Islandmagee Gas Storage Facility

Marine Consents Application

EIA Scoping Report



Islandmagee Gas Storage Facility

D01

October 2025

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
D01	Submission to DAERA	Various	[redacted]	[redacted]	03/10/2025

Approval for issue

[redacted] [redacted] 09/10/2025

© Copyright Tetra Tech Limited. All rights reserved.

The report has been prepared for the exclusive use and benefit of our client, Islandmagee Energy Limited, and for the sole and specific purpose for which it is provided. Tetra Tech Ltd., any of its subsidiaries, or a related entity (collectively 'TTRPS') does not accept any liability if this report is used for an alternative purpose from which it is intended. The report does not account for any changes relating the subject matter of the report, or any legislative or regulatory changes that have occurred since the report was produced and that may affect the report.

TTRPS does not accept any responsibility for any documents or information supplied to TTRPS by others. It is expressly stated that no independent verification of any documents or information supplied by others has been made.

Unless otherwise agreed in writing by TTRPS no other party may use, make use of, or rely on the contents of this report. TTRPS does not accept any responsibility or liability for loss whatsoever to any third party caused by, related to, or arising out of any use or reliance on the report.

Prepared by:

Tetra Tech RPS

[redacted]

T [redacted]

E [redacted]

Prepared for:

Islandmagee Energy Ltd.

[redacted]

T [redacted]

E [redacted]

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

✓

Table 2-1: Topics considered in this Report.

Report Chapter	Topic
5	Terrestrial Biodiversity, Flora and Fauna
6	Terrestrial Ornithology
7	Offshore and Intertidal Ornithology
8	Benthic, Subtidal and Intertidal Ecology
9	Fish, Shellfish and Plankton Ecology
10	Marine Mammals
11	Underwater Noise
12	Terrestrial Noise and Vibration
13	Shipping, Navigation and Safety
14	Material Assets - Commercial Fisheries
15	Material Assets - Infrastructure and Other Users
16	Material Assets - Agriculture and Land Use
17	Material Assets -Traffic and Transportation
18	Land, Soils, Geology and Hydrogeology
19	Water Quality
20	Flood Risk
21	Air Quality
22	Climate
23	Coastal Processes
24	Cultural Heritage and Archaeology
25	Waste
26	Seascape, Landscape and Visual Impact
27	Population and Human Health
28	Socio-economics
29	Risk of Major Accidents and Disasters

Table 3-1: Matrix for the determination of significant effects

		Magnitude of change				
		High	**Medium**	**Low**	**Negligible**	**No Change**
Sensitivity	**Very High**	Major	Major	Major / Moderate	Moderate	No Change
	High	Major	Major/ Moderate	Moderate	Moderate/ Minor	No Change
	Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor	No Change
	Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible	No Change
	Negligible	Negligible	Negligible	Negligible	Negligible	No Change

3.1.2 Mitigation

The specific approach to defining mitigation measures within the ES is defined by relevant sectoral guidance and standards. However, IEMA Guidance provides a benchmark for global standards and sets out the required interactions between the EIA and design process, so that mitigation measures can be captured and delivered. Following this approach ensures that during the EIA process, environmental issues are taken into account as part of an ongoing iterative design process, thus the EIA influences the design. Furthermore, the Guidance sets out key principles and direction to ensure that environmental mitigation identified during the pre-application assessment process (including design and EIA) is delivered once consent has been granted.

The topic-based chapters of the ES will outline mitigation measures that will form part of the Project and that have been considered in the assessment of effects for that topic. These include:

- measures included as part of the Project design (embedded mitigation);
- measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the Construction Environmental Management Plan (CEMP); and
- measures required due to legislative requirements.

Table 3-2 outlines the IEMA classification of types of EIA mitigation.

Table 3-2: Classification of types of mitigation outlined in the IEMA Guidance (IEMA, 2024)

Mitigation	Description
Primary (inherent)	Modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken. **Key principles:** • Action at the top of the mitigation hierarchy, with greater ability to avoid impacts. • Best applied early, because they become more difficult to accommodate as the design progresses and stabilises. • Become a fundamental part of the design seeking consent. • Described in detail within the ES project description.
Secondary (foreseeable)	Actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or through inclusion in the ES. **Key principles**: • A flexible form of mitigation that can be proposed at any point within the EIA process, including during the decision-making process. • Tend to operate in the middle of the mitigation hierarchy, focusing on reducing the significance or likelihood of adverse effects. • While they would be integrated into the application for consent, this form of mitigation requires additional action post-consent, beyond the core function of the development, to be implemented. • Carry a greater risk of non-implementation or ineffective application post consent than primary or tertiary mitigation. • Best managed through an Environmental Management Plan.
Tertiary (inexorable)	Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects. **Key principles:** • Can be identified at any point during the design and EIA process. • The least flexible form of mitigation – either they exist, or they do not. • The EIA Co-ordinator must be confident that any tertiary mitigation identified is very likely (>90%) to occur without further specific activity being undertaken within the EIA process. • It is helpful, but not strictly necessary, to include tertiary mitigation related to construction activities within a draft Construction Environmental Management Plan (CEMP) (or similar) included in the ES, to ensure that these actions are highlighted to the principal contractor.


C72
Drains Bay
C72
A2
P&O Larne - Cairnryan Ferry
Seawater Intake
Brine Outfall
Northern Ireland
Belfa
A8
Larne
Ballylumford
A2
A8
A8
B90
B90
Caverns
Mullaghboy
A2
Glynn
A2
Millbay
A2
Marine Application Areas
0 0.38 0.75 1.5 2.25 3
Kilometers
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

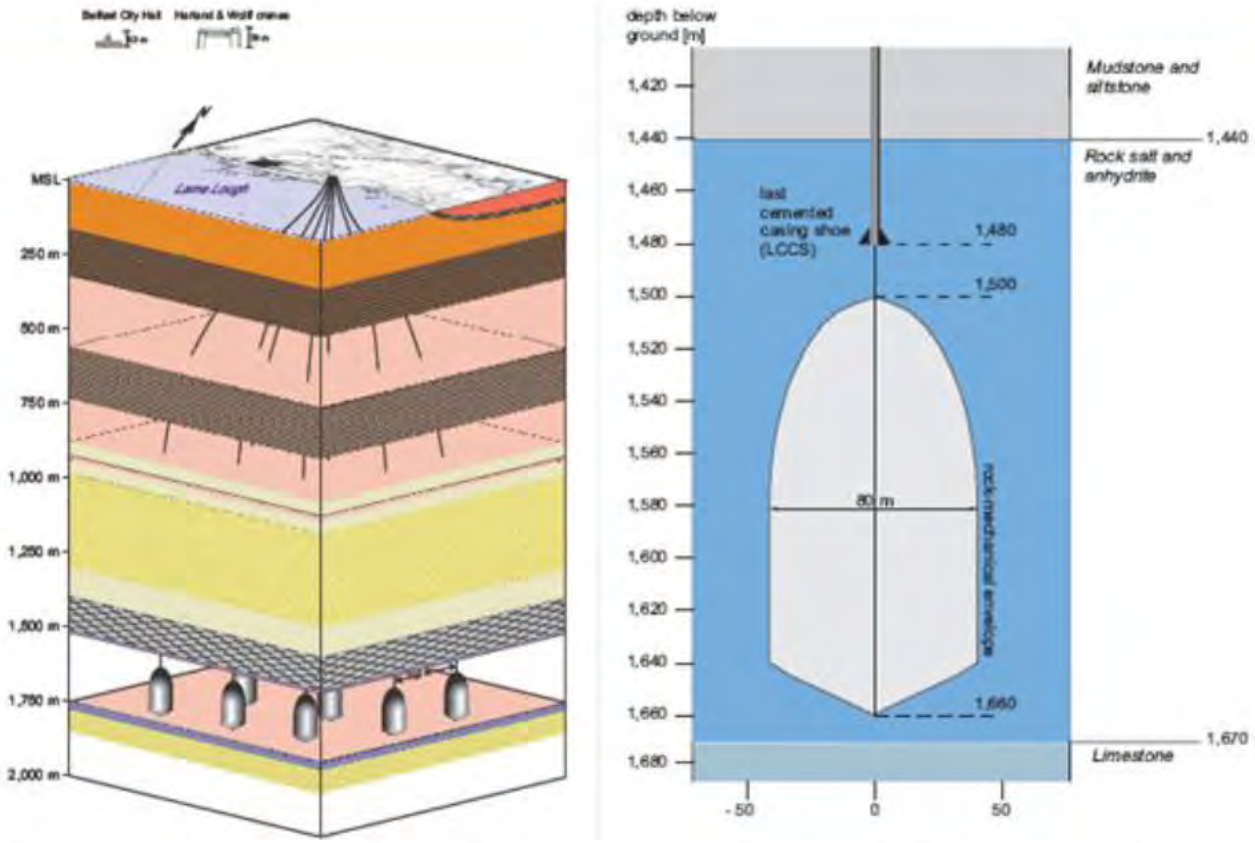


Figure 4-2: Conceptual Cavern Design Produced by DEEP Underground Engineering Gmbh (RPS, 2010a)



Figure 4-3: Location of discharge and abstraction points


Brine Outfall
(27m Water Depth)
Sea Water Intake
Sea Water Intake
Pumping Station
Temporary Construction
Set-Down Area
(existing hardstanding)
Seawater and Brine
Pumping Facilities
(Leaching Plant)
Subsurface Sea Water and
Brine Pipelines
Existing Power
Station
Main Gas Plant
Facilities
Access Road
Vent
Subsurface Sea Water,
Brine and Gas Pipelines
Access Road
Wellpad
Proposed Cavern Locations
(top of caverns c.1,5000m
beneath the seabed)
500 250 0 500 Meters
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

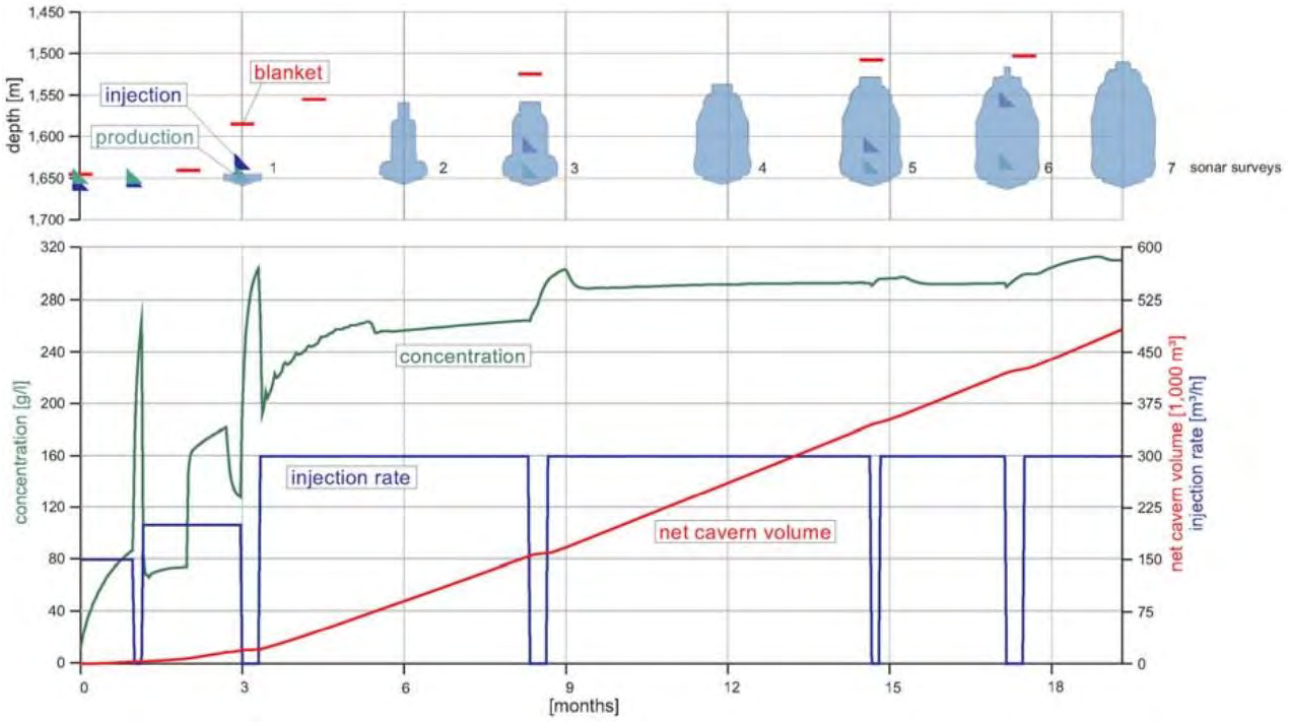

depth [m]
1,450
1,500
1,550
1,600
1,650
1,700
injection
production
blanket
1
2
3
4
5
6
7 sonar surveys
concentration [g/l]
320
280
240
200
160
120
80
40
0
concentration
injection rate
net cavern volume
net cavern volume [1,000 m³]
injection rate [m³/h]
600
525
450
375
300
225
150
75
0
0
3
6
9
12
15
18
[months]

Table 5-1: Impacts Proposed to be Scoped In (✓) / Out (x) for Terrestrial Ecology

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Temporary and permanent deterioration, loss and/or fragmentation of terrestrial habitat	x	x	As the Project for which development consent is being sought is entirely confined to the marine environment, there is no potential for the temporary or permanent deterioration, loss and/or fragmentation of terrestrial habitats. Terrestrial habitats have been scoped out of further assessment.	N/A	N/A
Spread of invasive alien plant species (IAPS)	x	x	As the Project for which development consent is being sought is entirely confined to the marine environment, there is no potential for the accidental spread of IAPS in the terrestrial ecology Study Area. The potential for introduction and spread of IAPS in the marine environment is dealt with in Chapter 8 (Benthic Subtidal and Intertidal Ecology).	N/A	N/A
Disturbance and displacement of Bat Species	x	x	There are records of bat associated with adjoining lands on the Islandmagee peninsula. As the Project for which development consent is being sought is entirely confined to the marine environment, there are no suitable structures or features present for roosting, breeding or hibernating bats. The site offers limited support for commuting or foraging bats, consisting of open sea and estuarine habitats.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			Bats have been scoped out of further assessment.		
Disturbance and displacement of Otter, or deterioration of the water environment relied upon by the species for obtaining its prey	✓	x	Otters occur both on land and within the marine area within the ZoI of the Project. Otters are scoped into the assessment for the construction/decommissioning phase of the Project.	Desktop data sources. Survey for otter in accordance with NIEA Survey Specification for Otter (DAERA, 2017)	The significance of effects upon otter will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact shall be determined by assessing the likelihood for disturbance of the marine activities proposed. The sensitivity of the receptor will be determined by the results of site-specific surveys conducted for the EIA.
Disturbance and displacement of Badger	x	x	There are records of badgers associated with adjoining lands on the Islandmagee peninsula.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			As the Project is entirely confined to the marine environment, there are no suitable habitats for commuting, foraging or breeding badgers. Badgers have been scoped out of further assessment.		

* The project phase refers to construction/decommissioning (C) and operation (O).

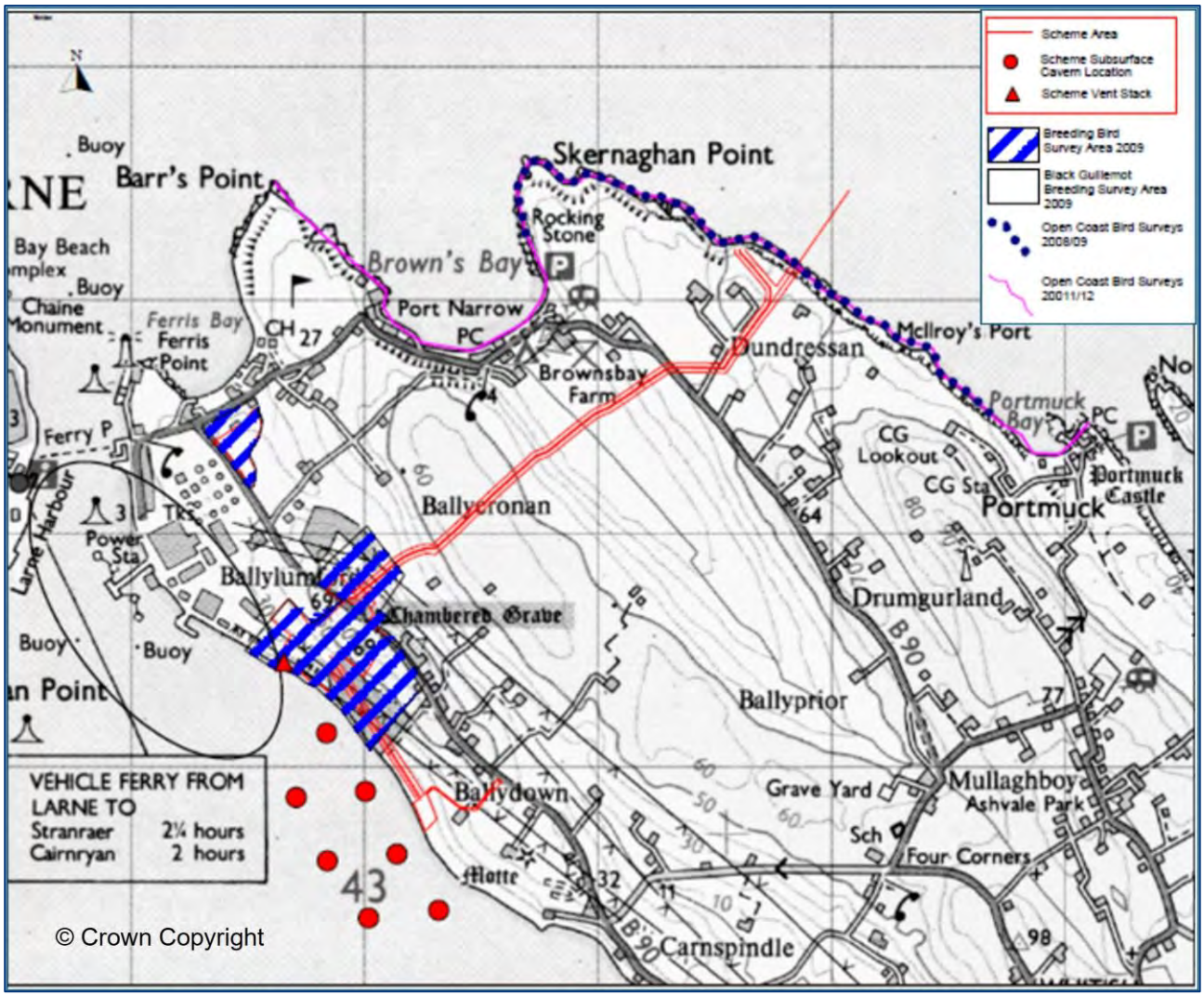
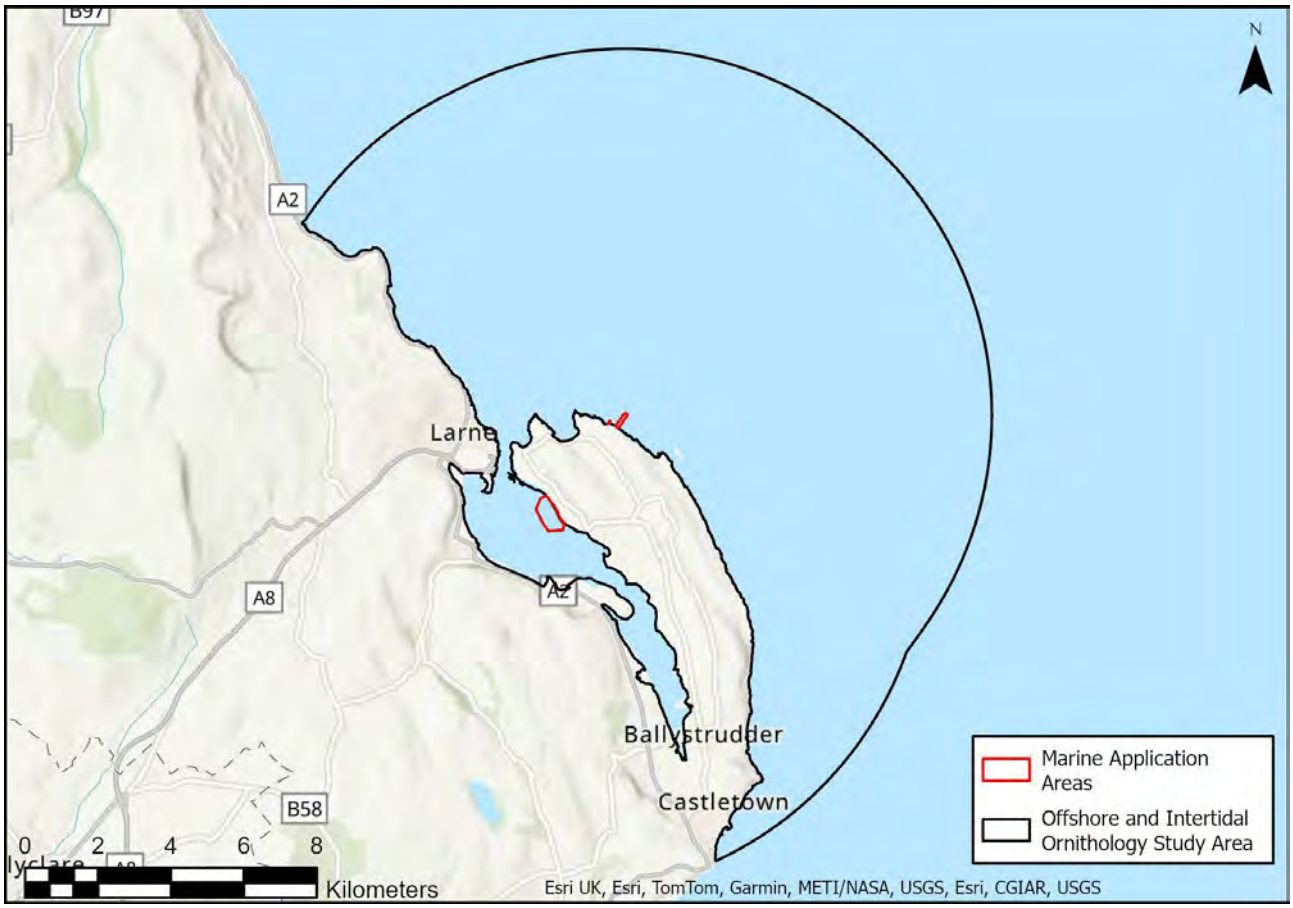

Scheme Area
Scheme Subsurface Cavern Location
Scheme Vent Stack
Breeding Bird Survey Area 2009
Black Guillemot Breeding Survey Area 2009
Open Coast Bird Surveys 2008/09
Open Coast Bird Surveys 2011/12
Skernaghan Point
Barr's Point
Rocking Stone
Brown's Bay
Port Narrow
PC
Brownsbay Farm
Dundressan
McIlroy's Port
Portmuck Bay
PC
CG Lookout
CG Sta
Portmuck
Portmuck Castle
Ferris Bay
Ferris Point
Ferry P
Larne Harbour
Power Sta
Ballyveronan
Ballylumford
Chambered Grave
Drumgurland
Ballyprior
Ballydown
Grave Yard
Mullaghboy
Ashvale Park
Sch
Four Corners
Motte
Carnspindle
B90
VEHICLE FERRY FROM LARNE TO
Stranraer 2¼ hours
Cairnryan 2 hours
43
© Crown Copyright

Table 6-1: Impacts Proposed to be Scoped In (✓) / Out (x) for Terrestrial Ornithology

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Disturbance and displacement of terrestrial birds	x	x	As the current Project is entirely contained within the marine environment and below MHWS, there is no significant risk of disturbance or displacement of terrestrial birds as a result of the Project. Disturbance and displacement of terrestrial birds have been scoped out of further assessment. Any impact associated with terrestrial works was assessed and consented under the extant planning application.	N/A	N/A
Loss of foraging or breeding habitat for terrestrial birds	x	x	As the current Project is entirely contained within the marine environment and below MHWS, there is no significant risk of loss of foraging or breeding habitat for terrestrial birds as a result of the project. Loss of foraging/breeding habitat for terrestrial birds has been scoped out of further assessment. Any impact associated with terrestrial works was assessed and consented under the extant planning application.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).


