investigations.

A set of heavy weights, up to 750 kg, is attached at the top end of the tube above which is a fin arrangement to keep the corer stable and vertical during its fall to the seabed. The sampler penetrates the seabed under its own weight. Normal practice is to lower the device to within 10 m of the seabed before releasing. The penetration depth is between 1 m and 3 m. Penetration in stiffer clays or sands is usually limited.

The penetrating end of the tube is fitted with a cutter and a concave spring-steel core-catcher to retain the sample when the corer is retracted from the soil. The suction caused when withdrawing a core barrel from a soft soil such as clay, can pull the sample from the barrel, or in other ways disturb its homogeneity. By fitting a piston above the sample, the partial vacuum caused above the piston, when the barrel is withdrawn, keeps the sample from being pulled out of the tube.

Upon refusal or at target depth of 3m, the sampler is recovered on deck where the sample is split, typically into 1m lengths, logged, sealed and stored for later laboratory analysis. The typical diameter of the liner is in the region of 90mm with a typical maximum diameter of 120mm.

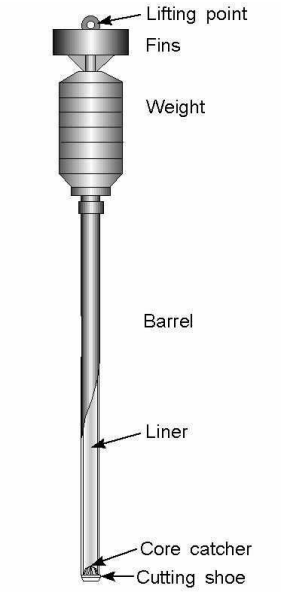


Figure 15. Gravity Corer schematic

Vibrocorer

Vibrocorers are used wherever soil conditions are unsuited to gravity corers or where greater penetration of the seabed is necessary. Vibrocore is best suited to non-cohesive soils (e.g. gravel or sand) as samples recovered are considered disturbed. Vibrocorers are commonly used for cable route investigations.

To penetrate soils such as dense sands and gravels, or to reach deeper into stiff clays, rather than depending on a gravity free-fall, the corer's barrel is vibrated, thus facilitating its penetration into the soil. This vibration energy allows the core barrel to penetrate the sediments under self-weight. In other respects, the barrel and sample retention systems are similar to gravity corers.

The typical vibrocorer consists of a tall steel frame and tripod support. Within the frame is a standard 102 mm steel coring barrel in which is inserted a PVC liner to contain the sample. The typical diameter of the PVC liner is in the region of 90mm with a typical maximum diameter of 120mm. A spring steel core catcher is fitted to the cutting shoe, as with the gravity corer. Two linear electric motors enclosed in a pressure housing provide the vibratory motion; the core barrel is attached directly to the motor housing. Power is fed to the motors via an electrical control line from the survey vessel.

Once in motion, the heavy motor housing provides the mass to drive the core barrel into the seabed. The penetration depth can be from 2m to 8m depending on seabed conditions. A typical 6 m vibrocorer will weigh nearly two tonnes and requires a crane for A-Frame or deployment and recovery. Vibrocorers come with barrel lengths of 3m, 6m and 8m. A normal coring operation in 100 m water depth will take about one hour.

Once coring is started, the core barrel will penetrate to the target depth. Upon refusal or at target depth of 3m, the vibrocore is recovered on deck where the sample in the liner is removed from the barrel, the sample is split, typically into 1m lengths, logged, sealed and stored for later laboratory analysis.

The sounds produced by the operation of a vibrocorer on the seabed consist of a series of impulses corresponding to the movement and impacts of the mechanics of the vibrating motion from the oscillating motors on the core barrel. Expected sound pressure levels generated by vibrocore equipment would be approximately 187.4 dB re 1µPa at 1m (LGL, 2010),

Figure 16. Deployment of Vibrocorer from Survey Vessel

Grab Samplers

Grab samplers are one of the most common methods of retrieving soil samples from the seabed surface. The grab sampler is a device that simply grabs a sample of the topmost layers of the seabed by bringing two steel clamshells together and cutting a bite from the seabed surface to a depth of 0.1 to 0.5m. The information they provide can be applied in a number of applications such as seabed classification, environmental sampling, chemical and biological analysis and ground truthing for morphological mapping and geophysical survey. Grab samplers can be used to recover samples of most seabed soils, although care is needed in selecting the right size unit for the task.

There are various grab sampler types to include but not limited to Van Veen (single or double, Figure 17), Hamon, Shipek and Day Grab samplers. Generally, some variants may come both as single or double, and in a variety of different sizes. The grab sampler comprises two steel clamshells acting on a single or double pivot. The shells are brought together either by a powerful spring (Shipek type) or powered hydraulic rams operated from the survey vessel.

In operation, the grab is lowered from the survey vessel to the seabed with the clamshells in the open position and which trigger shut when the sampler is in contact with the seafloor. The shells swivel together in a cutting action and retains a sample of seabed. The sampler is then recovered to the survey vessel for visual inspection, processing, logging and transfer to suitable sample containers for storage and later laboratory analysis. Typical performance rates are between three and four samples per hour.

The smaller Shipek type grab sampler is useful for ground truthing geophysical surveys for the surface layer, and samples are taken to about 0.1 m below the seabed. Larger hydraulic grabs are capable of recovering relatively intact samples of consolidated soils to a depth of about 0.5 m. In areas of large cobbles or boulders, grabs can become jammed open and their contents washed away during recovery to the surface. However, the hydraulic grab is more likely to recover cobbles and small boulders than any other system, and in this respect is invaluable. Various grabs will be available for the survey to ensure adequate sampling equipment for various sediment types.

Figure 17. Single and Double Van Veen Grab

SURVEY VESSELS

Offshore survey vessels are typically between 15m and 75m in length with potential for smaller vessels to be used in nearshore / shallow water areas. Offshore survey vessel typically have an endurance of approximately 14 to 28 days. A vessel with a shallow water draft will be utilised for the inshore survey area. An unmanned surface vehicle (USV) and/or autonomous surface vehicle (ASV) may also be used for the geophysical survey. The survey vessels may use a local port for personnel / equipment mobilisation, bunkering and provisioning.

The marine survey works 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 survey area. The exact equipment to be used will be confirmed following a tender process to procure the marine survey contractor.

All survey vessels will be fit for purpose, will possess all relevant classification certificates and capable of safely undertaking the survey work required. Health, safety, environment and welfare considerations will be a priority and will be actively managed during the course of the survey scopes of work. Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work. Prior to survey works taking place under Licence, both Project Supervisor for Design Process (PSDP) and Project Supervisor for Construction Stage (PSCS) will be appointed under the relevant legislation and project / survey specific HSE plans will be put in place which will form part of the survey project execution plans.

The vessels will conform to the following minimum requirements as appropriate:

- Compliance with Safety of Life at Sea (SOLAS), International Maritime Organization (IMO) and national requirements for operating within Irish territorial waters.
- Station-keeping and sea keeping capabilities required to carry out the survey operations safely;
- Calibrated equipment and spares with necessary tools for all specified works;
- Endurance (e.g. fuel, water, stores, etc.) to undertake the required survey works;
- Sufficient qualified staff to allow the survey operations to be carried out efficiently, (typically 24 hour continuous for offshore survey, 12 hour for nearshore survey); and
- Appropriate accommodation and crew welfare facilities.

Survey 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 a number of 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.

MARINE SURVEY AND SITE INVESTIGATIONS SOUND PRESSURE LEVEL SUMMARY

All survey works that involve the use of acoustic instrumentation will follow the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters, 2014.

The ranges of noise frequency and sound pressure levels associated with all the surveys outlined in previous sections is summarised in Tables 5. and 6 below. It can be noted that as the focus of the cable route surveys within the licence application area is the seabed surface and upper layers of seabed sediments and generally obtaining higher resolution data, the geophysical equipment such as MBES and SSS is generally operated more towards the higher end of the frequency range where possible.

TIMELINE AND DURATION OF SURVEY ACTIVITIES

The intention is to commence the survey as soon as feasible following license award, taking into account survey vessel availability, the overall cable route survey programme, seasonality and suitable weather windows. The exact mobilisation dates will not be known until the process of procuring a contractor and issue of the marine licence is complete. It is anticipated that the marine geophysical survey and site investigations activities within the marine licence area will take less than 6 weeks in total and will be completed over a 6 month period.

The estimated time required to complete the cable route survey campaign activities is described in Table 10 below.

Equipment Type	Purpose	Frequency Range	Duration	*Maximum* Source Pressure Level (re 1µPa at 1 m)	Reference
Multibeam Echo Sounder (MBES)	Measure detailed bathymetry by transmitting sound pulses (active sonar).	200 kHz to 500 kHz	0.05 - 10 ms	210 - 245 dB.	Danson 2005, Hopkins 2007, DECC 2011, Lurton and DeReutier 2011, Lurton 2016, BEIS 2020, Crocker & Fratantonio 2016
Side Scan Sonar (SSS)	Determine surficial nature of the seabed and detect objects by transmitting sound pulse.	200 kHz to 700 kHz	0.4 - 1.0 ms	200 - 240 dB.	BOEM 2016, BEIS 2020, DAHG 2014, Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Pinger	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 15 kHz	0.5 - 30 ms	214 dB.	Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Chirper	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 13 kHz	5 - 40 ms	185 - 215 dB.	Crocker & Fratantonio 2016, Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Boomer	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	500 Hz to 15 kHz	0.5 - 1.0 ms	205 - 215 dB.	Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Parametric	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	4 to 15 kHz, 85 to 115 kHz	0.2 - 30 ms	238 - 247 dB. 200 - 206 dB.	Hartley Anderson 2020
Ultra-Short Base Line (USBL)	Subsea positioning.	20 kHz to 50 kHz	5 - 10 ms	194 - 207 dB.	Kongsberg
Magnetometer	Identify ferrous anomalies for metal obstructions, shipwrecks, etc. on and under the seabed.	Passive	N/A	Passive	N/A
Survey Vessels	Carry out the survey and deploy the equipment.	50 Hz to 300 Hz	N/A	160 - 190 dB.	DECC 2011

Table 8. Marine Survey Activities.

Equipment Type	Purpose	Number of locations within Licence Application Area (up to)	Frequency Range	*Maximum* Source Pressure Level (re 1µPa at 1 m)	Reference
Cone Penetration Test (CPT)	Determine geotechnical engineering properties of seabed sediments.	26	28 Hz	118 - 145 dB.	BOEM 2012, EIRGRID 2014
Gravity Corer	Retrieve a seabed sediment sample by penetrating seabed with a steel core barrel under self-weight	19	N/A	N/A	N/A
Vibrocorer	Retrieve a seabed sediment sample by penetrating seabed with a vibrating steel core barrel	19	30 Hz	187.4 dB.	LGL 2010
Grab Samples	Collect small sediment samples from seabed surface with clamshell mechanism	17	N/A	N/A	N/A

Table 9. Marine Site Investigation Activities.

Activity	Typical Time Period Required for Activity	Total Number of SI Locations	Total Time for SI	Foot Print Affected per SI	Foot Print Affected per SI (ha)	Total Foot Print (ha)	Area Directly Affected as % of Licence Application Area
Inshore Geophysical Survey	3 to 4 days (weather and sea state dependent)	400 - 500 m cable route corridor	3 to 4 days (weather and sea state dependent)	N/A	N/A	376 ha	3.68953%
Offshore Geophysical Survey	8 to 10 days (weather and sea state dependent)	500 - 1500 m cable route corridor	8 to 10 days (weather and sea state dependent)	N/A	N/A	9815 ha	96.31047%
CPT	30 minutes - 2 hours in any one location	26	52 hours within total 10 days of Site Investigations campaign (weather and sea state dependent)	8m²	0.0008 ha	0.0208 ha	0.00020%
Gravity Corer	30 minutes - 2 hours in any one location	19	38 hours within total 10 days of Site Investigations campaign (weather and sea state dependent)	1m²	0.0001 ha	0.0019 ha	0.00002%
Vibro Corer	30 minutes - 2 hours in any one location	19	38 hours within total 10 days of Site Investigations campaign (weather and sea state dependent)	8m²	0.0008 ha	0.0152 ha	0.00015%
Grab Samples	20 minutes - 45 minutes in any one location	17	13 hours within total 10 days of Site Investigations campaign (weather and sea state dependent)	0.5m²	0.00005 ha	0.00085 ha	0.00001%

Table 10. Estimated Time and Duration of Survey Activities.

Ecological Assessment Methodology

Desk Study

A desk study was undertaken to gather and assess ecological data prior to undertaking fieldwork elements. Sources of datasets and information included:

- The National Parks and Wildlife Service
- National Biodiversity Data Centre
- Satellite, aerial and 6" map imagery
- INFOMAR (Lidar, backscatter and multibeam) (WMS data)
- Irish Whale and Dolphin Group
- Environmental Protection Agency (Water Quality Data)
- Bing Maps (ArcGIS)

A provisional desk-based assessment of the potential species and habitats of conservation importance was carried out in June 2023 and updated in July 2023. This included a detailed assessment of INFOMAR data (backscatter, multibeam and LIDAR) in addition to Marine Strategy Framework Directive habitat mapping of the inshore and off-shore area, Admiralty charts and satellite imagery and Rare and Protected Species Data.

Field Survey

Field surveys of the potential landfall sites were carried out by Bryan Deegan of Altemar Ltd. on the 27th January 2018, 20th February 2020, 2nd August 2020, 13th December 2020 , 31st August 2021 and the 13th May 2023. The survey covered intertidal and terrestrial elements of the project. It also included areas that involved equipment movements e.g. car park and in addition to beach access routes.

The purpose of the field surveys was to identify habitat extents in relation to the proposed works. In addition, more detailed information on the species composition and structure of habitats, conservation value and other data were gathered.

Survey Limitations

The most recent intertidal surveys were carried out in May 2023. Significant local pedestrian and canine activity was noted within the landfall areas of the proposed survey works. In light of this, additional detail was gleaned from the desk based review particularly in relation to the conservation objectives supporting documents for both the SPAs and SACs.

Consultation

The National Parks and Wildlife Service (NPWS) were consulted in relation to species and sites of conservation interest. Data of rare and threatened species were acquired from NPWS. The National Biological Data Centre records were consulted for species of conservation significance. David Lyons was consulted in relation to the proposed cable route in the vicinity of the Saltee Islands SAC.

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, conservatively it is not considered that the impacts of the proposed works would extend beyond 1km of the intertidal, primarily extended beyond the project footprint due to noise generation and 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*." During the survey works, vessel speeds are slow (4 kn). In light of this, and based on the localised nature of the survey works, the Zone of Influence in the subtidal was extended to 1 km either side of the proposed survey area. However, a search area of 15 km was used for the gathering of information for nationally and internationally designated sites and marine mammal species.

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.

Results

Proximity to Designated Conservation Sites

Designated conservation sites (National and international) within 15 km of the proposed survey works are seen in Figures 18-21. The proposed Licence Application Area is located within two designated conservation sites (Ballyteige Burrow SAC & pNHA). Given that there are proposed works located within Ballyteige Burrow SAC & pNHA, mitigation measures are required to ensure that there are no significant impacts on these sites.

In addition, there is potential for marine mammals from Saltee Islands SAC (*Halichoerus grypus* (Grey Seal)) to be in the vicinity of the proposed survey route and mitigation measures for the protection of marine mammals will be in place.

The proposed landfall location at Kilmore Quay is demonstrated in Figure 22. Watercourses, SACs, & pNHAs within the proposed Cable Route and Licence Application Area at Kilmore Quay are demonstrated in Figures 23 & 26. Designated conservation sites within 10km of Kilmore Quay are demonstrated in Figures 24, 25, 27, & 28. The proposed cable route, Licence Application Area, and works (to Irish 12 Nautical Mile Limit and Irish EEZ) are demonstrated in Figures 29 & 30.

There are no offshore SACs in proximity to any of the proposed survey works (Figure 31). The inshore coastal waterbodies through which the foreshore license area traverses (Eastern Celtic Sea) is classed as unpolluted under the Water Framework Directive (WFD) (Figure 32).

Table 11. European sites within 15km of the proposed site

Code	NATURA 2000 Site	Distance
Special Areas of Conservation		
000696	Ballyteige Burrow SAC	**Route passes through site**
000707	Saltee Islands SAC	350 m
000764	Hook Head SAC	3.6 km
000709	Tacumshin Lake SAC	5.6 km
000697	Bannow Bay SAC	7.6 km
002269	Carnsore Point SAC	10.3 km
000704	Lady's Island Lake SAC	11.5 km
002162	River Barrow and River Nore SAC	13.5 km
Special Protection Areas		
004020	Ballyteige Burrow SPA	700 m
004002	Saltee Islands SPA	3 km
004118	Keeragh Islands SPA	3.3 km
004092	Tacumshin Lake SPA	6.7 km
004033	Bannow Bay SPA	7.3 km
004009	Lady's Islands Lake SPA	11.9 km
004076	Wexford Harbour and Slobs SPA	14.8 km

Table 12. (proposed) NHAs & Ramsar sites within 15km of the proposed development site

National Conservation sites	Distance
Natural Heritage Areas	
Keeragh Islands NHA	3.3 km
Proposed Natural Heritage Areas	
Ballyteige Burrow pNHA	**Route passes through site**
Saltee Islands pNHA	3.5 km
Tacumshin Lake pNHA	5.6 km
Bannow Bay pNHA	7.3 km
Hook Head pNHA	7.7 km
Lady Island pNHA	11.5 km
Tintern Abbey pNHA	11.6 km
Wexford Slobs And Harbour pNHA	12.4 km
Duncannon Sandhills pNHA	14.7 km
Ramsar	**Distance**
Bannow Bay	7.4 km

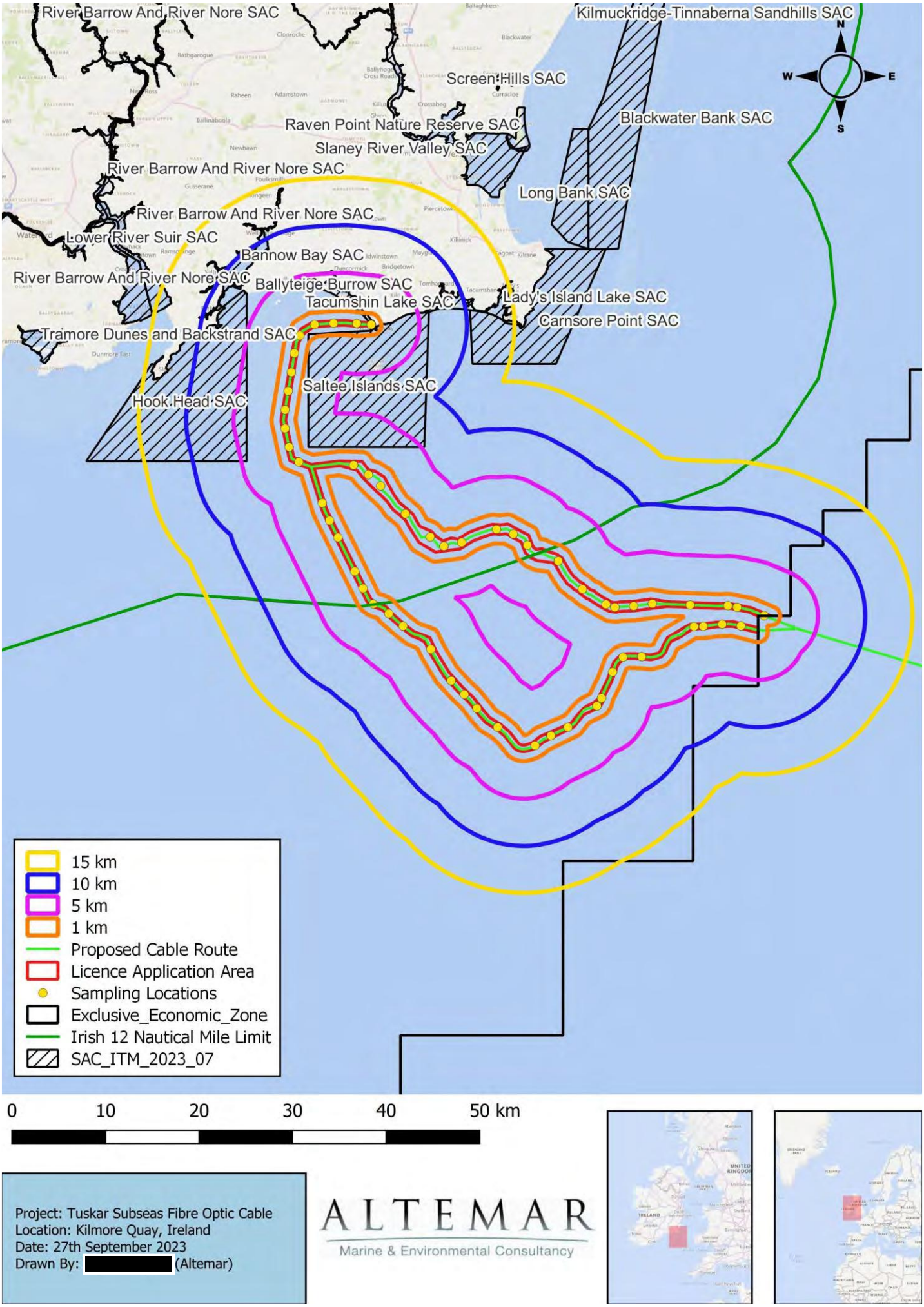


Figure 18: *Special Areas of Conservation within 15 km of the proposed survey route.*

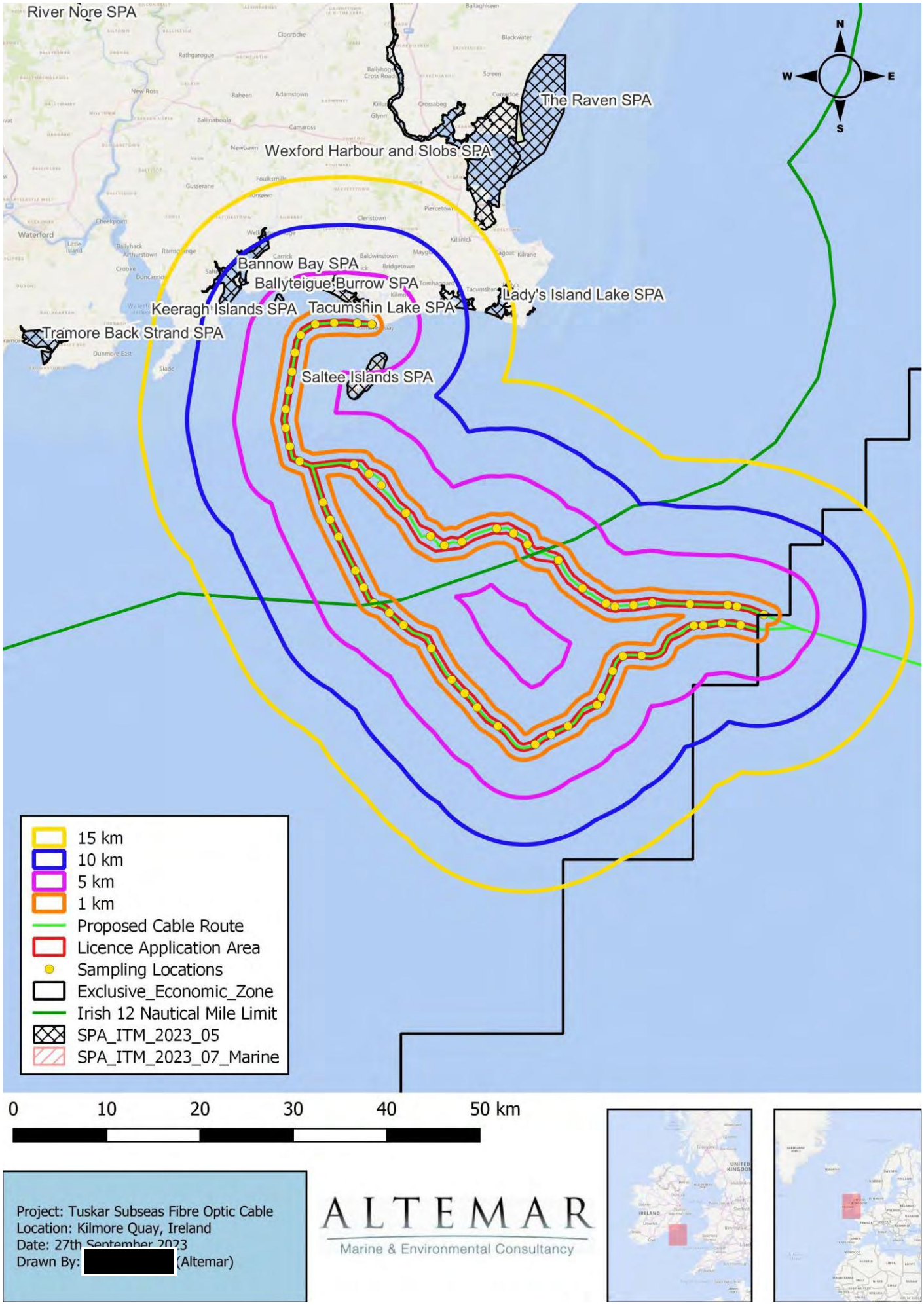


Figure 19. *Special Protection Areas within 15 km of the proposed route.*

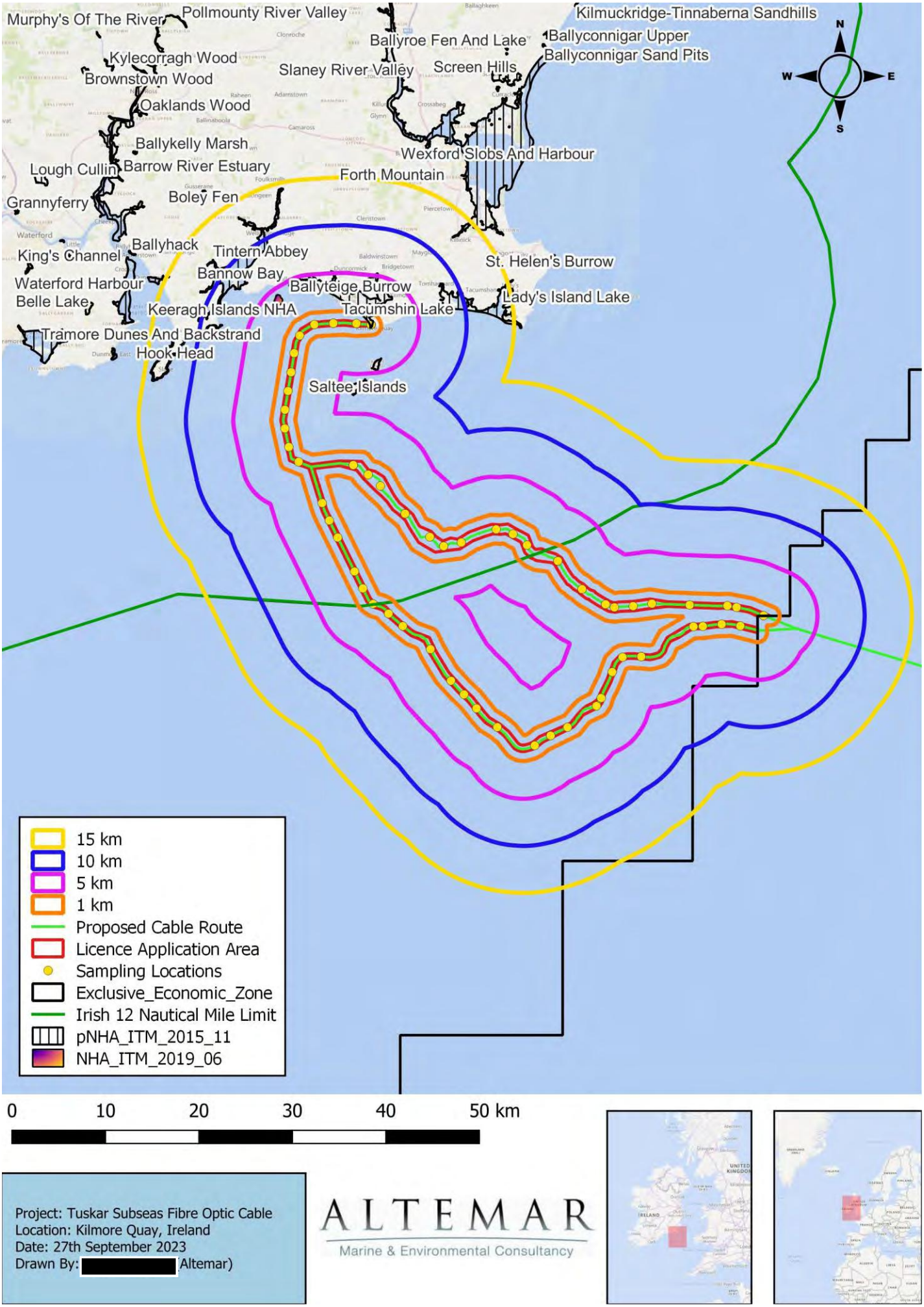


Figure 20: *Proposed National Heritage Areas and Nation Heritage Areas (None) within 15 km of the proposed survey route.*