B97
A2
Larne
A8
A2
Ballystrudder
Castletown
B58
N
Marine Application Areas
Offshore and Intertidal Ornithology Study Area
0 2 4 6 8
Kilometers
Esri UK, Esri, TomTom, Garmin, METI/NASA, USGS, Esri, CGIAR, USGS

- The Wildlife (Northern Ireland) Order 1985 (S.I. 1985/171 (N.I. 2)) as amended by The Wildlife (Amendment) (Northern Ireland) Order 1995 (S.I. 1995 No. 761 (N.I. 6)) ('The Wildlife Order');
- The Department of the Environment (DOE) Review of The Wildlife (Northern Ireland) Order 1985 – A Consultation Paper ('The Wildlife Order Review Paper');
- The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (S.R. 1995 No. 380) as amended by the Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004 (S.R. 2004 No. 435) and The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2007 (S.R. 2007 No. 345);
- The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2009 (S.R. 2009 No. 8) ('The Conservation Regulations');
- The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (S.I. 1985/170 (N.I. 1)) ('The Nature Conservation Order');
- The Fisheries Act (Northern Ireland) 1996 (as amended)
- Northern Ireland Biodiversity Strategy (Northern Ireland Biodiversity Group, 2002);
- The Environment (Northern Ireland) Order 2002 (S.I. 2002/3153 (N.I. 7)) ('The Environment Order');
- The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003 (S.R. 2003 No. 544); and
- Larne Area Plan 1984-2010.

7.3.2 Desktop Data

Table 7-1 presents the desktop data sources proposed for the offshore and intertidal ornithology assessment. The proposed site area and a surrounding buffer zone of 2km were included in a search to collate relevant environmental data and anecdotal information to assist with the ecological assessment and evaluation. A search for additional, more recent datasets is ongoing.

Table 7-1: Summary of Key Desktop Datasets and Reports

Title	Year	Source	Citation
Non-Estuarine Wetland Surveys (NEWS)	1998 and 2007	British Trust for Ornithology (BTO)	-
Wetland Bird Survey Data (WeBS)	2001-2006	BTO	-
JNCC (Joint Nature Conservation Committee) Tern Datasets for Larne Lough	2014	The Joint Nature Conservation Committee (JNCC)	Wilson et al. (2014)

7.3.3 Site-specific Surveys

Table 7-2 lists the suite of ornithological surveys undertaken for the project since 2008 within the Study Area to assess the potential impact of the Project on offshore and intertidal ornithology receptors.

Table 7-2: Summary of site-specific survey methodologies

Survey	Year	Summary
Breeding Black Guillemot Survey	2009 (Apr-May)	Surveys to establish the breeding population of a long-established colony within the Ballylumford Power Station jetties (approximately 800m from the proposed cavern locations, 3km from the proposed seawater intake and 3.5km from the proposed brine outfall). • April surveys used a peak count of all breeding adults. • May and June surveys used a non-invasive method to survey inaccessible nest sites. A productivity index was calculated by dividing successful nest sites in July by successful nest sites in May.
Open Coast Bird Survey	2008/09 (Dec-Feb)	Three surveys recording any breeding seabirds within 400m of the proposed outfall and the use of inshore waters by foraging birds along the eastern shore from Skernaghans Point to Portmuck Bay (2.2km)
Open Coast Bird Survey	2011/12 (Apr-Mar)	Additional surveys conducted along an extended route of the eastern shore from Skernaghans Point to Portmuck Bay (2.6km) in response to concerns of insufficient from the NIEA, NH. Fortnightly Early Morning and Afternoon/Early Evening Counts and monthly High Tide/Low Tide Counts were conducted across four subsections of the route: • Section 1: Skernaghan Point to Castle Robin (1km coastline) • Section 2: Castle Robin to McIlroys Port (800m coastline) • Section 3: McIlroys Port to Portmuck Bay (800m coastline) • Browns Bay
Open Coast Bird Survey	2019 (Jul to Sep)	Six surveys totalling eighteen hours were conducted. The methodology followed suggested by Bibby et al (1992), where counts were undertaken over a 3-hour period from a single vantage point located between the proposed seawater intake and discharge pipes at Castle Robin Bay. The survey area was an arc 1000m north and south of the vantage point, stretching from waters off Skernaghan Point to the northern edge of Portmuck Bay. For the purposes of recording distribution, the 180° arc was subdivided into eight zones of four c.45° survey sectors (numbered 1-4 north to south) which were split into two distance bands; 0-500m (A) and 500-

Survey	Year	Summary
		1000m (B). Anything beyond the 1000m arc was not included in the survey results.
Boat-based Transect Survey	2019 (28 Aug)	Two boat-based transect surveys were conducted to supplement the 2023/24 Open Coast Bird Surveys. Surveys were conducted as the vessel slowly moved through the survey area and all seabirds seen were recorded along with their numbers and behaviours, using the "look-see approach" as discussed in Bibby et al (1992).
Vantage Point (VP) Surveys	2023/24 (May-Apr)	Seventy-two survey hours were conducted. The protocol followed during surveys was a systematic 180° scan from a point at Castle Robin Bay for birds in flight, including overhead, divided into four sectors (A, B, C, D). The primary target species were all seabirds (divers, grebes, cormorants, herons, swans, geese, ducks, gulls, rails, cranes, waders and Kingfisher), Annex I raptors, and birds of prey. Vantage point surveys were conducted for 3 hours, twice per month, once at high tide and once at low tide. Vantage point locations can be seen in Figure 2.0 of the Marine Construction Licence Application. Appendix E – Ecological Survey for Birds (RPS, 2019b).
Dawn and Dusk Surveys	2023/24 (May-Apr)	Twenty-four visits were made across the year to monitor for wetland birds, one dawn visit per month and one dusk visit per month. Monthly counts were made during dawn and dusk conditions to record all waterbird species within Brown's Bay, Skernaghan Point, Portmuck and Portmuck Bay. Dawn conditions were considered to be 1 hour before sunrise to 3 hours after, dusk conditions were considered to be 3 hours before sunset to 1 hour after.

A Breeding Bird Survey, Coastal Bird Survey (Summer and Winter), Breeding Black Guillemot Survey, Overwintering Farm Bird Survey and Wetland Bird Survey have been commissioned and are underway; however, data were not available at the time of writing to include in this Scoping Chapter.

7.3.4 Consultation

Formal written consultation was undertaken with organisations of particular relevance to offshore and intertidal ornithology for the EIS (RPS, 2010) between 2007 and 2009. A summary of written responses is provided in Table 7-3.

Table 7-3: Summary of key consultation topics raised during consultation activities undertaken relevant to offshore and intertidal ornithology.

Date	Consultee and type of response	Comments
12/01/2009	NIEA NH	Evaluation of potential impacts on Larne Lough ASSI /SPA required. Assessment of utilisation of open coast by breeding seabirds required. Assessment of impact on countryside bird populations and breeding black guillemots required.
05/05/2009	RSPB NI	Core data information submitted Proposals for standard mitigation measures required.
22/12/2008	Agri Food and Biosciences Institute (AFBI)	Article 6 assessment will be required.

7.4 Baseline Environment

7.4.1 Designated Sites

Nature conservation designations with relevance to offshore and intertidal ornithology comprise Special Protection Areas (SPAs) within the National Site Network in the UK and the Natura 2000 network of European sites, Ramsar sites, national and regional designations. A number of designated sites with ornithological relevance are located within the Offshore and Intertidal Ornithology Study Area (**Figure 7-2**). These include:

- SPAs and proposed SPAs (pSPAs) designated under The Council Directive 2009/147/EC (79/409/EEC as amended) on the conservation of wild birds ('The Birds Directive');
- Areas of Special Scientific Interest (ASSIs) designated under the Wildlife (Northern Ireland) Order 1985 as amended by the Wildlife (Amendment) (Northern Ireland) Order 1995 and the Wildlife and Natural Environment Act (Northern Ireland) 2011, with protection strengthened under the Environment (Northern Ireland) Order 2002 as amended by the Wildlife and Natural Environment Act (NI) 2011; and
- Ramsar wetland sites of international importance designated under the Ramsar Convention (The Convention of Wetlands of International Importance, especially as Waterfowl Habitat).

Table 7-4 outlines these designated sites, relevant distances, and relevant qualifying ornithology features.

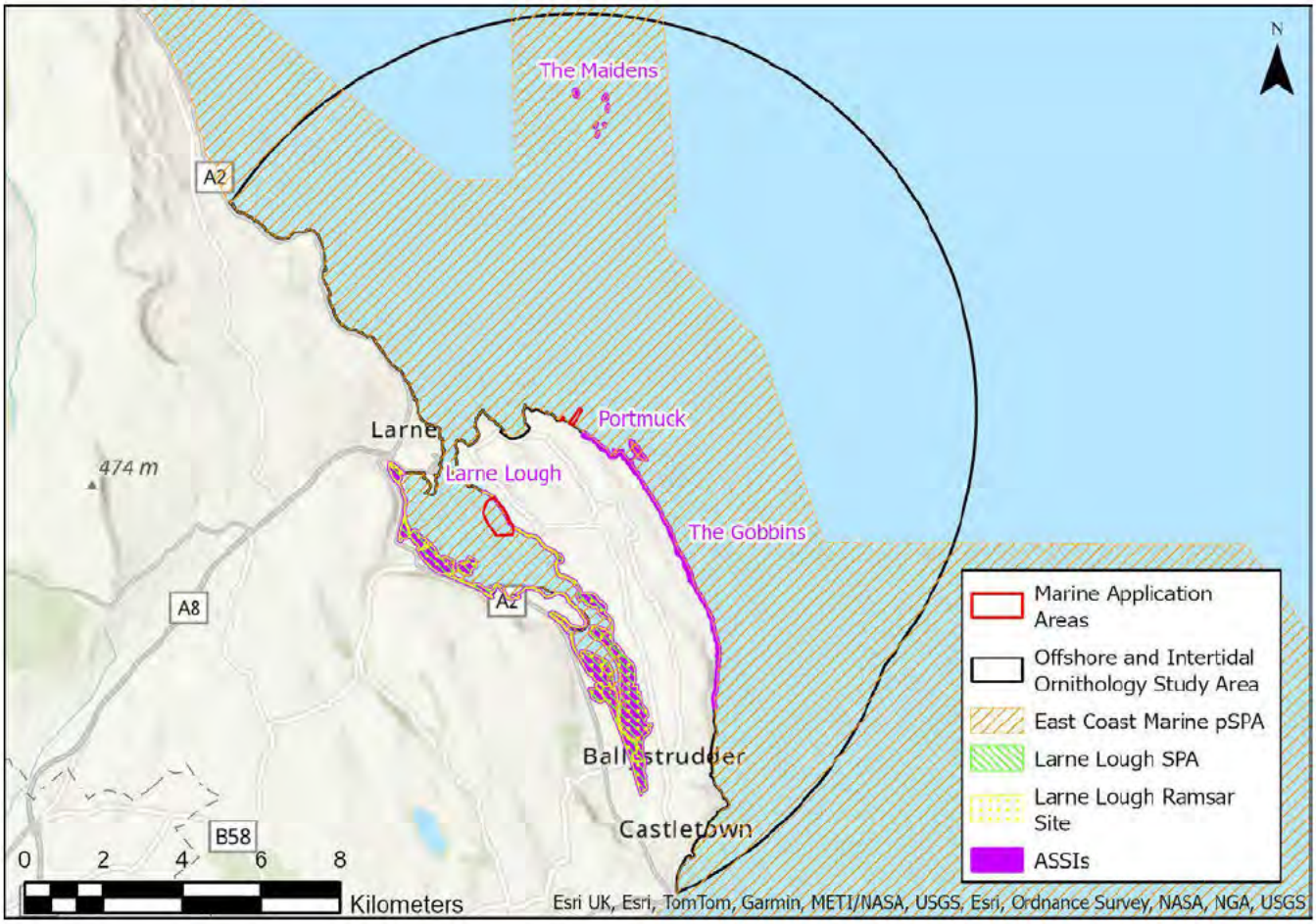


Figure 7-2: Designated sites with Ornithological Features within the Offshore and Intertidal Ornithology Study Area

Table 7-4: Ornithological Features of Designated Sites within the Offshore and Intertidal Ornithology Study Area

Protected Area	Area (ha)	Nearest distance to caverns, seawater intake and brine outfall (km)	Relevant Qualifying Interests	Designation Season	Citation Population
SPAs					
Larne Lough SPA[1]	398.00	0.07 2.65 3.10	Pale-bellied brent goose	Non-breeding	227[1]
			Sandwich tern	Breeding	192 pairs[1]
			Roseate tern	Breeding	6 pairs[1]
			Common tern	Breeding	247 pairs[1]
pSPA					

[1] The Larne Lough SPA subsumes the previous Swan Island SPA, incorporating it fully within its boundaries.

Protected Area	Area (ha)	Nearest distance to caverns, seawater intake and brine outfall (km)	Relevant Qualifying Interests	Designation Season	Citation Population
East Coast (NI) Marine pSPA	96,668.34	9.84 8.56 7.87	Great crested grebe	Non-breeding	2466[2]
			Red-throated diver	Non-breeding	142[3]
			Sandwich tern	Breeding	-
			Common tern	Breeding	-
			Arctic tern	Breeding	-
			Manx shearwater	Breeding	48,000 pairs[4]
			Eider	Non-breeding	3126[5]
ASSIs					
Portmuck ASSI	20.18	3.00 0.65 0.40	Kittiwake	Breeding	-
			Common guillemot	Breeding	-
			Razorbill	Breeding	-
			Puffin	Breeding	-
			Fulmar	Breeding	-
Gobbins ASSI	27.59	3.50 2.50 2.20	Kittiwake	Breeding	791[6]
			Common guillemot	Breeding	1484[6]
			Razorbill	Breeding	552[6]
			Puffin	Breeding	28[6]
			Fulmar	Breeding	17[6]
			Cormorant	Breeding	41[6]
			Shag	Breeding	16[6]
			Peregrine falcon	Breeding	-
Larne Lough ASSI	398.00	0.07 2.65 3.10	Pale-bellied brent goose	Non-breeding	-
			Shelduck	Non-breeding	-
			Goldeneye	Non-breeding	-
			Red-breasted merganser	Non-breeding	-
			Great crested grebe	Non-breeding	-
			Redshank	Non-breeding	-

Protected Area	Area (ha)	Nearest distance to caverns, seawater intake and brine outfall (km)	Relevant Qualifying Interests	Designation Season	Citation Population
			Greenshank	Non-breeding	-
			Sandwich tern	Breeding	-
			Roseate tern	Breeding	-
			Common tern	Breeding	-
The Maidens ASSI	6.06	9.63 7.17 6.91	Shag	Breeding	97 pairs[6]
Ramsar Site					
Larne Lough Ramsar Site	398.00	0.07 2.65 3.10	Pale-bellied brent goose	Non-breeding	-
			Shelduck	Non-breeding	-
			Eider	Spring/autumn	-
			Goldeneye	Non-breeding	-
			Red-breasted merganser	Spring/autumn	-
			Great crested grebe	Spring/autumn	-
			Redshank	Non-breeding	-
			Greenshank	Non-breeding	-
			Black-headed gull	Breeding	-
			Common gull	Non-breeding	-
			Sandwich tern	Breeding	-
			Roseate tern	Breeding	-
			Common tern	Breeding	-
			Cormorant	Non-breeding	-
		[1]5 year mean (1993-1997) [2]5 year mean (1991/92-1995/96) [3]5 year mean (2006/07-2008) [4]2000-2002 [5]5 year mean (2010/11-2014/15) [6]Seabird 2000 Data for Gobbins Cliffs, Country Antrim, NI			

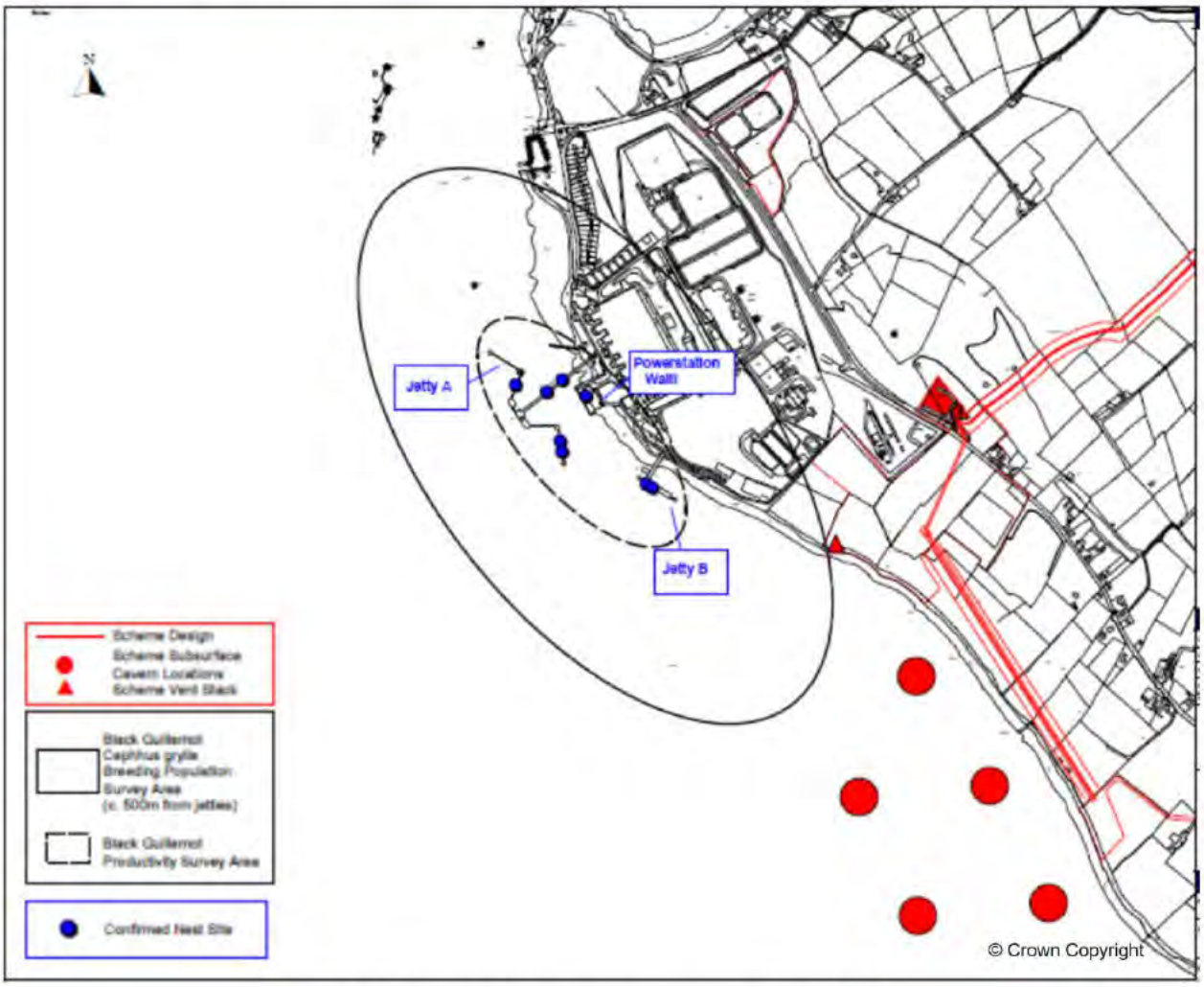


Figure 7-3: Black Guillemot Breeding Sites (RPS, 2010)

Table 7-5: April Black Guillemot Population Estimate Survey Results

Dates	Jetty	Breeding Adults	Non-breeders	Adults >300km	Peak Breeding Population
10/04/2009	A	13	1	3*	Jetty A: 13 Adult Birds (6-7 pairs) Jetty B: 4 Adult Birds (2 pairs)
	B	4	0		
17/04/2009	A	8	2	5*	
	B	3	9		
* Probably associated with another breeding colony in Larne Harbour					

Table 7-6: May and July Black Guillemot Productivity Estimate Results

Jetty	Occupied nest sites (May)	Occupied nest sites (July)	Productivity
A	6	5	0.83
B	2	2	1
Power Station Wall	1	1	1

The survey results show a total of 8 breeding black guillemot pairs with 5 at Jetty A, 2 at Jetty B and 1 in the wall of the Ballylumford Power Station. The productivity of the larger colony (Jetty A) was lower than that of the two smaller colonies (Jetty B and the power station wall).

7.4.3.2 Open Coast Bird Survey 2008/09

In the request for further environmental information issued by the NIEA NH following discussions with RPS on the 12th January 2009 (RPS 2010), it was stated that the Open Coast Bird Survey datasets from 2008/09 were insufficient to enable an Article 6 Appropriate Assessment to be completed. Therefore, the results of this survey are not discussed, and the results of the Open Coast Bird Survey 2011/12 override this dataset.

7.4.3.3 Open Coast Bird Survey 2011/12

Table 7-7 presents peak counts per subsection for the Open Coast Bird Survey collected between April 2011 and March 2012. Peak counts illustrated here are derived from peak 'total' counts. Total counts were calculated by adding together the number of birds recorded in each distance band in each section on each survey, to give a total for that section during that survey.

Target species are those that are the qualifying features of the designated sites in **Table 7-4** and/or species protected under the Birds Directive Annex I, the Wildlife (NI) Order 1985, NI Priority Species, the United Kingdom Biodiversity Action Plan (UKBAP) Priority Species and/or BoCC5 red-listed species.