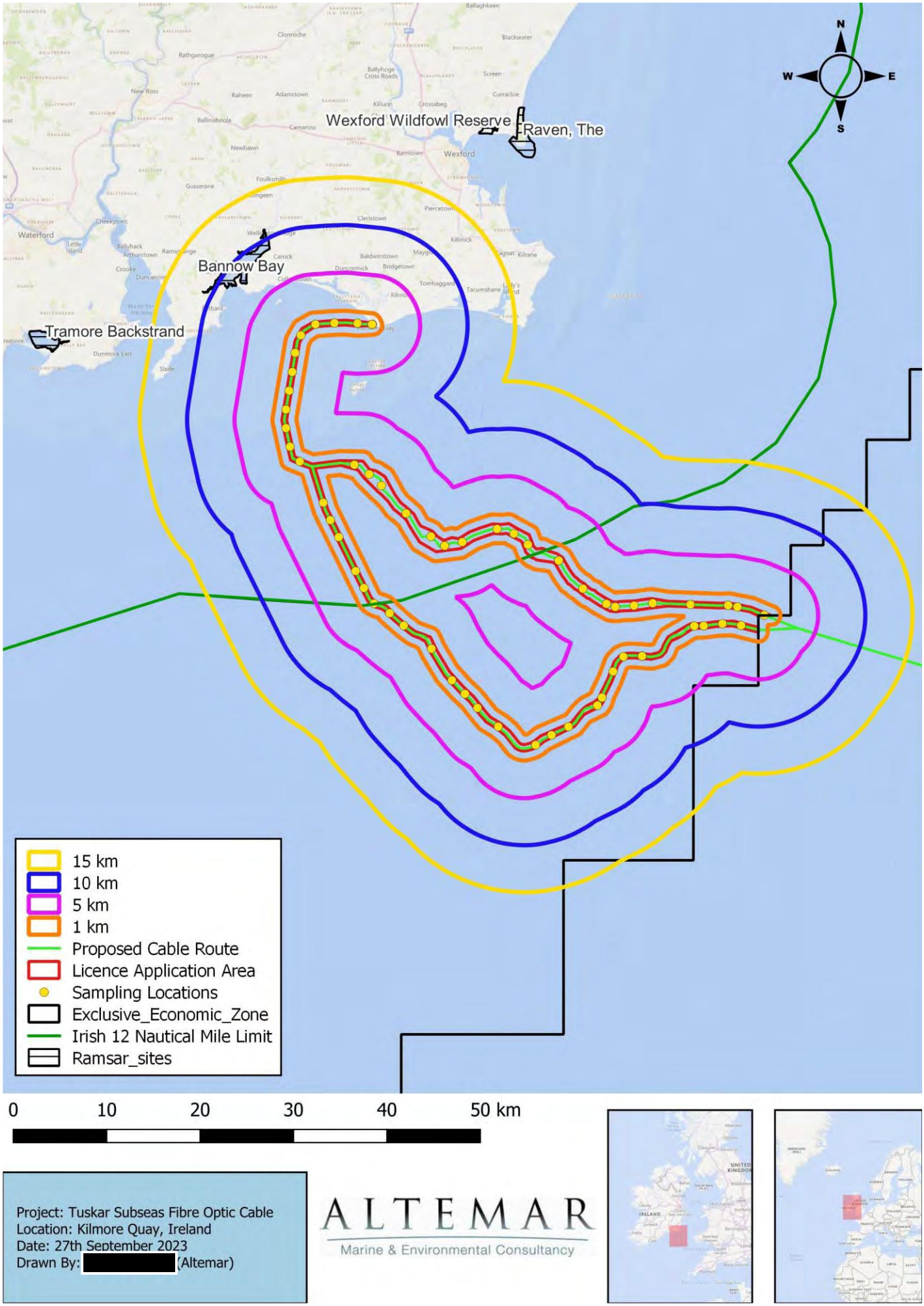


Figure 21. *Ramsar sites within 15km of the proposed survey route*

***Figure 22**. Proposed landfall at Kilmore Quay*

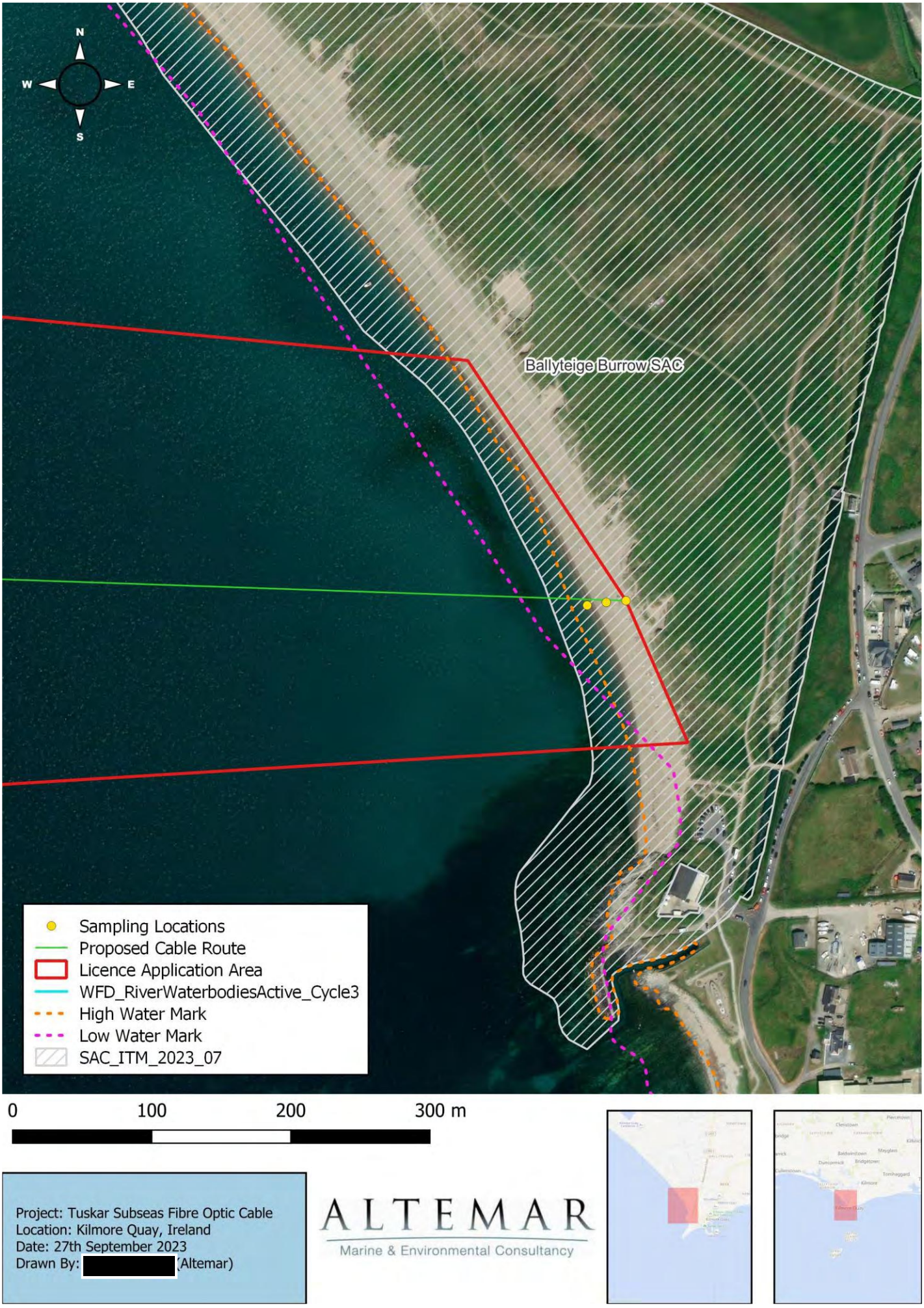


Figure 23. *Watercourses and Special Areas of Conservation within the proposed Cable Route and Licence Application Area at landfall location.*

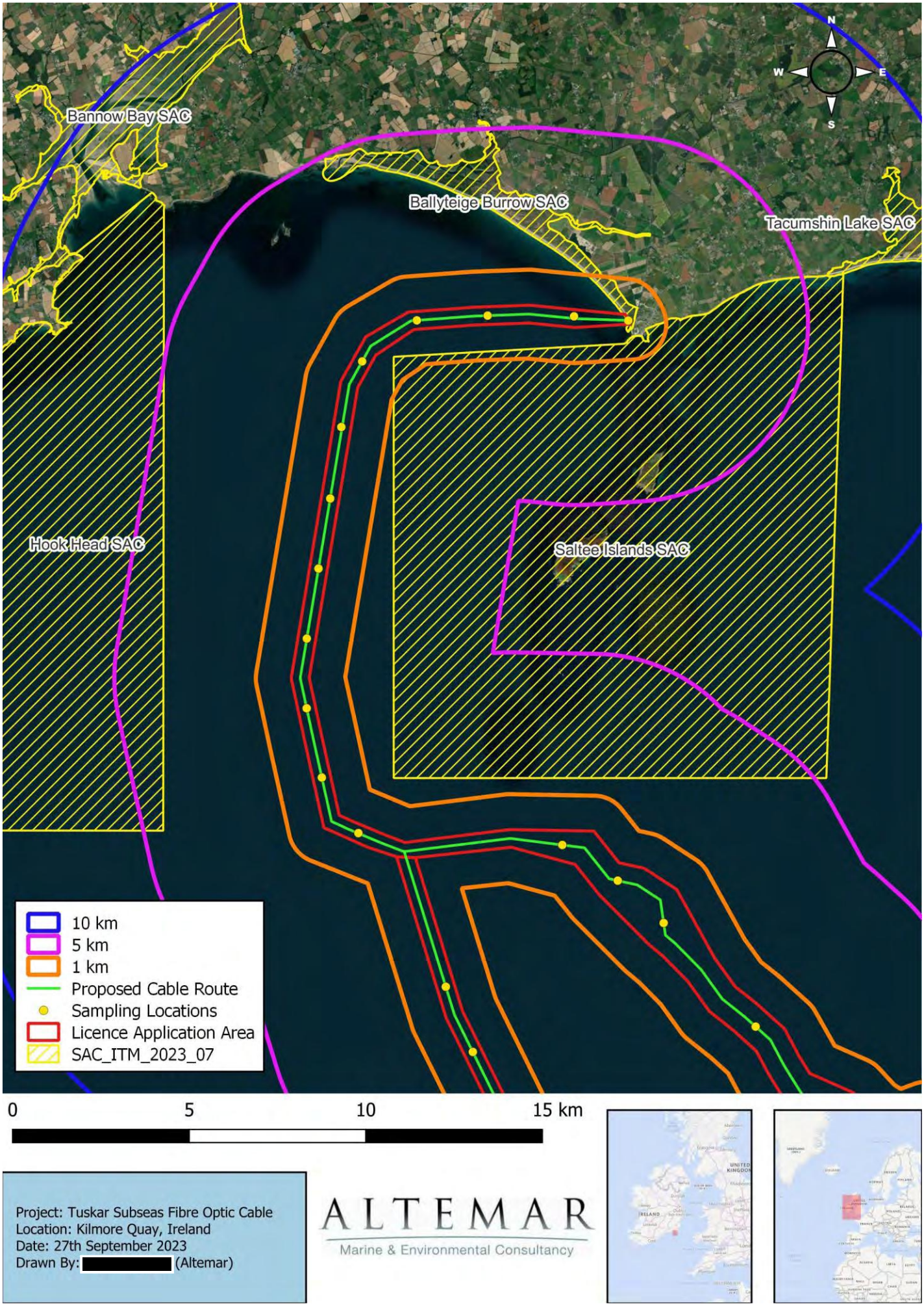


***Figure 24**. SACs located within 10km of the proposed cable route*

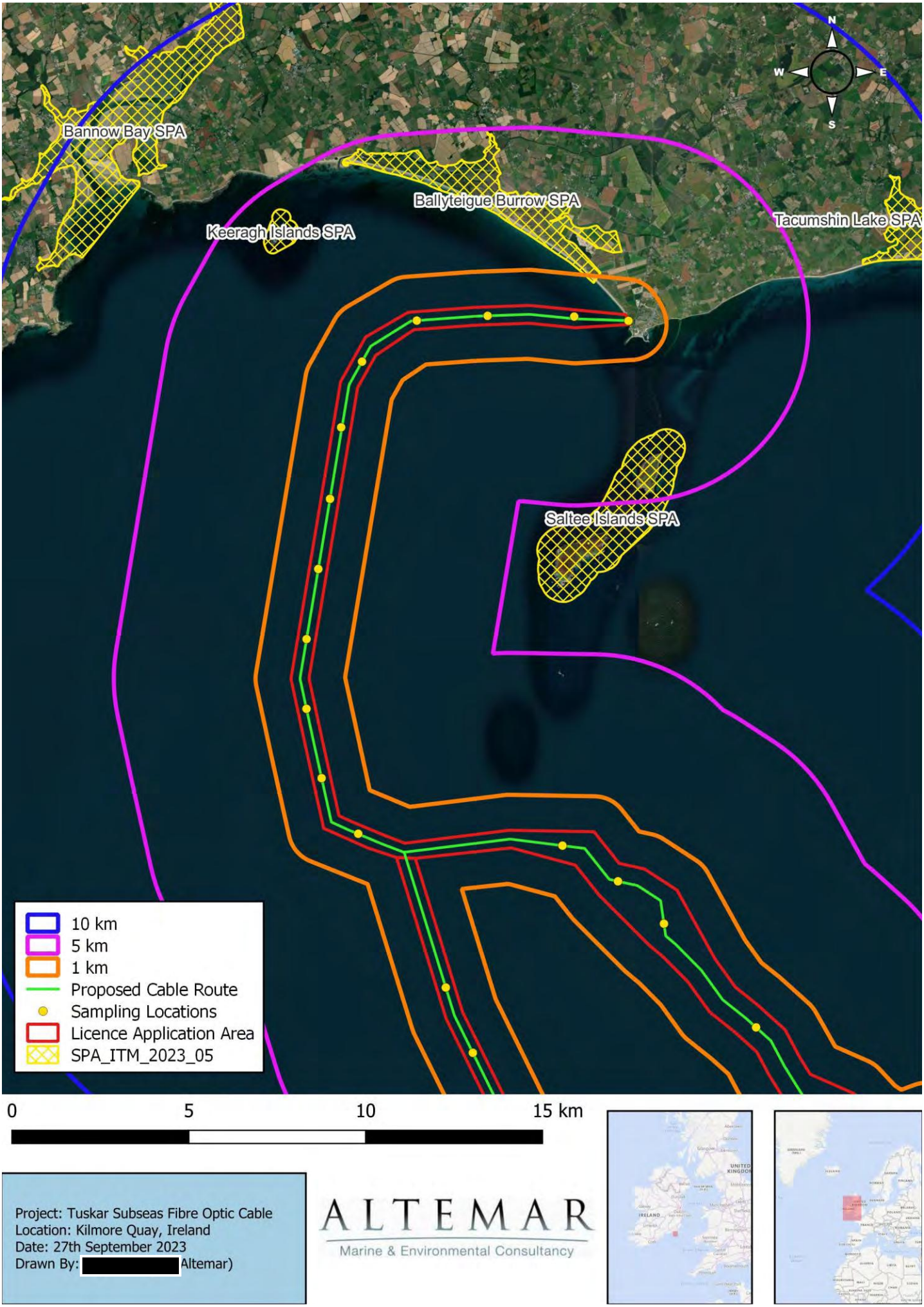


***Figure 25**. SPAs located within 5km of the proposed cable route*

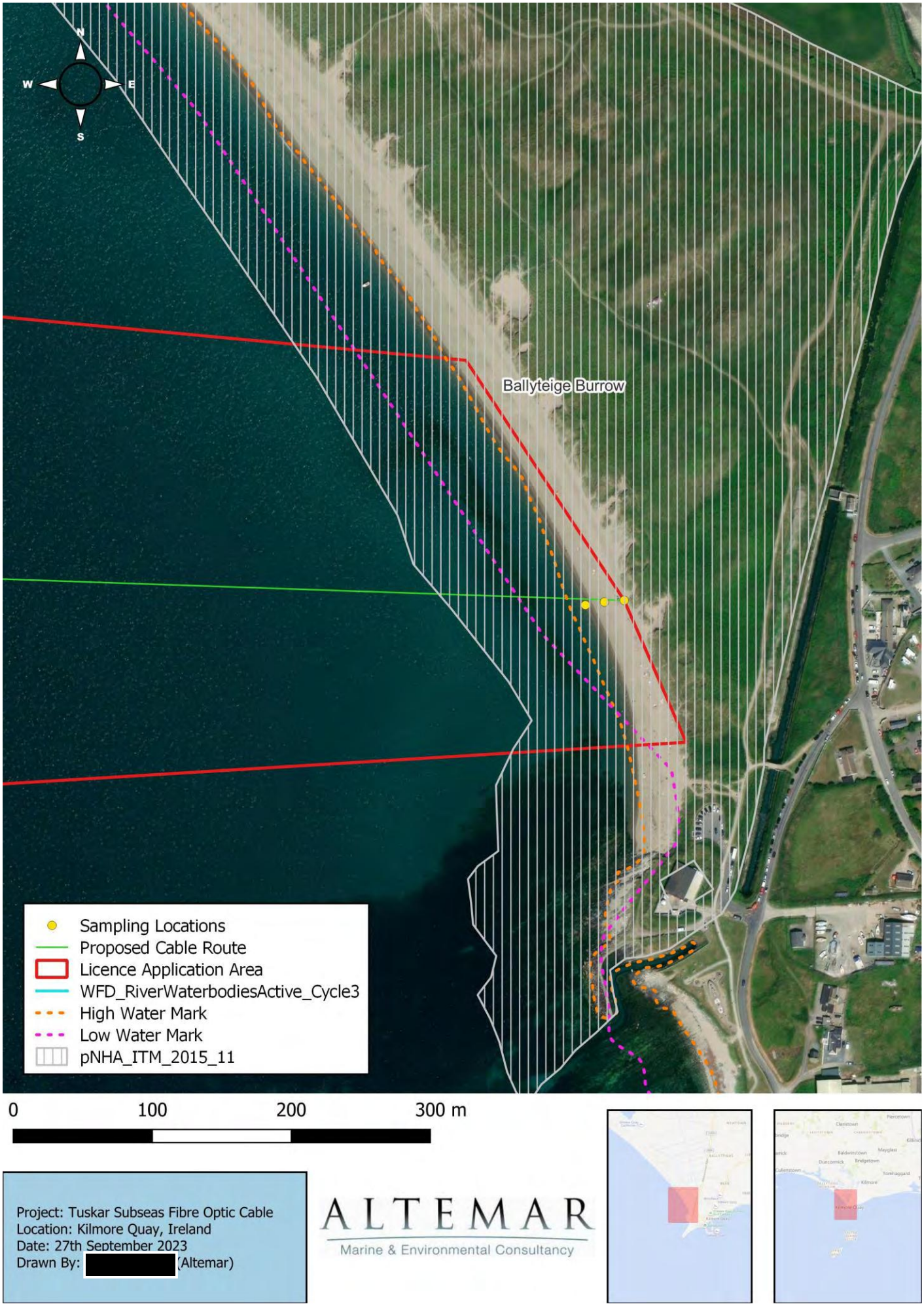


***Figure 26**. Watercourses and pNHAs within the proposed Cable Route and Licence Application Area at landfall location*

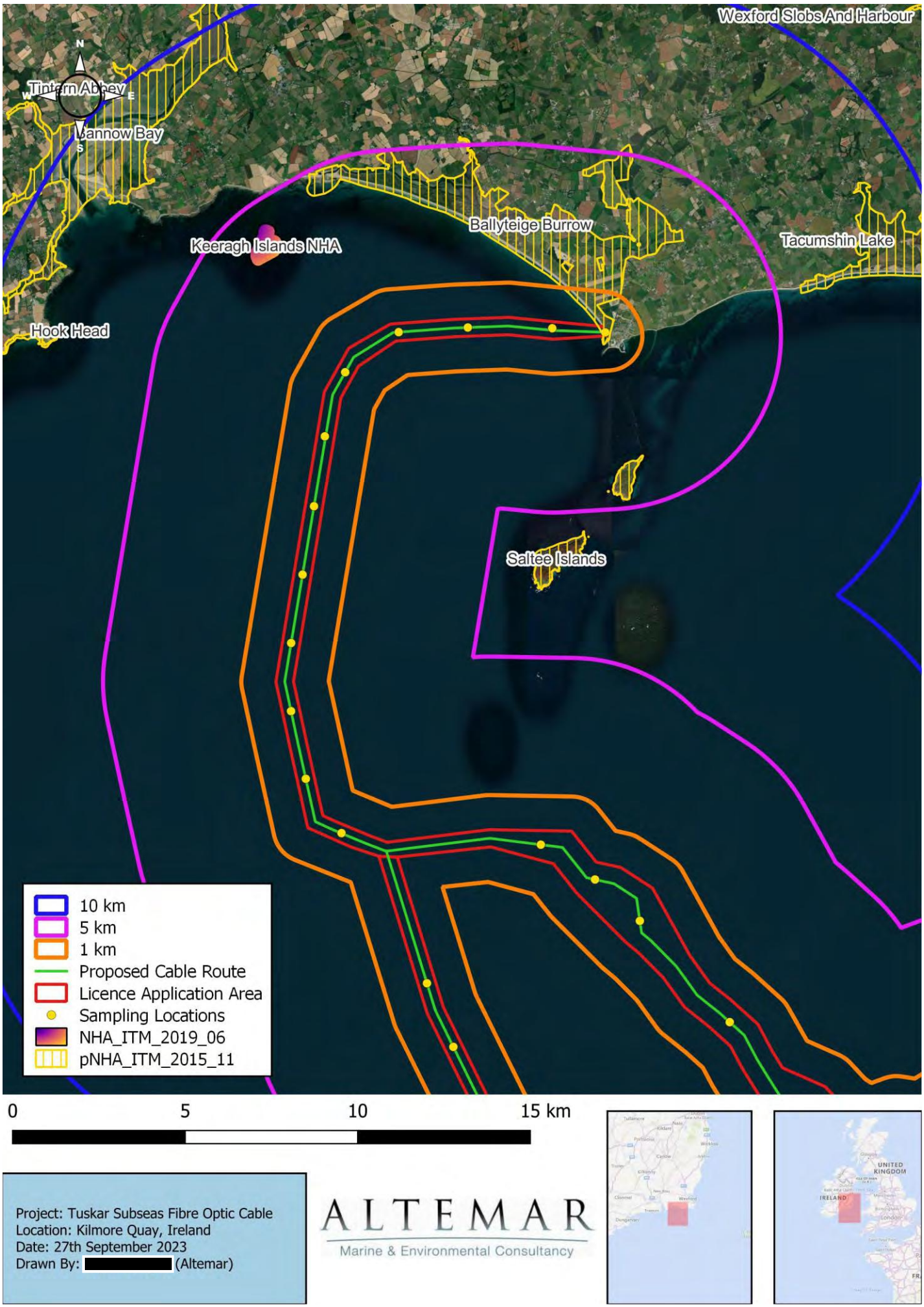


***Figure 27**. NHAs and pNHAs located within 5km of the proposed cable route*

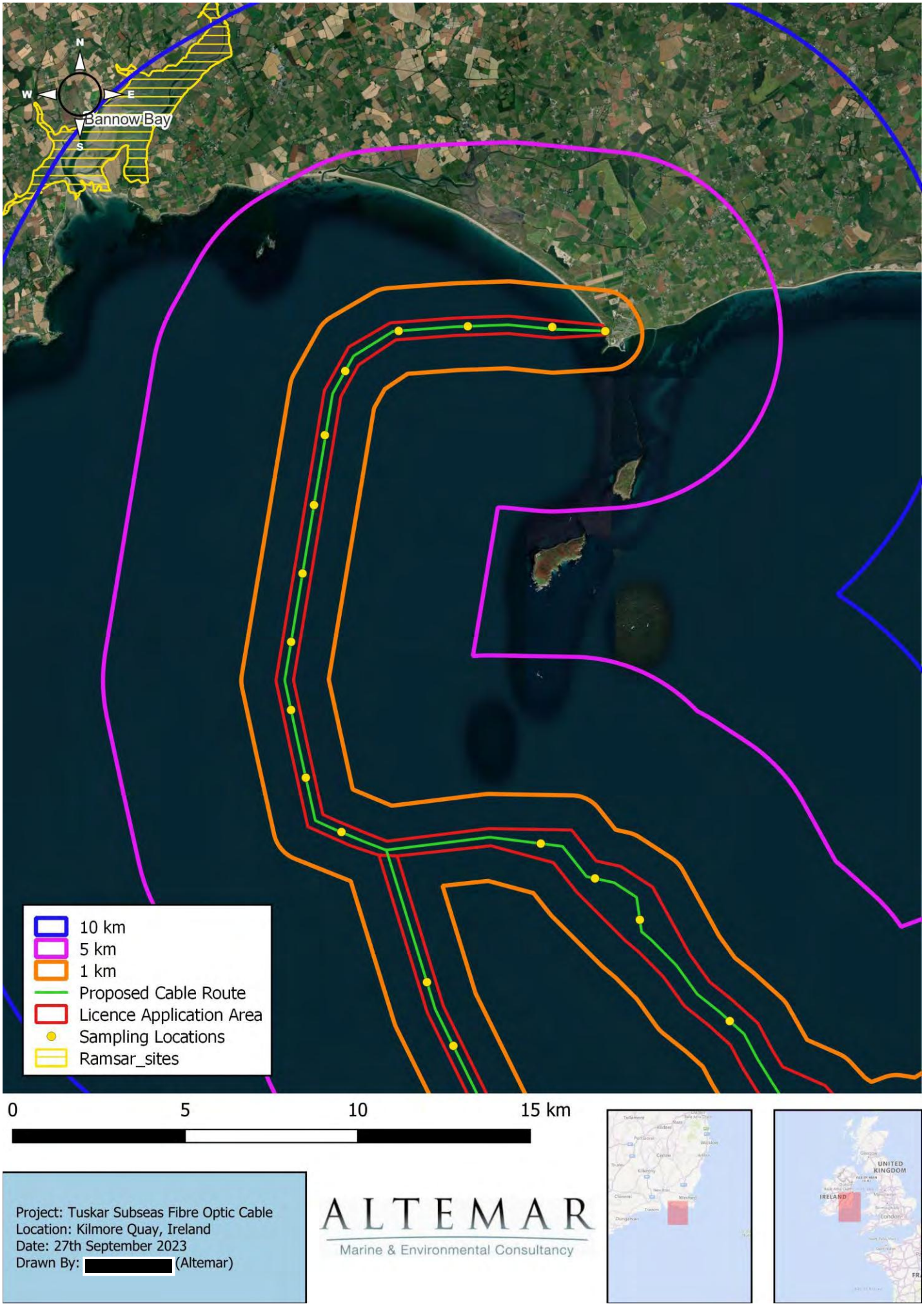


***Figure 28**. Ramsar Sites located within 10km of the proposed cable route*

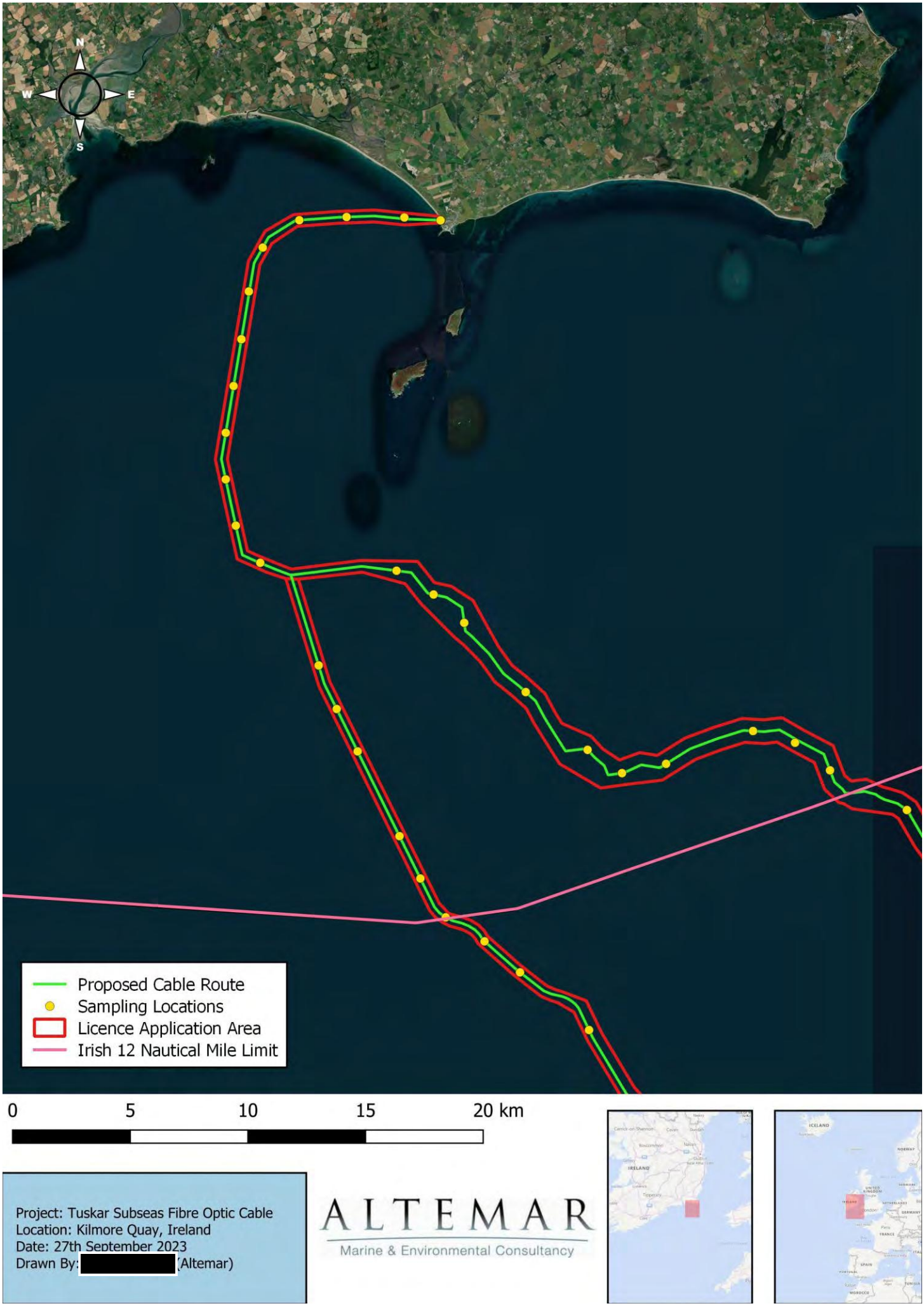


Figure 29: *Proposed Cable Route, Survey Route Corridor, and Works (to Irish 12 Nautical Mile Limit).*

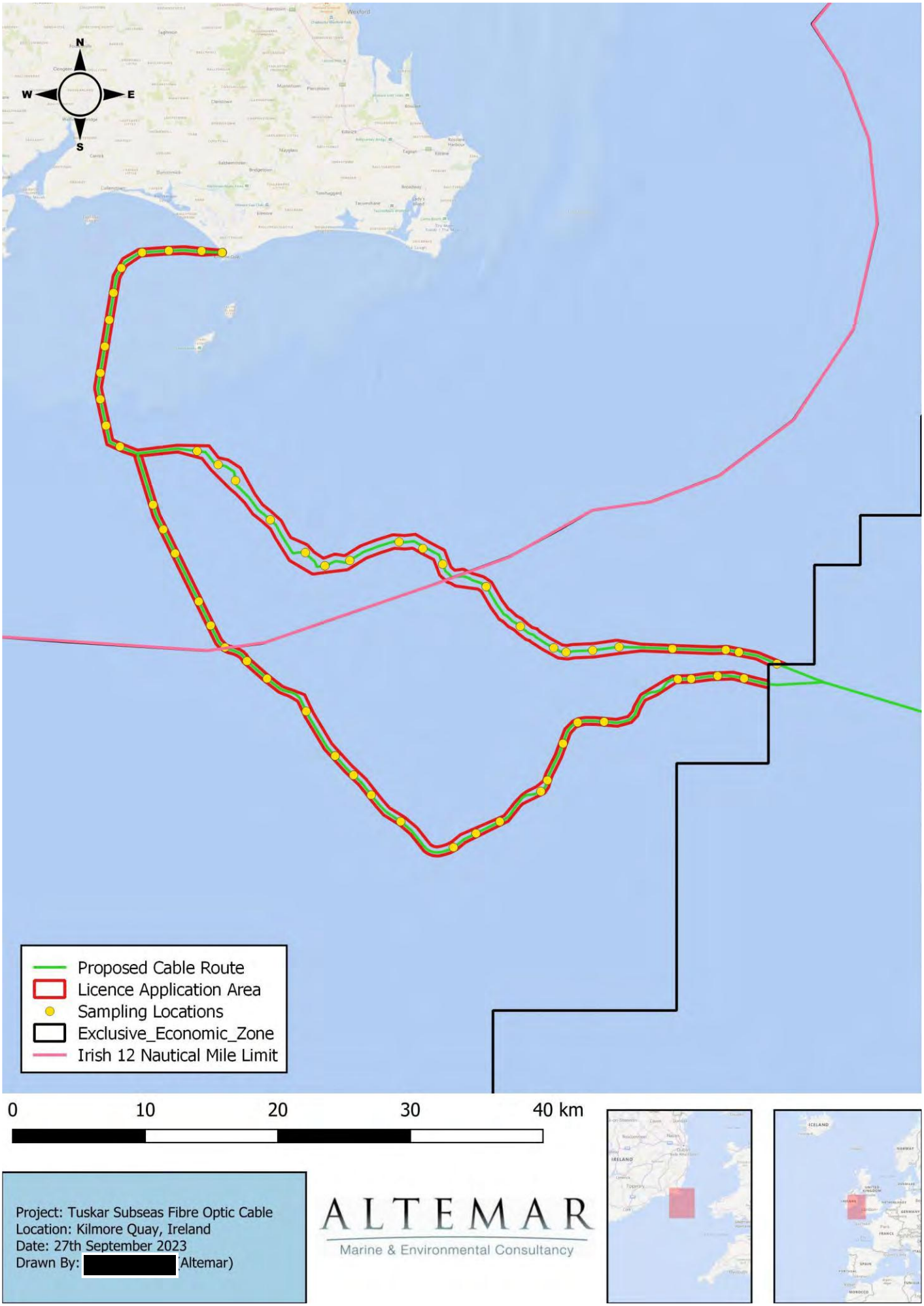


Figure 30. *Proposed Cable Route, Survey Route Corridor, and Works (to Irish Exclusive Economic Zone).*

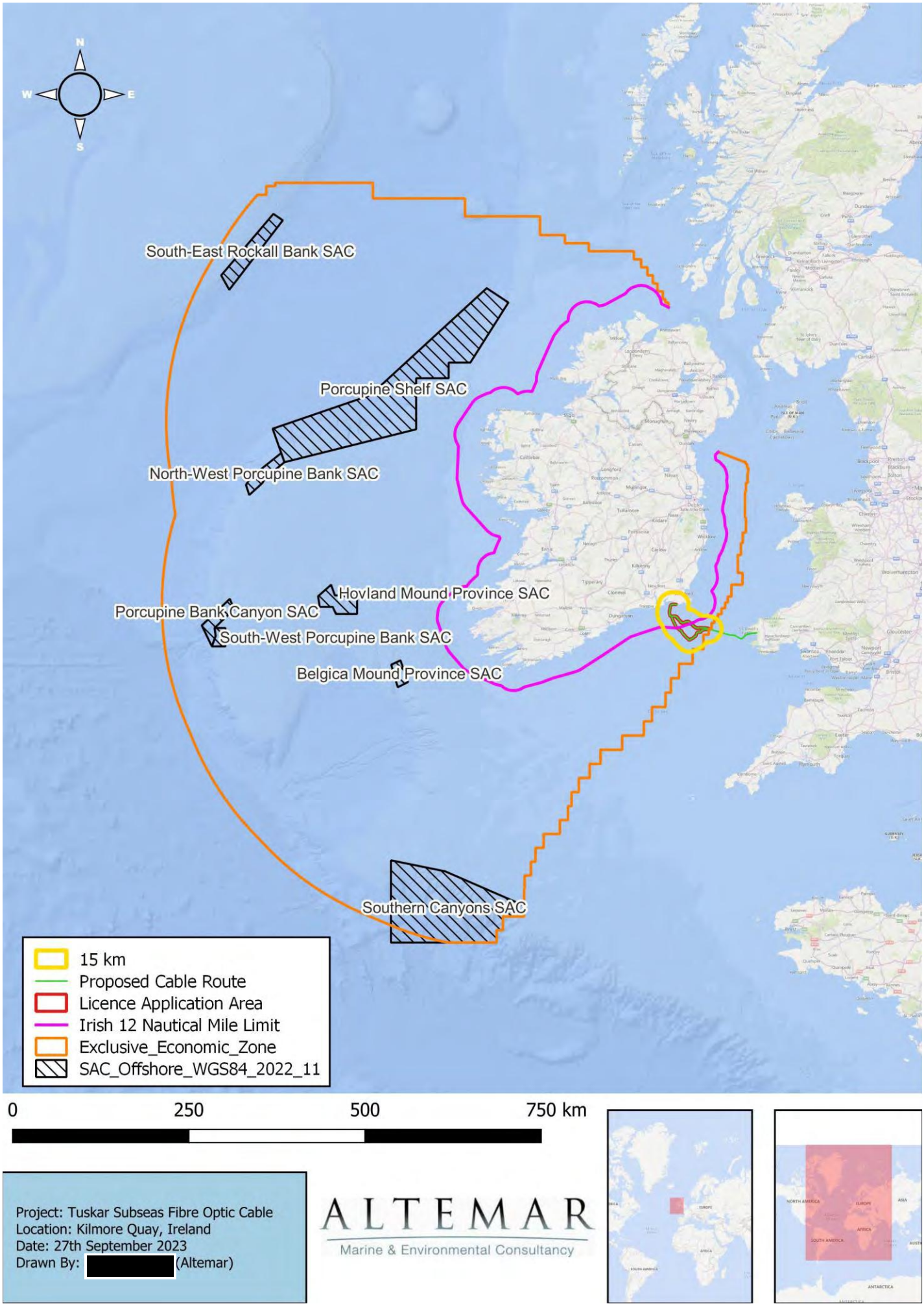


Figure 31: *Fibre optic survey route in relation to the 12 nm limit, Designated Irish Continental shelf and Offshore SAC's (no offshore SAC's in the area).*

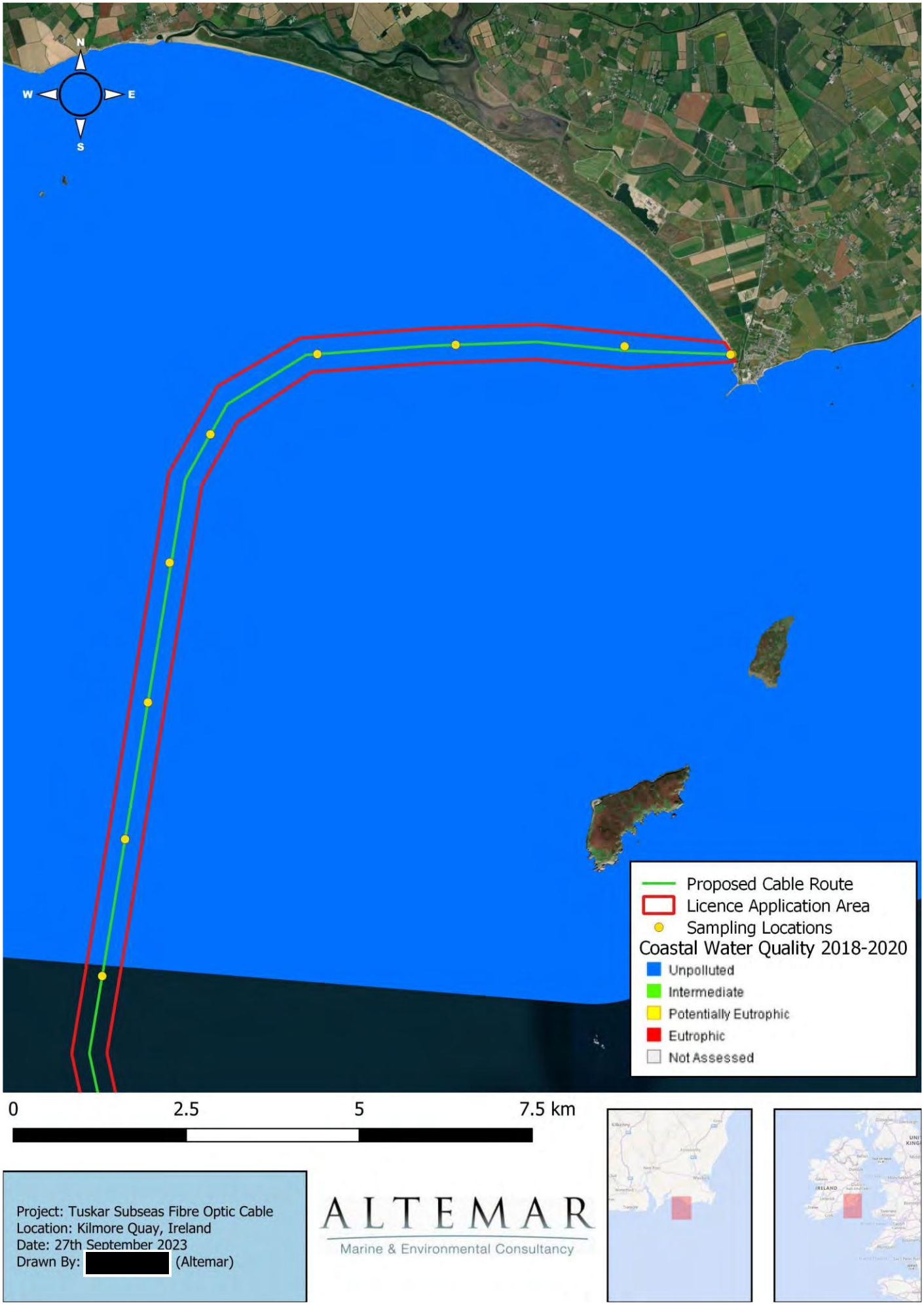


Figure 32. *Coastal waterbody quality under the Water Framework Directive (WFD)*

Habitats

Infomar seabed substrate (inshore and offshore) are seen in Figures 33 & 34 respectively. As can be seen from Figures 34 & 34 the inner shore contains a mosaic of coarse sediment and reef habitat, while the deeper subtidal consists of sand, which would be consistent with greater wave action on a moderately exposed shore in the shallower areas. The deeper areas of coarse sediment seen in Figure 34, could potential indicate areas of high current velocity. This would be further substantiated by the sand waves noted in the Infomar shaded relief image (Figure 35). The profile of the reef habitat within the Saltee Islands SAC is also noted in Figure 35. This tends to indicate that the reef habitat on the inshore element of the cable has a relatively low profile.

Habitats and Species – On-Site Fieldwork

During fieldwork (13th May 2023), habitats in the vicinity of the survey route were classified according to Fossitt (2000). Observations on species were made on a receding tide, as well as at Low Water. It should be noted that the entire project was designed in consultation with Altemar in order to limit the potential impact of the proposed project. As a result, the footprint of the proposed works is small, using existing formal terrestrial routes and does not involve the placing of machinery or personnel within the dune system. As the existing duct under the dune system will be used no terrestrial works are proposed in this area. Excavation works are proposed on the beach at the end of the duct, which is not located within the dune system.

Plate 1. Beach from the car park area (L). Area beneath car park (R).

LS2 Sand Shores

The intertidal cable route consists of Littoral Sediment- Sand shores. In the vicinity of the end of the duct and the excavation route (Plate 2) the sediment was coarse (plate 3) and appeared to be well trodden. No fauna or flora were noted along the intertidal route. However, the entire beach is classed in the conservation objectives document as Mudflats and sandflats not covered by sea water at low tide consisting of Mixed sediment to sand with nematodes and *Tubificoides benedii* community complex. However, it would be expected that *Tubificoides benedii* would be found in less mobile environments primarily. There was a drift line in this location in May 2023. Rock Samphire (*Crithmum maritimum*) was noted close to the car park. No seagrass (*Zostera sp*) was noted on site.

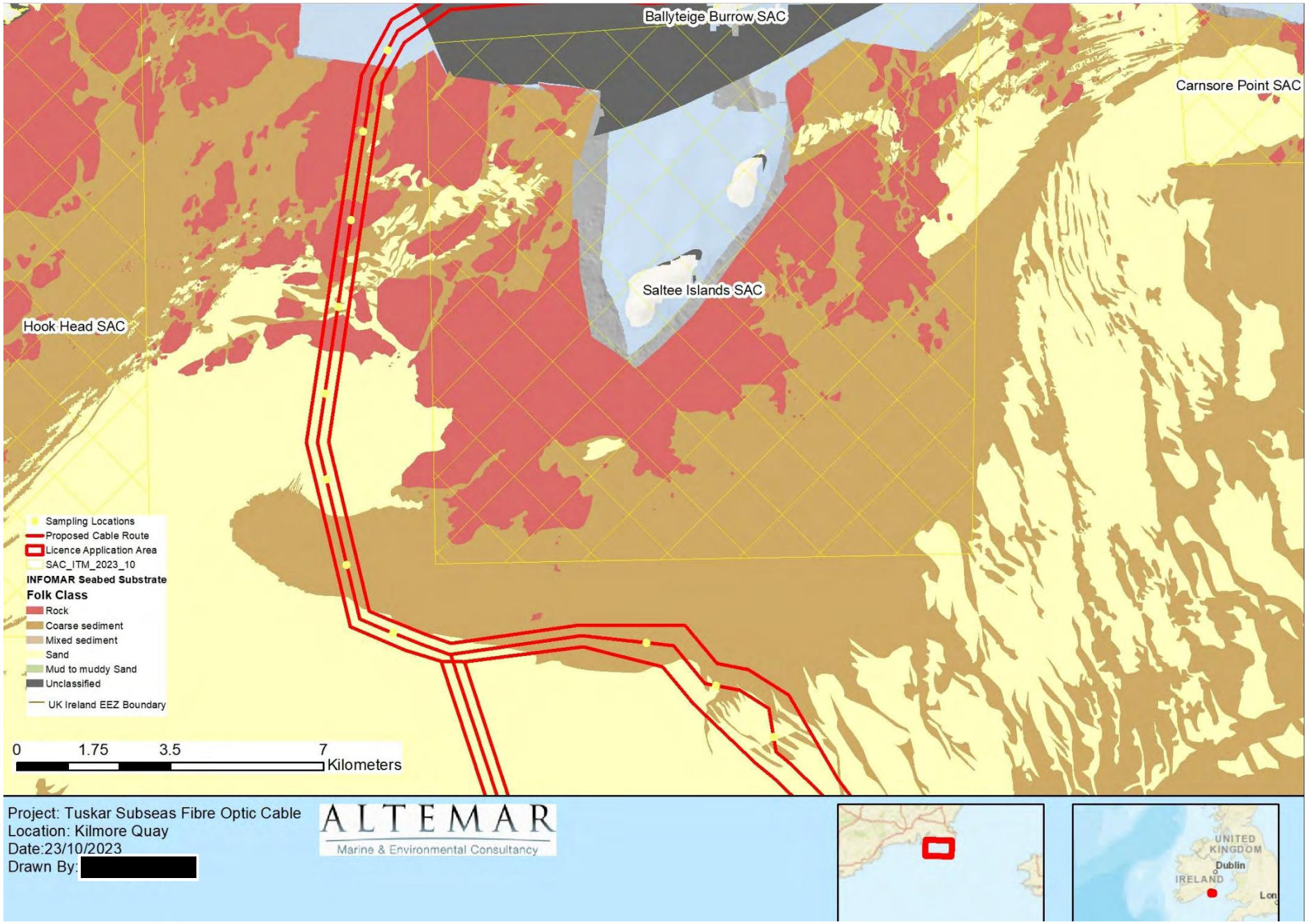


Figure 33. *Seabed substrate Inshore (Infomar)*

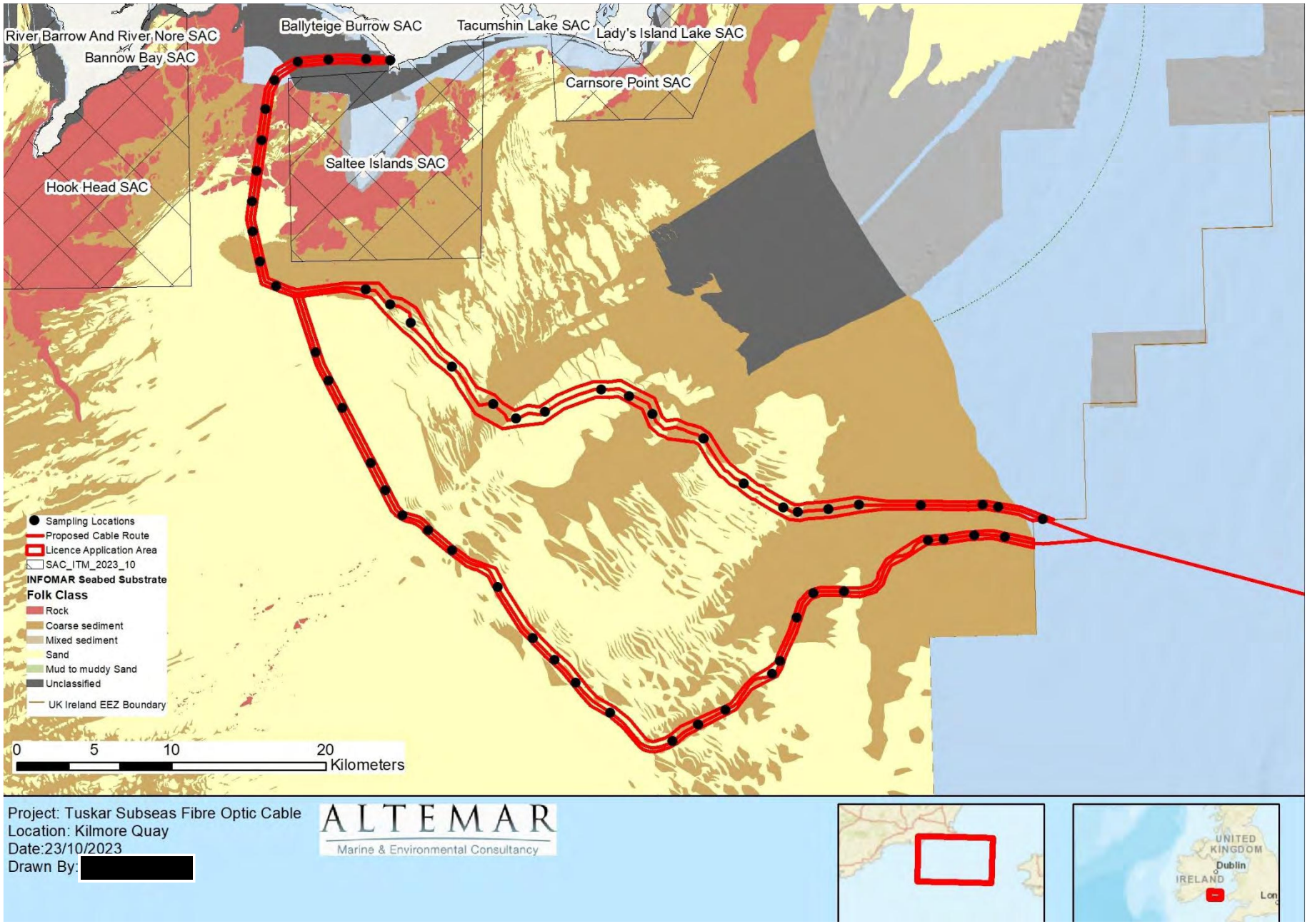


Figure 34. *Seabed substrate Offshore (Infomar)*

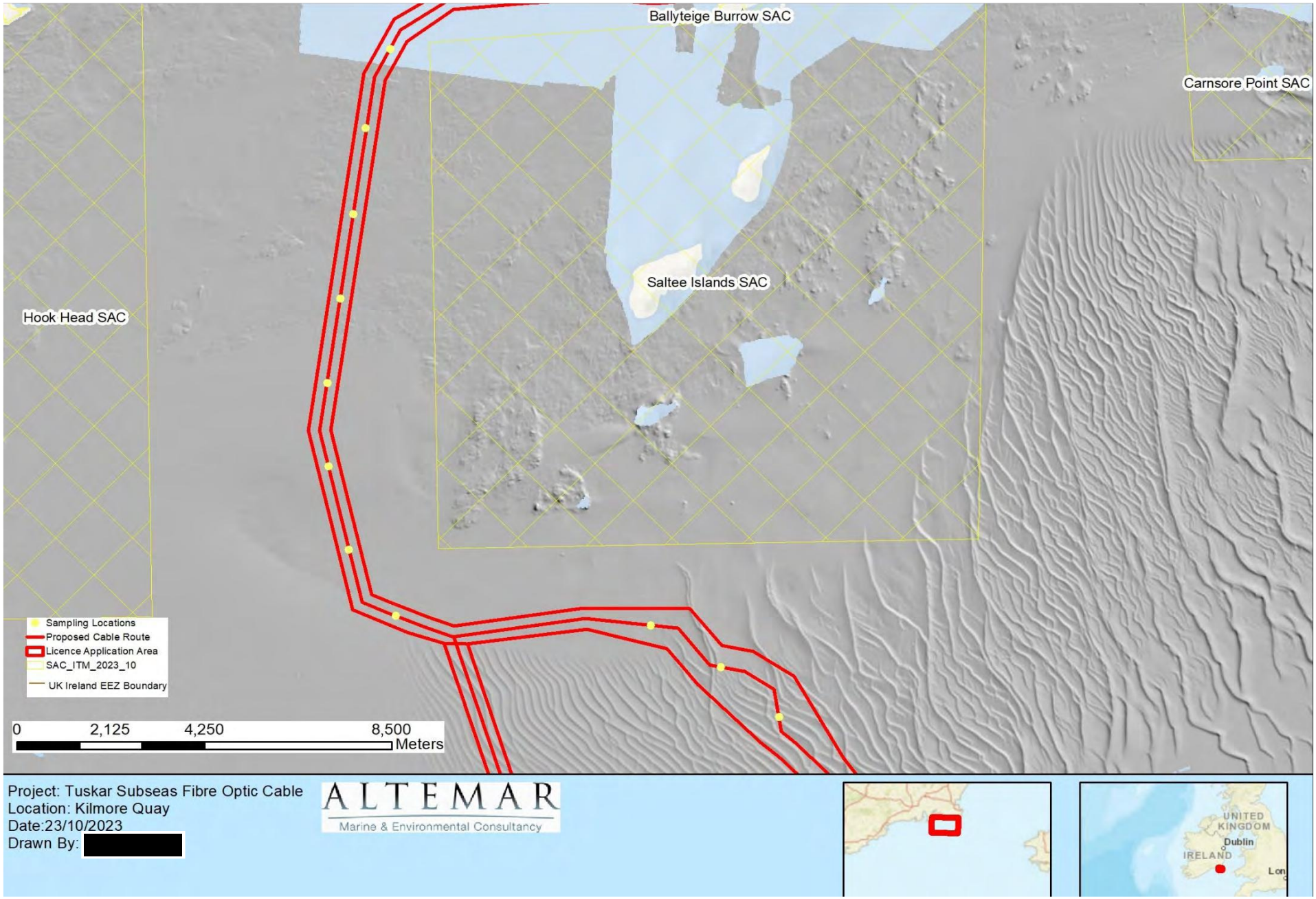


Figure 35. *Seabed Shaded relief (Infomar)*

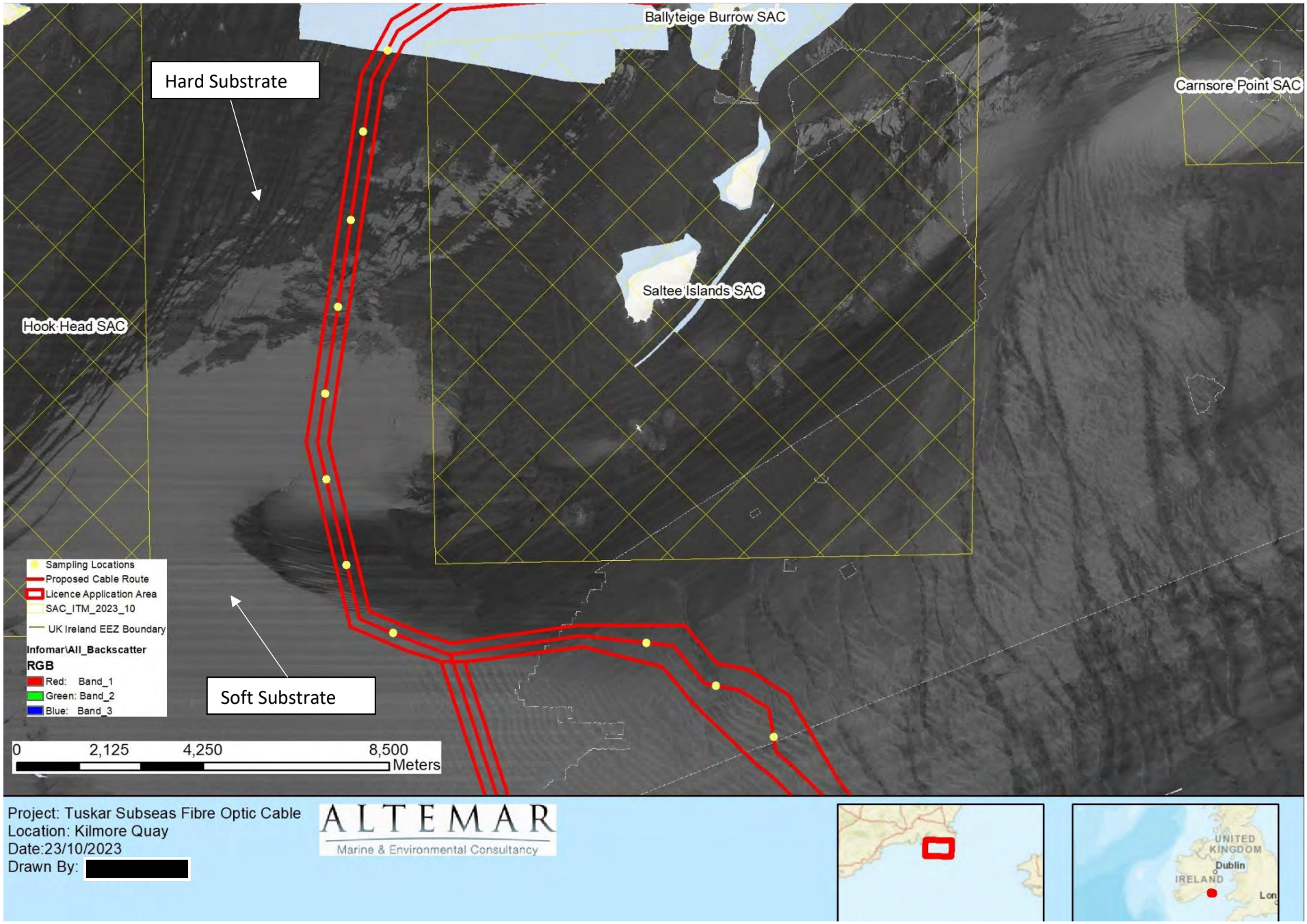


Figure 36. *Seabed backscatter (Infomar)*

Plate 3. Coarse sediment in the vicinity of the landfall area.

Plate 2. Beach in the vicinity of the landfall area Yellow indicative route).

BL-Built Land

Built land in the vicinity of the proposed works included the roads, footpaths, walls and car parking areas, (Figure 43). These areas are of low biodiversity importance and will not be impacted by the proposed works. It is proposed to use the existing duct infrastructure to go under these areas and not impact on the structural integrity of these areas.

CD2 Marram Dunes and ED2 Bare Ground

The proposed works are in the Ballyteige Burrow SAC and the dune system form an important component of the qualifying interests. Embryonic shifting dunes [2110], Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120], Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130], Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150] and Humid dune slacks [2190] are all features of interest of this SAC. Based on the conservation objectives supporting document Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') [2120] and Fixed coastal dunes with herbaceous vegetation ('grey dunes') [2130] are located in the landfall area. Species within the vicinity of the proposed project include Marram grass (*Ammophila arenaria),* Chamomile *(Chamaemelum nobile),* Scurvygrass *(Cochlearia anglica), Bracken (Pteridium aquilinum), bramble (Rubus fruticosus agg.),* Cat's-ear *(Hypochoeris radicata) and* Selfheal *(Prunella vulgaris).* No excavation are proposed in the dune systems. Works in the dune system relate to machinery and pedestrian access on existing paths and localised works in the vicinity of the existing beach manhole.

Plate 4. Existing pedestrian access to the beach

Plate 5. Existing beach manhole (not covered by dune habitat)

Species

Birds

The proposed landfall is within a SPA. It is proximate to Kilmore Quay and a public carpark and is an important area for overwintering birds. Please see main NIS document for information on the species of importance in this area. The site was visited outside of overwintering bird season. Bird species noted on site included black-headed gull (*Larus ridibundus*), little egret (*Egretta garzetta*), grey heron (*Ardea cinerea*) and pied wagtail (*Motacilla alba yarrellii*).

Amphibians

The common frog (*Rana temporaria*) was not observed in the surrounding terrestrial areas. NPWS records of rare and threatened species in addition to the NBDC sightings records were investigated and showed no records in proximity of the landfall or beach area. No streams or drainage ditches were observed in the terrestrial element of the cable route and existing terrestrial duct infrastructure will be used. No amphibians of conservation importance are recorded on NPWS data.

Terrestrial Mammals

No badger setts or evidence of terrestrial mammals of conservation importance were seen in the vicinity of the landfall area. Records of sightings of the badger, pine marten, otter and hedgehog were examined from the NBDC and NPWS rare and threatened species records showed no records in proximity of the landfall area. However, the conservation objectives supporting document highlights a 250m buffer from High Water as otter habitat within the SAC. Otters were not observed on site.