The purpose of the additional Open Coast Bird Survey undertaken in 2011/12 was to more fully inform the assessment of the importance of the coastal waters between Skernaghan Point and Portmuck Bay and to allow NIEA NH to complete their assessment of the potential impact on foraging seabirds as a result of brine emissions.

Table 7-7: Open Coast Bird Survey 2011/12 peak section counts (target species in bold)

Species	Peak Counts				Conservation Status[1]
	Section 1	Section 2	Section 3	Brown's Bay	
Pale-bellied brent Goose	**0**	**0**	**1**	**3**	**Qualifying feature of Larne Lough SPA, Larne Lough ASSI and Larne Lough Ramsar site**
Mute swan	0	1	0	0	
Whooper swan	**0**	**0**	**0**	**1**	**EUA1, WO, Amber, NIPS**
Shelduck	**0**	**4**	**2**	**0**	**Qualifying feature of Larne Lough ASSI and Larne Lough Ramsar site**
Mallard	0	4	5	5	
Eider	**9**	**9**	**27**	**5**	**Qualifying feature of Larne Lough Ramsar site**
Long-tailed duck	1	0	0	0	Red
Goldeneye	**7**	**0**	**0**	**22**	**WO, Red, NIPS** **Qualifying feature of Larne Lough ASSI and Larne Lough Ramsar site**
Red-breasted merganser	**2**	**2**	**4**	**2**	**Qualifying feature of Larne Lough Ramsar site**
Great crested grebe	**0**	**0**	**0**	**1**	**Qualifying feature of Larne Lough Ramsar site**
Oystercatcher	3	2	11	21	
Lapwing	**0**	**0**	**3**	**0**	**WO, Red, NIPS, UKBAP**

Species	Peak Counts				Conservation Status[1]
	Section 1	Section 2	Section 3	Brown's Bay	
Ringed plover	3	0	17	3	Red
Curlew	**5**	**0**	**1**	**4**	**WO, Red, NIPS, UKBAP**
Black-tailed godwit	**0**	**0**	**0**	**1**	**WO, Red, NIPS, UKBAP**
Turnstone	5	0	11	6	
Dunlin	**0**	**0**	**34**	**0**	**WO, Red, NIPS**
Purple sandpiper	1	0	1	0	Red
Redshank	**4**	**0**	**5**	**3**	**WO, Amber, NIPS** **Qualifying feature of Larne Lough Ramsar site**
Kittiwake (Black-legged)	**7**	**20**	**85**	**1**	**Red** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Black-headed gull	**14**	**33**	**54**	**209**	**Red, NIPS** **Qualifying feature of Larne Lough Ramsar site**
Mediterranean gull	**0**	**0**	**2**	**1**	**EUA1, WO, Amber**
Common gull	**34**	**17**	**33**	**914**	**Red** **Qualifying feature of Larne Lough Ramsar site**
Great black-backed gull	**3**	**2**	**6**	**6**	**Red**

Species	Peak Counts				Conservation Status[1]
	Section 1	Section 2	Section 3	Brown's Bay	
Iceland gull	0	0	0	1	Amber
Herring gull	**15**	**3**	**29**	**74**	**Red, NIPS, UKBAP**
Lesser black-backed gull	1	0	1	1	Amber
Sandwich Tern	**4**	**16**	**28**	**40**	**EUA1, WO, Amber** **Qualifying feature of Larne Lough SPA**
Common Tern	**12**	**4**	**8**	**32**	**EUA1, WO, Amber** **Qualifying feature of Larne Lough SPA**
Arctic Tern	**2**	**0**	**0**	**2**	**EUA1, WO, Amber**
Arctic skua	1	0	1	0	Red, NIPS, UKBAP
Common guillemot	**28**	**14**	**48**	**15**	**Amber** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Razorbill	**65**	**14**	**66**	**9**	**Amber** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Black guillemot	8	11	42	11	
Puffin (Atlantic)	**0**	**0**	**1**	**0**	**WO, UKBAP, Red** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**

Species	Peak Counts				Conservation Status[1]
	Section 1	Section 2	Section 3	Brown's Bay	
Red-throated diver	**4**	**4**	**8**	**2**	**EUA1, WO**
Great Northern diver	2	3	3	2	
Fulmar	**3**	**4**	**8**	**0**	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Manx Shearwater	**3**	**2**	**3**	**0**	**WO**
Gannet	10	9	4	4	
Cormorant	**7**	**2**	**5**	**4**	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Shag	**46**	**30**	**16**	**32**	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Grey heron	**1**	**1**	**1**	**2**	**WO**

[1] EUA1 – Birds Directive Annex I Species, WO – Protected at all times by The Wildlife (NI) Order 1985 (as amended), NIPS – NI Priority Species, Red – Red-listed BOCC5, UKBAP – United Kingdom Biodiversity Action Plan Priority Species

7.4.3.4 Open Coast Bird Survey 2019

Table 7-7 presents peak counts per subsection for the Open Coast Bird Survey collected between July and September 2019. Peak counts illustrated here are derived from peak 'total' counts. Total counts were calculated by adding together the number of birds recorded in each distance band in each section on each survey, to give a total for that section during that survey.

Table 7-8: Open Coast Bird Survey 2019 peak section counts (target species in bold)

Species	Peak Counts[1]								Conservation Status[2]
	1a	1b	2a	2b	3a	3b	4a	4b	
Greylag Goose							3		
Eider	**1**		**2**	**7**	**1**				**Qualifying feature of Larne Lough Ramsar site**
Oystercatcher	7		5		3		2	1	
Ringed plover			10						
Whimbrel	1					19			Red
Black-tailed Godwit	**13**		**2**						**WO, Red, NIPS, UKBAP**
Common Sandpiper	2								Amber
Redshank				**3**					**WO, Amber, NIPS** **Qualifying feature of Larne Lough Ramsar site**
Kittiwake	**3**		**18**	**6**	**12**	**74**		**72**	**Red** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Black-headed Gull	**1**	**1**	**5**		**5**		**6**		**Red, NIPS** **Qualifying feature of Larne Lough Ramsar site**
Mediterranean Gull			**1**						**EUA1, WO, Amber**
Common Gull	**6**		**8**		**4**		**14**		**Red** **Qualifying feature of Larne Lough Ramsar site**
Great Black-backed Gull	**2**	**5**	**4**	**3**	**2**	**1**	**2**		**Red**
Herring Gull	**16**	**1**	**8**	**5**	**3**	**100**	**9**	**2**	**Red, NIPS, UKBAP**
Lesser Black-backed Gull	3	2	4	1	7		2		Amber

Species	Peak Counts[1]								Conservation Status[2]
	1a	1b	2a	2b	3a	3b	4a	4b	
Sandwich Tern	**2**	**1**	**4**	**3**	**4**	**2**	**1**		**EUA1, WO, Amber** **Qualifying feature of Larne Lough SPA**
Common Tern					**1**				**EUA1, WO, Amber** **Qualifying feature of Larne Lough SPA**
Great Skua				1					
Common Guillemot	**8**	**5**	**40**	**9**	**6**	**201**	**14**		**Amber** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Razorbill			**22**	**5**	**7**	**62**	**3**		**Amber** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Black Guillemot				2	1				
Fulmar			**2**	**2**	**3**	**1**			**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Manx Shearwater				**1**		**1**			**WO**
Gannet	4	2	19	11	12	3	2		
Cormorant			**1**	**3**	**1**	**1**			**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Shag	**6**	**3**	**5**	**2**	**4**	**3**	**2**	**3**	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Grey Heron			**1**		**1**				**WO**
Little Egret					1				Amber

[1] For context, sectors 1a, 1b, 2a, 2c look out to the north-west of Castle Robin Bay, whilst sectors 3a, 3b, 4a and 4b look out to the north-east of Castle Robin Bay. Sectors 1a, 2a, 3a and 4a concentrate on 0-500 m offshore, whilst sectors 1b, 2b, 3b and 4b look 500-1,000 m offshore.

[2] EUA1 – Birds Directive Annex I Species, WO – Protected at all times by The Wildlife (NI) Order 1985 (as amended), NIPS – NI Priority Species, Red – Red-listed BOCC5, UKBAP – United Kingdom Biodiversity Action Plan Priority Species

7.4.3.5 Boat-based Transect Survey 2019

A total of 89 species were recorded during the boat-based transect, of which 60 were birds flying through the survey area. A small roost of twenty shag and two cormorant was recorded at Skernaghan Point at the northern extreme of Islandmagee. Only five birds were observed to be foraging or feeding, including three shag, one gannet and one cormorant.

7.4.3.6 VP Surveys 2023/24

Table 7-9 presents peak counts for the vantage point surveys collected between March 2023 and April 2024. The full dataset can be found in RPS (2024). Peak counts illustrated here are derived from peak 'total' counts. Total counts were calculated by adding together the number of birds recorded in each distance band in each section on each survey, to give a total for that section during that survey.

Table 7-9: Vantage point 2023/24 peak counts (target species in bold)

Species	Peak Count[1]				Conservation Status[2]
	A	B	C	D	
Greylag Goose	1	0	0	0	
Shelduck	**4**	**3**	**2**	**2**	**Qualifying feature of Larne Lough ASSI and Larne Lough Ramsar site**
Mallard	7	5	5	7	
Eider	**15**	**23**	**37**	**37**	**Qualifying feature of Larne Lough Ramsar site**
Red-breasted Merganser	**2**	**5**	**1**	**0**	**Qualifying feature of Larne Lough Ramsar site**
Oystercatcher	6	9	5	6	
Curlew	**4**	**4**	**0**	**1**	**WO, Red, NIPS, UKBAP**
Redshank	**46**	**20**	**6**	**11**	**WO, Amber, NIPS** **Qualifying feature of Larne Lough Ramsar site**

Species	Peak Count[1]				Conservation Status[2]
	A	B	C	D	
Black-headed Gull	5	4	3	4	Red, NIPS Qualifying feature of Larne Lough Ramsar site
Common Gull	4	6	4	3	Red Qualifying feature of Larne Lough Ramsar site
Great Black-backed Gull	70	55	45	50	Red
Herring Gull	40	31	24	24	Red, NIPS, UKBAP
Lesser Black-backed Gull	9	19	27	10	Amber
Sandwich Tern	3	19	27	6	EUA1, WO, Amber Qualifying feature of Larne Lough SPA
Common Tern	1	0	0	0	EUA1, WO, Amber Qualifying feature of Larne Lough SPA
Arctic Skua	38	30	57	246	Red, NIPS, UKBAP
Common Guillemot	45	19	12	154	Amber Qualifying feature of Portmuck ASSI and Gobbins ASSI

Species	Peak Count[1]				Conservation Status[2]
	A	B	C	D	
Razorbill	15	7	12	92	Amber Qualifying feature of Portmuck ASSI and Gobbins ASSI
Black Guillemot	1	1	3	2	
Great Northern Diver	4	2	2	1	
Fulmar	23	0	16	0	Qualifying feature of Portmuck ASSI and Gobbins ASSI
Manx Shearwater	9	7	9	6	WO
Gannet	25	7	20	10	
Cormorant	9	5	5	9	Qualifying feature of Portmuck ASSI and Gobbins ASSI
Shag	1	0	0	0	Qualifying feature of Portmuck ASSI and Gobbins ASSI
Grey Heron	1	1	0	0	WO
Little Egret	0	2	0	0	EUA1
Buzzard	1	0	0	0	
Raven	4	3	2	2	

[1] For context, sectors A and B look to the northwest of Castle Robin Bay, whilst sectors C and D look to the northeast of Castle Robin Bay.

[2] EUA1 – Birds Directive Annex I Species, WO – Protected at all times by The Wildlife (NI) Order 1985 (as amended), NIPS – NI Priority Species, Red – Red-listed BOCC5, UKBAP – United Kingdom Biodiversity Action Plan Priority Species

7.4.3.7 Dawn Dusk Surveys 2023/24

Table 7-10 presents peak counts for the vantage point surveys collected between March 2023 and April 2024. The full dataset can be found in RPS (2024).

Table 7-10: Peak counts for Dawn and Dusk Surveys 2023/24 (target species in bold)

Species	Peak Count (Dawn)	Peak Count (Dusk)	Conservation Status[1]
Greylag Goose	55	0	
Mallard	4	0	
Eider	**9**	**0**	**Qualifying feature of Larne Lough Ramsar site**
Red-breasted Merganser	**4**	**0**	**Qualifying feature of Larne Lough Ramsar site**
Great Crested Grebe	**1**	**0**	**Qualifying feature of Larne Lough Ramsar site**
Oystercatcher	46	7	
Ringed Plover	14	3	Red
Whimbrel	1	0	Red
Curlew	3	1	**WO, Red, NIPS, UKBAP**
Black-tailed Godwit	1	0	**WO, Red, NIPS, UKBAP**
Turnstone	4	14	Amber
Purple Sandpiper	2	0	Red
Common Sandpiper	8	0	Amber
Redshank	**9**	**0**	**WO, Amber, NIPS** **Qualifying feature of Larne Lough Ramsar site**

Species	Peak Count (Dawn)	Peak Count (Dusk)	Conservation Status[1]
Black-headed Gull	**32**	**14**	**Red, NIPS** **Qualifying feature of Larne Lough Ramsar site**
Mediterranean Gull	**1**	**0**	**EUA1, WO, Amber**
Common Gull	**43**	**8**	**Red** **Qualifying feature of Larne Lough Ramsar site**
Great Black-backed Gull	**4**	**1**	**Red**
Herring Gull	**78**	**2**	**Red, NIPS, UKBAP**
Lesser Black-backed Gull	6	10	Amber
Sandwich Tern	**4**	**0**	**EUA1, WO, Amber** **Qualifying feature of Larne Lough SPA**
Common Tern	**1**	**0**	**EUA1, WO, Amber** **Qualifying feature of Larne Lough SPA**
Common Guillemot	**3**	**0**	**Amber** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Razorbill	**2**	**0**	**Amber** **Qualifying feature of Portmuck ASSI and Gobbins ASSI**

Species	Peak Count (Dawn)	Peak Count (Dusk)	Conservation Status[1]
Black Guillemot	26	1	
Red-throated Diver	**2**	**0**	**EUA1, WO**
Fulmar	**6**	**0**	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Manx Shearwater	**4**	**0**	**WO**
Gannet	1	2	
Cormorant	**3**	**0**	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Shag	36	3	**Qualifying feature of Portmuck ASSI and Gobbins ASSI**
Grey Heron	1	1	**WO**

[1] **EUA1 – Birds Directive Annex I Species, WO – Protected at all times by The Wildlife (NI) Order 1985 (as amended), NIPS – NI Priority Species, Red – Red-listed BOCC5, UKBAP – United Kingdom Biodiversity Action Plan Priority Species**

7.4.3.8 Target Species Accounts

Table 7-11 below summarises all target species recorded during the various surveys.

Appendix A provides further information through individual target species accounts.

Table 7-11: Summary of Target Species from All Bird Surveys

Species	Designation feature	Protection[1]	BoCC5[2]	Peak	Survey
Whooper swan	-	EUA1, WO, NIPS	Amber	1	Open Coast 11/12
Shelduck	Larne Lough ASSI, Larne Lough Ramsar	-	Amber	4	Open Coast 11/12 VP 23/24
Eider	Larne Lough Ramsar	-	Amber	27	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Long-tailed duck	-	-	Red	1	Open Coast 11/12
Goldeneye	Larne Lough ASSI, Larne Lough Ramsar	WO, NIPS	Red	22	Open Coast 11/12
Red-breasted merganser	Larne Lough ASSI, Larne Lough Ramsar	-	-	4	Open Coast 11/12 VP 23/24 Dawn/Dusk 23/24
Great crested grebe	Larne Lough ASSI, Larne Lough Ramsar	-	Amber	1	Open Coast 11/12 Dawn/Dusk 23/24
Lapwing	-	WO, NIPS, UKBAP	Red	3	Open Coast 11/12
Ringed plover	-	-	Red	17	Open Coast 11/12
Curlew	-	WO, NIPS, UKBAP	Red	5	Open Coast 11/12 VP 23/24 Dawn/Dusk 23/24
Black-tailed godwit	-	WO, NIPS, UKBAP	Red	1	Open Coast 11/12 Open Coast 19 Dawn/Dusk 23/24
Dunlin	-	WO, NIPS	Red	34	Open Coast 11/12 Dawn/Dusk 23/24
Purple sandpiper	-	-	Red	1	Open Coast 11/12 Dawn/Dusk 23/24
Redshank	Larne Lough ASSI, Larne Lough Ramsar	WO, NIPS	Amber	5	Open Coast 11/12 Open Coast 19 VP 23/24

Species	Designation feature	Protection[1]	BoCC5[2]	Peak	Survey
					Dawn/Dusk 23/24
Kittiwake	Portmuck ASSI, Gobbins ASSI	-	Red	85	Open Coast 11/12 Open Coast 19
Black-headed gull	Larne Lough Ramsar	NIPS	Red	209	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Mediterranean gull	Larne Lough Ramsar	EUA1, WO	Amber	2	Open Coast 11/12 Open Coast 19 Dawn/Dusk 23/24
Common gull	-	-	Red	914	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Great black-backed gull	-	-	Red	6	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Herring gull	-	NIPS, UKBAP	Red	74	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Sandwich tern	Larne Lough SPA, Swan Island SPA[1], Larne Lough ASSI, Larne Lough Ramsar	EUA1, WO	Amber	40	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Common tern	Larne Lough SPA, Swan Island SPA[1], Larne Lough ASSI, Larne Lough Ramsar	EUA1, WO	Amber	32	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Arctic tern	-	EUA1, WO	Red	2	Open Coast 11/12

Species	Designation feature	Protection[1]	BoCC5[2]	Peak	Survey
					VP 23/24
Arctic skua	-	NIPS, UKBAP	Red	1	Open Coast 11/12 VP 23/24
Common guillemot	Portmuck ASSI, Gobbins ASSI	-	Amber	48	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Razorbill	Portmuck ASSI, Gobbins ASSI	-	Amber	66	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Black guillemot	-	-	-	42	Open Coast 11/12 Black Guillemot VP 23/24 Dawn/Dusk 23/24
Puffin	Portmuck ASSI, Gobbins ASSI	WO, UKBAP	Red	1	Open Coast 11/12
Red-throated diver	-	EUA1, WO	-	8	Open Coast 11/12 Dawn/Dusk 23/24
Fulmar	Portmuck ASSI, Gobbins ASSI	-	Amber	8	Open Coast 11/12 Open Coast 19 Dawn/Dusk 23/24
Manx shearwater	-	WO	Amber	3	Open Coast 11/12 Open Coast 19 VP 23/24 Dawn/Dusk 23/24
Cormorant	Gobbins ASSI, Larne Lough Ramsar	-	-	7	Open Coast 11/12 Open Coast 19 VP 23/24
Shag	Gobbins ASSI	-	Amber	46	Open Coast 11/12 Open Coast 19 VP 23/24

Species	Designation feature	Protection[1]	BoCC5[2]	Peak	Survey
Grey heron	-	WO	-	2	Open Coast 11/12 Open Coast 19 VP 23/24

[1] EUA1 – Birds Directive Annex I Species, WO – Protected at all times by The Wildlife (NI) Order 1985 (as amended), NIPS – NI Priority Species, UKBAP – United Kingdom Biodiversity Action Plan Priority Species Red – Red-listed BOCC5

Table 7-12: Impacts Proposed to be Scoped In (✓) / Out (x) for offshore and intertidal ornithology

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Noise and visual disturbance to bird species	✓	x	Construction activities (including tunnelling, excavation and drilling) associated with the caverns, seawater intake and brine outfall have the potential to temporarily affect bird populations through visual and both subsea and airborne noise disturbance. This could result in temporary displacement from foraging/roosting areas, a reduction in foraging opportunities and increased energy expenditure, affecting the survival rates or productivity of a population. The susceptibility of each species to construction disturbance will depend upon factors such as the feeding strategy of the species, the timing of construction activities, and behaviour (whether breeding or migrating). Construction activities will take place in close proximity (between 70m and 4.3km) to Larne Lough SPA[1], Larne Lough ASSI, Ramsar site and Gobbins and Portmuck ASSI. Therefore, it is likely that bird species which are designated features of these sites or were present in these areas during the site-specific surveys in high numbers will be affected by noise and visual disturbance from construction. As such, the following species have been scoped in for this impact: • Eider • Goldeneye • Great crested grebe	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			• Kittiwake • Black-headed gull • Sandwich tern • Common tern • Common guillemot • Razorbill • Black guillemot • Puffin • Fulmar • Manx shearwater • Cormorant • Shag However, it is noted that activities associated with the construction of the caverns will be undertaken beneath the seabed and will likely have a limited effect on bird species.		
Direct collision impacts on bird species within the use of mobile cranes on support vessels	✓	x	Species of geese and swan have the potential to collide with machinery used for construction activities (e.g. mobile cranes on support vessels), resulting in possible disturbance and displacement from foraging/roosting grounds, changes in behaviour (e.g. movement patterns, habitat usage) or injury and mortality.	Sufficient data has been collected during the site-specific surveys, with further site-specific surveys scheduled in 2024/25 (Section 7.3.3)	The assessment of this impact on this receptor will be based on the data collected during the site-specific surveys, third-party data following relevant

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			This impact is only considered relevant to pale-bellied brent geese and whooper swan, as these birds tend to be larger and fly at low altitudes with slower speeds, making them significantly more vulnerable to collisions compared to smaller, more agile species. Potential collision impacts on pale-bellied brent geese and whooper swan are highly unlikely due to the temporary presence of mobile cranes and support vessels. Although pale-bellied brent geese are a designated feature of Larne Lough SPA, both pale-bellied brent geese and whooper swan were present in very low numbers during the site-specific surveys. As such, this impact has been scoped out for further assessment in the LSE.		guidance listed in Section 7.3.1.
Impacts of indirect pollution causing disturbance via food resources	✓	x	The discharge of brine during cavern construction has the potential to indirectly cause disturbance to ornithological receptors via food resource depletion within the vicinity of the brine outfall, resulting in indirect displacement from foraging grounds in the area or reduced energy intake, affecting survival rates or productivity in the population in the short term. The brine outfall is located within close proximity (between 65m and 3.5km) of Portmuck and Gobbins ASSIs, with the brine influence area likely to be within 100-200m of the outfall. Therefore, it is likely that species which are designated features of these sites or were present in these areas during the site-specific surveys in high numbers will	Sufficient data has been collected during the site-specific surveys, with further site-specific surveys scheduled in 2024/25 (Section 7.3.3)	The assessment of this impact on this receptor will be based on the data collected during the site-specific surveys, third-party data following relevant guidance listed in Section 7.3.1.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			be affected by indirect pollution, causing disturbance via food resources during operation. As such, the following species have been scoped in for this impact: • Eider • Goldeneye • Great crested grebe • Kittiwake • Sandwich tern • Common tern • Common guillemot • Razorbill • Black guillemot • Puffin • Fulmar • Manx shearwater • Cormorant • Shag However, it is noted that brine outfall influence is likely to contained within 100-200m of the outfall and will likely have a limited effect on the foraging behaviours and resources of		

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			bird species. Furthermore, the outfall will only be in operation for the duration of the cavern construction (maximum five to ten years), with outfall capped during the operation of the facility.		