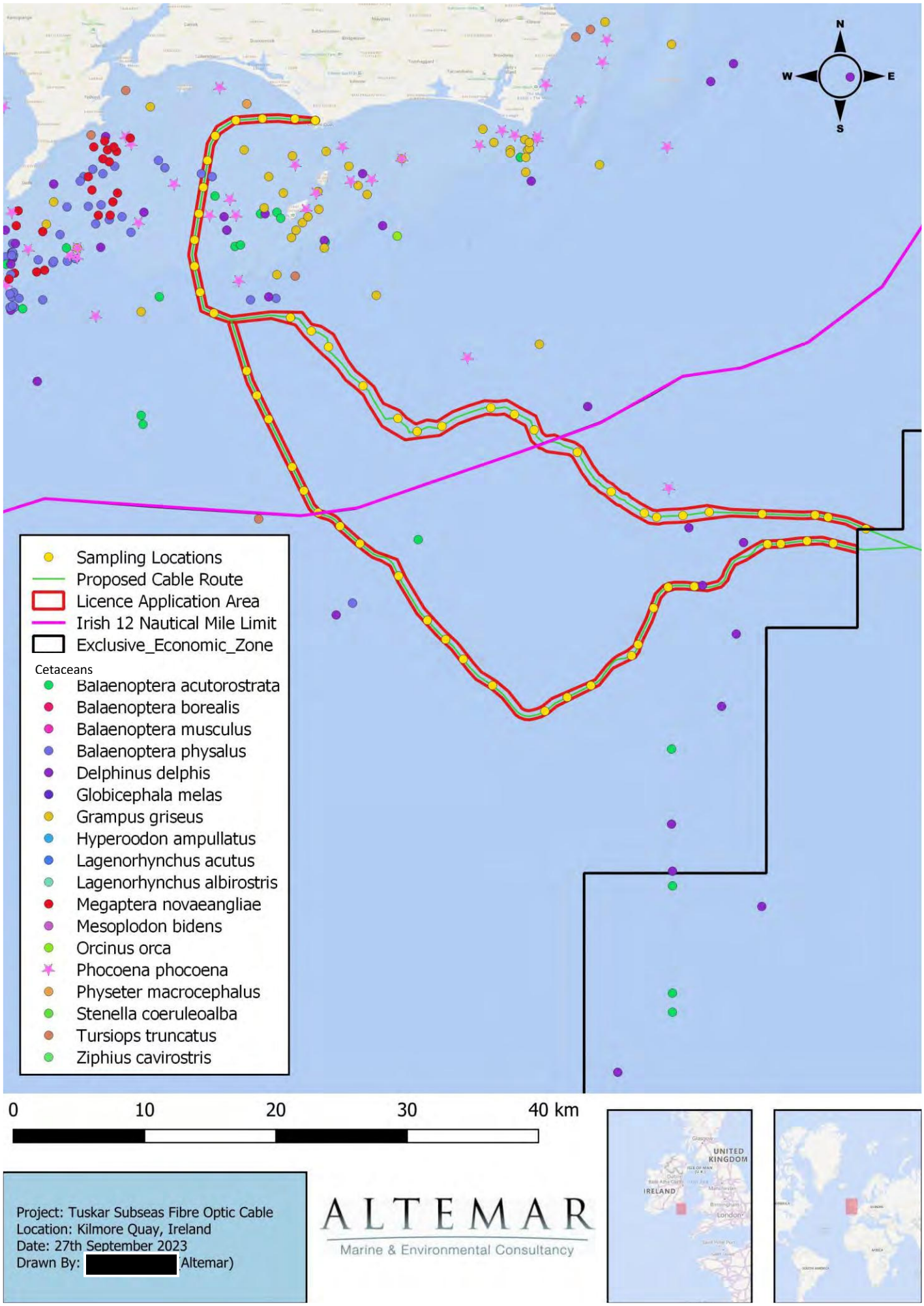


Figure 39. *Recorded Cetacean species sightings (Source NBDC sightings data) within the Irish EEZ*

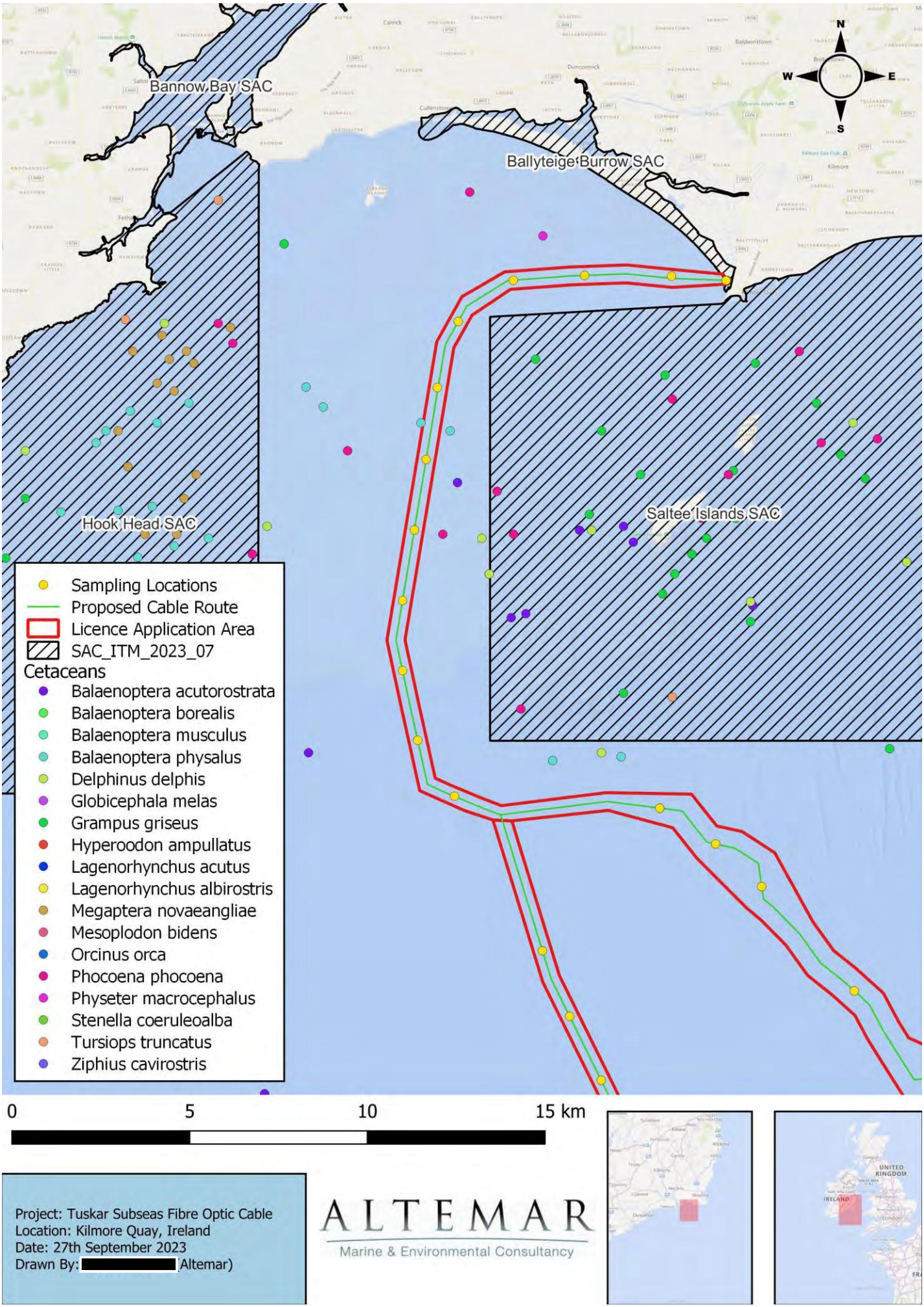


Figure 40. *Recorded Cetacean species sightings (Source NBDC sightings data) proximate to Saltee Islands*

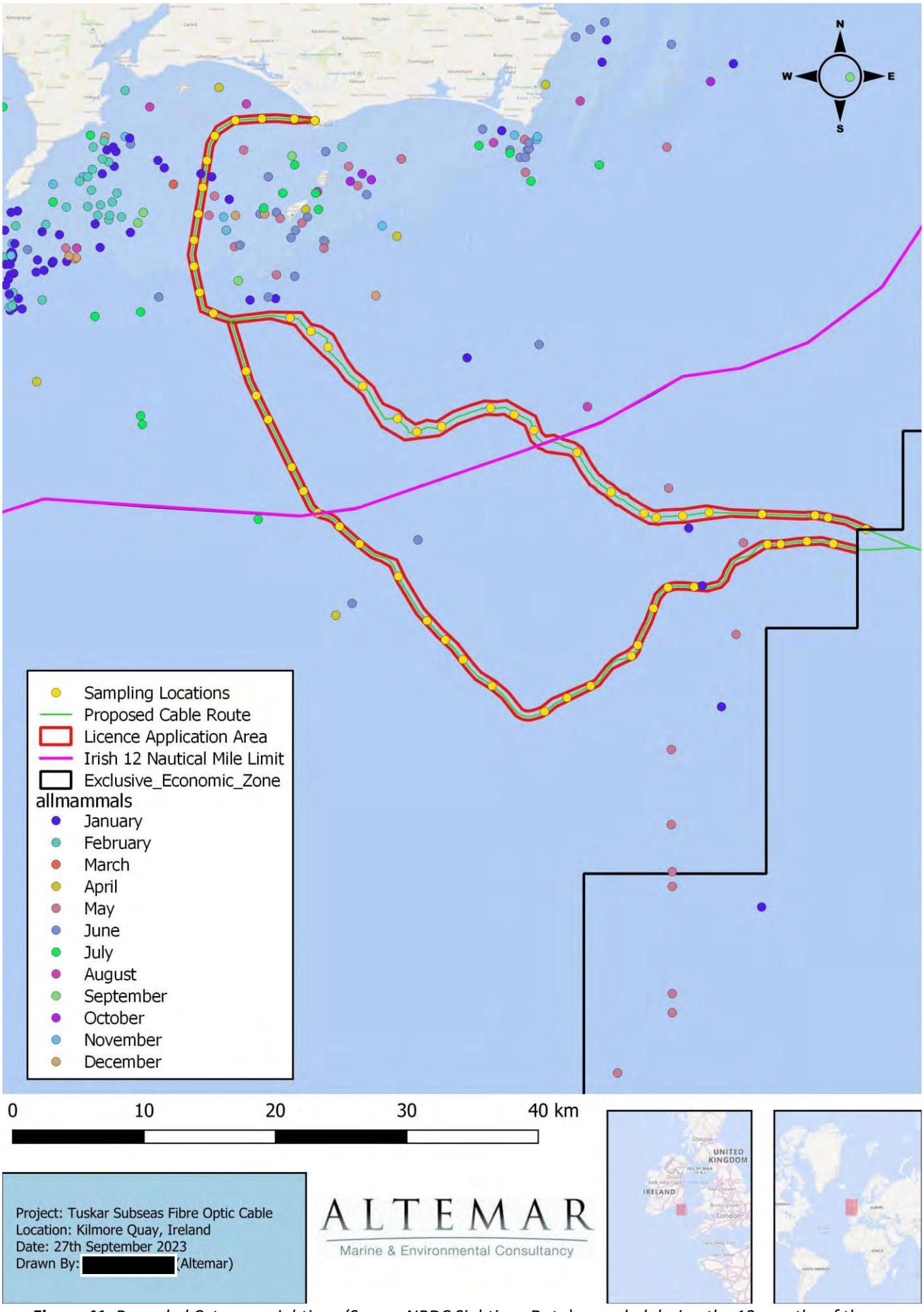


Figure 41. *Recorded Cetacean sightings (Source NBDC Sightings Data) recorded during the 12 months of the year within the Irish EEZ*

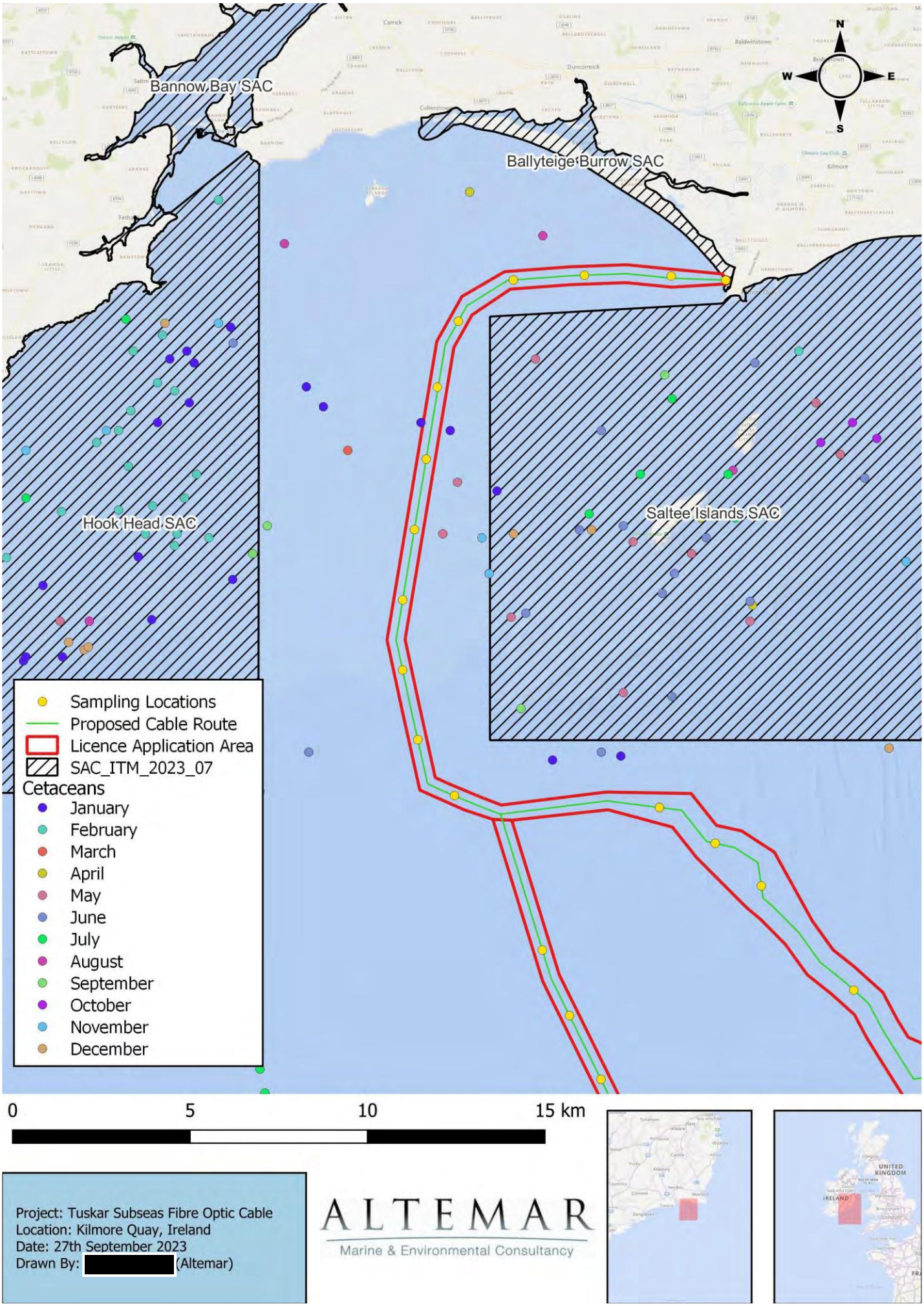


Figure 42. *Recorded Cetacean sightings (Source NBDC Sightings Data) recorded during the 12 months of the year proximate to the Saltee Islands*

Historic Records of Biodiversity

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. Appendix I provides a list of all species recorded in custom polygons drawn to the outline of the foreshore survey area and 10km grid areas that possess a specific designation, such as Invasive Species or Protected Species.

Potential Effects

The marine and intertidal survey for a subsea fibre-optic cable is a complex and challenging procedure. From the beginning of the planning stage to determining the final cable route, careful thought has gone into ensuring the longevity of the cable and uninterrupted service. This, in tandem with foreshore licencing and environmental legislation results in the routing of the cable in as stable an environment as possible that will have minimal impact on the environment and threat of anthropogenic disturbance. The marine survey is to identify the optimal route for the cable. The survey elements will involve intertidal trial pits/bar probes and acoustic/geophysical survey off shore.

The terrestrial activities will involve the movement of personnel and machinery on existing roads and car park areas. The principal elements of the terrestrial activities are the facilitation of access for machinery. Intertidal works involve excavation of trial pits and bar probed during a single falling tide on each beach. Temporary compaction would occur in localised areas, but these areas are on existing paths that have undergone compaction. The presence of machinery and personnel in the intertidal may temporally disturb wildlife. Pollution generated from machinery/construction activities could potentially impact the intertidal and terrestrial habitats. 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 11a (habitats) and 11b (species).

In the subtidal the process will involve a ship moving at a speed of approximately 4kn and generating acoustic noise with the use of acoustic equipment. In addition, geotechnical sampling will also generate localised noise but also localised disturbance of sediment. However, as the vessel will be stationary during geotechnical sampling (cores grabs etc.) this disturbance of silt will be very localised. During the acoustic survey disturbance of cetaceans may occur due to the presence of the vessel and underwater noise.

Table 11a. Potential impacts on habitats during construction.

Habitat	Fossitt	Habitats Directive	Rating	Survey effects	Impact Significance in the absence of mitigation.
Moderately Exposed Infralittoral Rock	SR2	"Reef - 1170"	A	No geotechnical surveys will be carried out on reef habitat. Each site will be assessed by echosounder prior to deployment. Acoustic, geophysical surveys will not impact on this habitat.	Neutral/ localised/short-term/not significant. No mitigation is required.
Moderately Exposed Circalittoral Rock	SR5	"Reef - 1170"	A	No geotechnical surveys will be carried out on reef habitat. Acoustic, geophysical surveys will not impact on this habitat.	Neutral/ localised/short-term/not significant. No mitigation is required.
Sand Shores	*LS2*		A	Temporary displacement of birds may occur in the vicinity of the works. However, the beach is a highly disturbed by human and canine activity. Short term impacts would be expected on infauna due to compression/ redistribution of sediments. The beach is moderately exposed and consist of coarse sand and faunal densities would be expected to be very low. There is potential for pollution on site. Mitigation measures are required.	Minor Adverse/ localised/short-term/not significant. Mitigation is required.
Circalittoral gravels and Sands	SS5		D	Temporary disturbance will occur during geotechnical sampling. Short term impacts would be expected on infauna due to compression/redistribution of sediments. No mitigation measures are required.	Minor Adverse/ localised/short-term/not significant.
Circalittoral Mixed sediments	SS8		D	Temporary disturbance will occur during geotechnical sampling. Short term impacts would be expected on infauna due to compression/redistribution of sediments. No mitigation measures are required.	Minor Adverse/ localised/short-term/not significant.
Built Land	BL		E	Works and including access will not impact on build land.	Neutral

Table 11b. Potential impacts on species during construction.

Species	Rating	Survey Effect	Impact Significance
Mammal-Cetaceans		A detailed section on the impact of the proposed survey follows this table. Subtidal survey 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 survey works on the sea floor. Vessel speeds are slow (4kn). Lurton (2016) modelled the sound field radiated by multibeam echosounders for acoustical impact assessment. He 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." Mitigation measures are required. The operations would comply with the NPWS (2014) "Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters".	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required.
Mammal-Seals	A	A detailed section on the impact of the proposed survey follows this table. Subtidal survey works may be carried out in vicinity of seals. Localised disturbance may occur due to the presence of the vessel and acoustic noise generated from survey works on the sea floor. Vessel speeds are slow (4kn). Lurton (2016) modelled the sound field radiated by multibeam echosounders for acoustical impact assessment. He 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." Mitigation measures are required. The operations would comply with the NPWS (2014) "Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters".	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required.
Mammal-Bats	A	There was no evidence of bat species at this site. Survey works in the intertidal will be carried out during daylight hours and will not involve additional lighting or noise after dusk. It will not impact on the food source for bat species or habitats important for roosting.	Neutral
Mammals-Terrestrial	A-D	Survey works will be carried out during daylight hours and any impacts would be primarily due to disturbance. There was no evidence of terrestrial mammal species at this site. However, otter could be present in the marine environment close to the shore. Mitigation measures are required in relation to mammals.	Minor Adverse/ localised/short-term
Birds-Over wintering	A	Survey works in the intertidal will be carried out during daylight hours and high tide when mudflats are covered. Impacts would be primarily due to disturbance. Based on the Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning & Construction Projects designed by Cutts et al. (2013)[1] the maximum likely distance at which disturbance will impact SCIs from this SPA is 300m (Cutts et al.,2013) from the proposed survey boundary. There	Minor Adverse/ localised/short-term/Not significant.

[1] https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/filer_public/8f/bd/8fbdd7e9-ea6f-4474-869f-ec1e68a9c809/11367.pdf

Species	Rating	Survey Effect	Impact Significance
		are no SPAs located within 300m of the proposed terrestrial survey works. The intertidal and terrestrial works are on a popular beach with a car park and existing human and dog walking activity. No significant noise impacts on protected bird species are predicted from the proposed survey works.	Mitigation measures are required.
Birds-residential	D	Survey works in the intertidal and terrestrial area will be carried out during daylight hours and impacts would be primarily due to disturbance. The works are in an existing highly disturbed environment.	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required.
Amphibians-Frogs	B	The intertidal or subtidal area is not a habitat for amphibian species. Amphibians were not noted in the dune habitat. An ecologist will be on site to ensure species of conservation importance are not impacted.	Neutral
Terrestrial Flora	A-D	The terrestrial element of this project is solely in on existing build land. However, dune habitats are proximate to the site. Mitigation including supervision are required to ensure that this terrestrial flora are protected.	Minor Adverse/ localised/short-term/Not significant. Mitigation measures are required
Marine algae	D	Intertidal marine algae are not located proximate to the proposed survey works. Subtidal marine algae are primarily associated with hard substrata and will not be impacted by the proposed survey works. Subtidal geotechnical works (cores, grabs etc.) will not be in bedrock areas.	Neutral
Fish Species	A	Localised disturbance of marine species may occur due to survey activities. Vessel speeds are very slow and significant impacts on fish would be expected to be avoided during works. Important fishing areas and fishery areas are seen in Appendix II.	Minor Adverse/ localised/short-term. No mitigation measures are required.
Reptiles	A	There is an extremely remote possibility that the leatherback turtle may be present at the time of survey works. Mitigation including supervision are required to ensure turtles are protected.	Minor Adverse/ localised/short-term. Mitigation measures are required.

Potential effects 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.

The proposed survey would be expected to impact on cetaceans primarily through the emission of noise due to the vessel and from survey equipment including multibeam. 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*.' Multi-beam can be defined as Low frequency (<1 kHz), Mid-frequency (1-10 kHz) and High Frequency (>10 kHz).

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 12.

Table 12. *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. australis); 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 13). 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 14). The updated figures for PTS and TTS for are outlined in Table 15.

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.

Table 13. 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 14. 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 15. 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-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

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 survey equipment and the noise frequency emissions are seen in Table 16.

Equipment Type	Purpose	Frequency Range	Duration	*Maximum* Source Pressure Level (re 1µPa at 1 m)	Reference
Multibeam Echo Sounder (MBES)	Measure detailed bathymetry by transmitting sound pulses (active sonar).	200 kHz to 500 kHz	0.05 - 10 ms	210 - 245 dB.	Danson 2005, Hopkins 2007, DECC 2011, Lurton and DeReutier 2011, Lurton 2016, BEIS 2020, Crocker & Fratantonio 2016
Side Scan Sonar (SSS)	Determine surficial nature of the seabed and detect objects by transmitting sound pulse.	200 kHz to 700 kHz	0.4 - 1.0 ms	200 - 240 dB.	BOEM 2016, BEIS 2020, DAHG 2014, Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Pinger	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 15 kHz	0.5 - 30 ms	214 dB.	Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Chirper	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	2 kHz to 13 kHz	5 - 40 ms	185 - 215 dB.	Crocker & Fratantonio 2016, Hartley Anderson 2020
Sub-bottom Profiler (SBP) - Boomer	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	500 Hz to 15 kHz	0.5 - 1.0 ms	205 - 215 dB.	Crocker & Fratantonio 2016
Sub-bottom Profiler (SBP) - Parametric	Identify different geological layers encountered in the shallow sediments and sediment thicknesses beneath the seabed.	4 to 15 kHz, 85 to 115 kHz	0.2 - 30 ms	238 - 247 dB. 200 - 206 dB.	Hartley Anderson 2020
Ultra-Short Base Line (USBL)	Subsea positioning.	20 kHz to 50 kHz	5 - 10 ms	194 - 207 dB.	Kongsberg
Magnetometer	Identify ferrous anomalies for metal obstructions, shipwrecks, etc. on and under the seabed.	Passive	N/A	Passive	N/A
Survey Vessels	Carry out the survey and deploy the equipment.	50 Hz to 300 Hz	N/A	160 - 190 dB.	DECC 2011

Table 16a. Details of the proposed types of acoustic equipment which emit sound.

Equipment Type	Purpose	Number of locations within Application Area (up to)	Frequency Range	*Maximum* Source Pressure Level (re 1µPa at 1 m)	Reference
Cone Penetration Test (CPT)	Determine geotechnical engineering properties of seabed sediments.	26	28 Hz	118 - 145 dB.	BOEM 2012, EIRGRID 2014
Gravity Corer	Retrieve a seabed sediment sample by penetrating seabed with a steel core barrel under self-weight	19	N/A	N/A	N/A
Vibrocorer	Retrieve a seabed sediment sample by penetrating seabed with a vibrating steel core barrel	19	30 Hz	187.4 dB.	LGL 2010
Grab Samples	Collect small sediment samples from seabed surface with clamshell mechanism	17	N/A	N/A	N/A

Table 16b. Details of the proposed types of geotechnical sampling.

The cetacean species observed in the survey area are high frequency, mid-frequency and low frequency cetaceans. Grey and Common Seals may also be present. The proposed survey equipment and the noise frequency emissions are seen in Table 16. The high frequencies emitted from the equipment are above the auditory range of the mid frequency (150Hz-160 kHz) but within the hearing range of high frequency cetaceans (275Hz -160kHz)- observed and on the proposed survey area.

The Multibeam Echo Sounder (MBES) (200 kHz to 500 kHz) and Side Scan Sonar (SSS)(200 kHz to 700 kHz), single beam echo sounder and Multi Beam Echo Sounder (MBES) will emit noise above the hearing frequency of marine mammals. The hull mounted Sub-bottom Profiler (SBP) – Pinger (2 kHz to 15 kHz) and Sub-bottom Profiler (SBP) - Chirper(2 kHz to 13 kHz), Sub-bottom Profiler (SBP) - Boomer (15 to 500 Hz), Sub-bottom Profiler (SBP) – Parametric (4 to 15 kHz, 85 to 115 kHz) and Ultra-Short Base Line (USBL) Subsea positioning. (20 kHz to 50 kHz) emits low and mid frequency noise, within the auditory range of all marine mammals including harbour porpoise, grey seal and harbour seal. However, all of the equipment (peak noise) at 1m from source emit noise above the onset of PTS for non-impulsive sounds for high, medium, low frequency cetaceans and Phocid Pinnipeds outlined by NOAA (2018) was 173 dB, 198 dB, 199 dB and 219dB respectively and the 198dB proposed injury levels indicated by Southall et al. (2019). As a result negative impacts may be foreseen if marine mammals are close enough to the equipment to receive sound levels above this indicative threshold. As outlined in Table 10 the inshore Geophysical Survey will be undertaken in 3 to 4 days (weather and sea state dependent) and the offshore Geophysical Survey in 14 to 18 days (weather and sea state dependent).

Lurton (2016) modelled the sound field radiated by multibeam echosounders for acoustical impact assessment. He 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."

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. 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. In addition, vessel speeds are extremely slow which would give marine mammals ample opportunity to move from the area.

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."

The difference in nomenclature between NOAA 2018 and Southall (2019) is that NOAA (2018) 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. australis) 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.

Mitigation Measures & Monitoring

Specific controls will be 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 in below.

Minor short-term impacts may result as a consequence of the survey phase 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 noise disturbance and the potential for pollution within the marine environment.

Disturbance

The proposed survey route is within an area of existing vessel traffic in Kilmore Quay and the intertidal element is on a popular beach with a car park and existing human and dog walking activity. As a result, the presence of additional personnel on the shore, intertidal and subtidal would not cause a significant additional disturbance. However, there is potential for disturbance of the sandflats and as a result the following mitigation measures would be carried out:

1. An ecologist would be onsite during the surveys within the terrestrial/intertidal and subtidal within Kilmore Quay in order to minimise disturbance and ensure site integrity is maintained.
2. Drift lines and vegetation on the shore in close proximity to the proposed route would contain the highest proportion of potential food source for bird species. If present, these should be avoided by machinery and personnel.
3. Any temporary access arrangements or structures that are put in place to allow machinery access to the shore area will be prepared in consultation with an ecologist and the site should be fully reinstated post works.

Reinstatement

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

Subtidal

Mitigation impacts are primarily concerned with the survey and the following mitigation measures would be enforced.

1. Mitigation measures will include the presence of a MMO onboard the survey vessel. The purpose of the MMO is to ensure that there is no disturbance of seal /cetacean populations.
2. The NPWS Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters' (NPWS, 2014) should be followed throughout the survey.
3. The MMO/ecologist will ensure that mitigation measures are carried out. Sufficient resources should be made immediately available on the survey vessel to deal with accidental oil spills including hydraulic hoses bursting etc. and reported to the on-board ecologist.
4. The vessels operating within Kilmore Quay will be inspected by the ecologist for pollution sources. Any pollutions sources identified by the ecologist to form a risk to the European Sites will be rectified immediately before works commence/recommence. The ecologist will maintain a watching brief in relation to pollution risks and observations. A spill kit will be on board the vessel.

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

Standard and specific mitigation measures are proposed. These would ensure that any of the proposed survey works do not adversely affect any of the habitats or fauna inhabiting them throughout the duration of the survey works exclusively. However, early implementation of ecological supervision and consultation with NPWS, prior to surveying, 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 survey works of the proposed project on terrestrial or 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 terrestrial biodiversity and 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 survey does not have environmental impacts and significant impacts on local biodiversity.

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

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 in-combination effects within the ZoI that may occur as a result of the proposed project, during and post works were assessed. The proposed landfall cable survey works are in a populated area and is a popular destination for the local community. It is a location with a regular stream of dog walkers and pedestrians on the shore. The proposed survey works would not be seen to have an impact on water quality of the area including impacting the water quality status. The intertidal section of this project will involve trial pits (in SAC/SPA/pNHA & Ramsar site) and machinery that will enter the upper shore (within the conservation sites).

The following is a list of planning applications as identified on the Department of Housing, Local Government and Heritage's 'National Planning Application Database' portal:

Table 13. In combination effects evaluated.

Ref. No.	Address	Proposal
20210079	Ballask (ED Kilmore), Kilmore.	Permission for the construction of 1) an All Weather Outdoor Training facility and associated lighting, 2) an All weather walking track and associated lighting and 3) all associated site works at Kilmore GAA grounds.
20191633	Crossfarnogue, Nemestown, Beak, Ballyteigue and Libgate, Kilmore.	Ten year planning permission to construct a new wastewater treatment plant in Kilmore Quay in two phases. Phase 1 (A) Wastewater treatment plant (WwTP) with a capacity of 850 population equivalent (PE) at Nemestown; (B) 2 No. wastewater pumping stations (WwPS) at Crossfarnogue; (C) 8.5 kms of pipeline Irish Water intends to deliver this phase within 5 years. Phase 2 construction of modular expansion to the WwTP to provide a treatment capacity up to 1,900 PE. A Natura Impact Statement accompanies this planning application.
20170534	Crossfarnogue, Kilmore.	Permission for extension to front of existing factory comprising the erection of single storey loading bay.

These potential future offshore developments are discussed with regard to the planned survey in the following sections. These have been detailed previously in the report.

Table 14. Foreshore licence applications in vicinity of survey works

Reference	Title	Year	Location	Activity	Status
FS007445	Blackwater Offshore Wind – Marine Surveys	2022	Wexford	Marine Surveys	Applied
FS007472	Mac Lir Offshore Wind Limited Site Investigations for proposed Offshore Wind Farm	2022	Wicklow, Wexford, Dublin	Site Investigations	Applied
FS007488	Celtic Offshore Renewable Energy Site Investigations for proposed Offshore Wind Farm	2022	Wexford and Waterford	Site Investigations	Applied
FS007436	Voyage Offshore Array Limited Site Investigations for proposed Wind Farm	2022	Waterford and Wexford	Site Investigations	Applied
FS007464	Bore Array Offshore Wind Farm	2022	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	Consultation
FS007232	DP Energy – Latitude 52 Offshore Windfarm Ltd. Site Investigations	2022	Wicklow and Wexford	Site Investigations	Applied
FS007135	ESB Wind Development Ltd. Site Investigations at Loch Garman Offshore Wind	2022	Wexford	Site Investigations	Consultation
FS007318	RWE Renewables Ireland East Celtic Ltd. Site Investigations for proposed East Celtic Offshore Wind Park	2022	Wexford and Waterford	Site Investigations	Applied
FS007384	Celtic Horizon Offshore Wind Farm Limited Site Investigations for proposed Offshore Wind Farm	2022	Wexford and Waterford	Site Investigations	Applied
FS007224	Rosslare Europort Berth 3 Extension	2022	Wexford	Extension of Existing Berth 3	Consultation
FS007219	Rosslare Europort Maintenance Dredging	2022	Wexford	Maintenance Dredging	Determination
FS007374	Mainstream Renewable Power Ltd.	2022	Waterford & Wexford	Site Investigations	Consultation
FS007038	Lady's Island Pipeline	2022	Wexford	Installation of 2 no. pipes and a flow control structure	Consultation
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
FS007274	UCD Soil and Vegetation Sampling - Ballyteige	2021	Wexford	Soil and vegetation sampling	Consultation
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	Consultation
FS006983	SSE Renewables Celtic Sea	2019	Waterford	Site investigations for Offshore Wind Farm	Consultation
FS007038	Lady's Island Pipeline	2021	Wexford	Installation of 2 no. pipes and a flow control structure	Consultation

The UK element of the project will be covered under UK licencing. Given this, it is considered that cumulative impacts with other existing and proposed developments in proximity to the application area would be unlikely, neutral, not significant and localised. It is concluded that no likely significant effects on Natura 2000 sites will be seen as a result of the proposed survey works alone or combination with other projects.

The potential impacts of the proposed cable route survey are Temporary (i.e. Effects lasting less than a year) and primarily to occur during the brief survey period (with the presence of boats, machinery and personnel in the vicinity of the works). Impacts on infauna would be deemed to be temporary (i.e. Effects lasting less than a year). The 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 impacts are foresee with the proposed project.

This report pertains to the survey for a marine fibre optic cable in subtidal and intertidal habitats. As can be seen from using the Best Available Techniques and mitigation measures during survey, 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).

From a review of the above, it is concluded that no projects in the vicinity of the proposed project would be seen to have a significant cumulative impacts on biodiversity or designated conservation sites.

Residual Impacts and Conclusion

The mitigation proposed for the survey works 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 survey works will result in a short term minor adverse not significant residual effect on the ecology. Mitigation measures will be in place and will be supervised by either an ecologist or MMO depending on the works being carried out.

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Appendix I-Recorded species, associated designations and grid references

Species Name	Date of Record	Designation
Survey Area - Polygon		
Atlantic Puffin (Fratercula arctica)	*26/07/1998*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Basking Shark (Cetorhinus maximus)	*16/02/2008*	*Threatened Species: OSPAR Convention*
Black-legged Kittiwake (Rissa tridactyla)	*25/02/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Dolphin (Delphinus delphis)	*20/01/2019*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Common Guillemot (Uria aalge)	*23/09/1997*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Porpoise (Phocoena phocoena)	*30/07/2011*	*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*
Common Seal (Phoca vitulina)	*12/04/2016*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
European Storm-petrel (Hydrobates pelagicus)	*19/07/1995*	*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*
Fin Whale (Balaenoptera physalus)	*02/06/2011*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Great Black-backed Gull (Larus marinus)	*29/10/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Skua (Stercorarius skua)	*25/08/1983*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Grey Seal (Halichoerus grypus)	*18/10/2012*	*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)	*24/07/1997*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Killer Whale (Orcinus orca)	*02/04/2010*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Lesser Black-backed Gull (Larus fuscus)	*24/07/1997*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*27/06/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Mew Gull (Larus canus)	*08/02/1991*	*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)	*30/05/2009*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*

Northern Gannet (Morus bassanus)	*26/05/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Razorbill (Alca torda)	*22/12/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Risso's Dolphin (Grampus griseus) *Spotted Ray (Raja montagui)*	*19/07/2018* *22/09/1993*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts* *Threatened Species: OSPAR Convention*
Thornback Ray (Raja clavata)	*22/09/1993*	*Threatened Species: OSPAR Convention*

Species Name	Date of Record	Designation
S80		
Cherry Laurel (Prunus laurocerasus)	*26/01/2012*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species*
Common Cord-grass (Spartina anglica)	*22/07/2019*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Japanese Knotweed (Fallopia japonica)	*10/10/2019*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Rhododendron ponticum	*10/08/1992*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
American Mink (Mustela vison)	*11/07/2011*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Brown Rat (Rattus norvegicus)	*05/04/2015*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Common Broomrape (Orobanche minor)	*01/06/2019*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Evergreen Oak (Quercus ilex)	*26/03/1994*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Himalayan Honeysuckle (Leycesteria formosa)	*26/03/1994*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Japanese Rose (Rosa rugosa)	*26/05/2014*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Russian-vine (Fallopia baldschuanica)	*08/12/2005*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Sycamore (Acer pseudoplatanus)	*15/04/2017*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Traveller's-joy (Clematis vitalba)	*21/05/2016*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Wall Cotoneaster (Cotoneaster horizontalis)	*08/12/2005*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Wild Parsnip (Pastinaca sativa)	*05/09/2006*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Common Garden Snail (Cornu aspersum)	*22/05/2006*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Jenkins' Spire Snail (Potamopyrgus antipodarum)	*02/07/1975*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Keeled Slug (Tandonia sowerbyi)	*08/04/1968*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Wrinkled Snail (Candidula intersecta)	*02/07/1975*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*

European Rabbit (Oryctolagus cuniculus)	*18/04/2011*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Sea-buckthorn (Hippophae rhamnoides)	*12/10/2012*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Three-cornered Garlic (Allium triquetrum)	*27/03/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Bottle-nosed Dolphin (Tursiops truncatus)	*26/02/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Otter (Lutra lutra)	*18/07/2016*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Common Porpoise (Phocoena phocoena)	*03/12/2020*	*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*
Grey Seal (Halichoerus grypus)	*10/06/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Atlantic White-sided Dolphin (Lagenorhynchus acutus)	*01/01/1900*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Common Dolphin (Delphinus delphis)	*21/08/2020*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Fin Whale (Balaenoptera physalus)	*19/01/2016*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Humpback Whale (Megaptera novaeangliae)	*13/02/2010*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Long-finned Pilot Whale (Globicephala melas)	*05/08/1957*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Minke Whale (Balaenoptera acutorostrata)	*10/05/2017*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Northern Bottlenose Whale (Hyperoodon ampullatus)	*01/01/1900*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Risso's Dolphin (Grampus griseus)	*13/07/2019*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Striped Dolphin (Stenella coeruleoalba)	*29/04/2011*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Leathery Turtle (Dermochelys coriacea)	*18/08/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention*
Pine Marten (Martes martes)	*23/04/2021*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Common Lizard (Zootoca vivipara)	*21/04/2019*	*Protected Species: Wildlife Acts*
Eurasian Badger (Meles meles)	*31/12/2013*	*Protected Species: Wildlife Acts*
West European Hedgehog (Erinaceus europaeus)	*27/04/2021*	*Protected Species: Wildlife Acts*
Great Northern Diver (Gavia immer)	*09/11/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
Little Egret (Egretta garzetta)	*09/11/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
Peregrine Falcon (Falco peregrinus)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
European Golden Plover (Pluvialis apricaria)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Bar-tailed Godwit (Limosa lapponica)	*31/12/2011*	*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
Common Tern (Sterna hirundo)	*31/07/1991*	*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*
Corn Crake (Crex crex)	*31/07/1972*	*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 - Red List*
Dunlin (Calidris alpina)	*31/12/2011*	*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*
Hen Harrier (Circus cyaneus)	*31/12/2011*	*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*
Little Tern (Sternula albifrons)	*31/07/1991*	*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*
Mediterranean Gull (Larus melanocephalus)	*31/12/2011*	*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*
Merlin (Falco columbarius)	*29/02/1984*	*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*
Red-billed Chough (Pyrrhocorax pyrrhocorax)	*31/12/2011*	*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*
Red-throated Diver (Gavia stellata)	*09/11/2019*	*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*
Sandwich Tern (Sterna sandvicensis)	*31/12/2011*	*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*
Short-eared Owl (Asio flammeus)	*31/12/2011*	*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*
Whooper Swan (Cygnus cygnus)	*29/02/1984*	*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*

Rock Pigeon (Columba livia)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species*
Common Pheasant (Phasianus colchicus)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species*
Common Wood Pigeon (Columba palumbus)	*09/11/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species*
Mallard (Anas platyrhynchos)	*09/11/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species*
Common Coot (Fulica atra)	*31/07/1991*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Teal (Anas crecca)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Wigeon (Anas penelope)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Pintail (Anas acuta)	*31/12/2001*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Jack Snipe (Lymnocryptes minimus)	*29/02/1984*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species*
Common Snipe (Gallinago gallinago)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Woodcock (Scolopax rusticola)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Shoveler (Anas clypeata)	*31/12/2001*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Gadwall (Anas strepera)	*29/02/1984*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Threatened Species: Birds of Conservation Concern ||*

		Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Long-tailed Duck (Clangula hyemalis)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species*
Red-breasted Merganser (Mergus serrator)	*09/11/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species*
Common Scoter (Melanitta nigra)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Greater Scaup (Aythya marila)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Goldeneye (Bucephala clangula)	*31/12/2001*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Curlew (Numenius arquata)	*03/08/2020*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Northern Lapwing (Vanellus vanellus)	*09/11/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Barn Swallow (Hirundo rustica)	*06/05/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black Guillemot (Cepphus grylle)	*24/04/1998*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-tailed Godwit (Limosa limosa)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Brent Goose (Branta bernicla)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Greenshank (Tringa nebularia)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Kestrel (Falco tinnunculus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Linnet (Carduelis cannabina)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*

Common Sandpiper (Actitis hypoleucos)	*21/04/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Shelduck (Tadorna tadorna)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Starling (Sturnus vulgaris)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Oystercatcher (Haematopus ostralegus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Tree Sparrow (Passer montanus)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
European Shag (Phalacrocorax aristotelis)	*09/11/2019*	*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)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Cormorant (Phalacrocorax carbo)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Crested Grebe (Podiceps cristatus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Grey Plover (Pluvialis squatarola)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
House Martin (Delichon urbicum)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
House Sparrow (Passer domesticus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*04/09/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Little Grebe (Tachybaptus ruficollis)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Mew Gull (Larus canus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Mute Swan (Cygnus olor)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Wheatear (Oenanthe oenanthe)	*31/08/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Red Kite (Milvus milvus)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Ringed Plover (Charadrius hiaticula)	*26/08/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Sand Martin (Riparia riparia)	*01/08/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*

Sky Lark (Alauda arvensis)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Spotted Flycatcher (Muscicapa striata)	*31/07/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Stock Pigeon (Columba oenas)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Water Rail (Rallus aquaticus)	*29/02/1984*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-headed Gull (Larus ridibundus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Common Redshank (Tringa totanus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Herring Gull (Larus argentatus)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Red Knot (Calidris canutus)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Yellowhammer (Emberiza citrinella)	*09/11/2019*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Bombus (Bombus) magnus	*20/07/1970*	*Threatened Species: Data deficient*
Wild Asparagus (Asparagus prostratus)	*18/04/2011*	*Threatened Species: Endangered*
Wall (Lasiommata megera)	*23/06/2018*	*Threatened Species: Endangered*
Great Yellow Bumble Bee (Bombus (Subterraneobombus) distinguendus)	*20/07/1970*	*Threatened Species: Endangered*
Sharp-leaved Fluellen (Kickxia elatine)	*01/03/2006*	*Threatened Species: Least concern*
Bifid Crestwort (Lophocolea bidentata)	*16/02/2012*	*Threatened Species: Least concern*
Blueish Veilwort (Metzgeria violacea)	*16/02/2012*	*Threatened Species: Least concern*
Common Frillwort (Fossombronia pusilla)	*16/02/2012*	*Threatened Species: Least concern*
Common Pouchwort (Calypogeia fissa)	*16/02/2012*	*Threatened Species: Least concern*
Common Threadwort (Cephaloziella divaricata)	*16/02/2012*	*Threatened Species: Least concern*
Dilated Scalewort (Frullania dilatata)	*16/02/2012*	*Threatened Species: Least concern*
Endive Pellia (Pellia endiviifolia)	*16/02/2012*	*Threatened Species: Least concern*
Forked Veilwort (Metzgeria furcata)	*16/02/2012*	*Threatened Species: Least concern*
Frullania microphylla var. microphylla	*16/02/2012*	*Threatened Species: Least concern*
Minute Pouncewort (Cololejeunea minutissima)	*16/02/2012*	*Threatened Species: Least concern*
Notched Pouchwort (Calypogeia arguta)	*16/02/2012*	*Threatened Species: Least concern*
Top Notchwort (Leiocolea turbinata)	*16/02/2012*	*Threatened Species: Least concern*
Western Pouncewort (Lejeunea lamacerina)	*16/02/2012*	*Threatened Species: Least concern*
White Earwort (Diplophyllum albicans)	*16/02/2012*	*Threatened Species: Least concern*
Aloe Haircap (Pogonatum aloides)	*16/02/2012*	*Threatened Species: Least concern*
Amblystegium serpens var. salinum	*16/02/2012*	*Threatened Species: Least concern*
Anomalous Bristle-moss (Orthotrichum anomalum)	*16/02/2012*	*Threatened Species: Least concern*
Awl-leaved Earth-moss (Pleuridium subulatum)	*16/02/2012*	*Threatened Species: Least concern*
Bird's-claw Beard-moss (Barbula unguiculata)	*16/02/2012*	*Threatened Species: Least concern*
Bristly Pottia (Tortula viridifolia)	*16/02/2012*	*Threatened Species: Least concern*
Bruch's Pincushion (Ulota bruchii)	*16/02/2012*	*Threatened Species: Least concern*
Bryum dichotomum	*16/02/2012*	*Threatened Species: Least concern*

Capillary Thread-moss (Bryum capillare)	*16/02/2012*	*Threatened Species: Least concern*
Clustered Feather-moss (Rhynchostegium confertum)	*16/02/2012*	*Threatened Species: Least concern*
Common Aloe-moss (Aloina aloides)	*16/02/2012*	*Threatened Species: Least concern*
Common Cord-moss (Funaria hygrometrica)	*16/02/2012*	*Threatened Species: Least concern*
Common Feather-moss (Eurhynchium praelongum)	*16/02/2012*	*Threatened Species: Least concern*
Common Pottia (Tortula truncata)	*16/02/2012*	*Threatened Species: Least concern*
Common Striated Feather-moss (Eurhynchium striatum)	*16/02/2012*	*Threatened Species: Least concern*
Common Tamarisk-moss (Thuidium tamariscinum)	*16/02/2012*	*Threatened Species: Least concern*
Crimson-tuber Thread-moss (Bryum rubens)	*16/02/2012*	*Threatened Species: Least concern*
Cylindric Beard-moss (Didymodon insulanus)	*16/02/2012*	*Threatened Species: Least concern*
Dusky Beard-moss (Didymodon luridus)	*16/02/2012*	*Threatened Species: Least concern*
Elegant Bristle-moss (Orthotrichum pulchellum)	*16/02/2012*	*Threatened Species: Least concern*
Fern-leaved Hook-moss (Cratoneuron filicinum)	*16/02/2012*	*Threatened Species: Least concern*
Flat Neckera (Neckera complanata)	*16/02/2012*	*Threatened Species: Least concern*
Fox-tail Feather-moss (Thamnobryum alopecurum)	*16/02/2012*	*Threatened Species: Least concern*
Frizzled Pincushion (Ulota phyllantha)	*16/02/2012*	*Threatened Species: Least concern*
Great Plait-moss (Hypnum lacunosum var. lacunosum)	*16/02/2012*	*Threatened Species: Least concern*
Green Pocket-moss (Fissidens viridulus)	*16/02/2012*	*Threatened Species: Least concern*
Grey-cushioned Grimmia (Grimmia pulvinata)	*16/02/2012*	*Threatened Species: Least concern*
Heath Star Moss (Campylopus introflexus)	*16/02/2012*	*Threatened Species: Least concern*
Heim's Pottia (Hennediella heimii)	*16/02/2012*	*Threatened Species: Least concern*
Hornschuch's Beard-moss (Pseudocrossidium hornschuchianum)	*16/02/2012*	*Threatened Species: Least concern*
Lateral Cryphaea (Cryphaea heteromalla)	*16/02/2012*	*Threatened Species: Least concern*
Lesser Bird's-claw Beard-moss (Barbula convoluta)	*29/03/2007*	*Threatened Species: Least concern*
Neat Feather-moss (Scleropodium purum)	*16/02/2012*	*Threatened Species: Least concern*
Nicholson's Beard-moss (Didymodon nicholsonii)	*16/02/2012*	*Threatened Species: Least concern*
Olive Beard-moss (Didymodon tophaceus)	*16/02/2012*	*Threatened Species: Least concern*
Pink-fruited Thread-moss (Pohlia melanodon)	*16/02/2012*	*Threatened Species: Least concern*
Redshank (Ceratodon purpureus)	*16/02/2012*	*Threatened Species: Least concern*
Rigid Beard-moss (Didymodon rigidulus)	*16/02/2012*	*Threatened Species: Least concern*
River Feather-moss (Brachythecium rivulare)	*16/02/2012*	*Threatened Species: Least concern*
Rock Pocket-moss (Fissidens dubius)	*16/02/2012*	*Threatened Species: Least concern*
Rough-stalked Feather-moss (Brachythecium rutabulum)	*16/02/2012*	*Threatened Species: Least concern*
Schreber's Forklet-moss (Dicranella schreberiana)	*16/02/2012*	*Threatened Species: Least concern*

Seaside Grimmia (Schistidium maritimum)	*16/02/2012*	*Threatened Species: Least concern*
Silky Wall Feather-moss (Homalothecium sericeum)	*16/02/2012*	*Threatened Species: Least concern*
Silver-moss (Bryum argenteum)	*16/02/2012*	*Threatened Species: Least concern*
Slender Bristle-moss (Orthotrichum tenellum)	*16/02/2012*	*Threatened Species: Least concern*
Small-bud Bryum (Bryum gemmiferum)	*16/02/2012*	*Threatened Species: Least concern*
Springy Turf-moss (Rhytidiadelphus squarrosus)	*16/02/2012*	*Threatened Species: Least concern*
Supine Plait-moss (Hypnum cupressiforme var. resupinatum)	*16/02/2012*	*Threatened Species: Least concern*
Swartz's Feather-moss (Oxyrrhynchium hians)	*16/02/2012*	*Threatened Species: Least concern*
Tender Feather-moss (Rhynchostegiella tenella)	*16/02/2012*	*Threatened Species: Least concern*
Thickpoint Grimmia (Schistidium crassipilum)	*16/02/2012*	*Threatened Species: Least concern*
Upright Pottia (Microbryum rectum)	*16/02/2012*	*Threatened Species: Least concern*
Variable Crisp-moss (Trichostomum brachydontium)	*16/02/2012*	*Threatened Species: Least concern*
Variable Forklet-moss (Dicranella varia)	*16/02/2012*	*Threatened Species: Least concern*
Wall Screw-moss (Tortula muralis)	*16/02/2012*	*Threatened Species: Least concern*
Wall Thread-moss (Bryum radiculosum)	*16/02/2012*	*Threatened Species: Least concern*
Weissia controversa var. controversa	*16/02/2012*	*Threatened Species: Least concern*
White-tipped Bristle-moss (Orthotrichum diaphanum)	*16/02/2012*	*Threatened Species: Least concern*
Whitish Feather-moss (Brachythecium albicans)	*16/02/2012*	*Threatened Species: Least concern*
Whorled Tufa-moss (Eucladium verticillatum)	*16/02/2012*	*Threatened Species: Least concern*
Wood Bristle-moss (Orthotrichum affine)	*16/02/2012*	*Threatened Species: Least concern*
Yellow Crisp-moss (Tortella flavovirens)	*16/02/2012*	*Threatened Species: Least concern*
Zygodon viridissimus var. viridissimus	*16/02/2012*	*Threatened Species: Least concern*
Autumn Lady's-tresses (Spiranthes spiralis)	*12/09/2010*	*Threatened Species: Near threatened*
Bugloss (Anchusa arvensis)	*22/07/1992*	*Threatened Species: Near threatened*
Dwarf Spurge (Euphorbia exigua)	*21/08/1990*	*Threatened Species: Near threatened*
Fragrant Agrimony (Agrimonia procera)	*02/09/2008*	*Threatened Species: Near threatened*
Glebionis segetum	*22/07/1992*	*Threatened Species: Near threatened*

Greater Knapweed (Centaurea scabiosa)	*26/06/1990*	*Threatened Species: Near threatened*
Milk Thistle (Silybum marianum)	*31/12/1994*	*Threatened Species: Near threatened*
Pale Flax (Linum bienne)	*21/05/2016*	*Threatened Species: Near threatened*
Rough Clover (Trifolium scabrum)	*19/04/2011*	*Threatened Species: Near threatened*
Slender Thistle (Carduus tenuiflorus)	*12/09/2010*	*Threatened Species: Near threatened*
Spiked Sedge (Carex spicata)	*10/08/1992*	*Threatened Species: Near threatened*
Yellow Horned-poppy (Glaucium flavum)	*31/12/1997*	*Threatened Species: Near threatened*
Gatekeeper (Pyronia tithonus)	*12/07/2018*	*Threatened Species: Near threatened*
Small Heath (Coenonympha pamphilus)	*12/07/2018*	*Threatened Species: Near threatened*
Colletes (Colletes) similis	*13/07/1999*	*Threatened Species: Near threatened*
Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius)	*04/05/2022*	*Threatened Species: Near threatened*
Megachile (Megachile) centuncularis	*13/07/1999*	*Threatened Species: Near threatened*
Moss Carder-bee (Bombus (Thoracombus) muscorum)	*13/04/2023*	*Threatened Species: Near threatened*
Common Whorl Snail (Vertigo (Vertigo) pygmaea)	*22/05/2006*	*Threatened Species: Near threatened*
Rib-leaf Moss (Tortula atrovirens)	*16/02/2012*	*Threatened Species: Near threatened*
Atlantic Cod (Gadus morhua)	*31/10/2013*	*Threatened Species: OSPAR Convention*
Thornback Ray (Raja clavata)	*25/02/2021*	*Threatened Species: OSPAR Convention*
Chives (Allium schoenoprasum)	*04/05/2022*	*Threatened Species: Vulnerable*
Green-winged Orchid (Orchis morio)	*15/03/2020*	*Threatened Species: Vulnerable*
Henbane (Hyoscyamus niger)	*01/06/2019*	*Threatened Species: Vulnerable*
Narrow-fruited Cornsalad (Valerianella dentata)	*21/08/1990*	*Threatened Species: Vulnerable*
Perennial Glasswort (Sarcocornia perennis)	*28/07/2014*	*Threatened Species: Vulnerable*
Dark Green Fritillary (Argynnis aglaja)	*12/07/2018*	*Threatened Species: Vulnerable*
Andrena (Micrandrena) semilaevis	*13/07/1999*	*Threatened Species: Vulnerable*
Neat Mining Bee (Lasioglossum (Evylaeus) nitidiusculum)	*13/07/1999*	*Threatened Species: Vulnerable*
Northern Colletes (Colletes (Colletes) floralis)	*04/07/2022*	*Threatened Species: Vulnerable*
Heath Snail (Helicella itala)	*22/05/2006*	*Threatened Species: Vulnerable*

Marsh Whorl Snail (Vertigo (Vertigo) antivertigo)	*22/05/2006*	*Threatened Species: Vulnerable*
Blunt-fruited Pottia (Tortula modica)	*16/02/2012*	*Threatened Species: Vulnerable*
Corncockle (Agrostemma githago)	*31/05/2022*	*Threatened Species: Waiting list*
Cornflower (Centaurea cyanus)	*12/08/2006*	*Threatened Species: Waiting list*
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Cherry Laurel (Prunus laurocerasus)	*30/07/2003*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species*
Eastern Grey Squirrel (Sciurus carolinensis)	*06/01/2017*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Wakame (Undaria pinnatifida)	*31/12/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Wireweed (Sargassum muticum)	*20/08/2023*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Common Cord-grass (Spartina anglica)	*23/08/2010*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Indian Balsam (Impatiens glandulifera)	*02/07/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Japanese Knotweed (Fallopia japonica)	*24/09/2021*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
American Mink (Mustela vison)	*27/06/2016*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Brown Rat (Rattus norvegicus)	*14/04/2018*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Leathery Sea Squirt (Styela clava)	*31/12/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Douglas Fir (Pseudotsuga menziesii)	*30/07/2003*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Common Broomrape (Orobanche minor)	*02/08/1965*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Himalayan Honeysuckle (Leycesteria formosa)	*31/05/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Least Duckweed (Lemna minuta)	*09/07/2011*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Pampas-grass (Cortaderia selloana)	*11/06/2010*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Sycamore (Acer pseudoplatanus)	*13/05/2023*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Traveller's-joy (Clematis vitalba)	*28/09/2012*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Budapest Slug (Tandonia budapestensis)	*31/12/1911*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Common Garden Snail (Cornu aspersum)	*18/06/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Jenkins' Spire Snail (Potamopyrgus antipodarum)	*31/10/2016*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Wrinkled Snail (Candidula intersecta)	*21/04/1982*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*

European Rabbit (Oryctolagus cuniculus)	*06/07/2016*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Botrylloides violaceus	*31/12/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species*
Japanese Skeleton Shrimp (Caprella mutica)	*31/12/2022*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Water Fern (Azolla filiculoides)	*29/07/2012*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Sea-buckthorn (Hippophae rhamnoides)	*01/07/2012*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Three-cornered Garlic (Allium triquetrum)	*13/05/2023*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Spanish Bluebell (Hyacinthoides hispanica)	*19/05/1990*	*Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)*
Loggerhead Turtle (Caretta caretta)	*31/10/1953*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Otter (Lutra lutra)	*04/09/2018*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Common Porpoise (Phocoena phocoena)	*27/11/2019*	*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*
Common Seal (Phoca vitulina)	*12/04/2016*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Grey Seal (Halichoerus grypus)	*10/11/2020*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Atlantic White-sided Dolphin (Lagenorhynchus acutus)	*08/04/1989*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Common Dolphin (Delphinus delphis)	*20/01/2019*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Cuvier's Beaked Whale (Ziphius cavirostris)	*17/03/1997*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Fin Whale (Balaenoptera physalus)	*22/11/2018*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Killer Whale (Orcinus orca)	*08/12/1986*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Long-finned Pilot Whale (Globicephala melas)	*26/12/2007*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Minke Whale (Balaenoptera acutorostrata)	*11/12/2004*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Risso's Dolphin (Grampus griseus)	*24/07/2019*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Sowerby's Beaked Whale (Mesoplodon bidens)	*01/04/2004*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*

Sperm Whale (Physeter macrocephalus)	*18/08/2011*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Striped Dolphin (Stenella coeruleoalba)	*02/08/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Daubenton's Bat (Myotis daubentonii)	*26/08/2014*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Lesser Noctule (Nyctalus leisleri)	*01/06/2009*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Soprano Pipistrelle (Pipistrellus pygmaeus)	*01/06/2009*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Leathery Turtle (Dermochelys coriacea)	*16/08/2012*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts || Threatened Species: OSPAR Convention*
Common Frog (Rana temporaria)	*11/05/2020*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Pine Marten (Martes martes)	*17/11/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Smooth Newt (Lissotriton vulgaris)	*09/07/2016*	*Protected Species: Wildlife Acts*
Corn Bunting (Emberiza calandra)	*31/07/1972*	*Protected Species: Wildlife Acts*
Common Lizard (Zootoca vivipara)	*09/09/2020*	*Protected Species: Wildlife Acts*
Eurasian Badger (Meles meles)	*11/03/2023*	*Protected Species: Wildlife Acts*
Eurasian Pygmy Shrew (Sorex minutus)	*27/06/2018*	*Protected Species: Wildlife Acts*
West European Hedgehog (Erinaceus europaeus)	*08/08/2022*	*Protected Species: Wildlife Acts*
Great Northern Diver (Gavia immer)	*03/05/2021*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
Little Egret (Egretta garzetta)	*01/10/2022*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
Little Gull (Larus minutus)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
Peregrine Falcon (Falco peregrinus)	*26/05/2020*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*
European Golden Plover (Pluvialis apricaria)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Arctic Tern (Sterna paradisaea)	*31/07/1972*	*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*
Bar-tailed Godwit (Limosa lapponica)	*17/01/2021*	*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*

Bewick's Swan (Cygnus columbianus subsp. bewickii)	*31/12/2001*	*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 - Red List*
Common Kingfisher (Alcedo atthis)	*14/10/2022*	*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*
Common Tern (Sterna hirundo)	*31/07/1972*	*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*
Dunlin (Calidris alpina)	*26/11/2017*	*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*
European Nightjar (Caprimulgus europaeus)	*31/07/1972*	*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 - Red List*
European Storm-petrel (Hydrobates pelagicus)	*31/07/1991*	*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*
Hen Harrier (Circus cyaneus)	*04/04/2021*	*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*
Little Tern (Sternula albifrons)	*31/07/1972*	*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*
Mediterranean Gull (Larus melanocephalus)	*31/12/2011*	*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*
Merlin (Falco columbarius)	*17/03/2021*	*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*
Red-throated Diver (Gavia stellata)	*24/03/2012*	*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*
Sandwich Tern (Sterna sandvicensis)	*16/07/2020*	*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*
Whooper Swan (Cygnus cygnus)	*17/03/2021*	*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*

Rock Pigeon (Columba livia)	*09/06/2019*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species*
Common Pheasant (Phasianus colchicus)	*02/04/2021*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species*
Common Wood Pigeon (Columba palumbus)	*02/01/2021*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species*
Mallard (Anas platyrhynchos)	*15/05/2020*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species*
Grey Partridge (Perdix perdix)	*31/07/1991*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Common Coot (Fulica atra)	*31/07/1991*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Pochard (Aythya ferina)	*12/11/2017*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Teal (Anas crecca)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Wigeon (Anas penelope)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Pintail (Anas acuta)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Common Snipe (Gallinago gallinago)	*07/03/2021*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*

Eurasian Woodcock (Scolopax rusticola)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Shoveler (Anas clypeata)	*31/12/2001*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Red-breasted Merganser (Mergus serrator)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species*
Greater Scaup (Aythya marila)	*29/02/1984*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Goldeneye (Bucephala clangula)	*31/12/2011*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Curlew (Numenius arquata)	*04/04/2021*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Northern Lapwing (Vanellus vanellus)	*10/01/2021*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Atlantic Puffin (Fratercula arctica)	*16/07/2020*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Barn Swallow (Hirundo rustica)	*18/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black Guillemot (Cepphus grylle)	*03/05/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-tailed Godwit (Limosa limosa)	*26/11/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Brent Goose (Branta bernicla)	*18/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of*

		Conservation Concern >> Birds of Conservation Concern - Amber List
Common Grasshopper Warbler (Locustella naevia)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Greenshank (Tringa nebularia)	*24/08/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*19/03/2023*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Kestrel (Falco tinnunculus)	*06/10/2022*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Linnet (Carduelis cannabina)	*07/04/2020*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Sandpiper (Actitis hypoleucos)	*26/08/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Shelduck (Tadorna tadorna)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Starling (Sturnus vulgaris)	*16/02/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Swift (Apus apus)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Oystercatcher (Haematopus ostralegus)	*03/05/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Eurasian Tree Sparrow (Passer montanus)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
European Shag (Phalacrocorax aristotelis)	*16/07/2020*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
European Turtle Dove (Streptopelia turtur)	*31/07/1972*	*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)	*18/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Cormorant (Phalacrocorax carbo)	*26/05/2020*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Crested Grebe (Podiceps cristatus)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of*

		Conservation Concern >> Birds of Conservation Concern - Amber List
Grey Plover (Pluvialis squatarola)	*18/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
House Martin (Delichon urbicum)	*21/09/2020*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
House Sparrow (Passer domesticus)	*02/01/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*31/03/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Little Grebe (Tachybaptus ruficollis)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*31/07/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Mew Gull (Larus canus)	*31/03/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Mute Swan (Cygnus olor)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*29/07/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Wheatear (Oenanthe oenanthe)	*04/08/2018*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Razorbill (Alca torda)	*16/07/2020*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Red Kite (Milvus milvus)	*08/01/1986*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Ringed Plover (Charadrius hiaticula)	*18/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Sand Martin (Riparia riparia)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Sky Lark (Alauda arvensis)	*27/06/2018*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Spotted Flycatcher (Muscicapa striata)	*31/12/2011*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of*

		Conservation Concern >> Birds of Conservation Concern - Amber List
Stock Pigeon (Columba oenas)	*24/03/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Barn Owl (Tyto alba)	*26/05/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Black-headed Gull (Larus ridibundus)	*31/03/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Common Redshank (Tringa totanus)	*18/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Herring Gull (Larus argentatus)	*03/04/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Red Knot (Calidris canutus)	*12/11/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Yellowhammer (Emberiza citrinella)	*07/03/2021*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
European Eel (Anguilla anguilla)	*23/08/2023*	*Threatened Species: Critically Endangered*
Sphecodes gibbus	*12/08/1950*	*Threatened Species: Critically Endangered*
Sea Pea (Lathyrus japonicus)	*31/12/1994*	*Threatened Species: Data deficient*
Field Slug (Deroceras (Deroceras) agreste)	*31/12/1911*	*Threatened Species: Data deficient*
Lesser Centaury (Centaurium pulchellum)	*21/08/2019*	*Threatened Species: Endangered*
Round-leaved Crane's-bill (Geranium rotundifolium)	*11/06/2010*	*Threatened Species: Endangered*
Weasel's-snout (Misopates orontium)	*20/05/2014*	*Threatened Species: Endangered*
Wild Asparagus (Asparagus prostratus)	*28/05/2022*	*Threatened Species: Endangered*
Agabus (Gaurodytes) conspersus	*27/06/2006*	*Threatened Species: Endangered*
Small Blue (Cupido minimus)	*04/06/2021*	*Threatened Species: Endangered*
Wall (Lasiommata megera)	*18/08/2021*	*Threatened Species: Endangered*
Great Yellow Bumble Bee (Bombus (Subterraneobombus) distinguendus)	*19/08/1972*	*Threatened Species: Endangered*
Hylaeus (Prosopis) brevicornis	*23/06/2022*	*Threatened Species: Endangered*
Nomada striata	*11/06/1999*	*Threatened Species: Endangered*
Shrill Carder Bee (Bombus (Thoracombus) sylvarum)	*29/07/1970*	*Threatened Species: Endangered*
Sharp-leaved Fluellen (Kickxia elatine)	*17/07/2009*	*Threatened Species: Least concern*
Tamarisk Scalewort (Frullania tamarisci)	*31/12/1989*	*Threatened Species: Least concern*
Big Shaggy-moss (Rhytidiadelphus triquetrus)	*31/12/1988*	*Threatened Species: Least concern*
Broom Fork-moss (Dicranum scoparium)	*31/12/1991*	*Threatened Species: Least concern*