* The project phase refers to construction/decommissioning (C) and operation (O).

Table 8-1: Summary of key desktop data sources for benthic subtidal and intertidal ecology

Data Title	Data Time Period	Source
Centre for Environment, Fisheries and Aquaculture Science (CEFAS) OneBenthic Baseline Tool	2025	CEFAS (2025a)
CEFAS Action Levels Tool	2025	CEFAS (2025b)
DAERA Guidance on selection and designation of Marine Conservation Zones (MCZs) in the Northern Ireland Inshore Region	2014	DAERA (2014)
European Marine Observation and Data Network (EMODnet) Map Viewer	2025	EMODnet (2025)
National Biodiversity Network (NBN) Atlas	2025	NBN Atlas (2025)
Islandmagee Storage Project: Environmental Impact Statement – Chapter 9: Coastal Processes	2010	RPS (2010a)
Islandmagee Storage Project Environmental Impact Statement – Chapter 6: Marine Flora and Fauna, Marine Mammals and Fisheries	2010	RPS (2010b)
Islandmagee Storage Project: Environmental Impact Statement – Chapter 14: Summary of Impacts and Mitigation Measures	2010	RPS (2010c)
Islandmagee Gas Storage Facility: Marine Environmental Conditions Update Report	2019	RPS (2019a)
Islandmagee Gas Storage Facility Brine Dispersion Modelling	2019	RPS (2019b)

8.3.2 Site-specific Survey Data

The site-specific survey data outlined in Table 8-2 have also been used to inform this Chapter of the Scoping Report.

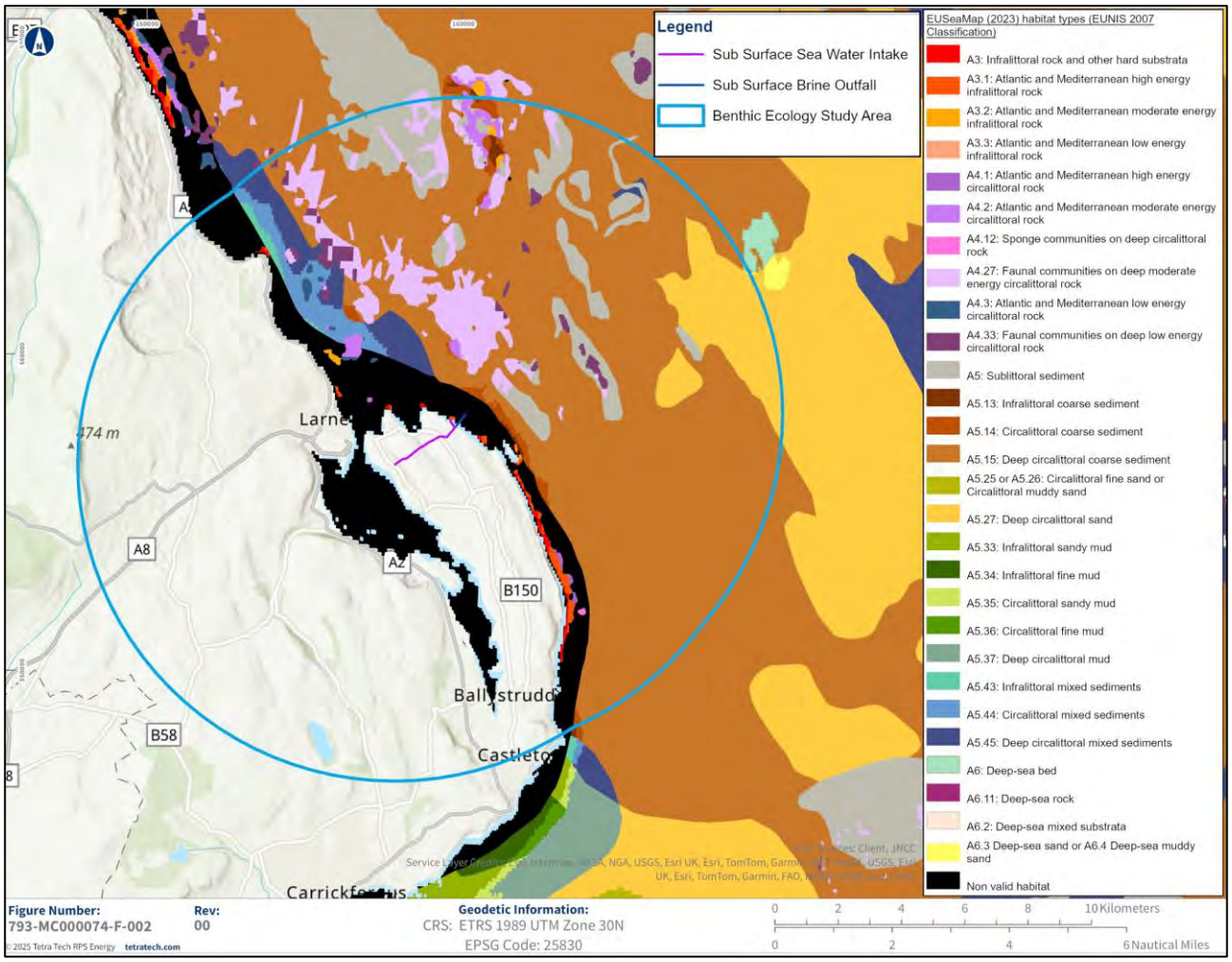
Table 8-2: Site-specific survey data sources

Data Title	Data Time Period	Source
Islandmagee Storage Project Environmental Impact Statement – Chapter 6: Marine Flora and Fauna, Marine Mammals and Fisheries	2009 - 2010	RPS (2010b)
Islandmagee Gas Storage Facility: Marine Environmental Conditions Update Report	2019	RPS (2019a)
Islandmagee Gas Storage Facility: Benthic Survey Reports – Appendix D	2019	Aquatic Services Unit (2019)

Benthic surveys were carried out in 2009 and 2010 to inform the environmental assessment for the IGSF, focusing on characterising subtidal and intertidal habitats along the eastern Islandmagee coast, with survey design based on a preliminary dispersion model developed by RPS in 2009 (RPS, 2010b), which predicted that the brine plume would remain near the seabed, concentrated around the 27m depth contour. Nine shore-perpendicular transects were established, centred on the outfall route, with sampling stations concentrated near predicted high-salinity zones. Hard substrates inshore were surveyed using Drop Down Video (DDV) and diver-based video methods, while offshore gravelly sediments were sampled using anchor dredge techniques. Additional subtidal stations were placed within Larne Lough near the proposed gas storage facility, and intertidal transects were positioned on both shores of Islandmagee near construction zones. Although this data is dated, it remains valuable due to its site-specific detail.

The surveys conducted by Aquatic Services Unit in August 2019 included a benthic survey to collect grab samples using Van Veen and Hamon grabs at 14 stations to assess infaunal benthos. A DDV and grab sampling survey was carried out across 38 stations to assess the epifaunal benthos, and a beam trawl survey was undertaken at 10 locations to investigate epibenthos and fisheries (Aquatic Services Unit, 2019). Survey stations for grab sampling and DDV were located in both the North Channel and Brown's Bay, along with beam trawl surveys in the North Channel. Survey efforts were focused around the proposed intake and outfall locations, with stations selected to comprehensively cover areas where the brine dispersion model predicted elevated salinity levels, as well as adjacent zones.

Given the time elapsed since the last site-specific surveys in 2019, a further survey is in progress, which will collect data to update the baseline characterisation of benthic communities in the vicinity of the proposed seawater intake and brine outfall locations.


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Benthic Ecology Study Area
EUSeaMap (2023) habitat types (EUNIS 2007 Classification)
A3: Infralittoral rock and other hard substrata
A3.1: Atlantic and Mediterranean high energy infralittoral rock
A3.2: Atlantic and Mediterranean moderate energy infralittoral rock
A3.3: Atlantic and Mediterranean low energy infralittoral rock
A4.1: Atlantic and Mediterranean high energy circalittoral rock
A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
A4.12: Sponge communities on deep circalittoral rock
A4.27: Faunal communities on deep moderate energy circalittoral rock
A4.3: Atlantic and Mediterranean low energy circalittoral rock
A4.33: Faunal communities on deep low energy circalittoral rock
A5: Sublittoral sediment
A5.13: Infralittoral coarse sediment
A5.14: Circalittoral coarse sediment
A5.15: Deep circalittoral coarse sediment
A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand
A5.27: Deep circalittoral sand
A5.33: Infralittoral sandy mud
A5.34: Infralittoral fine mud
A5.35: Circalittoral sandy mud
A5.36: Circalittoral fine mud
A5.37: Deep circalittoral mud
A5.43: Infralittoral mixed sediments
A5.44: Circalittoral mixed sediments
A5.45: Deep circalittoral mixed sediments
A6: Deep-sea bed
A6.11: Deep-sea rock
A6.2: Deep-sea mixed substrata
A6.3 Deep-sea sand or A6.4 Deep-sea muddy sand
Non valid habitat
474 m
A8
B150
B58
Figure Number:
793-MC000074-F-002
Rev:
00
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 2 4 6 8 10 Kilometers
0 2 4 6 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com

sites and effects on the site(s) conservation objectives will be undertaken in the Report to Inform an Appropriate Assessment (RIAA) if required.

All designated sites with relevant Benthic Subtidal and Intertidal Ecology features are summarised in Table 8-3, with marine route distances to the brine outfall and seawater intake, and are shown in Figure 8-2.

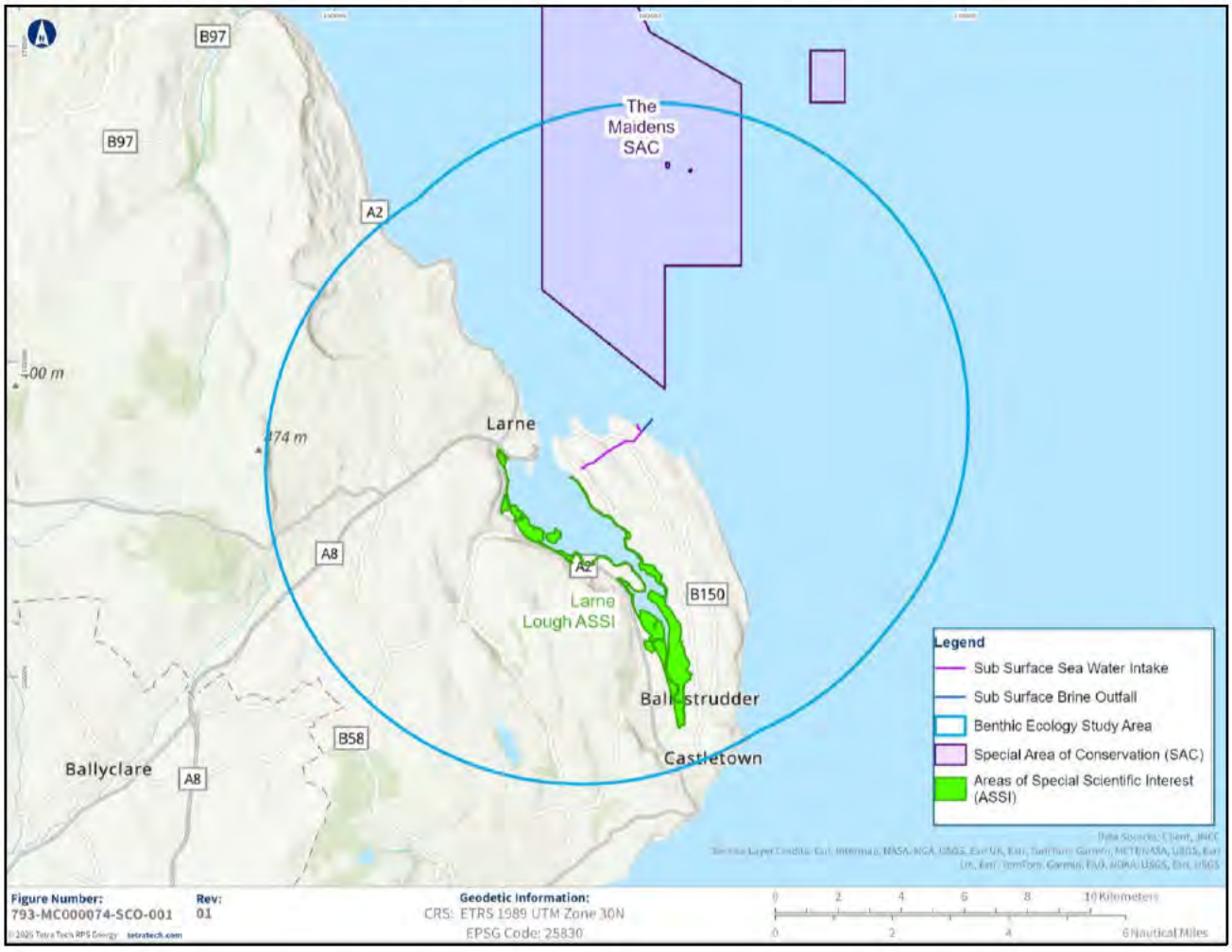


Figure 8-2: Designated Sites with relevant Benthic Subtidal and Intertidal Ecology features

Table 8-3: Designated sites with benthic ecology features within the Benthic Subtidal and Intertidal Ecology Study Area

Designated site	Distance to the brine outfall (km)	Distance to the seawater intake (km)	Designated features
The Maidens SAC	1.0	1.4	• Annex I sandbanks, which are slightly covered by seawater all the time. • Annex I reef habitats.
Larne Lough ASSI	5.2	4.7	• Seagrass *Z. marina* • Saline lagoons

Table 8-4: Impacts Proposed to be Scoped In (✓) / Out (x) for Benthic Subtidal and Intertidal Ecology

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Effects on benthic receptors associated with cavern construction and operation (Receptor: Benthic Subtidal and Intertidal Ecology)	x	x	Cavern construction activities occur entirely beneath the seabed, with no direct interaction with or pathway for impact on the marine environment. Similarly, during the operation phase, there are no activities that may interact with the marine environment. Therefore, no effects on benthic receptors are anticipated, and this impact is scoped out for both construction and operation.	N/A	N/A
Effect on benthic receptors associated with the discharge of brine during operation of the outfall (Receptor: Benthic Subtidal Ecology)	✓		Brine discharge is expected to cause localised increases in salinity, with levels ranging between 37.6 and 50.5 practical salinity units (PSU). Salinity levels exceeding 40PSU are predicted to extend only 10–15m from the outfall location (RPS, 2019b). Increased salinity may affect osmoregulation in subtidal benthic fauna. Embedded mitigation includes duckbill diffuser valves on the outfall diffusers to maximise brine dispersion and mixing. Additionally, the Environmental Monitoring	Baseline data has previously been collected (RPS, 2019a), and future site-specific benthic surveys will update this baseline characterisation. Brine dispersion modelling (RPS, 2019b) has been conducted to quantify the scale of impact.	The significance of effects on benthic receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact will be assessed quantitatively from the brine dispersion modelling (RPS, 2019b). The sensitivity of the receptor will be assessed based on a review of scientific literature and using the Marine Evidence-

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			Programme (EMP) will include real-time monitoring of salinity and an alarm system for salinity thresholds, along with field surveys to confirm the overall footprint of the brine plume compared to the modelling.		based Sensitivity Assessment (MarESA) tool.
		x	Salinity effects are scoped out for the operation phase, as no brine is discharged during this period, only during the construction phase. Therefore, there is no pathway for salinity-related impacts on benthic receptors during operation.	N/A	N/A
Effect on benthic receptors associated with the discharge of brine during operation of the outfall (Receptor: Benthic Intertidal Ecology)	x	x	Intertidal ecology has been scoped out for further assessment. This receptor is located more than 100m from the outfall, while predicted salinity increases are highly localised (<100m from the brine outfall) (RPS, 2019b). Therefore, there is no impact pathway for intertidal receptors.	N/A	N/A
Temporary habitat loss/disturbance (Receptor: Benthic Subtidal Ecology)	✓		Temporary habitat loss and disturbance to subtidal benthic communities during construction will be limited by the Project's design (tunnel and shaft leading to the intake head and HDD for the brine	Baseline data has previously been collected (RPS, 2019a) and future site-specific benthic surveys will update this baseline characterisation.	The significance of effects upon benthic receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			outfall. These methods significantly reduce the footprint of seabed disturbance. Nonetheless, a small area of subtidal seabed will be temporarily disturbed during activities such as HDD breakout and tunnel reception pit excavation.		Where possible, the magnitude of the impact will be quantified from the Project design to present the areas of habitat potentially affected in the context of the size of the Benthic Subtidal and Intertidal Ecology Study Area. The sensitivity of benthic receptors will be determined using the MarESA tool.
		x	There will be no further temporary habitat loss or disturbance during the operation phase; therefore, this effect is scoped out for this phase.	N/A	N/A
Temporary habitat loss/disturbance (Receptor: Benthic Intertidal Ecology)	x	x	Intertidal benthic habitats have been scoped out of further assessment for both the construction and operational phases due to the avoidance of impact through project design. The use of tunnelling and HDD ensure that no construction activities will occur within the intertidal zone. As a result, no physical disturbance or habitat loss is anticipated in this area.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Long-term habitat loss (Receptor: Benthic Subtidal Ecology)	✓	✓	The installation of permanent infrastructure associated with the seawater intake and brine outfall will result in long-term loss of subtidal habitat, where soft seabed is replaced by artificial hard substrate. This includes approximately 42.25m² of gabion or mattress protection around the seawater intake and up to 240m² of concrete block mattress covering the exposed 40m section of the brine outfall on the seabed. While the overall footprint is relatively small, these structures will alter the physical characteristics of the seabed and may lead to changes in the associated benthic communities. The infrastructure will remain in place for the lifetime of the facility, with intake heads and diffuser valves potentially being removed and replaced with blank plates to prevent silt ingress and fouling.	Baseline data has previously been collected (RPS, 2019a) and future site-specific benthic surveys will update this baseline characterisation.	The significance of effects upon benthic receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact will be quantified from the Project design to present the maximum area of habitat loss in the context of the size of the Benthic Subtidal and Intertidal Ecology Study Area. The sensitivity of benthic receptors will be determined using the MarESA tool.
Long-term habitat loss (Receptor: Benthic Intertidal Ecology)	x	x	Long-term habitat loss within the intertidal zone has been scoped out for both construction and operational phases. As mentioned	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			previously, the Project design avoids intertidal habitats through the use of tunnelling and HDD. As a result, there will be no physical disturbance or replacement of natural substrate, and therefore no impact pathway exists for intertidal benthic ecology.		
Increased Suspended Sediment Concentrations (SSCs) and associated deposition (Receptor: Benthic Subtidal and Intertidal Ecology)	**x**	**x**	Activities such as tunnelling, excavation and HDD punchout are all expected to generate sediment plumes, resulting in temporary and localised increases in SSC and subsequent deposition. However, given the short-term and spatially limited nature of these effects during the construction phase, potential impacts to subtidal and intertidal receptors are considered negligible and have therefore been scoped out of further assessment. Similarly, no activities during the operation phase are expected to cause significant increases in SSCs.	N/A	N/A
Resuspension of contaminated sediments	**x**	**x**	This effect is closely linked to increases in SSCs. The level of sediment resuspension expected during construction is limited and	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
(Receptor: Benthic Subtidal and Intertidal Ecology)			temporary. During the operational phase, no activities are proposed that would cause significant sediment resuspension. Additionally, existing data indicate a lack of contaminants within the sediment that could be mobilised during construction or operation (CEFAS, 2025b). As such, the potential for resuspension of sediment-bound contaminants is considered negligible. Therefore, this effect has been scoped out for both construction and operation phases.		
Increased risk of introduction and spread of Invasive Non-Native Species (INNS). (Receptor: Benthic Subtidal and Intertidal Ecology)	x	x	Vessel movements during the construction present a recognised vector for the introduction and spread of INNS, referred to as Invasive Alien Species (IAS) in NI. Transfer mechanisms include hull fouling, ballast water discharge, and equipment contamination. Additionally, the installation of artificial hard structures (e.g. intake and outfall infrastructures) introduce novel substrates that may facilitate colonisation and establishment of INNS. Adherence to the	N/A	N/A

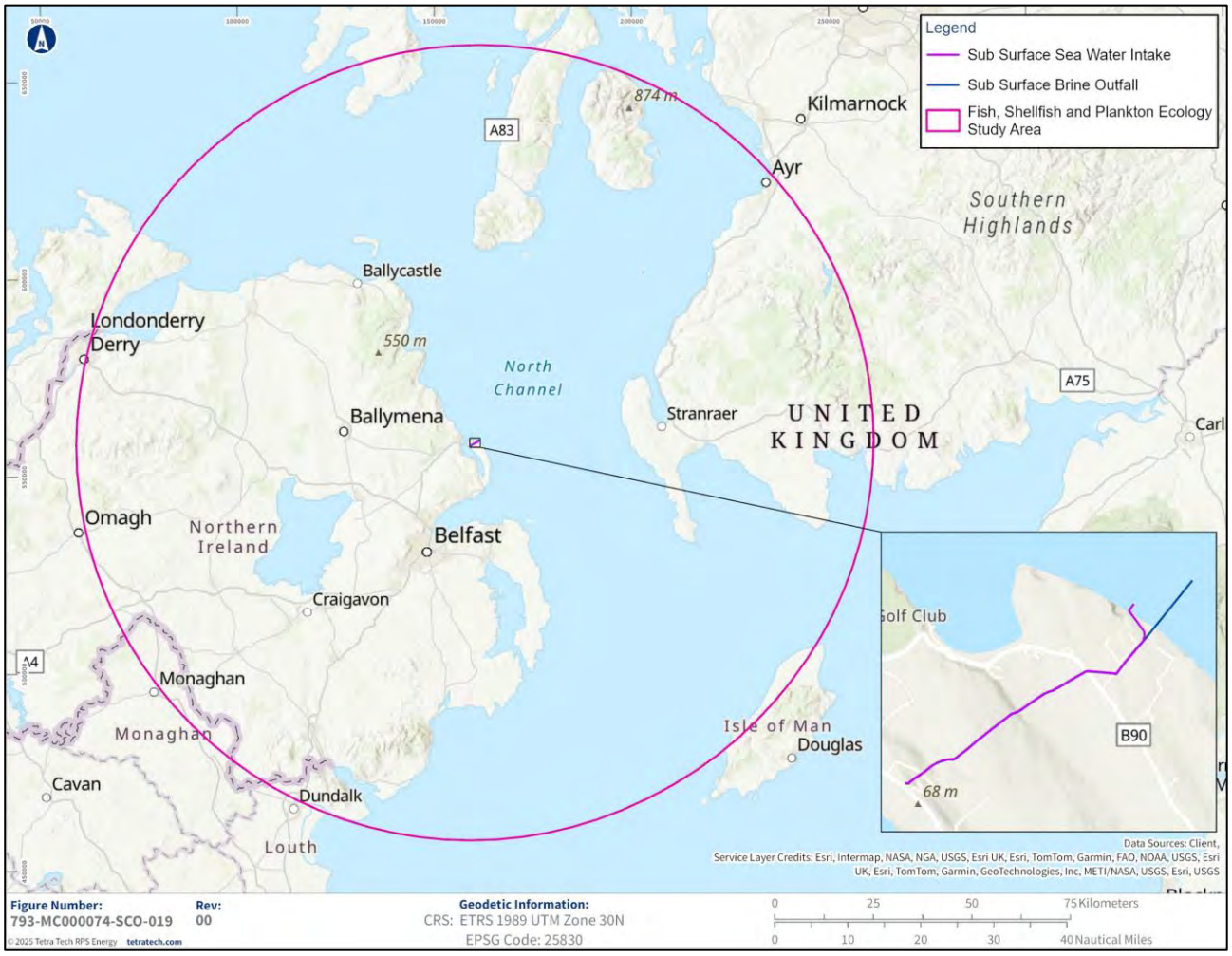
Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			International Maritime Organization (IMO) biofouling guidelines, compliance with available guidelines on mitigating the introduction and spread of INNS/IAS, alongside adherence to standard protocols embedded within the Environmental Management Plan and Species and Habitat Management Plan (SHMP) will collectively minimise the risk of INNS introduction and spread within the marine environment. Therefore, this impact has been scoped out for both phases.		
Introduction and colonisation of hard structures. (Receptor: Benthic Subtidal Ecology)	✓	✓	The installation of anthropogenic structures will represent a change from sedimentary to hard substrate, which is expected to be colonised by a range of hard substrate species. This will result in a change of species composition and potentially a localised increase in biodiversity.	Baseline data has previously been collected (RPS, 2019a) and future site-specific benthic surveys will update this baseline characterisation.	The significance of effects upon benthic receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact in terms of area available for colonisation will be quantified from the Project design to present the area of habitat potentially affected in the context of the size of the

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
					Benthic Subtidal and Intertidal Ecology Study Area. The sensitivity of benthic receptors will be determined using the MarESA tool.
Introduction and colonisation of hard structures. (Receptor: Benthic Intertidal Ecology)	x	x	The introduction and colonisation of hard structures has been scoped out for intertidal habitats during both construction and operation. The Project design avoids direct interaction with the intertidal zone through the use of tunnelling and HDD, meaning no infrastructure is introduced in these areas. As a result, no pathway exists for colonisation by hard substrate species.	N/A	N/A
Accidental pollution during construction (Receptor: Benthic Subtidal and Intertidal Ecology	x	x	Scoped out as best practice measures (e.g. an EMP and a marine pollution contingency plan) will reduce the risk of accidental pollution and the magnitude of effects if a spill were to occur.	N/A	N/A
Effect of heat from brine discharge	✓		During the construction phase of the Project, brine will be discharged at an elevated temperature, approximately 2°C above the intake	Baseline data has previously been collected (RPS, 2019a) and future site-specific benthic surveys will update this baseline	The significance of effects upon benthic receptors will be determined by correlating the magnitude

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
(Receptor: Benthic Subtidal Ecology)			temperature. This discharge is expected to persist for the duration of cavern construction. As such, the effect is scoped in for the construction phase due to the potential for localised thermal enrichment at the seabed, which may influence subtidal benthic ecology. Operational monitoring will be put in place to ensure compliance with temperature thresholds: the EMP will include real-time monitoring of temperature and an alarm system for temperature thresholds.	characterisation. Brine dispersion modelling (RPS, 2019b) has been conducted to quantify the scale of impact.	of the impact and the sensitivity of the receptor. The magnitude of the impact will be assessed quantitatively from the brine dispersion modelling (RPS, 2019b). The sensitivity of the receptor will be assessed based on a review of scientific literature and using the Marine Evidence based Sensitivity Assessment (MarESA) tool.
		x	This effect is scoped out for the operation phase as there is no brine discharge during this period. Therefore, there is no potential pathway for thermal effects on benthic receptors.	N/A	N/A
Effect of heat from brine discharge (Receptor: Benthic Intertidal Ecology)	**x**	**x**	The effect of brine discharge of elevated temperature on intertidal ecology is scoped out for both phases, as there is no impact-receptor pathway.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Underwater noise emissions from construction of intake and outfall(Receptors: Benthic Subtidal and Intertidal Ecology)	x	x	No impact-receptor pathway and therefore scoped out from further assessment.	N/A	N/A
Effects on benthic receptors from entrainment and impingement associated with the operation of the intake (Receptor: Benthic Subtidal and Intertidal Ecology)	x	x	Sessile communities therefore no impact-receptor pathway for further assessment.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Fish, Shellfish and Plankton Ecology Study Area
874 m
Kilmarnock
A83
Ayr
Southern Highlands
Ballycastle
Londonderry
Derry
550 m
North Channel
A75
Ballymena
Stranraer
U N I T E D K I N G D O M
Omagh
Northern Ireland
Belfast
Craigavon
A4
Monaghan
Monaghan
Isle of Man
Douglas
B90
Cavan
Dundalk
68 m
Louth
Data Sources: Client,
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS, Esri, USGS
Figure Number:
793-MC000074-SCO-019
Rev:
00
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 25 50 75 Kilometers
0 10 20 30 40 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com

marine environment and not to the caverns. However, the Fish, Shellfish and Plankton Ecology Study Area still covers the location of the caverns.

The 100km buffer was used to account for the mobile nature of fish and some shellfish species, to provide a wider geographic context and to identify all relevant fish, shellfish and plankton receptors with potential to be affected by the Project (Figure 9-1). The Fish, Shellfish and Plankton Ecology Study Area extends into Scottish waters, and as such, this report also considers relevant Scottish Priority Marine Features (PMFs). The Fish, Shellfish and Plankton Ecology Study Area is considered to be sufficient to represent the wider geographic area and will be used to inform the assessment of potential impacts on relevant receptors within the ZoI.

9.3 Data Sources

9.3.1 Desktop Data

An initial desk-based review of literature and data sources (Table 9-1) has been undertaken, which identified data sources that provide coverage of the Fish, Shellfish and Plankton Ecology Study Area. These sources have been used to inform this Chapter of the Scoping Report.

Table 9-1: Summary of key desktop data sources for fish, shellfish and plankton ecology

Data Title	Data Time Period	Source
Conservation Designations for United Kingdom (UK) Taxa	2023	Joint Nature Conservation Committee (JNCC) (2023a)
Fisheries Sensitivity Maps in British Waters	1998	Coull *et al.* (1998)
Islandmagee Storage Project Environmental Impact Statement: Chapter 6 – Marine Flora and Fauna, Marine Mammals and Fisheries	2010	RPS (2010a)
Islandmagee Storage Project: Environmental Impact Statement – Chapter 14: Summary of Impacts and Mitigation Measures	2010	RPS (2010b)
Islandmagee Gas Storage Facility: Marine Environmental Conditions Update Report	2019	RPS (2019b)
Islandmagee Gas Storage Facility: Centre for Environmental Data and Recording (CEDaR) results – Appendix G	1983 to 2018	RPS (2019c)

Data Title	Data Time Period	Source
Islandmagee Gas Storage Facility Brine Dispersion Modelling	2019	RPS (2019d)
NatureScot PMFs in Scotland's Seas	2020	NatureScot (2020)
National Biodiversity Network (NBN) Atlas	2025	NBN Atlas (2025)
Review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment: implications for the development of marine renewables	2003 to 2010	Malcom *et al.* (2010)
Spawning and nursery grounds of selected fish species in UK waters	1982 to 2010	Ellis *et al.* (2012)

9.3.2 Site-specific Survey Data

The site-specific survey data outlined in Table 9-2 have also been used to inform this Chapter of the Scoping Report.

Table 9-2: Site-specific survey data sources

Data Title	Data Time Period	Source
Islandmagee Storage Project Environmental Impact Statement: Chapter 6 – Marine Flora and Fauna, Marine Mammals and Fisheries	2009 to 2010	RPS (2010a)
Islandmagee Gas Storage Facility: Benthic Survey Report – Appendix D	2019	RPS (2019a)

The site-specific marine ecological surveys conducted in 2009 and 2010 for the IGSF were designed to assess the baseline conditions for marine flora and fauna (RPS, 2010a). These surveys focused on the eastern coast of Islandmagee, with particular focus on the area surrounding the proposed outfall at approximately 27m depth (RPS, 2010a). The survey programme included Drop-Down Video (DDV) surveys, diver surveys and anchor dredging. Although the data is dated, it remains valuable for characterising baseline conditions in the Fish, Shellfish and Plankton Fish and Shellfish Ecology Study Area due to its inclusion of fish and shellfish records.

grounds for a total of 20 species according to Coull *et al.*, (1998), Ellis *et al.*, (2012), and DAERA's NI Marine Mapviewer (2025), including 14 species of finfish, 5 elasmobranch species and 1 crustacean (**Table 9-3**Table 9-3).

Table 9-3: Summary of the species with spawning and nursery grounds within the Fish, Shellfish and Plankton Ecology Study Area

Common Name	Species	Spawning	Nursery
Finfish			
Anglerfish	*Lophius piscatorius*	N/A	High and low intensity
Atlantic Horse Mackerel	*Trachurus trachurus*	Low intensity	N/A
Atlantic Mackerel	*Scomber scombrus*	High and low intensity	High and low intensity
Blue whiting	*Micromesistius poutassou*	N/A	Low intensity
Cod	*Gadus morhua*	High and low intensity	High and low intensity
European Hake	*Merluccius merluccius*	Low intensity	Low intensity
Haddock	*Melanogrammus aeglefinus*	N/A	Undefined intensity
Herring	*Clupea harengus*	N/A	High and low intensity
Ling	*Molva molva*	Low intensity	Low intensity
Plaice	*Pleuronectes platessa*	High and low intensity	Low intensity
Saithe	*Pollachius virens*	N/A	Undefined intensity
Sandeel	Ammodytidae spp.	Low intensity	Low intensity
Sole	*Solea solea*	Low intensity	Low intensity
Whiting	*Merlangius merlangus*	Low intensity	High and low intensity
Elasmobranchs			
Common Skate	*Dipturus batis*	Low intensity	Low intensity
Spotted Ray	*Raja montagui*	Low intensity	Low intensity
Spurdog	*Squalus acanthias*	High intensity	High intensity
Thornback Ray	*Raja clavate*	Low intensity	Low intensity
Tope Shark	*Galeorhinus galeus*	Low intensity	Low intensity
Crustaceans			
Norway lobster	*Nephrops norvegicus*	High intensity	Undefined intensity

9.4.6 Plankton

The Fish, Shellfish and Plankton Ecology Study Area aligns with the coastal frontal zone typology, characterised by moderate salinity and nutrient concentrations (RPS, 2019b). Phytoplankton blooms, dominated by diatoms and dinoflagellates, which typically occur in spring and summer, support zooplankton such as copepods (*Pseudocalanus elongatus*, *Temora longicornis*, *Acartia clausi*) and larval crustaceans. These planktonic organisms form the base of the marine food web and are critical prey for fish larvae and

Table 9-4: Impacts Proposed to be Scoped In (✓) / Out (x) for Fish, Shellfish and Plankton Ecology

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Effects on marine ecology receptors associated with cavern construction and operation (Receptor: Fish, Shellfish and Plankton Ecology)	x	x	Cavern construction activities occur entirely beneath the seabed, with no direct interaction with or pathway for impact to the marine environment. The level of underwater noise from cavern construction is not considered to be of concern for fish, shellfish or plankton receptors (Chapter 11 (Underwater Noise)). Similarly, during the operation phase, there are no activities that may interact with the marine environment. Therefore, no effects on fish, shellfish or plankton receptors are anticipated and this impact is scoped out for both construction and operation.	N/A	N/A
Effects on marine ecology receptors associated with underwater noise emissions from the construction of intake and outfall infrastructure (Receptor: Fish Ecology including fish larvae)	✓		Tunnelling, excavation and drilling activities (including HDD) involved in the construction of the intake and outfall have the potential to generate underwater noise, which may result in effects (including auditory injury and disturbance) on fish receptors found within the Fish, Shellfish and Plankton Study Area.	Previous site-specific benthic grab, DDV, and beam trawl surveys have been completed. Baseline underwater noise data has also previously been collected (RPS, 2019b). No further fish surveys are required. However, upcoming benthic surveys may incidentally record fish and shellfish, which will be used to inform the ES.	The significance of effects upon fish ecology receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. Where possible, the magnitude of the impact will be quantified from noise modelling to present the areas of habitat potentially affected in

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
					the context of the size of the Fish, Shellfish and Plankton Ecology Study Area. Relevant guidance will be used to assess the potential disturbance, injury, or barriers to migrations (e.g. Popper *et al.* (2014)). The hearing abilities of different species will be considered within the assessment, with sound pressure and particle motion considered. Qualitative assessment will be undertaken when adequate thresholds and guidance, and models are not available.
		x	There is no significant underwater noise generated during the operational phase of the Project. Therefore, this effect is scoped out for further assessment.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Effects on marine ecology receptors associated with underwater noise emissions from construction of intake and outfall infrastructure (Receptor: Shellfish and Plankton Ecology)	x	x	No impact-receptor pathway and therefore scoped out from further assessment.	N/A	N/A
Effects on marine ecology receptors from entrainment and impingement associated with the operation of the intake structure (Receptor: Fish, Shellfish and Plankton Ecology)	✓		Fish, some shellfish and plankton are free-moving receptors that could be found within range of the intake structure, and therefore, an impact–receptor pathway exists. The intake pipe will be fitted with a 12mm mesh screen to prevent entrainment of larger fish and shellfish, but smaller individuals and plankton (including fish and shellfish larvae) may still be entrained. Although the intake velocity is low (≤0.15m/s) (RPS, 2019b), which allows many fish and shellfish to avoid impingement, entrainment of smaller organisms is still possible, especially those with limited swimming ability. Plankton, being largely passive and generally smaller than the mesh size, are particularly susceptible.	Previous site-specific benthic grab, DDV, and beam trawl surveys have been completed (RPS, 2019b). No further surveys are required. However, upcoming benthic surveys may incidentally record fish and shellfish, which will be used to inform the ES.	The significance of effects upon fish, shellfish and plankton receptors will be determined by correlating the magnitude of the impact, which will be assessed qualitatively, and the sensitivity of the receptor, which will be based on a review of scientific literature and the Marine Evidence-based Sensitivity Assessment (MarESA) tool.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		x	The intake is not operational during the operation phase, therefore, there is no impact-receptor pathway, and this impact is scoped out for the construction phase.	N/A	N/A
Effects on marine ecology receptors associated with the discharge of brine during operation of the outfall (Receptor: Fish, Shellfish and Plankton Ecology)	✓		Brine discharge is expected to cause localised increases in salinity, with levels ranging between 37.6 and 50.5PSU. Salinity levels exceeding 40 PSU are predicted to extend only 10–15m from the outfall location (RPS, 2019d). Increased salinity may affect fish, shellfish and plankton receptors, for example, by disrupting osmoregulation. Embedded mitigation includes duckbill diffuser valves on the outfall diffusers to maximise brine dispersion and mixing to reduce salinity impacts. Additionally, the Environmental Monitoring Programme (EMP) will include real-time monitoring of salinity and an alarm system for salinity thresholds, along with field surveys to confirm the overall footprint of the brine plume compared to the modelling.	Brine dispersion modelling has been conducted (RPS, 2019d). No further surveys are required. However, upcoming benthic surveys may incidentally record fish and shellfish, which will be used to inform the ES.	The significance of effects upon fish, shellfish, and plankton receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact will be assessed quantitatively from the brine dispersion modelling (RPS, 2019d). The sensitivity of the receptor will be assessed based on a review of scientific literature and using the MarESA tool.
		x	Salinity effects are scoped out for the operation phase, as no brine is discharged during this period, only during the construction phase. Therefore, there is no pathway	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			for salinity-related impacts on fish, shellfish and plankton receptors during operation.		
Temporary habitat loss/ disturbance (Receptor: Fish and Shellfish Ecology)	✓		Temporary habitat loss and disturbance to fish and shellfish ecology during construction will be limited by the Project's design, which incorporates the use of a tunnel and shaft to the intake head and HDD for the brine outfall. These methods significantly reduce the footprint of disturbance. Nonetheless, a small area of subtidal seabed will be temporarily disturbed during activities such as HDD breakout and tunnel reception pit excavation.	Previous site-specific benthic grab, DDV, and beam trawl surveys have been completed (RPS, 2019b). No further surveys are required. However, upcoming benthic surveys may incidentally record fish and shellfish, which will be used to inform the ES.	The significance of effects upon fish and shellfish ecology receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. Where possible, the magnitude of the impact will be quantified from the Project design to present the areas of habitat potentially affected in the context of the size of the Fish, Shellfish and Plankton Ecology Study Area. The sensitivity of fish and shellfish receptors will be determined using the MarESA tool.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		x	There will be no further temporary habitat loss or disturbance during the operation phase; therefore, this effect is scoped out for the operation phase.	N/A	N/A
Temporary habitat loss/ disturbance (Receptor: Plankton Ecology)	x	x	Temporary habitat loss and disturbance to plankton during construction and operation have been scoped out of the assessment due to the pelagic nature of plankton, meaning loss/disturbance to seabed habitats will not have a negative impact.	N/A	N/A
Increases in Suspended Sediment Concentrations (SSCs) and associated sediment deposition (Receptor: Fish, Shellfish and Plankton Ecology)	x	x	Tunnelling, excavation and HDD punchout activities are all expected to generate sediment plumes, resulting in temporary and localised increases in SSCs and subsequent deposition. However, given the short-term and spatially limited nature of these effects during the construction phase, potential impacts to fish, shellfish and plankton ecology are considered negligible and have therefore been scoped out of further assessment. Similarly, no activities during the operation phase are expected to cause significant increases in SSCs.	N/A	N/A
Resuspension of sediment-bound contaminants (Receptor: Fish, Shellfish and Plankton Ecology)	x	x	This effect is closely linked to increases in SSCs. The level of sediment resuspension expected during construction is limited and temporary. During the operational phase, no activities are proposed that would cause significant sediment resuspension. Additionally, existing data indicate a lack of contaminants within the sediment that could be mobilised during construction or operation (CEFAS, 2025). As such, the potential for resuspension of sediment-bound contaminants is	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			considered negligible. Therefore, this effect has been scoped out for both construction and operation phases.		
Long-term habitat loss (Receptor: Fish and Shellfish Ecology)	✓	✓	The installation of permanent infrastructure associated with the seawater intake and brine outfall will result in long-term loss of subtidal habitat, where soft seabed is replaced by artificial hard substrate. This includes approximately 42.25m² of gabion or mattress protection around the seawater intake and up to 240m² of concrete block mattress covering the exposed 40m section of the brine outfall on the seabed. While the overall footprint is relatively small, these structures will alter the physical characteristics of the seabed and may lead to changes in the associated fish and shellfish communities. The infrastructure will remain in place for the lifetime of the facility, with intake heads and diffuser valves potentially being removed and replaced with blank plates to prevent silt ingress and fouling.	Previous site-specific benthic grab, DDV, and beam trawl surveys have been completed (RPS, 2019b). No further surveys are required. However, upcoming benthic surveys may incidentally record fish and shellfish, which will be used to inform the ES.	The significance of effects upon fish and shellfish ecology receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact will be quantified from the Project design to present the maximum area of habitat loss in the context of the size of the Fish, Shellfish and Plankton Ecology Study Area. The sensitivity of fish and shellfish receptors will be determined using the MarESA tool.
Long-term habitat loss	**x**	**x**	Long-term habitat loss associated with the installation of permanent infrastructure has been scoped out for plankton as a receptor during both construction and	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
(Receptor: Plankton Ecology)			operation. There is no impact-receptor pathway due to the pelagic nature of plankton, meaning that loss of seabed habitat will not have a negative impact.		
Increased risk of introduction and spread of Invasive Non-Native Species (INNS). **(Receptor: Fish, Shellfish and Plankton Ecology)**	x	x	Vessel movements during the construction present a recognised vector for the introduction and spread of INNS, referred to as Invasive Alien Species (IAS) in NI. Transfer mechanisms include hull fouling, ballast water discharge, and equipment contamination. Additionally, the installation of artificial hard structures (e.g. intake and outfall infrastructures) introduces novel substrates that may facilitate colonisation and establishment of INNS. Adherence to the International Maritime Organisation (IMO) biofouling guidelines, compliance with available guidelines on mitigating the introduction and spread of INNS/IAS, alongside adherence to standard protocols embedded within the Environmental Management Plan and Species and Habitat Management Plan (SHMP), will minimise the risk of introduction and spread of INNS. Therefore, this impact has been scoped out for both phases.	N/A	N/A
Introduction and colonisation of hard structures **(Receptor: Fish, Shellfish and Plankton Ecology)**	x	x	The introduction of anthropogenic hard structures on the seabed will represent a change from sedimentary to hard substrate, which is expected to be colonised by hard substrate benthic species and therefore a change in species composition. However, the effect is considered negligible for fish and shellfish receptors due to the small scale of habitat change and the availability of extensive alternative habitats in the surrounding area. Additionally, the impact of colonisation of hard structures	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			will be assessed in the Benthic Subtidal and Intertidal Ecology assessment (see Chapter 8). Plankton are pelagic organisms and are therefore not dependent on benthic substrates. As such, changes to the seabed are not expected to affect plankton ecology. Therefore, this impact is scoped out for fish, shellfish, and plankton receptors.		
Accidental pollution (Receptor: Fish, Shellfish and Plankton Ecology)	**x**	**x**	Scoped out as best practice measures (e.g. an Environmental Management Plan, SHMP and a marine pollution contingency plan) will reduce the risk of accidental pollution and the magnitude of effects if a spill were to occur.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

10.3 Data Sources

An initial desk-based review of literature and data sources to support this Chapter of the Scoping Report has identified several baseline datasets. These are summarised below in Table 10-1.