Capillary Thread-moss (Bryum capillare)	*31/12/1988*	*Threatened Species: Least concern*
Great Plait-moss (Hypnum lacunosum var. lacunosum)	*31/12/1988*	*Threatened Species: Least concern*
Neat Feather-moss (Scleropodium purum)	*31/12/1988*	*Threatened Species: Least concern*
Pale Thread-moss (Bryum pallens)	*31/12/1988*	*Threatened Species: Least concern*
Redshank (Ceratodon purpureus)	*31/12/1991*	*Threatened Species: Least concern*
Silky Wall Feather-moss (Homalothecium sericeum)	*31/12/1988*	*Threatened Species: Least concern*
Wall Screw-moss (Tortula muralis)	*31/12/1991*	*Threatened Species: Least concern*
Yellow Feather-moss (Homalothecium lutescens)	*31/12/1988*	*Threatened Species: Least concern*
Autumn Lady's-tresses (Spiranthes spiralis)	*21/08/2019*	*Threatened Species: Near threatened*
Brackish Water-crowfoot (Ranunculus baudotii)	*20/04/2014*	*Threatened Species: Near threatened*
Bugloss (Anchusa arvensis)	*27/08/2012*	*Threatened Species: Near threatened*
Fragrant Agrimony (Agrimonia procera)	*28/09/2012*	*Threatened Species: Near threatened*
Glebionis segetum	*28/08/2012*	*Threatened Species: Near threatened*
Greater Knapweed (Centaurea scabiosa)	*30/07/1935*	*Threatened Species: Near threatened*
Irish Sorrel (Rumex acetosa subsp. hibernicus)	*18/04/2011*	*Threatened Species: Near threatened*
Knotted Hedge-parsley (Torilis nodosa)	*19/05/1990*	*Threatened Species: Near threatened*
Milk Thistle (Silybum marianum)	*16/05/1995*	*Threatened Species: Near threatened*
Northern Dead-nettle (Lamium confertum)	*19/05/1990*	*Threatened Species: Near threatened*
Pale Flax (Linum bienne)	*09/07/2011*	*Threatened Species: Near threatened*
Rough Clover (Trifolium scabrum)	*31/12/1948*	*Threatened Species: Near threatened*
Slender Thistle (Carduus tenuiflorus)	*27/08/2012*	*Threatened Species: Near threatened*
Spiked Sedge (Carex spicata)	*23/07/1992*	*Threatened Species: Near threatened*
Yellow Horned-poppy (Glaucium flavum)	*18/04/2011*	*Threatened Species: Near threatened*
Gatekeeper (Pyronia tithonus)	*21/07/2018*	*Threatened Species: Near threatened*
Grayling (Hipparchia semele)	*06/09/2021*	*Threatened Species: Near threatened*
Small Heath (Coenonympha pamphilus)	*17/07/2021*	*Threatened Species: Near threatened*
Andrena (Andrena) fucata	*07/05/1932*	*Threatened Species: Near threatened*
Andrena (Leucandrena) barbilabris	*27/06/2021*	*Threatened Species: Near threatened*
Colletes (Colletes) similis	*22/06/2022*	*Threatened Species: Near threatened*
Gipsy Cuckoo Bee (Bombus (Psithyrus) bohemicus)	*13/08/2004*	*Threatened Species: Near threatened*
Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius)	*07/05/2023*	*Threatened Species: Near threatened*
Megachile (Delomegachile) willughbiella	*12/08/2003*	*Threatened Species: Near threatened*
Megachile (Megachile) centuncularis	*23/06/2022*	*Threatened Species: Near threatened*
Megachile (Xanthosarus) maritima	*23/06/2022*	*Threatened Species: Near threatened*
Moss Carder-bee (Bombus (Thoracombus) muscorum)	*01/05/2023*	*Threatened Species: Near threatened*
Osmia (Helicosmia) aurulenta	*23/06/2022*	*Threatened Species: Near threatened*

Common Whorl Snail (Vertigo (Vertigo) pygmaea)	*31/12/1911*	*Threatened Species: Near threatened*
Rib-leaf Moss (Tortula atrovirens)	*23/03/2007*	*Threatened Species: Near threatened*
Atlantic Cod (Gadus morhua)	*29/11/2014*	*Threatened Species: OSPAR Convention*
Dog Whelk (Nucella lapillus)	*29/08/2023*	*Threatened Species: OSPAR Convention*
Borrer's Saltmarsh-grass (Puccinellia fasciculata)	*29/07/2012*	*Threatened Species: Vulnerable*
Henbane (Hyoscyamus niger)	*29/07/1994*	*Threatened Species: Vulnerable*
Perennial Glasswort (Sarcocornia perennis)	*31/12/2005*	*Threatened Species: Vulnerable*
Smooth Brome (Bromus racemosus)	*22/05/2016*	*Threatened Species: Vulnerable*
Enochrus halophilus	*05/04/1911*	*Threatened Species: Vulnerable*
Dark Green Fritillary (Argynnis aglaja)	*01/09/2021*	*Threatened Species: Vulnerable*
Scarce Blue-tailed Damselfly (Ischnura pumilio)	*12/07/2017*	*Threatened Species: Vulnerable*
Andrena (Cnemidandrena) denticulata	*12/08/2003*	*Threatened Species: Vulnerable*
Andrena (Ptilandrena) angustior	*31/05/2009*	*Threatened Species: Vulnerable*
Field Cuckoo Bee (Bombus (Psithyrus) campestris)	*02/08/1969*	*Threatened Species: Vulnerable*
Hylaeus (Spatulariella) hyalinatus	*11/07/1999*	*Threatened Species: Vulnerable*
Northern Colletes (Colletes (Colletes) floralis)	*20/06/2022*	*Threatened Species: Vulnerable*
Red-tailed Carder Bee (Bombus (Thoracombus) ruderarius)	*06/08/2014*	*Threatened Species: Vulnerable*
Ear Pond Snail (Radix auricularia)	*31/12/1911*	*Threatened Species: Vulnerable*
Heath Snail (Helicella itala)	*20/06/2022*	*Threatened Species: Vulnerable*
Moss Bladder Snail (Aplexa hypnorum)	*31/12/1911*	*Threatened Species: Vulnerable*
Tree Snail (Balea (Balea) perversa)	*31/12/1911*	*Threatened Species: Vulnerable*
Ventrosia ventrosa	*31/10/2016*	*Threatened Species: Vulnerable*
X89		
Common Porpoise (Phocoena phocoena)	*21/07/2018*	*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*
Grey Seal (Halichoerus grypus)	*23/09/2012*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Common Dolphin (Delphinus delphis)	*06/11/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Fin Whale (Balaenoptera physalus)	*27/01/2015*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Humpback Whale (Megaptera novaeangliae)	*21/02/2010*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Minke Whale (Balaenoptera acutorostrata)	*03/06/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Risso's Dolphin (Grampus griseus)	*08/07/2019*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Great Northern Diver (Gavia immer)	*21/10/2012*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species*

Common Scoter (Melanitta nigra)	*21/10/2012*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Atlantic Puffin (Fratercula arctica)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black Guillemot (Cepphus grylle)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
European Shag (Phalacrocorax aristotelis)	*21/10/2012*	*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)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Cormorant (Phalacrocorax carbo)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Skua (Stercorarius skua)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*17/06/2017*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Razorbill (Alca torda)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Herring Gull (Larus argentatus)	*21/10/2012*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Atlantic Cod (Gadus morhua)	*07/09/2019*	*Threatened Species: OSPAR Convention*
Basking Shark (Cetorhinus maximus)	*07/04/2017*	*Threatened Species: OSPAR Convention*
Spotted Ray (Raja montagui)	*27/09/1998*	*Threatened Species: OSPAR Convention*

Thornback Ray (Raja clavata)	*23/09/1993*	*Threatened Species: OSPAR Convention*
X88		
Common Dolphin (Delphinus delphis)	*07/10/2011*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Fin Whale (Balaenoptera physalus)	*21/01/2020*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Minke Whale (Balaenoptera acutorostrata)	*17/10/2011*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Risso's Dolphin (Grampus griseus)	*28/06/2018*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Atlantic Puffin (Fratercula arctica)	*05/09/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*23/11/2015*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*17/01/1996*	*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)	*18/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Skua (Stercorarius skua)	*17/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*18/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*05/09/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*18/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Herring Gull (Larus argentatus)	*17/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Spotted Ray (Raja montagui)	*10/11/2013*	*Threatened Species: OSPAR Convention*
Spurdog (Squalus acanthias)	*30/11/2014*	*Threatened Species: OSPAR Convention*
Thornback Ray (Raja clavata)	*10/11/2013*	*Threatened Species: OSPAR Convention*
X87		
Common Dolphin (Delphinus delphis)	*23/11/2015*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Storm-petrel (Hydrobates pelagicus)	*05/09/1992*	*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
Black-legged Kittiwake (Rissa tridactyla)	*23/11/2015*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*17/07/1994*	*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)	*17/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*07/07/1995*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*14/06/2015*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*07/07/1995*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Razorbill (Alca torda)	*07/07/1995*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Herring Gull (Larus argentatus)	*16/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Thornback Ray (Raja clavata)	*29/09/2013*	*Threatened Species: OSPAR Convention*
X97		
Bottle-nosed Dolphin (Tursiops truncatus)	*04/07/2011*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Grey Seal (Halichoerus grypus)	*18/10/2012*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Common Dolphin (Delphinus delphis)	*20/10/2013*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Black-legged Kittiwake (Rissa tridactyla)	*17/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*17/07/1994*	*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)	*16/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*17/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of*

		Conservation Concern >> Birds of Conservation Concern - Amber List
Manx Shearwater (Puffinus puffinus)	*16/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*17/01/1996*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Y36		
Common Dolphin (Delphinus delphis)	*27/11/2010*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Storm-petrel (Hydrobates pelagicus)	*27/07/1983*	*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*
Atlantic Puffin (Fratercula arctica)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Spotted Ray (Raja montagui)	*28/11/2012*	*Threatened Species: OSPAR Convention*
Spurdog (Squalus acanthias)	*28/11/2012*	*Threatened Species: OSPAR Convention*
Thornback Ray (Raja clavata)	*28/11/2012*	*Threatened Species: OSPAR Convention*
Y35		
Common Dolphin (Delphinus delphis)	*11/10/2015*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Storm-petrel (Hydrobates pelagicus)	*27/07/1983*	*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*
Common Scoter (Melanitta nigra)	*27/07/1983*	*Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Atlantic Puffin (Fratercula arctica)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*24/11/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species:*

		Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Guillemot (Uria aalge)	*11/06/1992*	*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)	*24/11/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Skua (Stercorarius skua)	*27/07/1983*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*24/11/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*11/06/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*11/06/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Razorbill (Alca torda)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-headed Gull (Larus ridibundus)	*16/04/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Y26		
Common Dolphin (Delphinus delphis)	*11/10/2015*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Storm-petrel (Hydrobates pelagicus)	*05/09/1992*	*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*
Atlantic Puffin (Fratercula arctica)	*27/07/1983*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*05/09/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*07/06/2001*	*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)	*09/08/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Great Skua (Stercorarius skua)	*08/04/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*

Lesser Black-backed Gull (Larus fuscus)	*11/08/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*07/06/2001*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*07/06/2001*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Razorbill (Alca torda)	*05/01/1992*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Herring Gull (Larus argentatus)	*17/11/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Y25		
Common Dolphin (Delphinus delphis)	*11/10/2015*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Minke Whale (Balaenoptera acutorostrata)	*30/05/2014*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
European Storm-petrel (Hydrobates pelagicus)	*17/07/1994*	*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*
Atlantic Puffin (Fratercula arctica)	*24/11/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*24/11/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*07/06/2001*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*24/11/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*07/06/2001*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*07/06/2001*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Herring Gull (Larus argentatus)	*15/12/1991*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List*
Y16		
Grey Seal (Halichoerus grypus)	*18/10/2012*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected*

		Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Common Dolphin (Delphinus delphis)	*25/01/2014*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Roseate Tern (Sterna dougallii)	*10/05/2000*	*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*
Atlantic Puffin (Fratercula arctica)	*10/05/2000*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Black-legged Kittiwake (Rissa tridactyla)	*13/11/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*10/05/2000*	*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)	*16/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*10/05/2000*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Manx Shearwater (Puffinus puffinus)	*26/05/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*26/05/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Y06		
Grey Seal (Halichoerus grypus)	*18/10/2012*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts*
Common Dolphin (Delphinus delphis)	*17/07/1994*	*Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts*
Black-legged Kittiwake (Rissa tridactyla)	*13/11/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Common Guillemot (Uria aalge)	*23/11/1999*	*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)	*17/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Lesser Black-backed Gull (Larus fuscus)	*17/07/1994*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*

Manx Shearwater (Puffinus puffinus)	*26/05/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Northern Gannet (Morus bassanus)	*13/11/2016*	*Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List*
Spotted Ray (Raja montagui)	*25/11/2014*	*Threatened Species: OSPAR Convention*
Spurdog (Squalus acanthias)	*28/11/2012*	*Threatened Species: OSPAR Convention*
Thornback Ray (Raja clavata)	*26/11/2013*	*Threatened Species: OSPAR Convention*

Appendix II-Fisheries Areas

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*."

Conclusions

The proposed foreshore survey route passes through known cod (*Gadus morhua*) nursery and spawning grounds. These nursery grounds span for much of the Irish coastline and therefore the grounds in which the survey works will take place are not of specific importance to this species. There is the potential for minor disturbances to cod within their spawning grounds. These spawning grounds span a large proportion of the Irish east coast, and so any disturbances to spawning activity due to the proposed surveys should not be significant. Peak spawning period for cod occurs in February and March, and so any surveying activities undertaken outside of this timeframe will avoid any possible disturbances.

Both survey route options pass through known haddock (*Melanogrammus aeglefinus*) nursery and spawning grounds. Haddock nursery grounds span large areas off the east and south coasts, as well as smaller areas off the west and northwest coasts. The grounds in which the survey works will take place are therefore not of specific importance to this species. There is the potential for minor disturbances to haddock within their spawning grounds. These spawning grounds span a similar area and location to known nursery grounds, and so any disturbances to spawning activity due to the proposed surveys would not be significant. The spawning period for haddock peaks in March and April, and so to avoid disturbance to spawning haddock, survey activities should be undertaken outside of this period.

The proposed foreshore survey route options pass through hake (*Merluccius merluccius*) nursery grounds. Hake nursery grounds span a large proportion of Irish waters, including the majority of the Celtic Sea and seas off southwest Ireland, and so the grounds in which the survey works will take place are therefore not of specific importance to this species.

The proposed foreshore survey route options pass at the edge of the Keeragh Island herring (*Clupea harengus*) spawning ground (Figure 4). It should be noted that the survey would take approximately 1 hr to pass through this area. Herring spawning grounds occur in small, localised coastal areas around the south, west and northwest of Ireland, and are vulnerable to disturbance. The spawning beds are overlapping, as well as adjacent to, the proposed survey routes (Dunmore East: Tramore, Baginbun, Keeragh Island) constitute the largest collection by area of known Irish herring spawning grounds in the Celtic Sea, therefore the grounds in which the survey works will take place are of specific importance to this species. Spawning activity in the Keeragh Island spawning ground peaks in September and October. Herring spawn on specific substrate, which is sensitive to disturbance. The proposed

sampling methods which are small but involve contact with the sea bed (core penetration test, gravity core, grab sampling, vibrocorer etc.), due to their minimal footprint and temporary nature, will have negligible impact on the sediment structure of this area and associated spawning activity. Sampling and surveying outside of peak spawning activity at the Keeragh spawning ground (September and October) will mitigate any negative impact of the proposed survey route on herring spawning activity at these grounds.

The proposed foreshore survey route options pass through horse mackerel (*Trachurus trachurus*) nursery grounds. Horse mackerel nursery grounds span a large proportion of Irish waters, including the majority of the Celtic Sea and the entirety of the Irish Sea, and so the grounds in which the survey works will take place are therefore not of specific importance to this species.

The southern proposed foreshore survey route option passes through megrim (*Lepidorhombus whiffiagonis*) nursery grounds. Megrim nursery grounds span a large proportion of the Celtic Sea, and so the grounds in which the survey works will take place are therefore not of specific importance to this species.

The proposed foreshore survey route options pass through known whiting (*Merlangius merlangus*) nursery and spawning grounds. These nursery grounds span large areas of the Celtic Sea and therefore the grounds in which the survey works will take place are not of specific importance to this species. There is the potential for minor disturbances to whiting within their spawning grounds. These spawning grounds span a large proportion of the Celtic Sea, and so any disturbances to spawning activities from the proposed surveys would not be significant. The spawning period for whiting ranges from February through June, and so any surveying activities undertaken outside of this timeframe will avoid any potential disturbances.

The proposed foreshore survey route options pass through the range of wild Atlantic salmon (*Salmo salar*). Atlantic salmon native to rivers draining into the Irish Sea, Celtic Sea and English Channel utilise the Celtic Sea as transitional habitat both as smolts out-migrating from rivers towards their feeding grounds and as adults returning to their natal streams. Atlantic salmon will be present within the proposed survey routes 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, it is unlikely that the proposed works will have any significant impact on Atlantic Salmon. Avoiding survey activities during the month of June will limit any potential impacts the works may have on salmon migration patterns.

The proposed foreshore survey route options pass through areas of lobster (*Homarus Gammarus*) and crab potting activity. Due to the survey methods being utilised, no impact on the target species for this fishery is foreseen. Consultation with fisheries representatives and engagement with local fleets should be carried out prior to works to avoid disruption to fisheries and prevent a direct overlap of fishing with survey activities.

The proposed foreshore survey route options pass through areas of dredging activity for razor clam (*Ensis magnus*). Due to the survey methods being utilised, and the fact that no bottom sampling locations have been proposed within this dredging area, no impact on the target species for this fishery is foreseen. Consultation with fisheries representatives and engagement with local fleets should be carried out prior to works to avoid disruption to fisheries and prevent a direct overlap of fishing with survey activities.

Mitigation

The proposed survey works would not be expected to result in the direct mortality of fish species due to the slow-moving nature of the survey vessel. Surveys and associated sampling in the herring spawning will take approximately 1 hour. No significant impacts on fish nursery areas are predicted. Due to the nature of the proposed survey methods, there should be no disruption to the stocks or activities of local potting and dredging fisheries.

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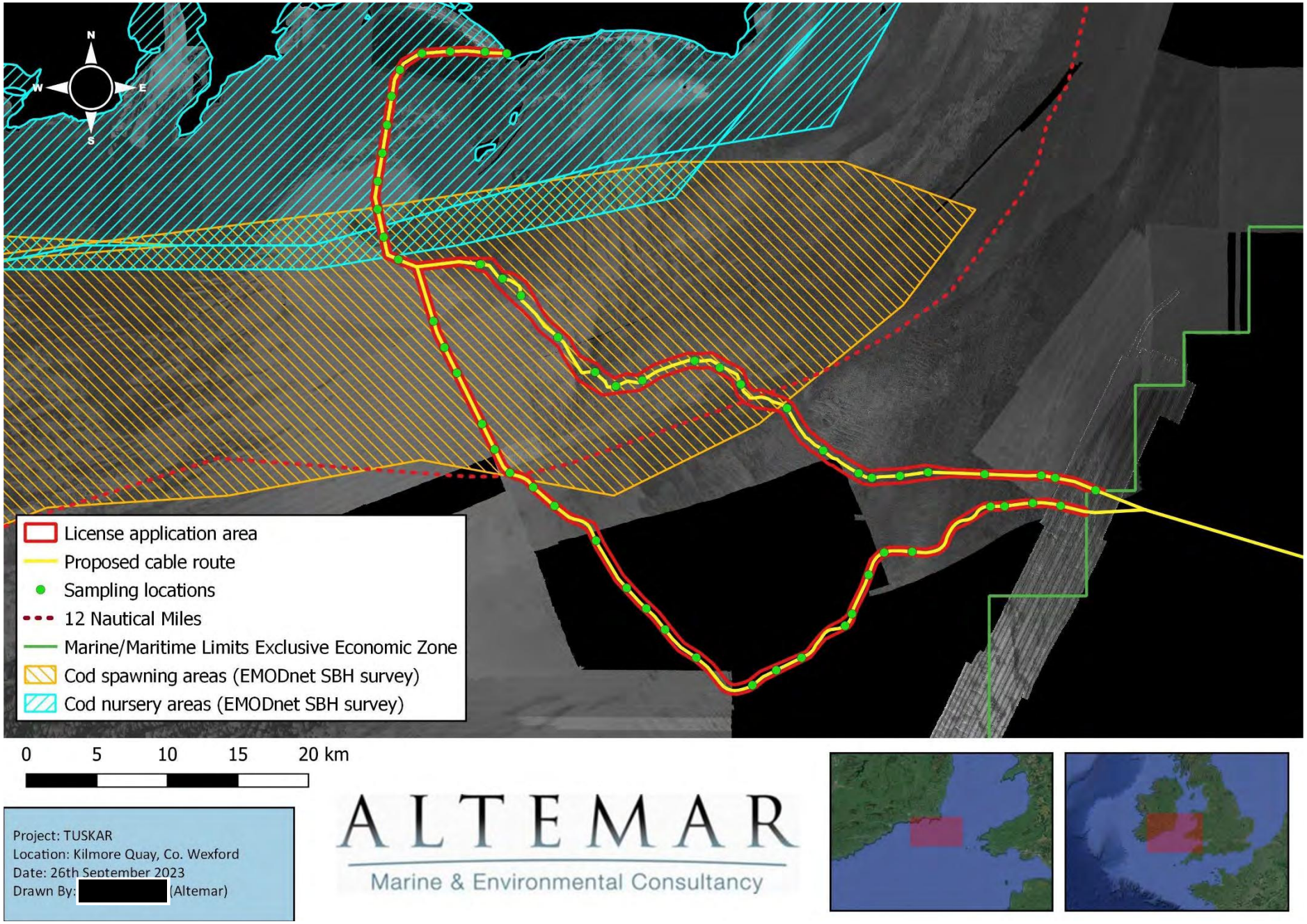

Figure 1. *Cod spawn and nursery grounds proximate to the proposed foreshore survey area*

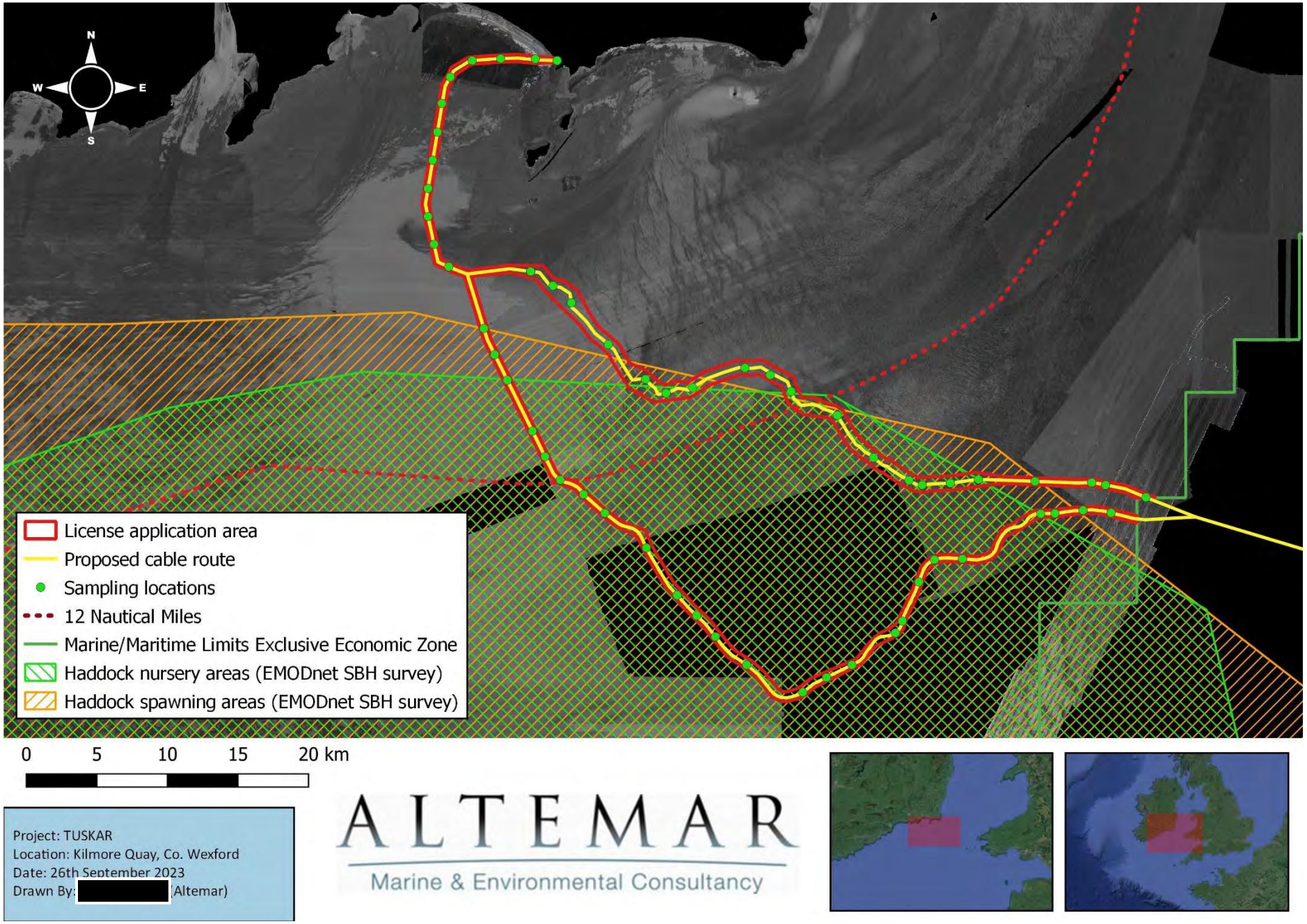

Figure 2. *Haddock spawn and nursery grounds proximate to the proposed foreshore survey*

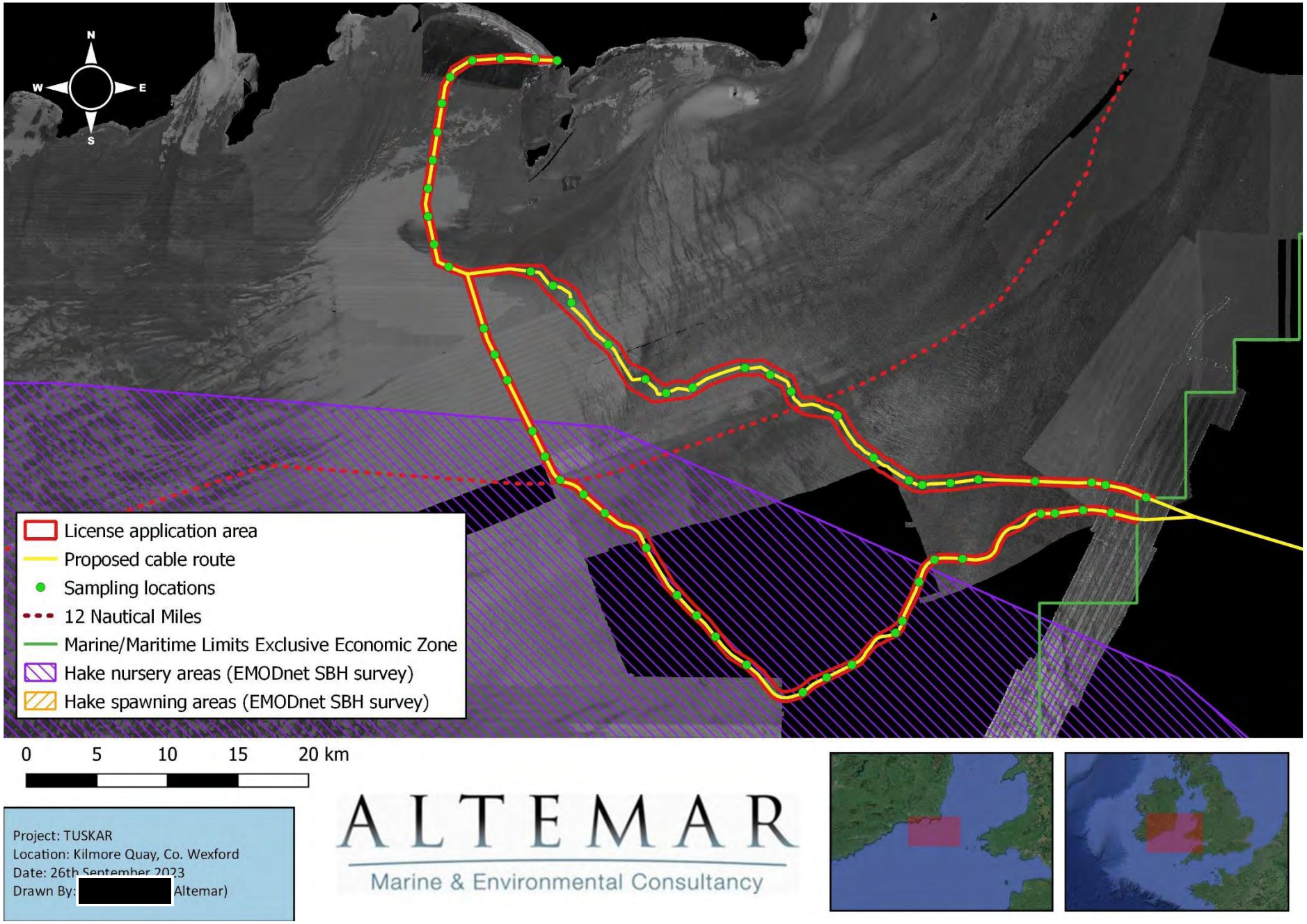

Figure 3. *Hake spawn and nursery grounds proximate to the proposed foreshore survey area*

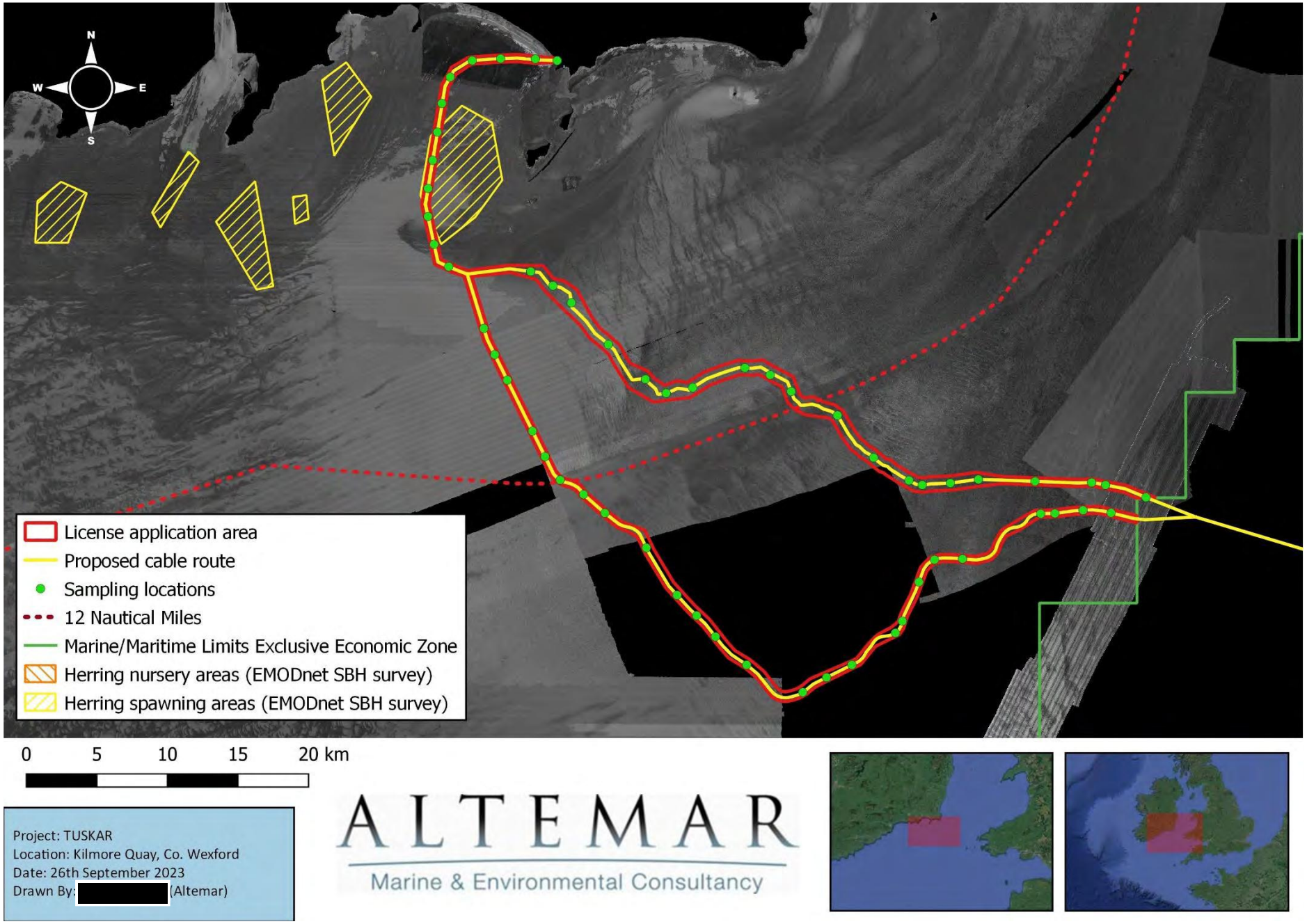

Figure 4. *Herring spawn and nursery grounds proximate to the proposed foreshore survey*