Table 10-1: Summary of key desktop reports for marine mammals

Data Title	Data Time Period	Source
Aerial thermal Imaging survey of seals in Ireland, 2017 - 2018	2002 to 2018	Morris and Duck (2018)
Atlas of the Distribution and Relative Abundance of Marine Mammals in Irish Offshore Waters 2005-2011	2005 to 2011	Wall *et al.* (2013)
Distribution and relative abundance of harbour porpoise (*Phocoena phocoena*), white-beaked dolphins (*Lagenorhynchus albirostris*), and minke whales (*Balaenoptera acutorostrata*) around the British Isles.	1979 to 1991	Northridge *et al.* (1995)
Irish Whale and Dolphin Group (IWDG) Sightings and Strandings	2024	IWDG (2024)
Islandmagee Storage Project Environmental Impact Statement: Chapter 6: Intertidal and Underwater Flora and Fauna Fisheries and Marine Mammals	2010	RPS (2010)
Islandmagee Storage Facility Environmental Statement Addendum: Appendix C Marine Flora and Fauna	2011	RPS (2011)
Islandmagee Storage Facility Marine Environmental Conditions Update Report	2019	RPS (2019)
Atlas of cetacean distribution in north-west European waters Joint Nature Conservation Committee (JNCC).	2003	Reid *et al.* (2003)
JNCC Marine Protected Areas (MPAs) and Special Areas of Conservation (SACs) Mapper	2025	JNCC (2025)

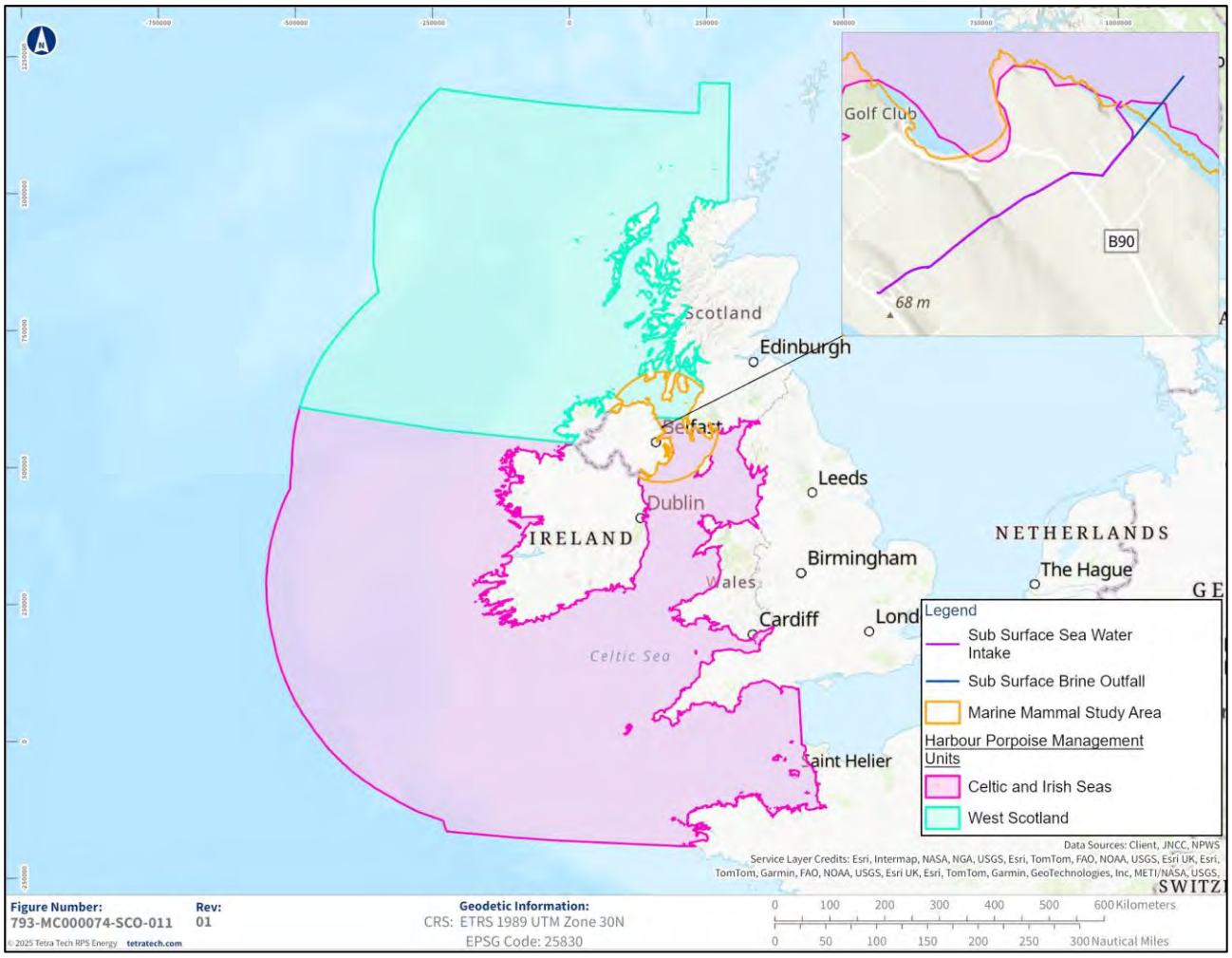
Data Title	Data Time Period	Source
JNCC Report No. 544: The Identification of Discrete and Persistent Areas of Relatively High Harbour Porpoise Density in the Wider United Kingdom (UK) Marine Area	1994 to 2011	Heinänen and Skov (2015)
JNCC Report 547: Management Units for Cetaceans in UK Waters.	2015	IAMMWG (2015)
JNCC Report 565: The use of harbour porpoise sightings data to inform the development of Special Areas of Conservation in UK waters.	1994-2011	JNCC (2015)
Joint Cetacean Data Portal (JCDP)	2005 to 2019	JCDP (2022)
Revised Phase III Data Analysis of Joint Cetacean Protocol Data Resources	1994 to 2010	Paxton *et al*. (2016)
Distribution maps of cetacean and seabird populations in the North-East Atlantic.	1980 to 2018	Waggitt *et al*. (2020)
Modelled Distribution and Abundance of Cetaceans and Seabirds in Wales and Surrounding Waters.	1990 to 2020	Evans and Waggitt (2023)
Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2015-2017.	2015 to 2017	Rogan *et al.* (2018)
Relative abundance, density and distribution of the harbour porpoise (*Phocoena phocoena*) along the west coast of the of the UK	2002 to 2004	Goodwin and Speedie (2008)
Sympatric seals, satellite tracking and protected areas: habitat-based distribution estimates for conservation and management.	Telemetry: 2005 to 2019 Count: 2001 to 2018	Carter *et al.*, (2022)
Harbour and grey seals: distribution maps for Scotland.	Telemetry: 2022 Count: 2001 to 2023	Carter *et al.*, (2025)

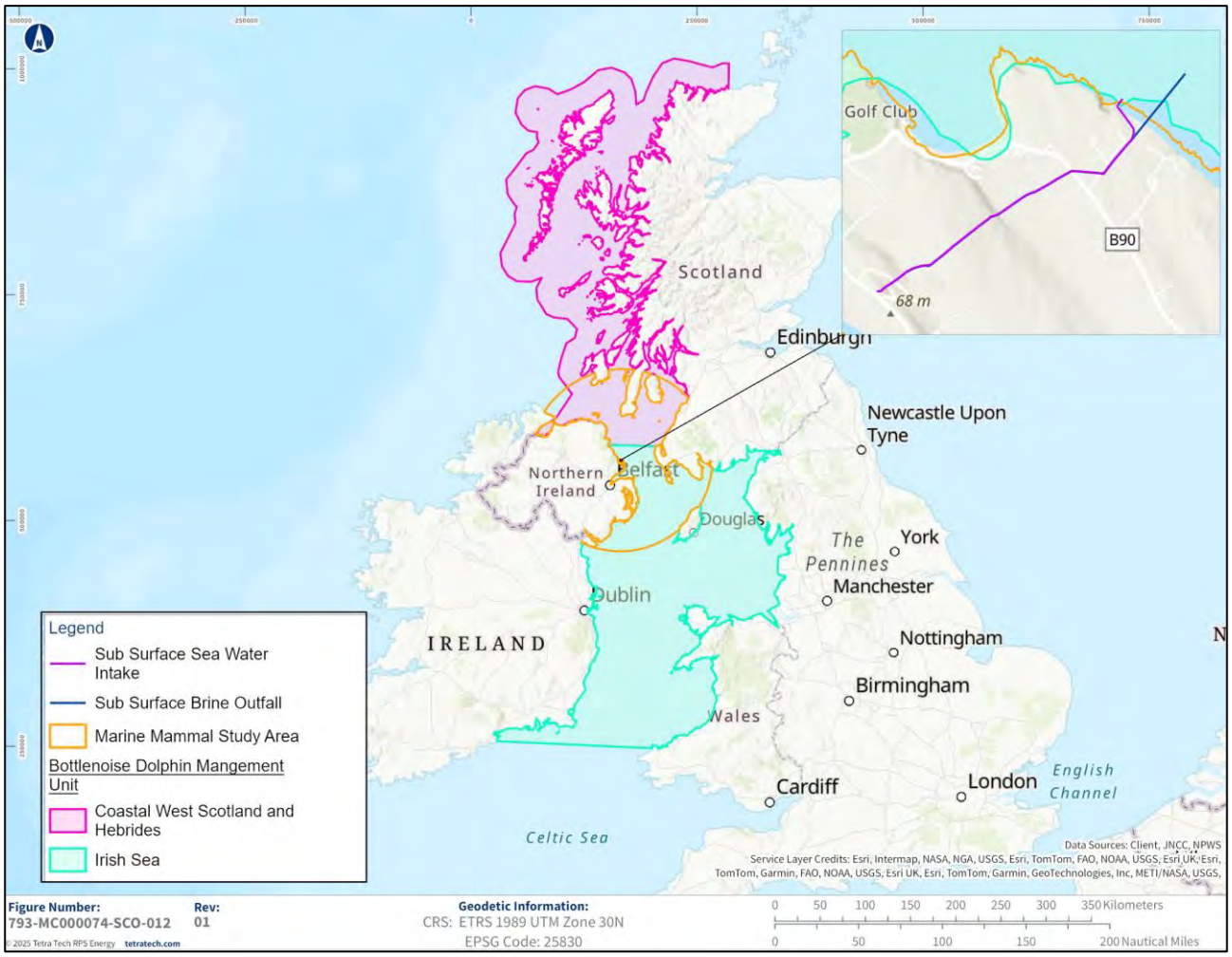
Data Title	Data Time Period	Source
Seal haul-out counts	2016 to 2019	Data provided by Seal Mammal Research Unit (SMRU), presented in RPS (2019)
Seal telemetry	1990 to 2018	Data provided by SMRU, presented in RPS (2019)
Revised Report: Estimates of Cetacean Abundance in European Atlantic Waters in Summer 2016 from the SCANS-III Aerial and Shipboard Surveys.	2021	Hammond *et al.* (2021)
Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys.	2023	Gilles *et al.* (2023)
Scientific Advice on Matters Related to the Management of Seal Populations: 2024	2024	SCOS (2024)
Updated abundance estimates for cetacean Management Units in UK waters	2022	IAMMWG (2022)
Atlas of the marine mammals of Wales.	1990 to 2009	Baines and Evans (2012)
ISCOPE–Irish Scheme for Cetacean Observation and Public Education.	2003 to 2005	Berrow *et al.* (2005)
Manx Marine Environmental Assessment	2013	Hanley *et al.* (2013)

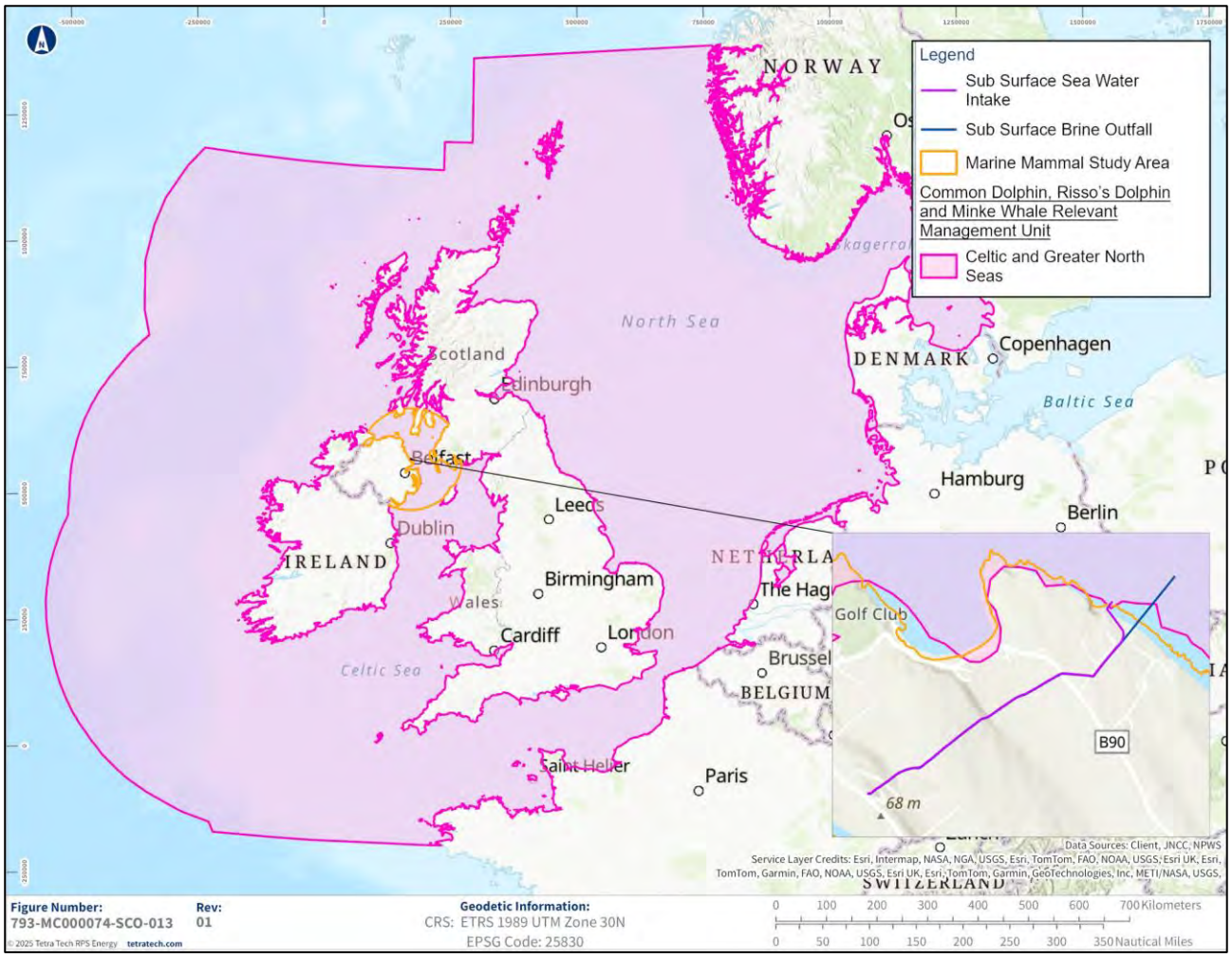
10.4 Baseline Environment

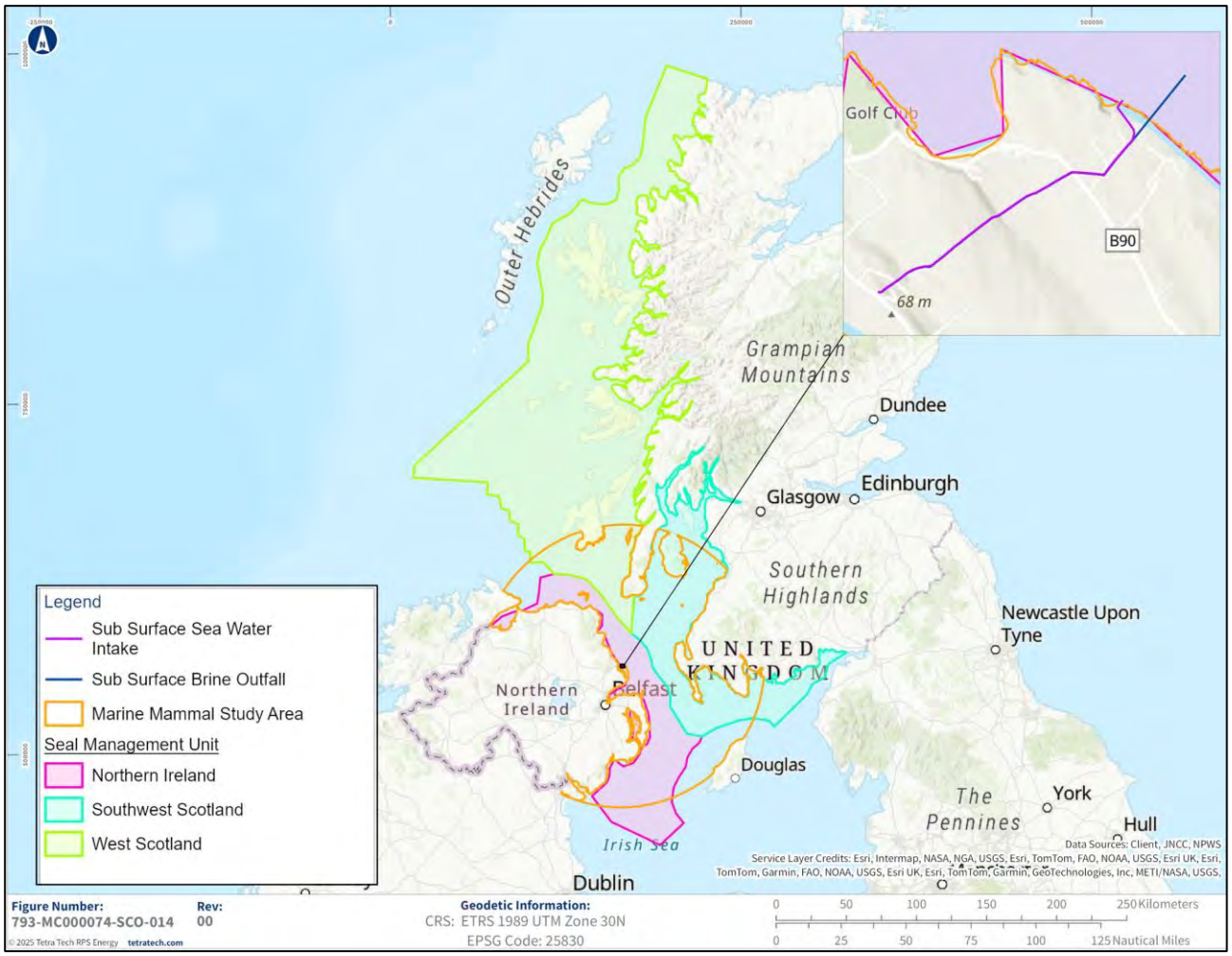
Marine mammals in UK waters comprise cetaceans (dolphins, whales and porpoises) and pinnipeds (seals). Only certain species of cetaceans and pinnipeds are likely to be present in the Marine Mammal Study Area, based on habitat preferences and fine-scale distribution. A summary of the distribution and abundance for each of the key species likely to be found within the Marine Mammal Study Area is provided below.

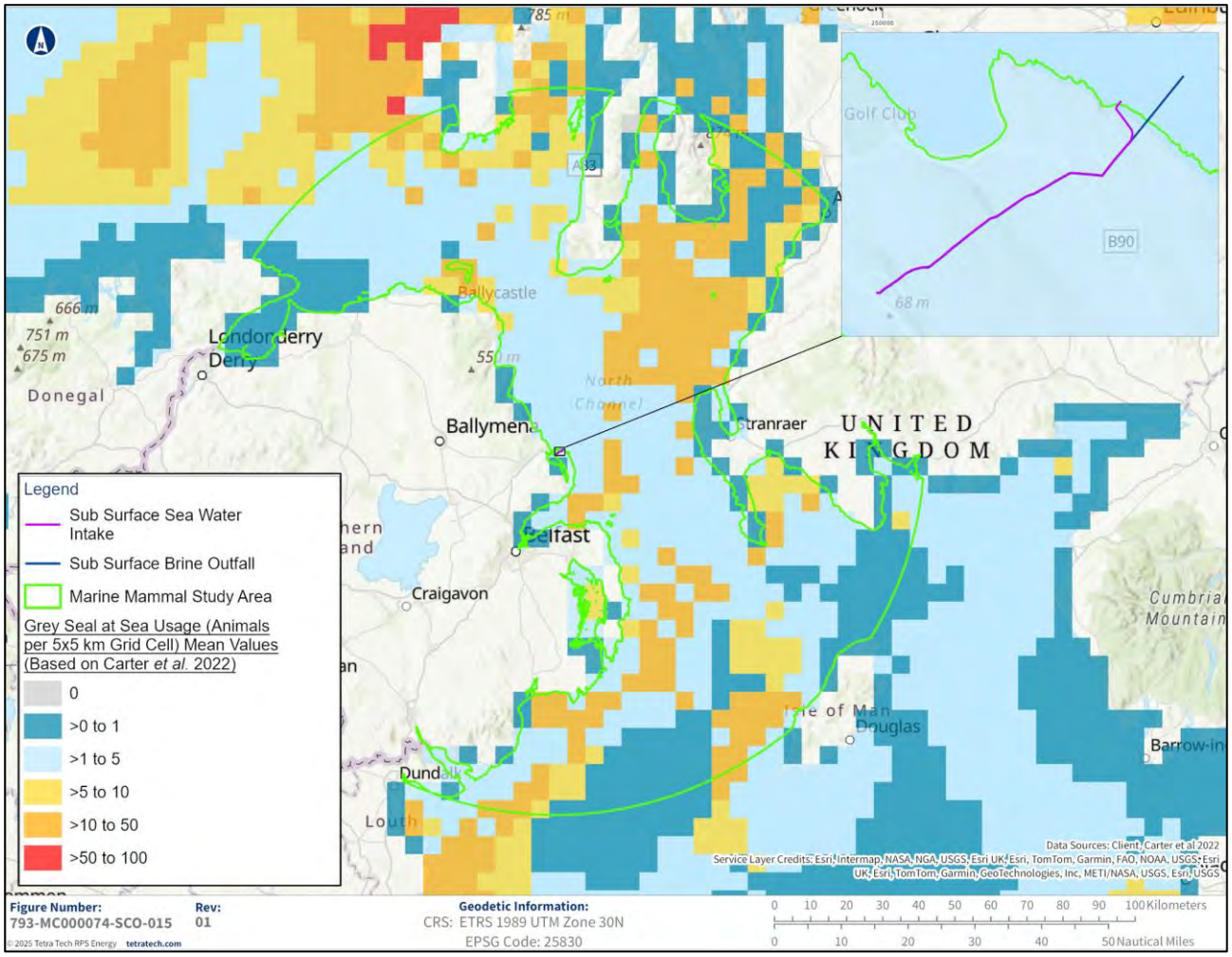
Twenty-four species of cetacean and two species of pinniped have been recorded in Irish waters, through incidental sightings, targeted surveys and strandings records (Berrow *et al.*, 2010; O'Brien *et al.*, 2009). The waters of the north-west of the Irish Sea regularly support seven species of cetacean, including harbour porpoise (*Phocoena phocoena*), short-beaked common dolphin (*Delphinus delphis*) (hereafter referred to as