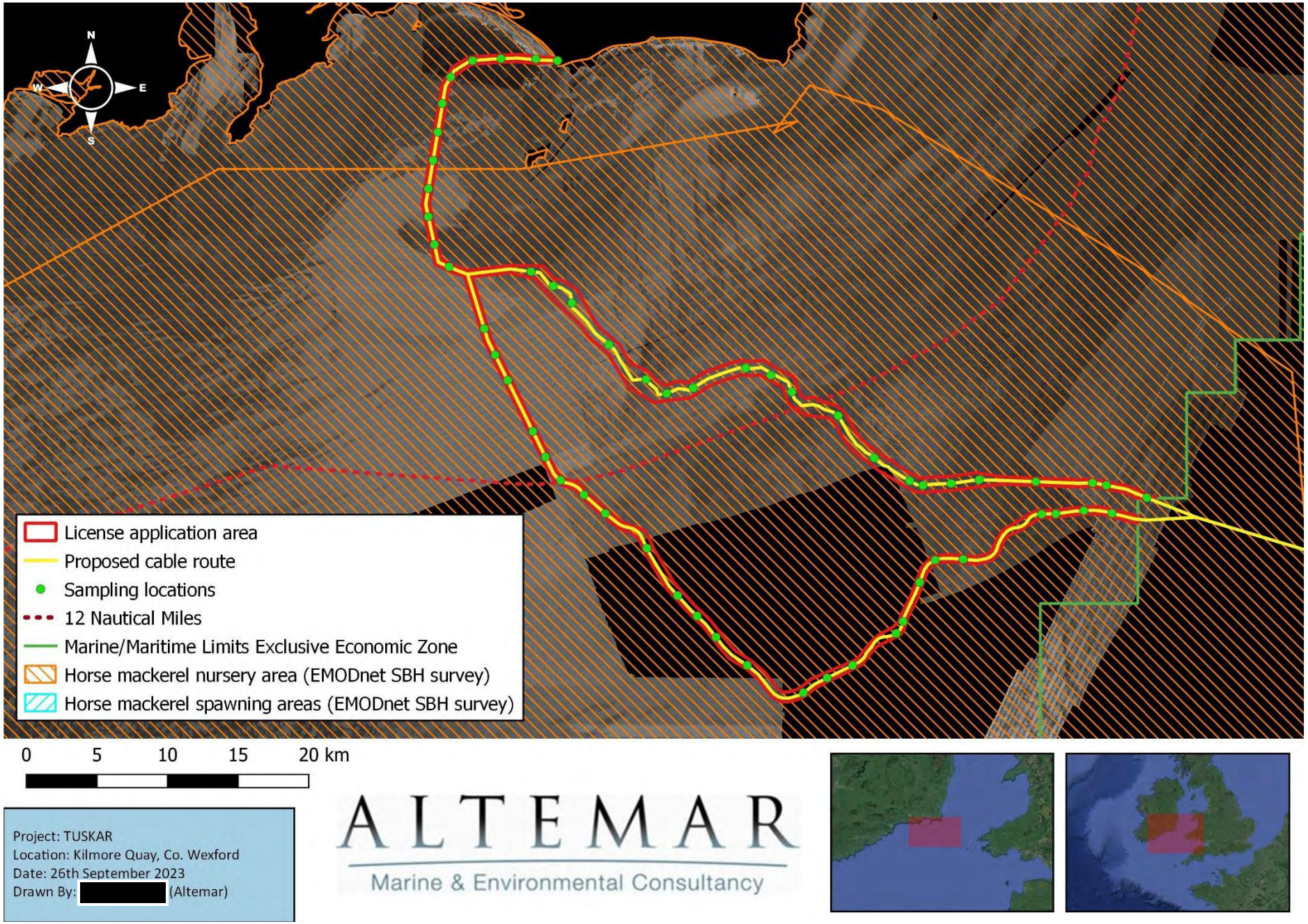

Figure 5. *Horse Mackerel spawn and nursery grounds proximate to the proposed foreshore*

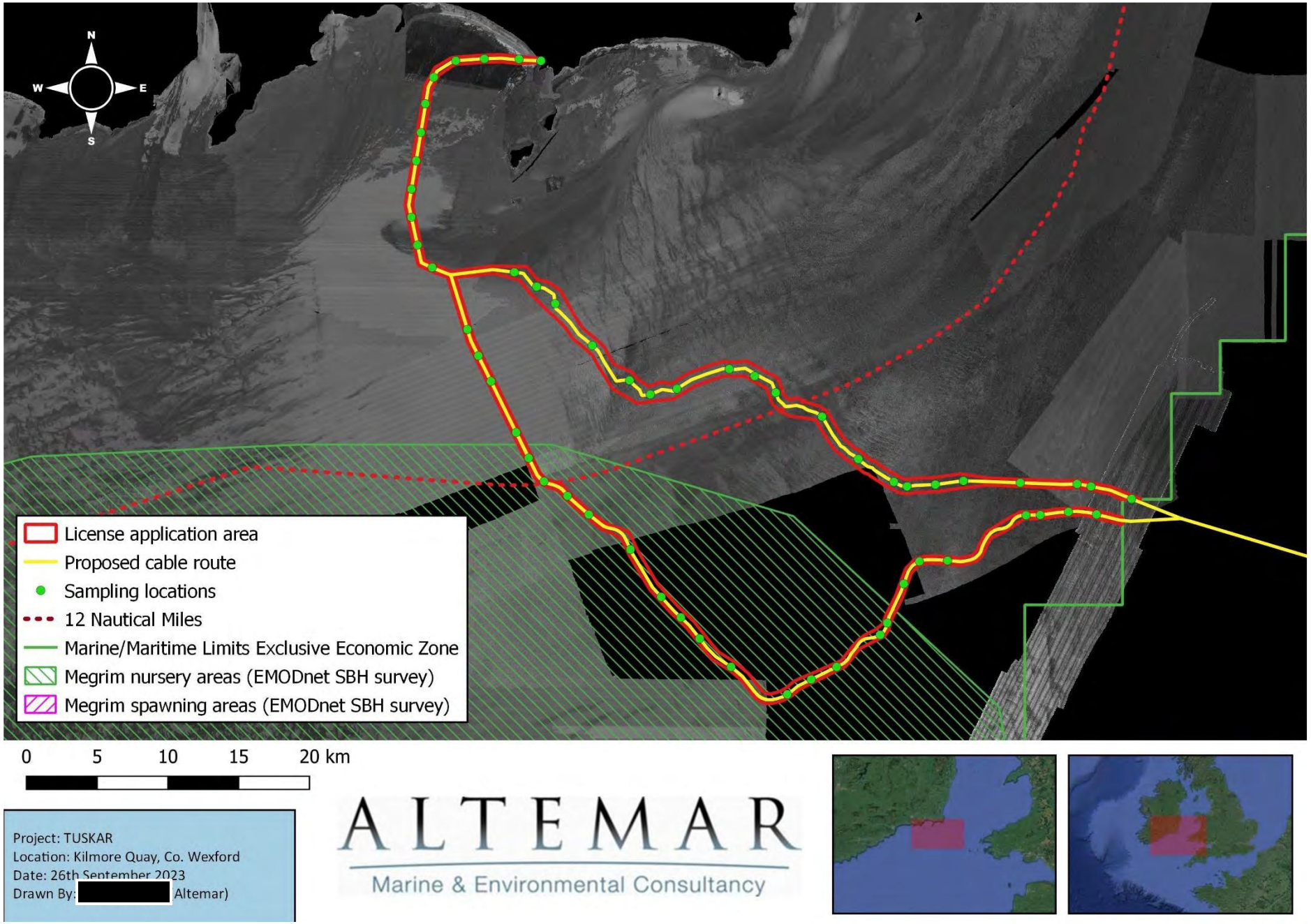

Figure 6. *Megrim spawn and nursery grounds proximate to the proposed foreshore survey*

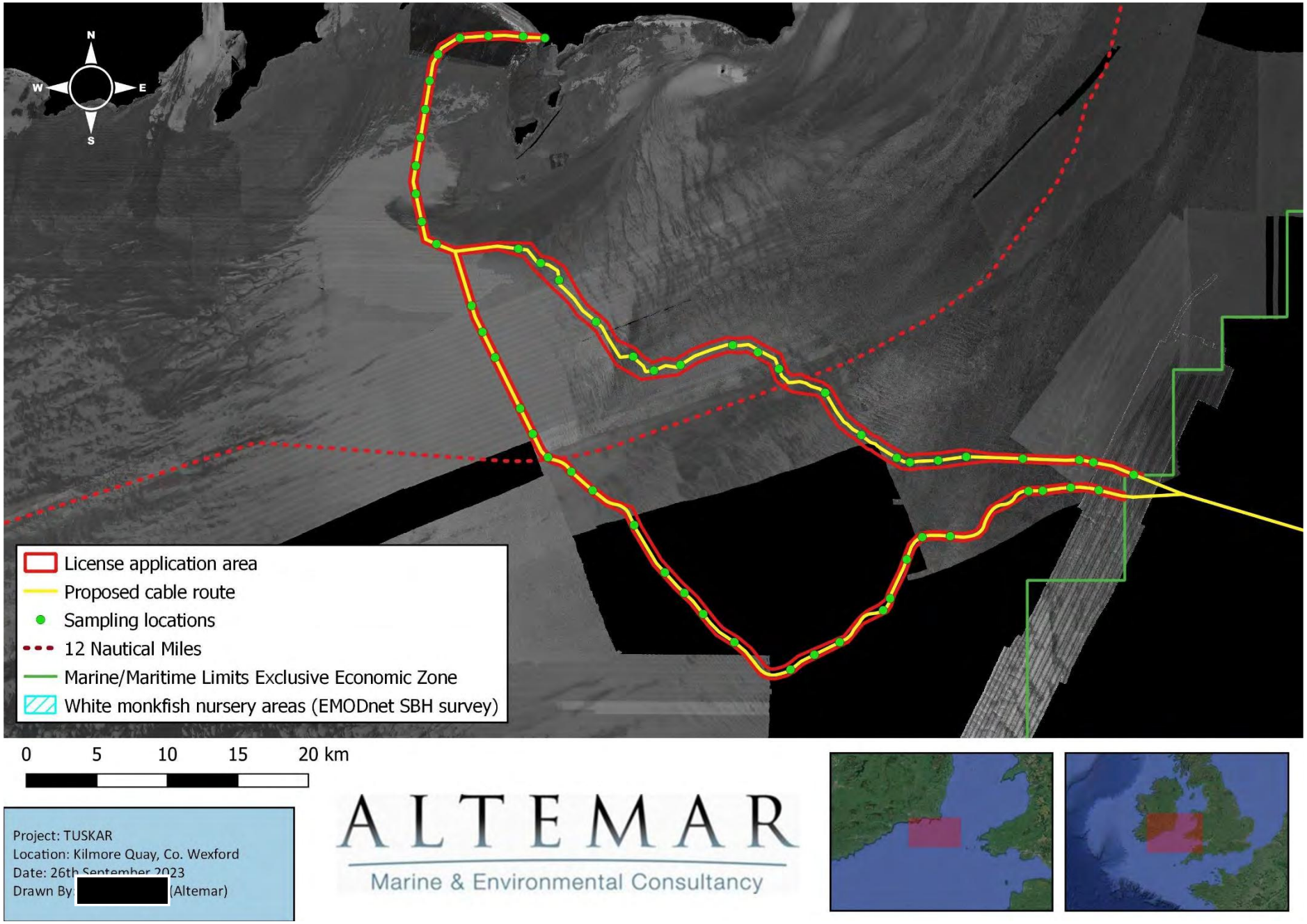

Figure 7. *White Monkfish nursery grounds proximate to the proposed foreshore survey area*

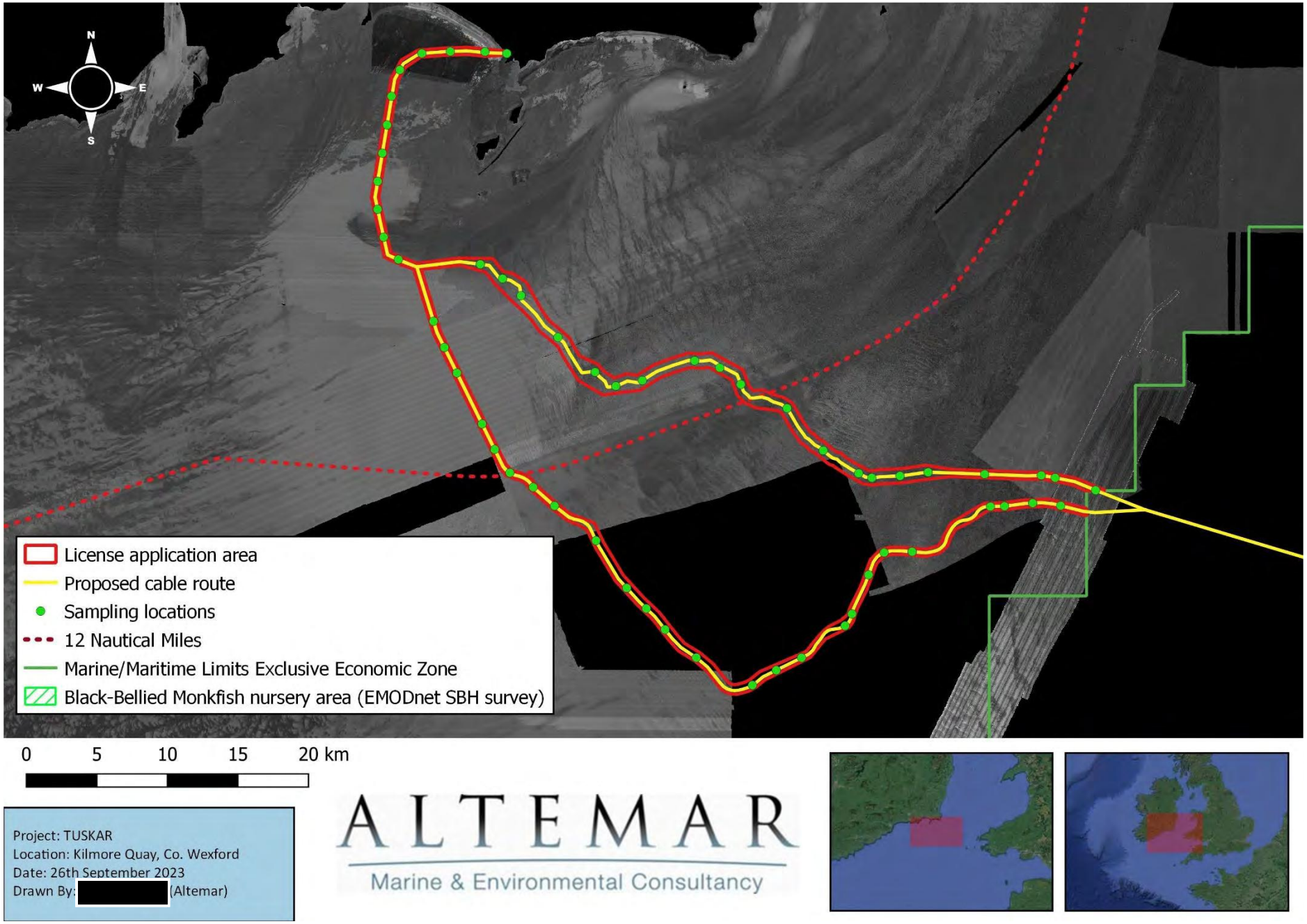

Figure 8. *Black-Bellied Monkfish nursery grounds proximate to the proposed foreshore survey*

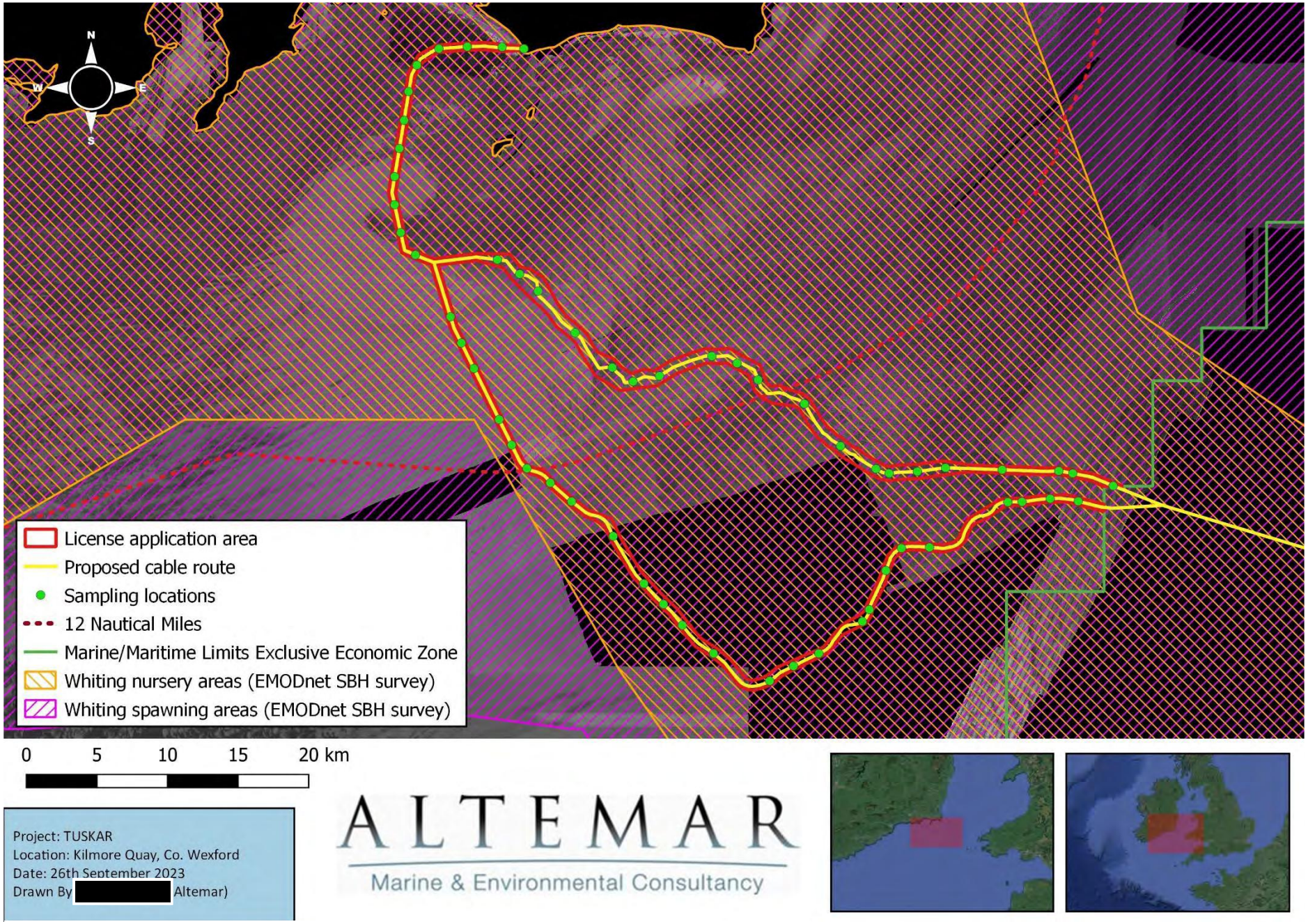

Figure 9. *Whiting spawn and nursery grounds proximate to the proposed foreshore survey*

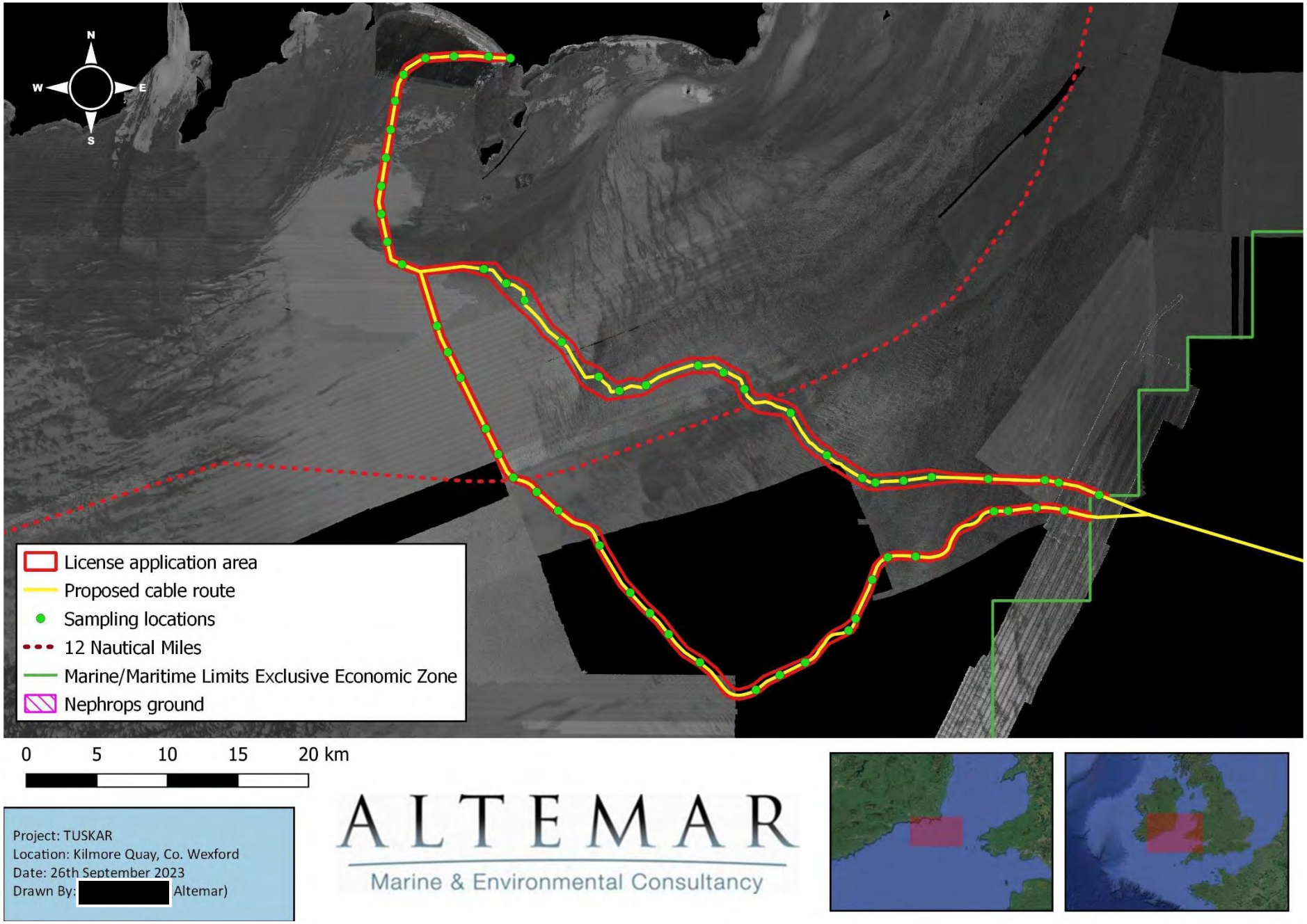

Figure 10. *Nephrops grounds proximate to the proposed foreshore survey area*

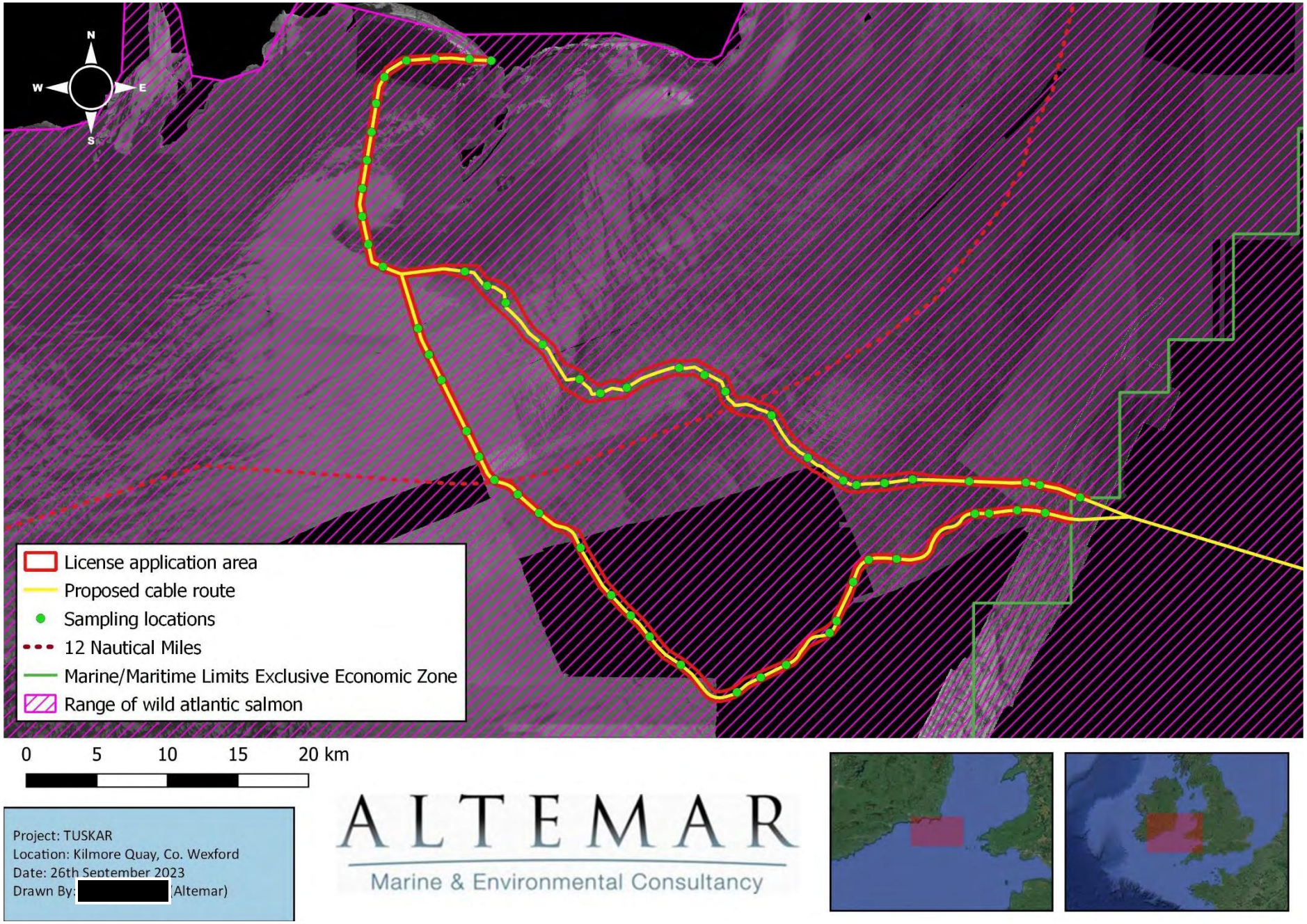

Figure 11. *Range of Atlantic Salmon proximate to the proposed foreshore survey area*

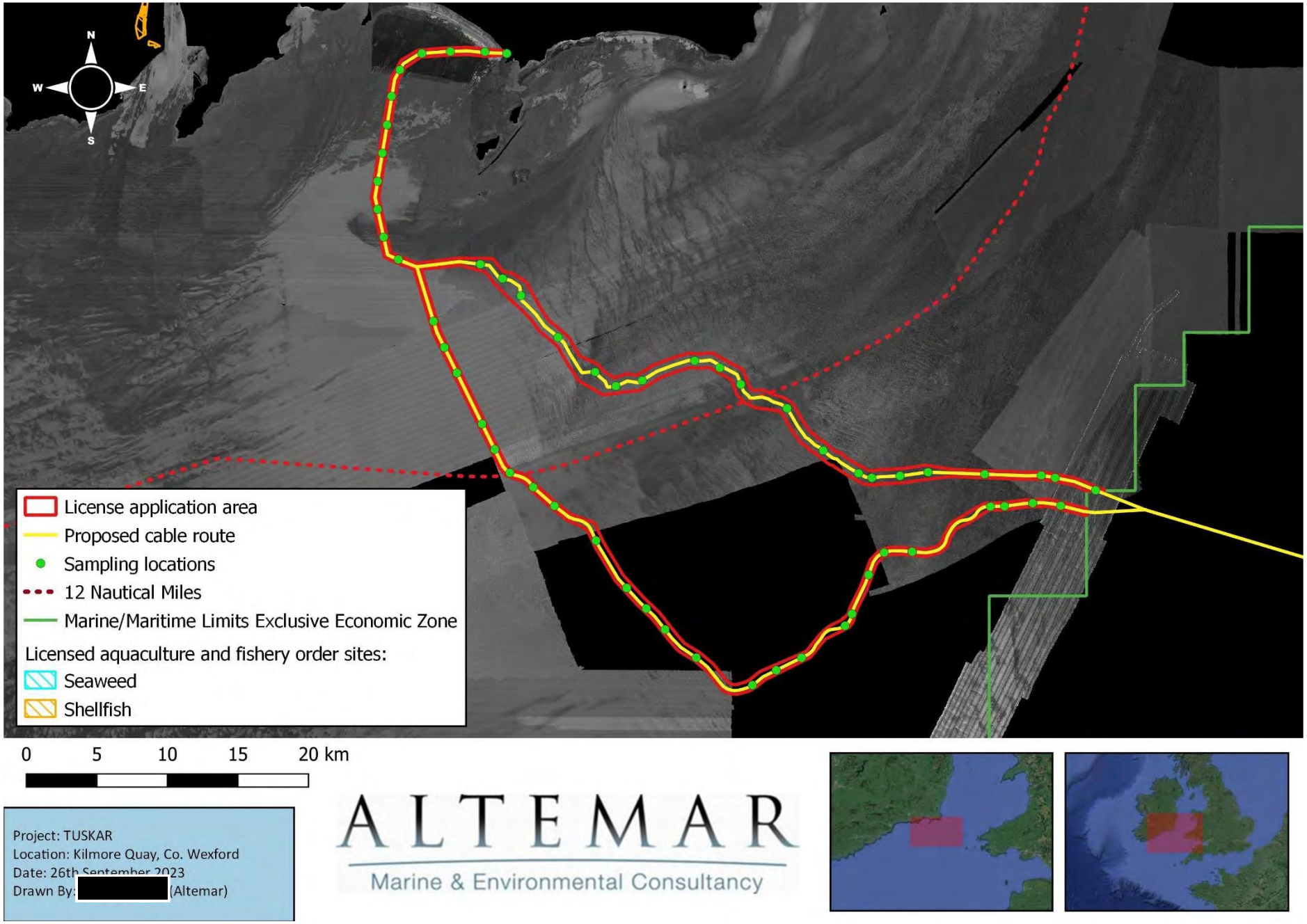

Figure 12. *Licensed aquaculture and fishery order sites proximate to the proposed foreshore survey area*

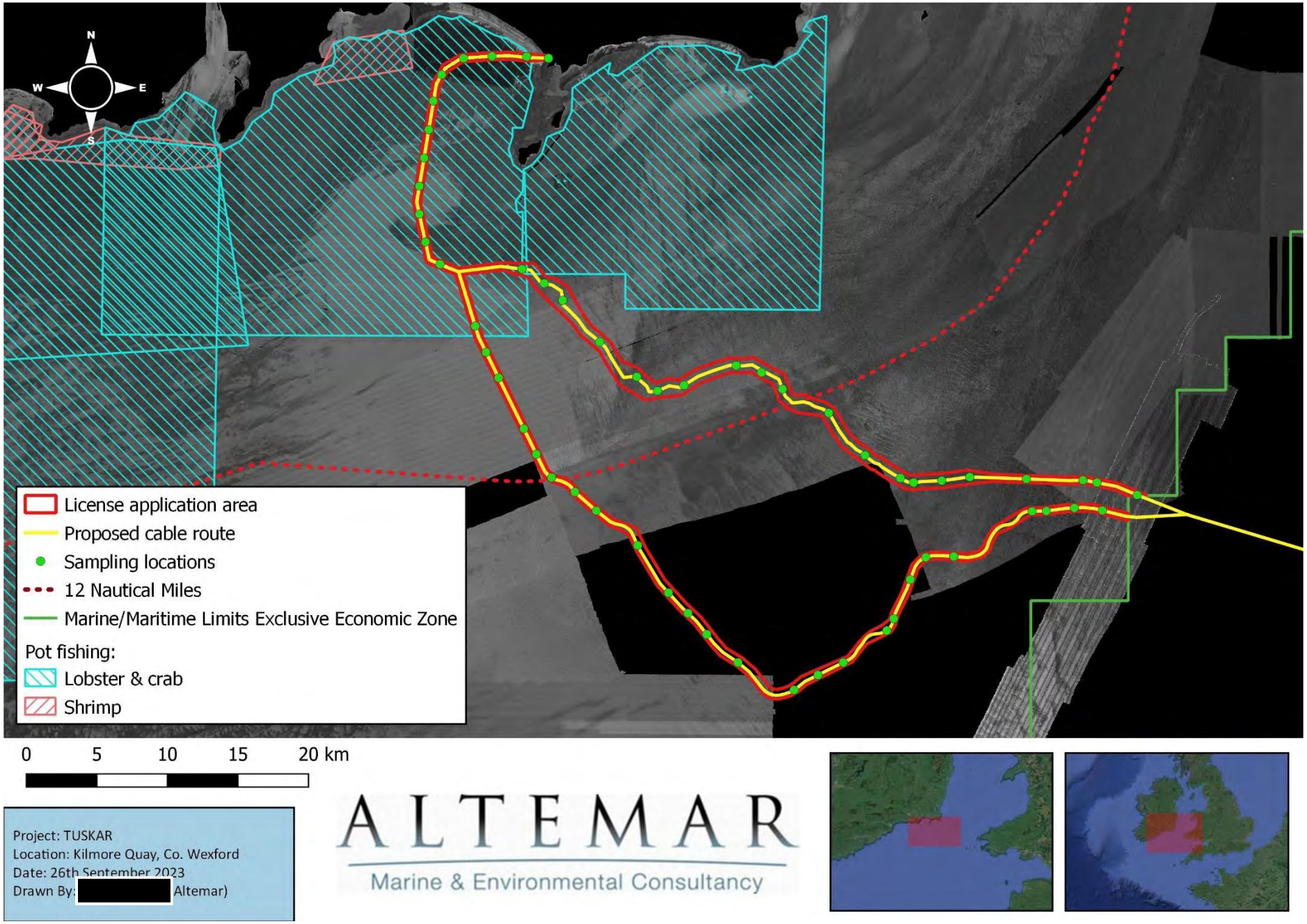

Figure 13. *Pot fishing proximate to the proposed foreshore survey area*

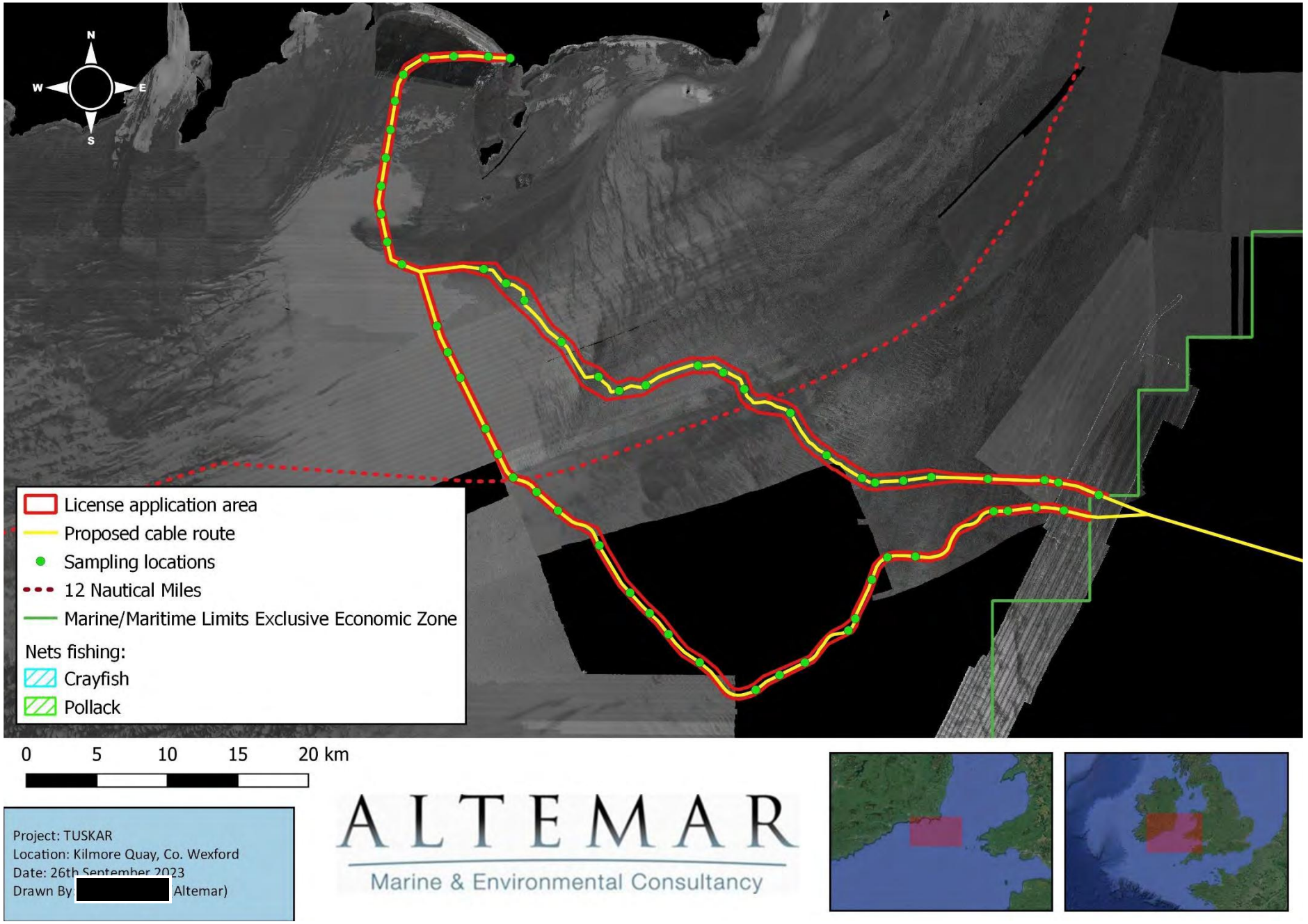

Figure 14. *Nets fishing proximate to the proposed foreshore survey area*

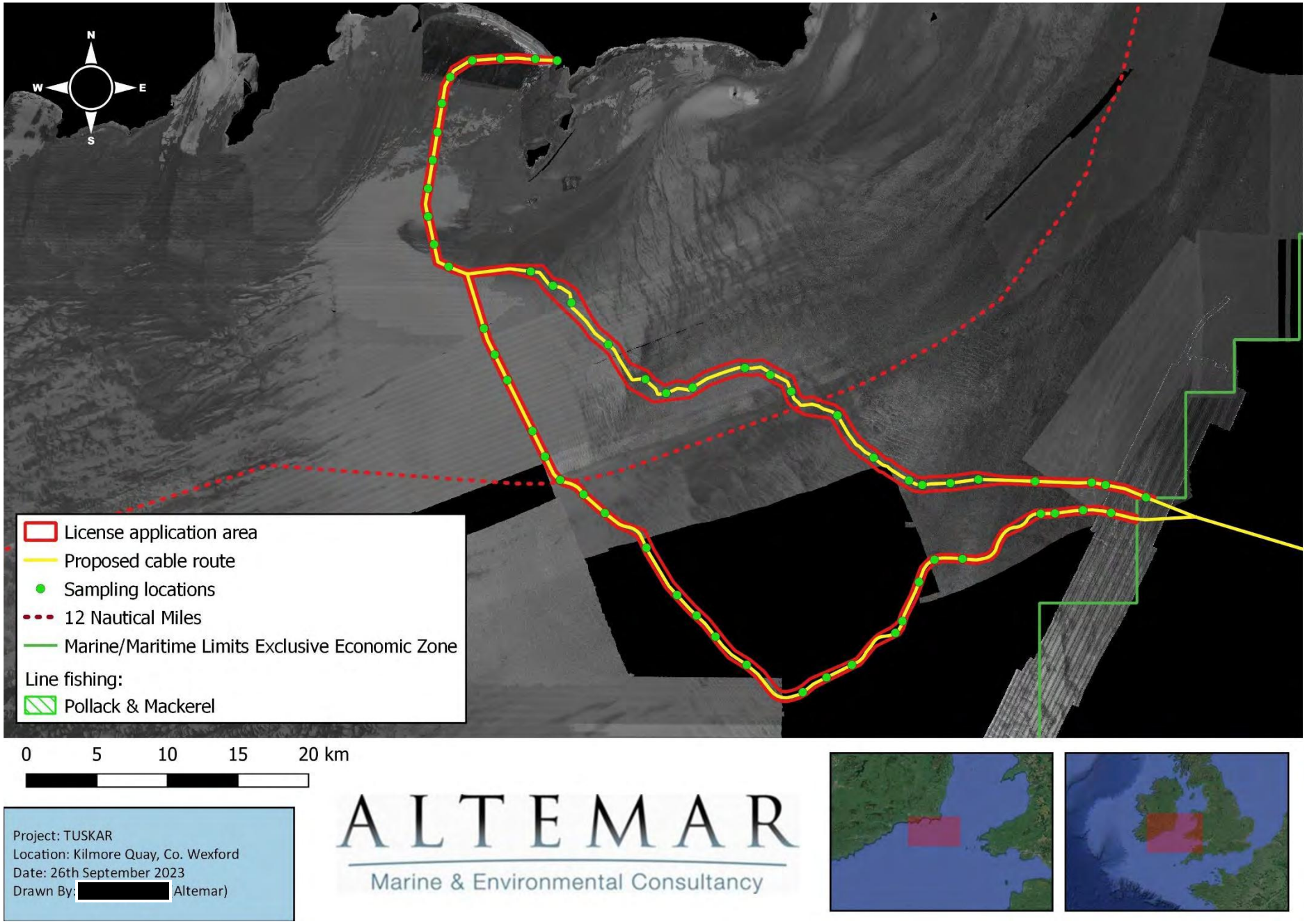

Figure 15. *Line fishing proximate to the proposed foreshore survey area*

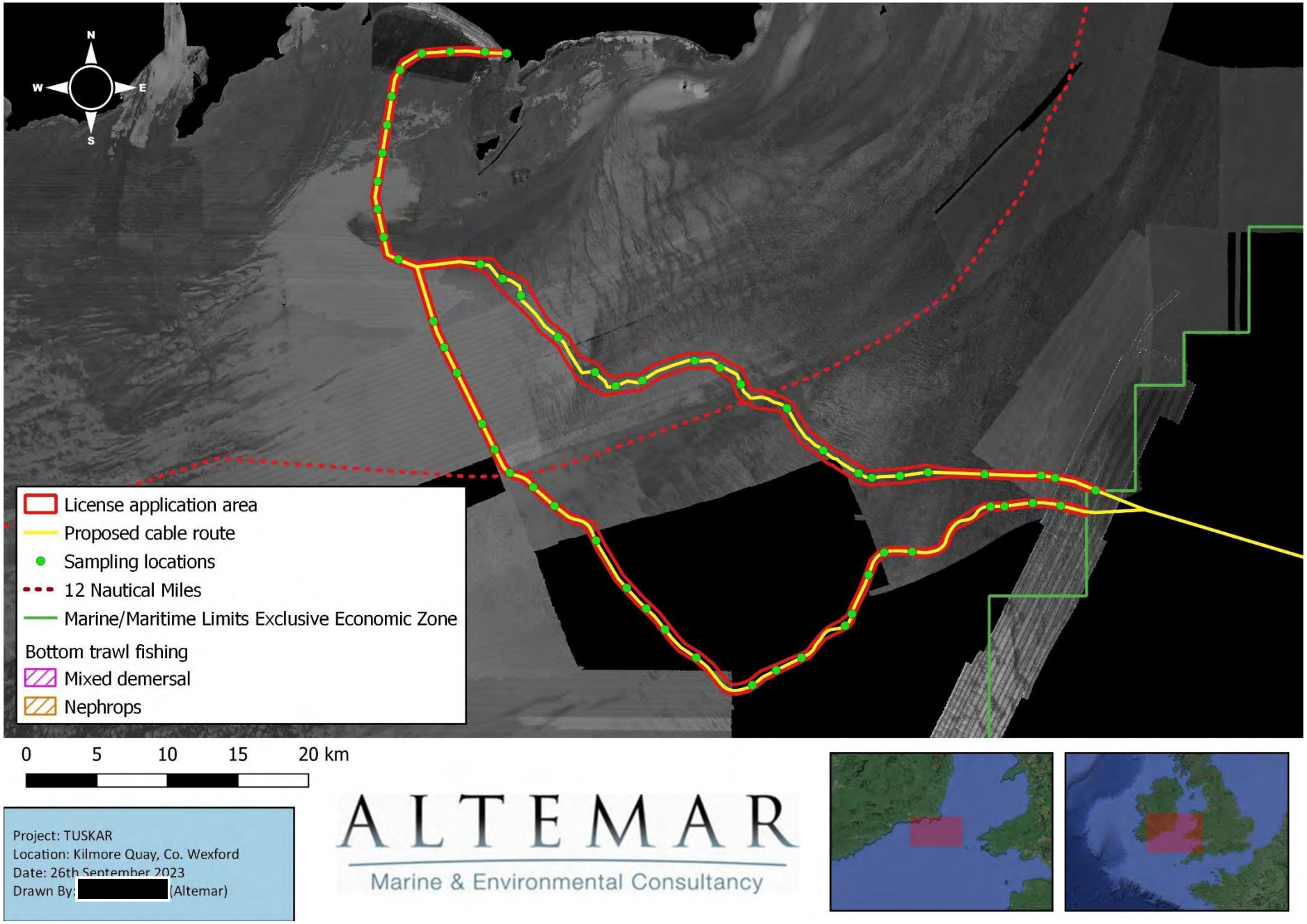

Figure 16. *Bottom trawl fishing proximate to the proposed foreshore survey area*

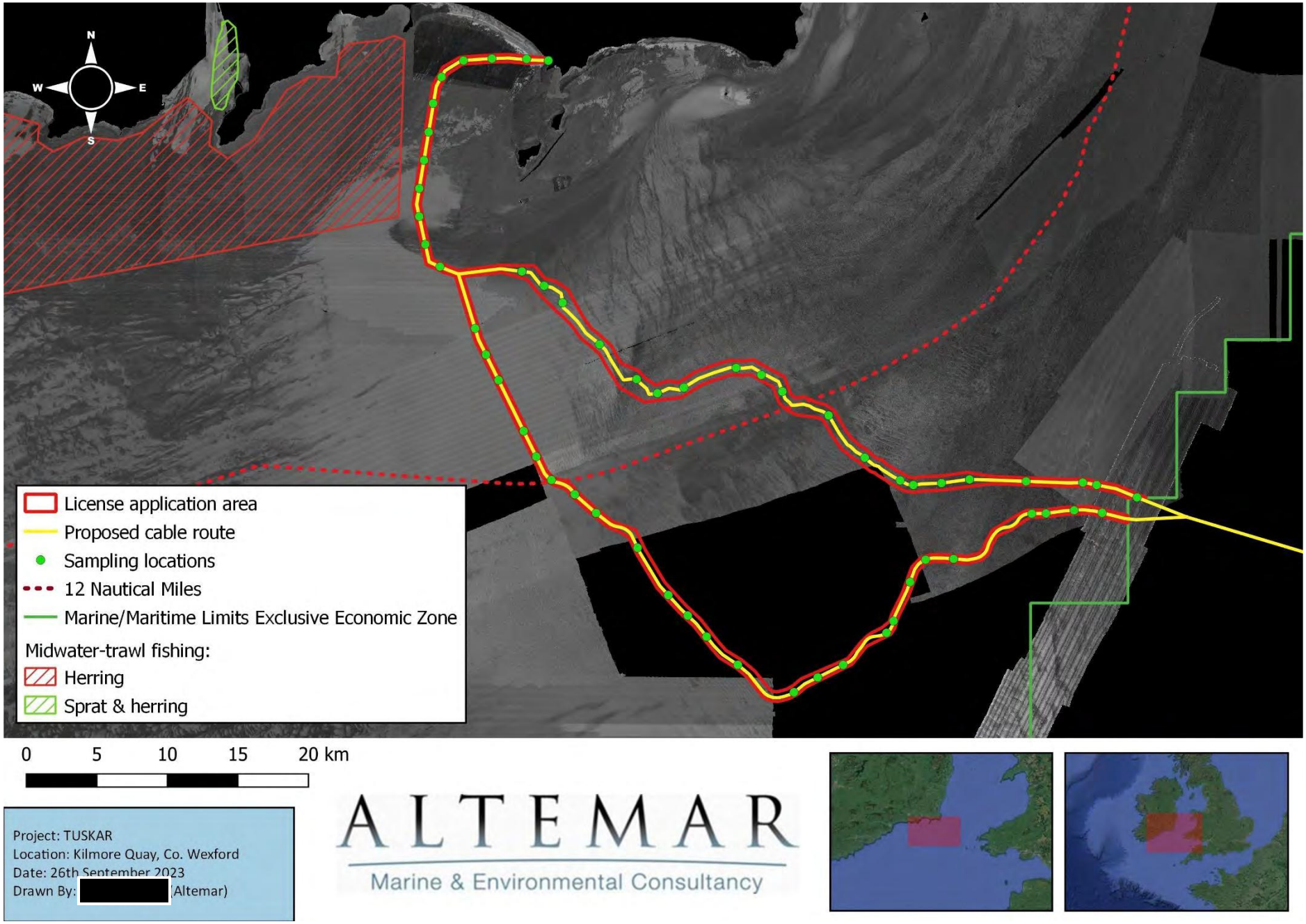

Figure 17. *Midwater trawl fishing proximate to the proposed foreshore survey area*

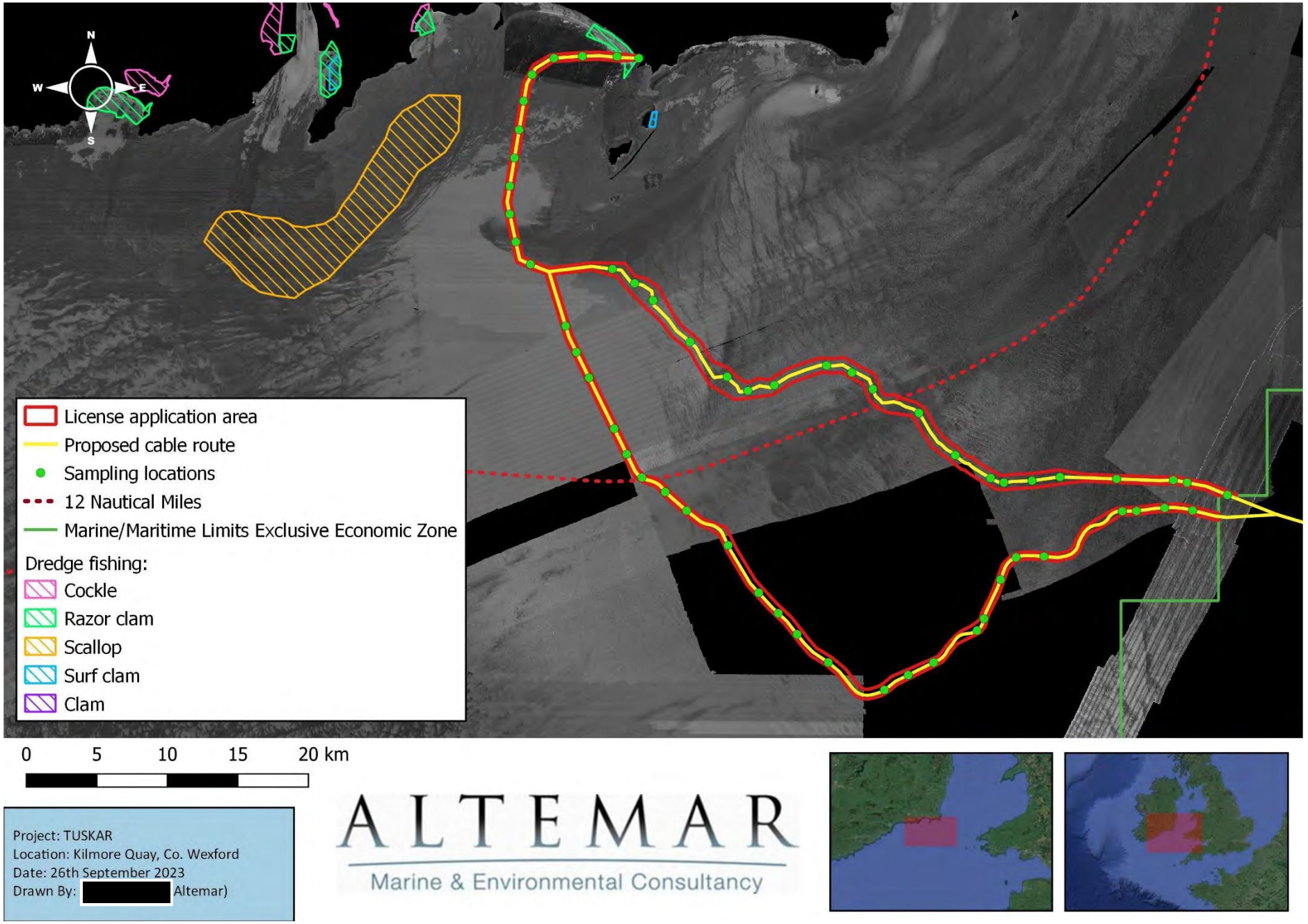

Figure 18. *Dredge fishing proximate to the proposed foreshore survey area*

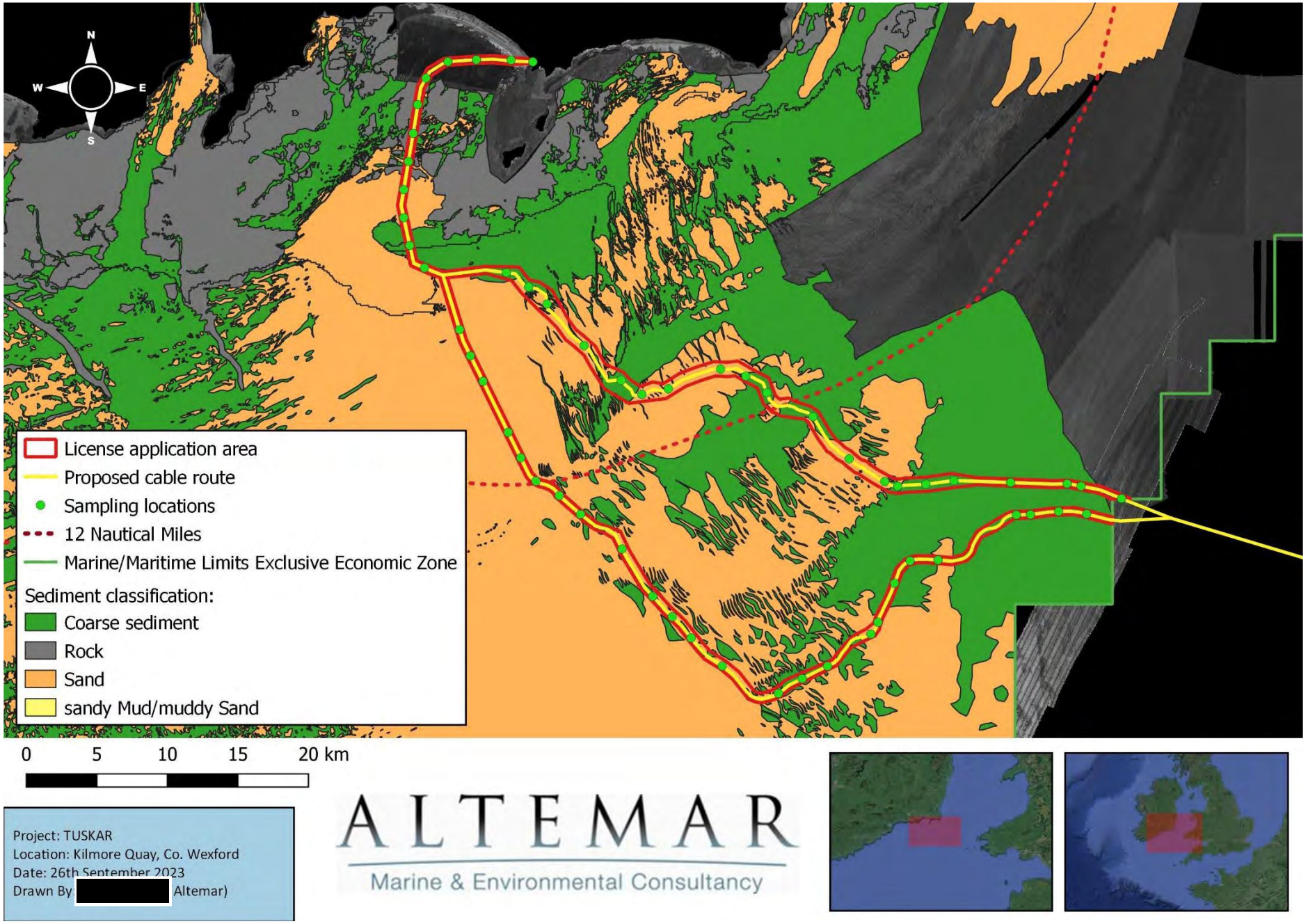

Figure 19. *Seabed habitats along proposed foreshore survey route*

Spawning Area	Spawning Ground	Spawning Bed	Depth (m)	Area (Sq Km)	Actvity
Daunt	Holeopen Bay	Holeopen Bay 1	18-25	0.33	October
	Daunt 1	Daunt 1.1	15-35	0.24	Nov and Feb
		Daunt 1.2	15-35	0.22	February
	Daunt 2	Daunt 2.1	20-35	1.01	Oct/Nov
		Daunt 2.2	30	2.36	February
	Daunt 3	Daunt 3.1	20-30	0.22	Nov/Dec
		The Smiths	21-25	0.53	February
East Cork	Ballycotton	Ballycotton 1	20-30	0.41	November
	Youghal	Youghal	15	0.61	October
	Rams Head	Rams Head 1	20-25	1.17	Nov and Feb
Dunmore East	Tramore	Brownstone	15-20	10.89	Jan/Feb
		The Roads	35	5.24	Dec/Jan
	Baginbun	Hook Head	25-35	15.06	December
		The Big Rock	30	1.72	December
		Baginbun 1	20-30	11.83	October
	Keeragh Island	Keeragh Island 1	36	36.07	Sept/Oct

Figure 20. *Spawning areas, spawning grounds and spawning beds around the Celtic Sea and southwest coast. Area (km2) and depth (m) refer to individual spawning beds.*

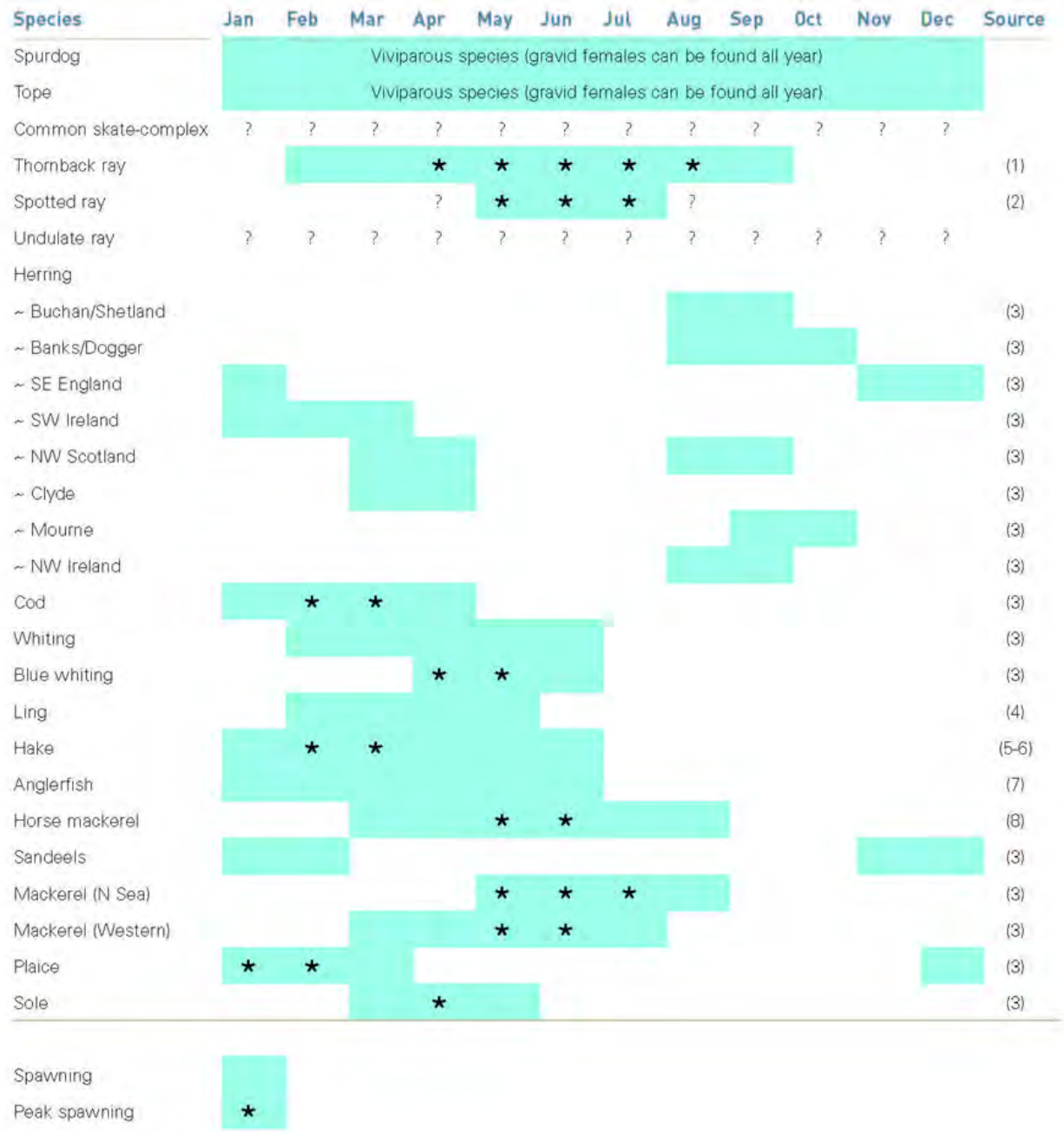

Figure 21. *Spawning times of various fish species in the British Isles (CEFAS)*