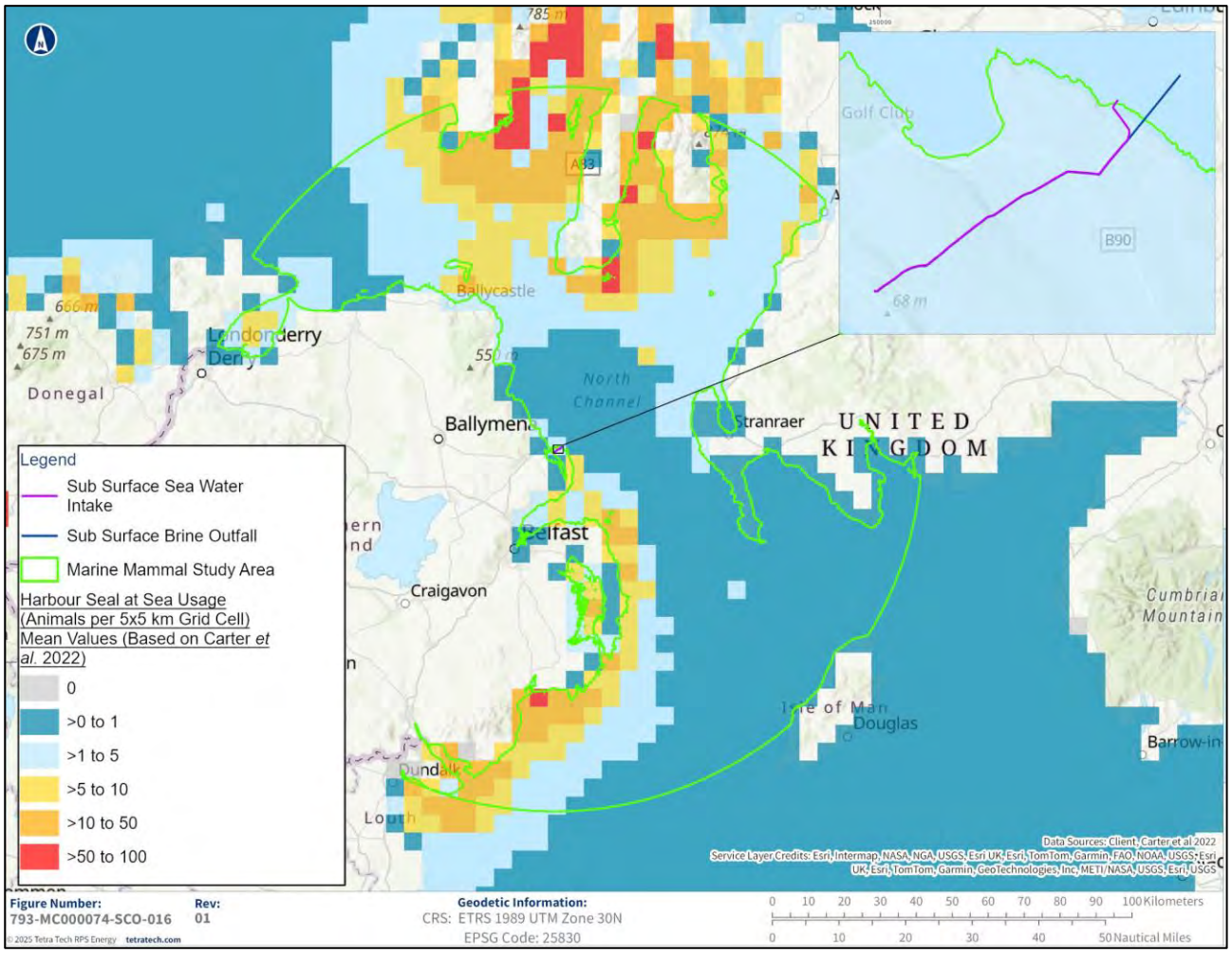

Golf Club
B90
68 m
Scotland
Edinburgh
Belfast
Leeds
Dublin
IRELAND
Birmingham
NETHERLANDS
The Hague
Wales
Cardiff
Celtic Sea
Saint Helier
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Harbour Porpoise Management Units
Celtic and Irish Seas
West Scotland
Data Sources: Client, JNCC, NPWS
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri, TomTom, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,
Figure Number:
793-MC000074-SCO-011
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 100 200 300 400 500 600 Kilometers
0 50 100 150 200 250 300 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Golf Club
B90
68 m
Scotland
Edinburgh
Newcastle Upon Tyne
Northern Ireland
Belfast
Douglas
The Pennines
York
Manchester
Dublin
IRELAND
Nottingham
Birmingham
Wales
Cardiff
London
English Channel
Celtic Sea
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Bottlenoise Dolphin Mangement Unit
Coastal West Scotland and Hebrides
Irish Sea
Data Sources: Client, JNCC, NPWS
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri, TomTom, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,
Figure Number:
793-MC000074-SCO-012
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 50 100 150 200 250 300 350 Kilometers
0 50 100 150 200 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Common Dolphin, Risso's Dolphin and Minke Whale Relevant Management Unit
Celtic and Greater North Seas
NORWAY
North Sea
Scotland
Edinburgh
Belfast
Dublin
IRELAND
Leeds
Birmingham
Wales
Cardiff
London
Celtic Sea
Saint Helier
Paris
Brussel
BELGIUM
The Hag
NETHERLA
Hamburg
Berlin
DENMARK
Copenhagen
Baltic Sea
Golf Club
B90
68 m
Data Sources: Client, JNCC, NPWS
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri, TomTom, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,
Figure Number:
793-MC000074-SCO-013
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 100 200 300 400 500 600 700 Kilometers
0 50 100 150 200 250 300 350 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Golf Club
B90
68 m
Outer Hebrides
Grampian Mountains
Dundee
Edinburgh
Glasgow
Southern Highlands
Newcastle Upon Tyne
UNITED KINGDOM
Northern Ireland
Belfast
Douglas
The Pennines
York
Hull
Irish Sea
Dublin
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Seal Management Unit
Northern Ireland
Southwest Scotland
West Scotland
Data Sources: Client, JNCC, NPWS
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri, TomTom, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,
Figure Number:
793-MC000074-SCO-014
Rev:
00
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 50 100 150 200 250 Kilometers
0 25 50 75 100 125 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Grey Seal at Sea Usage (Animals per 5x5 km Grid Cell) Mean Values (Based on Carter et al. 2022)
0
>0 to 1
>1 to 5
>5 to 10
>10 to 50
>50 to 100
Ballycastle
Londonderry
Derry
Donegal
Ballymena
Stranraer
UNITED KINGDOM
Belfast
Craigavon
Douglas
Isle of Man
Dundalk
Louth
Golf Club
B90
A83
785 m
666 m
751 m
675 m
550 m
68 m
Data Sources: Client; Carter et al 2022
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS, Esri, USGS
Figure Number:
793-MC000074-SCO-015
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 10 20 30 40 50 60 70 80 90 100 Kilometers
0 10 20 30 40 50 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Harbour Seal at Sea Usage (Animals per 5x5 km Grid Cell) Mean Values (Based on Carter et al. 2022)
0
>0 to 1
>1 to 5
>5 to 10
>10 to 50
>50 to 100
Ballycastle
Londonderry
Derry
Donegal
Ballymena
Belfast
Craigavon
Stranraer
UNITED KINGDOM
Isle of Man
Douglas
Barrow-in
Dundalk
Louth
North Channel
Golf Club
A83
B90
785 m
751 m
675 m
68 m
Data Sources: Client, Carter et al 2022
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS, Esri, USGS
Figure Number:
793-MC000074-SCO-016
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 10 20 30 40 50 60 70 80 90 100 Kilometers
0 10 20 30 40 50 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Marine Mammal Study Area
Special Area of Conservation (SAC)
Marine Nature Reserve (MNR)
Inner Hebrides and the Minches SAC
Monach Islands SAC
Treshnish Isles SAC
Skerries and Causeway SAC
The Maidens SAC
Strangford Lough SAC
North Channel SAC
Murlough SAC
Rockabill to Dalkey Island SAC
Blasket Islands SAC
West Wales Marine / Gorllewin Cymru Forol SAC
Roaringwater Bay and Islands SAC
Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC
Cardigan Bay/Bae Ceredigion SAC
Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC
North Anglesey Marine / Gogledd Môn Forol SAC
Ramsey Bay MNR
West Coast MNR
North Channel SAC
Golf Club
B90
68 m
Scotland
Northern Ireland
IRELAND
Wales
Celtic Sea
English Channel
Edinburgh
Belfast
Dublin
Newcastle Upon Tyne
York
Nottingham
Birmingham
Cardiff
London
Lille
Data Sources: Client, JNCC, NPWS
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri, TomTom, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, GeoTechnologies, Inc, METI/NASA, USGS,
Figure Number: 793-MC000074-SCO-010
Rev: 01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 50 100 150 200 250 300 350 Kilometers
0 50 100 150 200 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com

Table 10-2: Summary of marine mammal designated sites in the Marine Mammal Study Area

Designated site	Distance to the Sub Surface Brine Outfall End Point (km)	Distance to Sub Surface Sea Water Intake End Point (km)	Marine mammal designated features
Special Areas of Conservation			
North Channel SAC	0 (overlaps)	0 (overlaps)	Harbour porpoise
The Maidens SAC	1.0	1.4	Grey seal
Strangford Lough SAC	63.4	63.7	Harbour seal
Skerries and Causeway SAC	69.7	69.7	Harbour porpoise
Murlough SAC	80.3	80.5	Harbour seal
Inner Hebrides and the Minches SAC	96.9	97.0	Harbour porpoise
Isle of Man Marine Nature Reserves			
West Coast MNR	89.4	89.8	Harbour porpoise Harbour seal Grey seal
Ramsey Bay MNR	98.6	98.9	Harbour seal Grey seal

10.5 Potentially Significant Effects

A range of potential impacts on Marine Mammals, which may occur during the construction, and operation phase of the Project, have been identified. At this stage, it is considered that decommissioning activities will be a subset of the construction phase. Further environmental assessment and relevant consents for decommissioning will be required in the future.

The impacts that have been scoped in to, or out of, the assessment are outlined in Table 5-1 together with justification, a description of any additional data collection (e.g. site-specific surveys) and supporting analyses (e.g. modelling) that will be required to enable a full assessment of the impacts. The impacts included have been decided based on those discussed and agreed with DAERA (letter dated 5 July 2019) and following stakeholder consultation.

Table 10-3: Impacts Proposed to be Scoped In (✓) / Out (x) for Marine Mammals

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Effects on marine mammals associated with cavern construction and operation	x	x	Any underwater noise levels associated with the construction and operation of the caverns (In-sediment or underground drilling) are sub-seabed surface and attenuated by the sediment. The level of underwater noise is not considered to be of concern for marine mammal receptors (Chapter 11 (Underwater Noise)).	N/A	N/A
Underwater noise emissions from the construction and operation of the intake and outfall	✓		Tunnelling, excavation and drilling activities (including HDD) involved in the construction of the intake and outfall have the potential to generate underwater noise, which may result in effects (including auditory injury and disturbance) on marine mammal receptors found within the Marine Mammal Study Area. Mitigation measures will be applied to reduce these risks (e.g. the use of a Marine Mammal Observer (MMO), pre-watch survey and exclusion zones; see Section 10.7). Since there is an impact-receptor pathway, this impact has been scoped in during the construction phase.	No further data collection is required for Marine Mammals. The baseline marine mammal information used to inform the Marine Environmental Conditions Update (RPS, 2019) will be used to characterise the baseline environment for the ES. The underwater noise modelling and assessment completed as part of the Marine Environmental Conditions Update (Appendix C; RPS, 2019) will be used to inform the ES.	A marine mammal impact assessment will be undertaken as part of the ES, which will include a review of desktop sources, including both new and existing data. The significance of effects upon marine mammal receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. Where possible, the magnitude of the impact will be quantified from noise modelling to present the number of animals and area of

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
					habitat potentially affected in the context of the size of the marine mammal reference populations and the Marine Mammal Study Area. Relevant guidance will be used to assess the potential disturbance, injury, or barriers to migrations (e.g. Southall *et al.*, 2019; National Marine Fisheries Service (NMFS), 2024) The hearing abilities of different species will be considered within the assessment. Qualitative assessment will be undertaken when adequate thresholds, guidance and models are not available.
		x	There is no significant underwater noise generated during the operational phase of the Project. Operational noise from pumps and infrastructure is attenuated through the pipeline and diffuser systems, resulting in noise levels that are close to baseline and below those arising from ferry traffic (RPS, 2019). Consequently, no impact receptor	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			pathway exists for marine mammals during operation, and the effect is scoped out for further assessment.		
Effects on Marine Mammals associated with the discharge of brine during operation of the outfall	✓		During the cavern formation, wells will be drilled from the onshore wellsite at Ballydown, and the caverns will be sequentially formed using seawater drawn from the seawater intake at Dundressan. The resulting brine will be discharged. The Brine Dispersion Modelling Report produced for the 2019 Marine Environmental Conditions Update (RPS, 2019) showed that the discharge of up to 1,000m^3/hour of saturated brine via the proposed outfall and diffuser will have minimal impact on salinity levels beyond the immediate vicinity of the outfall. Maximum salinity increases of more than 0.5 Practical Salinity Units (PSU) above background are not anticipated to occur more than a few hundred metres from the diffuser and salinities in excess of 36PSU are not predicted to occur more than100 m from the diffuser. Since these values are within the normal variations to salinity experienced in the North Channel, it is unlikely this impact will pose any adverse impacts to marine mammal receptors or their fish prey species (including impacts on fish prey species supporting habitat).	No further data collection is required for Marine Mammals. The baseline marine mammal surveys used to inform the Marine Environmental Conditions Update (RPS, 2019) will characterise the baseline environment for the ES. The brine modelling and assessment completed as part of the Marine Environmental Conditions Update (Appendix B; RPS, 2019) will be used to inform the ES.	A marine mammal impact assessment will be undertaken as part of the ES which will include a review of desktop sources, including both new and existing data. The significance of effects upon marine mammal receptors will be determined by correlating the magnitude of the impact and the sensitivity of the receptor. The magnitude of the impact will be assessed quantitatively from the brine dispersion modelling (RPS, 2019). The sensitivity of the receptor will be assessed based on a review of scientific literature.

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			However, following stakeholder consultation, concerns were raised on the potential for brine discharge to impact movements of marine mammal receptors through the North Channel (e.g. through avoidance behaviour or due to changes in prey availability). As such, on a precautionary basis, this impact has been scoped into assessment in the ES.		
		x	Salinity effects are scoped out for the operation phase, as no brine is discharged during this period, only during the operational phase. Therefore, there is no pathway for salinity-related impacts on marine mammal receptors during construction.	N/A	N/A
Effects on Marine Mammals from entrainment and impingement associated with the operation of the intake	x	x	The intake structure is operational during the construction phase but not during the operational phase. Therefore, there is no impact-receptor pathway for further assessment during the operational phase, and this impact is scoped out for further assessment in this phase. For the construction phase, during cavern formation, wells will be drilled from an onshore wellsite, and the caverns will be sequentially formed using seawater drawn from seawater intake. During seawater intake, small marine fauna are vulnerable to both entrainment (direct intake via the intake head of fauna which are small enough to pass	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			through the intake screen mesh, into the salt caverns and then discharged with the brine) and impingement (when animals which are sufficiently large to avoid going through the intake screen are trapped against them by the force of the flowing water). The intake pipe will be fitted with a 12mm mess screen to prevent the entrainment of marine biota and therefore marine mammals will be prevented from entrainment. Studies have shown that because entrance velocities in passive screen intakes are generally low (for this project, a maximum velocity of 0.15m/s), impingement for marine mammals is highly unlikely (Electric Power Research Institute (EPRI), 2006). Marine mammals are also highly agile and mobile receptors, which further reduces the likelihood of impingement, making it negligible. As such, this impact has been scoped out of further assessment in the construction phase, as well as during the operational phase (as described above).		
Disturbance to seal haul-out sites	x	x	The closest seal haul out sites are found at Maiden Rocks. This is approximately 9km from the outfall site and therefore this impact has been scoped out due to distance and no realistic risk of disturbance.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Increased underwater noise from vessels	✓	✓	There will be limited vessel traffic associated with the Project during construction. This includes a construction vessel and a support vessel. During operation, there will be occasional ongoing visits to and from the site (e.g. for site inspections and sampling). Until details of specific vessels to be used are known, this impact is scoped in on a precautionary basis.	No data collection will be required.	Assessment will be undertaken qualitatively. The vessel type and level of activity will inform likely noise levels. These will be contextualised against other vessel activity, and typical background noise levels in the area.
Increased vessel activity, which may result in collision risk	✓	✓	Potential increased vessel traffic during all phases of the Project has the potential to increase the risk of collisions with marine mammals. However, there will be only a very minor uplift in vessel numbers associated with the Project. Mitigation measures, within the Construction Environmental Management Plan, will include a code of conduct for vessel operators, which will manage vessel speed, and routes will reduce any risk of this impact to negligible. However, until details of specific vessels to be used are known, this impact is scoped in on a precautionary basis.	No data collection will be required.	Assessment will be undertaken qualitatively. The vessel type and level of activity will be used to inform the risk of collision.
Increases in Suspended Sediment	x	x	Tunnelling, excavation and HDD punchout activities are all expected to generate sediment plumes, resulting in temporary and localised increases in	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Concentrations (SSCs) and associated sediment deposition			SSC and subsequent deposition. However, given the short-term and spatially limited nature of these effects during the construction phase, potential impacts to marine mammals are considered negligible and have therefore been scoped out of further assessment. Similarly, no activities during the operation phase are expected to cause significant increases in SSCs.		
Accidental pollution	✓	✓	There is a risk of accidental pollution from vessels and equipment during construction and operations. This risk will be minimised through the use of good industry practice for vessels and the application of relevant guidelines for the prevention of pollution at sea (such as those from the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), International Maritime Organisation (IMO), and the International Convention for the Prevention of Pollution from Ships (MARPOL)). Thus, it is unlikely that accidental pollution will occur. However, this has been scoped in on a precautionary basis.	No data collection will be required.	Assessment will be undertaken qualitatively. The vessel type and level of activity will be used to inform the risk of collision
Changes to prey availability	✓	x	Changes in prey abundance and distribution during the construction phase of the Project may have an indirect impact on Marine Mammals. More information is contained within Chapter 9 (Fish,	No data collection will be required.	The Marine Mammal assessment will be based on the results of the Fish, Shellfish and Plankton

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
			Shellfish and Plankton Ecology) of the Scoping Report. Therefore, this impact is scoped in on a precautionary basis.		Ecology assessment (see Chapter 9 (Fish, Shellfish and Plankton Ecology) of the Scoping Report).

* The project phase refers to construction/decommissioning (C) and operation (O).

11 Underwater Noise

11.1 Introduction

This Chapter of the Scoping Report identifies the underwater noise sources of relevance to the Project and considers the potential impacts arising from the construction/decommissioning, and operation and maintenance of the Project.

Generally, the activities of concern for this report are the construction/decommissioning and operation of the seawater intake, brine outfall and caverns where they occur at or below the high-water mark.

11.2 Study Area

The Study Area is limited to the Marine Application Areas displayed in Figure 4-1. This marks the extent of activities associated with the Project, but not the maximal area of effects of noise, which is to be determined on the basis of a noise impact assessment, if deemed appropriate.

11.3 Data Sources

To inform this Scoping Report, the environmental and technical sources presented in **Table 11-1** have been used.

Table 11-1: Data sources for this assessment

Category	Sub-category	Data Sources
Environment	Bathymetry	United Kingdom Hydrographic Office Admiralty Data: https://seabed.admiralty.co.uk.
		EMODnet Bathymetry (DTM 2022): https://emodnet.ec.europa.eu/geonetwork/srv/eng/catalog.search#/search.
		I-Boating's Nautical chart service: https://fishing-app.gpsnauticalcharts.com/i-boating-fishing-web-app/fishing-marine-charts-navigation.htm
	Sediment	EMODnet Geology: EMODnet Geology Web Map Service (WMS), https://drive.emodnet-geology.eu/geoserver/gtk/wms 1:250k folk 16-class classification.
Noise Sources	Drilling activities	Internal database of noise levels of HDD activity or similar activities (Erbe and McPherson, 2017; L-F, et al., 2023; MR, M, M, and I, 2010; Ward and Needham, 2012; Fisheries and Marine Service, 1975).
	Underwater construction	Internal database of noise levels of various underwater machinery and construction methods (e.g. rock dumping, rock breaking [pecking], various dredging methods).

Category	Sub-category	Data Sources
	Vessels	Internal database of recorded noise levels (measurements).
		Empirical and numerical models e.g.: (Jukka et al., 2018; MacGillivray and de Jong, 2021; Wittekind, 2014).
	Flow noise	Various empirical models for estimation of cavitation probability in the noise (detailed in Appendix B).

11.4 Baseline Environment

The marine environment has natural sources of noise such as breaking waves, wind-driven noise, sediment transport, earthquakes/microseismical activity, rainfall and biological organisms. The factors relevant to underwater noise associated with the Project, described in the baseline description below, will emit additional anthropogenic noise to the marine environment.

11.4.1 Noise Level Measurements

RPS undertook field measurements of noise levels off the coast of Islandmagee in 2018 (approx. location: 54.8531 N, 5.7320 W), showing the following trends in noise (all unweighted):

- Typical daytime levels: 100-105 dB SPL (sound pressure levels), 118-125 dB L_{pk}
- Quiet periods: 87-93 dB SPL, 110-130 dB L_{pk}
- Ferry pass: 95-130 dB SPL, 112-145 dB L_{pk}

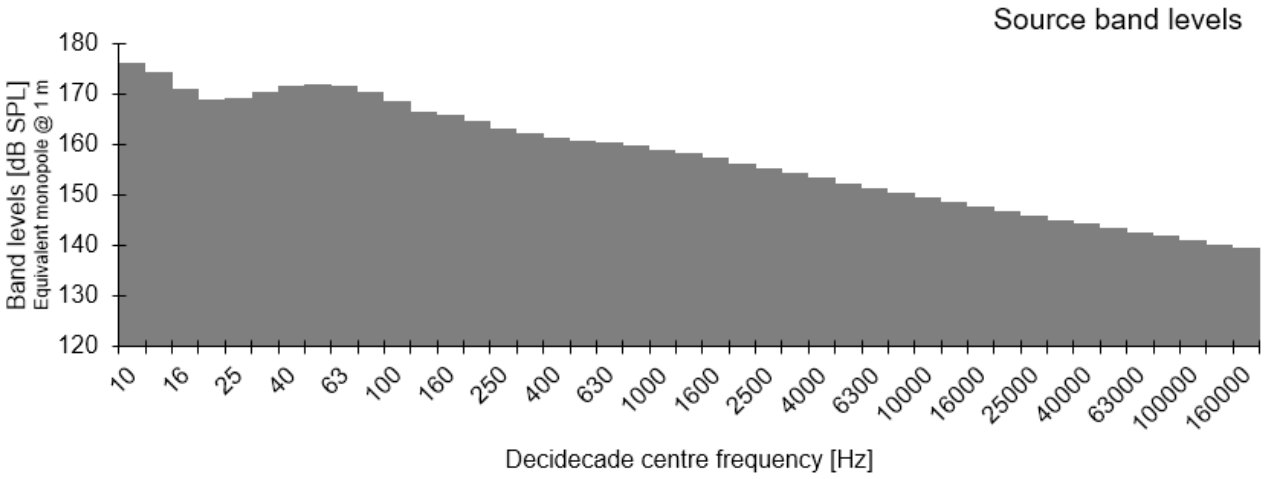
11.4.2 Background Noise – Wind and Rain

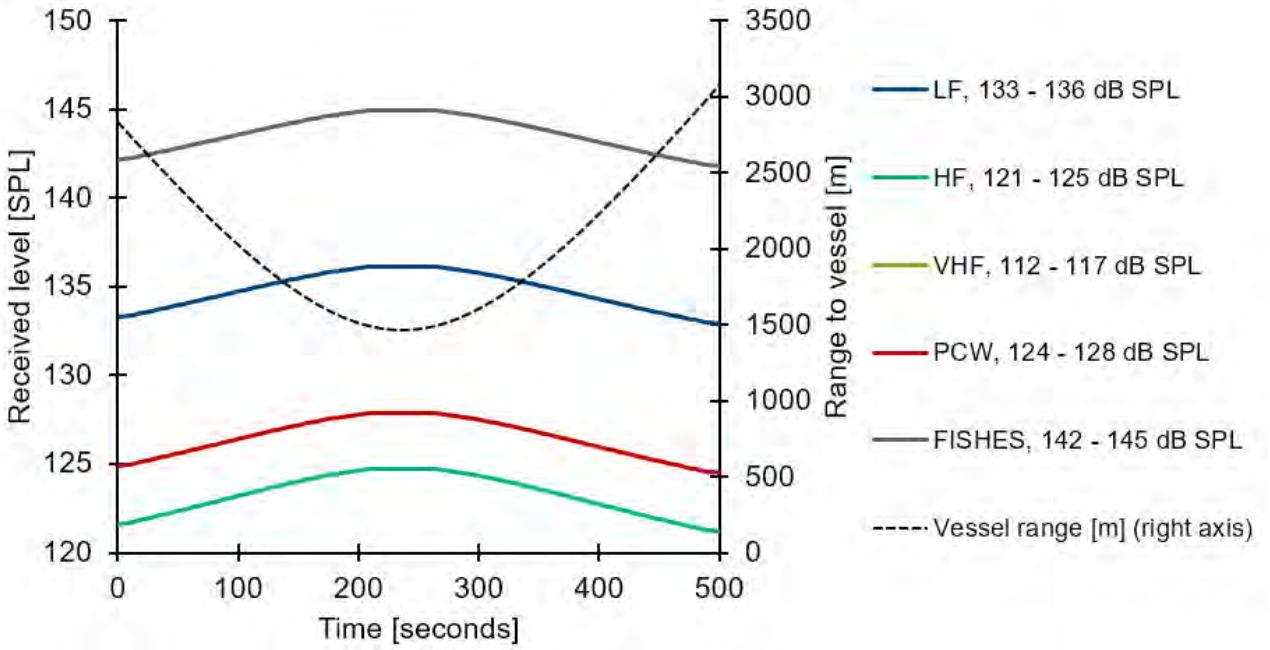
Background noise for the area can be estimated from models:

- A 50th percentile noise level of 105-110dB SPL at 125Hz is estimated by the Strive report series 121 (Coastal and Marine Research Centre, Environmental Research Institute, University College Cork, Ireland and Quiet-Oceans, Brest, France 2011).
- A typical broadband background noise level of 111dB SPL is estimated by the noise model presented in Ma, Nustensing and Lien (2005) using wind speeds (10m/s) and rainfall amounts (2mm/hour) (MeteoBlue 2024).

It is therefore expected to see background levels of 105-110 dB SPL, which are broadly commensurate with those recorded by RPS in 2018, meaning that once propagation losses bring the noise from e.g. a vessel 6 dB below this level it is no longer contributing significantly[3] to the ambient noise.

[3] E.g. if 6 dB below background noise it will add c. 1.0 dB.


Source band levels
Band levels [dB SPL]
Equivalent monopole @ 1 m
180
170
160
150
140
130
120
10
16
25
40
63
100
160
250
400
630
1000
1600
2500
4000
6300
10000
16000
25000
40000
63000
100000
160000
Decidecade centre frequency [Hz]


150
145
140
135
130
125
120
Received level [SPL]
0
100
200
300
400
500
Time [seconds]
3500
3000
2500
2000
1500
1000
500
0
Range to vessel [m]
LF, 133 - 136 dB SPL
HF, 121 - 125 dB SPL
VHF, 112 - 117 dB SPL
PCW, 124 - 128 dB SPL
FISHES, 142 - 145 dB SPL
Vessel range [m] (right axis)

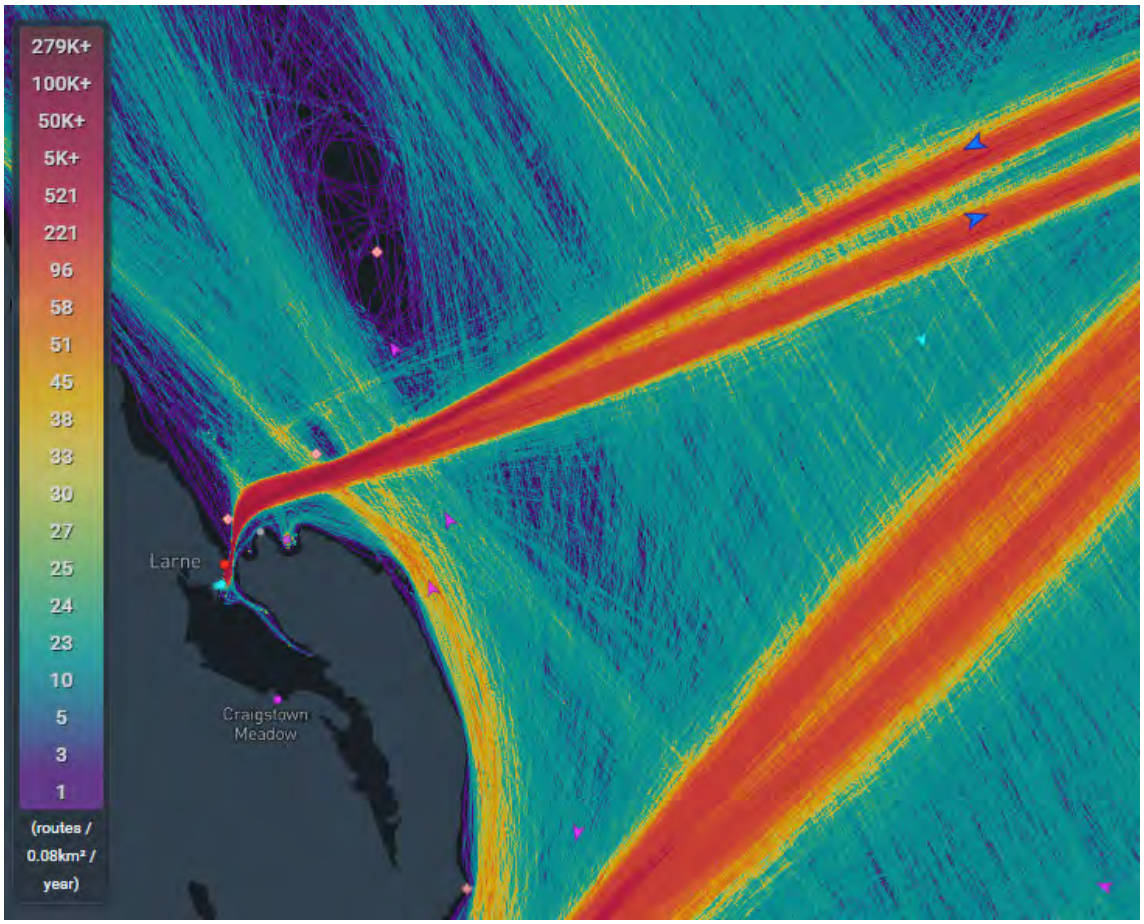

279K+
100K+
50K+
5K+
521
221
96
58
51
45
38
33
30
27
25
24
23
10
5
3
1
(routes / 0.08km² / year)
Larne
Craigstown Meadow

Table 11-2: Impacts Proposed to be Scoped In (✓) / Out (x) for underwater noise

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Noise from support or dredging vessels exceeding limits for adverse auditory effects on marine mammals and/or fish	✓		Vessels used for either support or dredging during seawater intake or brine outfall construction are likely to increase noise levels above baseline levels, as well as above limits for auditory effect on marine mammals and fish. Support vessels using dynamic positioning systems (thrusters) or acoustic positioning devices (e.g. Sonardyne Ranger Ultra Short BaseLine [USBL], Kongsberg HiPaP) will likely emit significant noise compared to limits for marine mammals and fish. Vessels are not required for activities associated with the construction of the caverns, which occur beneath the seabed.	Desktop survey of AIS data.	Modelling of impact ranges for noise from vessel movements and dredging using representative vessel sizes and dredging methods to determine the need for mitigation.
		x	No significant additional vessel or dredging activity expected during operation. Once operational, caverns operate from land-based stations with no relevant noise emissions into the marine environment.	N/A	N/A
Noise from excavation/dredging for seawater intake foundation exceeding	✓		Depending on the sediment composition and the excavation method, this activity can be noisy compared to baseline levels and limits for auditory effects on marine mammals and fish.	N/A	Modelling of impact ranges for noise from excavation to determine the need for mitigation.

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
limits for adverse auditory effects on marine mammals and/or fish		x	Activity no longer relevant.	N/A	N/A
Noise from in-sediment or underground drilling exceeding limits for adverse auditory effects on marine mammals and/or fish	x		A review of 16 recordings of various drilling operations in water (see Section 11.3) shows maximal likely source levels of <160dB SPL. In-water levels from drilling within the sediment will be well below this (>20-30dB lower), given the attenuation offered by the sediment.	N/A	N/A
		x	Activity no longer relevant.	N/A	N/A
Noise from water flow at intake or outfall exceeding limits for adverse auditory effects on marine mammals and/or fish	x		Given the expected lack of cavitation during discharge, the generation of significant noise levels is highly unlikely (0).	N/A	N/A
		x	Given the expected lifespan of the caverns of 50 years, some modification or maintenance might require additional leeching. Given the expected lack of cavitation during discharge, the generation of significant noise levels is highly unlikely (Appendix B).	N/A	N/A

* Project phase refers to construction/decommissioning (C) and operation (O).

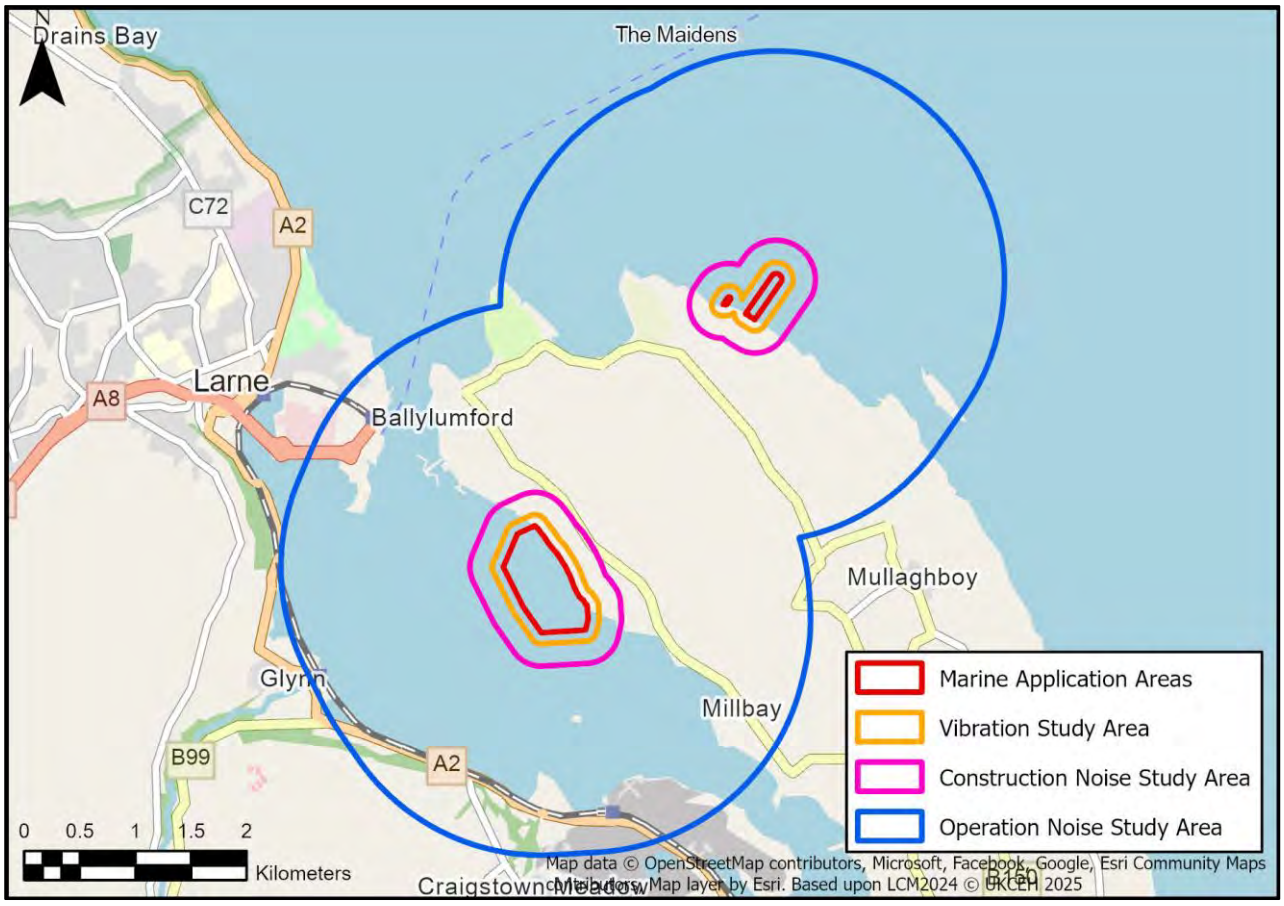

N
Drains Bay
The Maidens
C72
A2
A8
Larne
Ballylumford
Mullaghboy
Glynn
Millbay
B99
A2
0 0.5 1 1.5 2
Kilometers
Marine Application Areas
Vibration Study Area
Construction Noise Study Area
Operation Noise Study Area
Map data © OpenStreetMap contributors, Microsoft, Facebook, Google, Esri Community Maps Contributors, Map layer by Esri. Based upon LCM2024 © UKCEH 2025
Craigstown
Meadow
B150

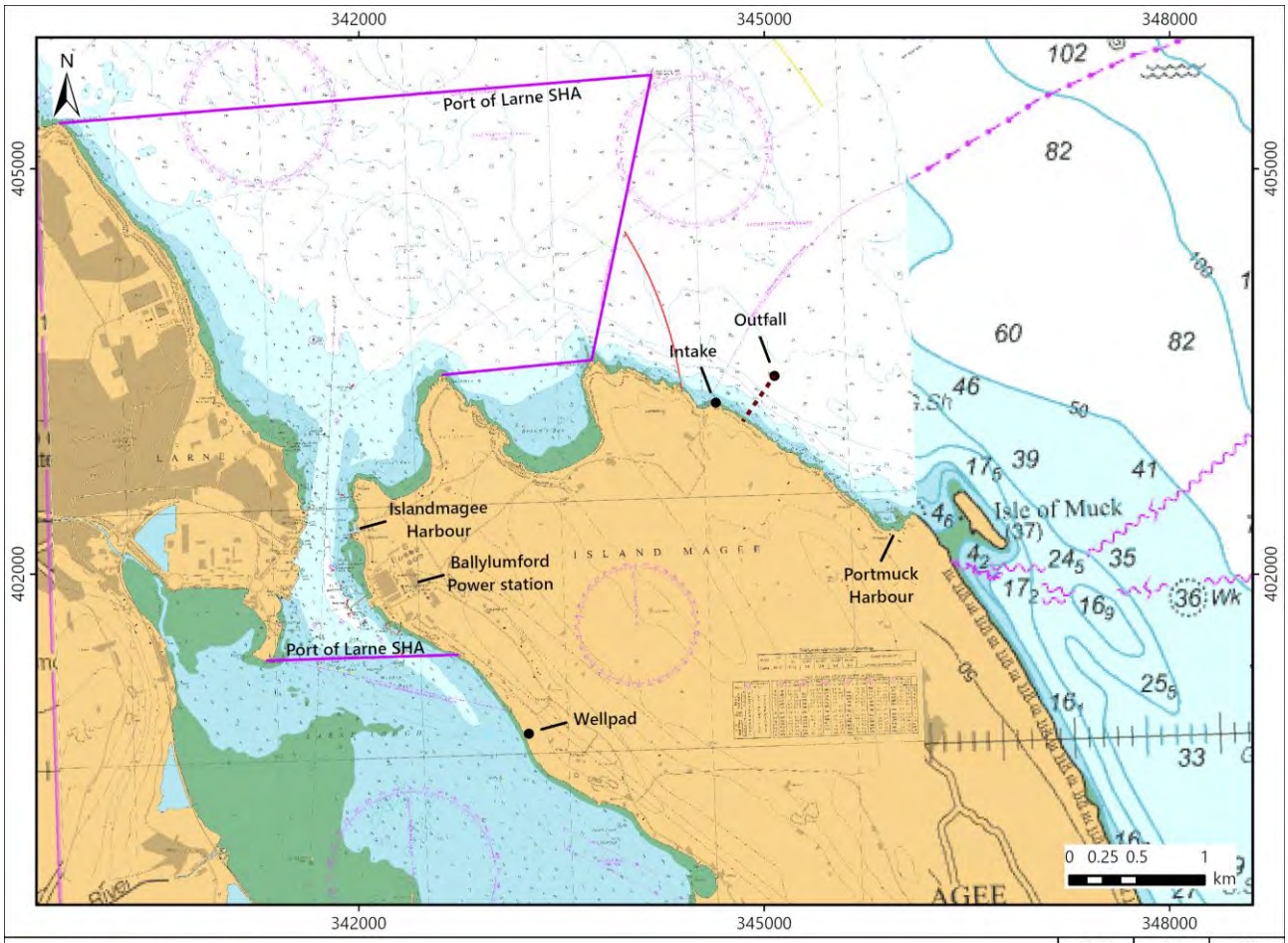
Table 12-1: Impacts Proposed to be Scoped In (✓) / Out (x) for Terrestrial Noise and Vibration

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
Noise generated by the Project impacts on nearby sensitive receptors	✓		Construction activities[7] have the potential to temporarily increase noise levels at nearby noise-sensitive receptors within the study area. The construction of the caverns will be carried out underwater and it has been assumed there will be no terrestrial noise impacts. Further information on underwater noise can be found in Chapter 11 (Underwater Noise). Terrestrial noise associated with operation at the well pad to support the creation of the caverns has been considered and consented under the extant Planning Consent for the Project and is therefore scoped out. There is potential for noise to be generated by excavations/dredging, support vessels, etc. during the construction of the brine outfall and seawater intake.	Baseline noise monitoring will be required to determine the existing noise levels at the nearest sensitive receptors. Locations will be agreed in consultation with Mid and East Antrim Borough Council and will be carried out for a sufficient period to allow typical noise levels to be established.	Construction noise will be predicted at receptor locations using accepted modelling techniques and industry standard source sound-level data following the guidance within BS 5228-1 'Code of practice for Noise and Vibration control on construction and open sites – Part 1: Noise'.

[7] All construction activities relating to this Project are located within the marine environment. Construction activities within the terrestrial environment have been considered and approved as part of the existing terrestrial planning consent/conditions within F/2010/0092/F

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
		x	There will be no operational noise from the marine elements of the Project, and operational noise from the terrestrial component is already consented under the extant Planning Consent.	N/A	N/A
Noise generated by traffic on nearby sensitive receptors	x	x	The impact on traffic has been scoped out on this application, as it only considers the marine elements of the natural gas facilities. In addition, traffic noise was considered and consented under the extant Planning Consent.	N/A	N/A
Vibration generated by the Project impacts on nearby sensitive receptors	x	x	Vibration impacts are unlikely during the construction and operational phase of the Project, and there are no vibration-sensitive receptors located within the vibration study area.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).



Port of Larne SHA

Outfall

Date	By	QA
Aug 25	OJR	NKD

Coordinate System
TM65 Irish Grid

Projection
Transverse Mercator

Project No. 5661
Fig_Study_Area_Islandmagee_A5

© ABPmer, All rights reserved, 2025. © British Crown and OceanWise, 2025. All rights reserved. License No. EMS-EK001-1045684. Not to be used for Navigation.

Table 13-1: Impacts Proposed to be Scoped In (✓) / Out (x) for Shipping, Navigation and Safety

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Contact of vessel with shore infrastructure	✓		Both Construction and recreational or commercial vessels manoeuvring in close proximity to marine structures have the potential for contact (allision) with infrastructure during construction.	Marine accident and incident data, stakeholder consultation and vessel transit information, such as AIS, to determine regular users and vessel routes.	Review of collected data to inform the NRA and EIA.
		x	Once pipeline infrastructure is constructed, the outfall and intake infrastructure are located close to shore, where vessels do not routinely navigate. The storage caverns are located beneath the seabed, and associated works are conducted from the land, thus presenting no risk to navigation.	N/A	N/A
Collision of passing vessels with construction, support or maintenance craft:	✓		Vessel collision (commercial, recreational or fishing) with the construction or support craft whilst transiting to or from the site or during construction activities.	Marine accident and incident data, stakeholder consultation and vessel transit information, such as AIS, to determine regular users and vessel routes.	Review of collected data to inform the NRA and EIA.
		x	The Project does not present a risk of collision during the operational phase, as there is no requirement or planned survey or maintenance support.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Collision during navigation	✓		Vessel collision (commercial, recreational or fishing) with the construction craft whilst transiting to or from the site during construction activities.	Marine accident and incident data collection, stakeholder consultation and vessel transit information, such as AIS, to determine regular users and vessel routes	Review of collected data to inform the NRA and EIA.
		x	Support vessels are not required for the operational phase of the Project, therefore a risk of collision is not possible.	N/A	N/A
Grounding of vessels	✓	✓	Vessels engaged in the construction of the sea water intake and brine outfall works could ground on the foreshore or infrastructure during construction phase additionally passing vessels could ground upon the infrastructure during the operational phase. The storage caverns are constructed below the seabed and present no grounding risk.	Marine accident and incident data collection, stakeholder consultation and vessel transit information such as AIS to determine regular users and vessel routes	Review of collected data to inform the NRA and EIA.
Commercial dive-related incident	✓		Diving-related incident as a result of an underwater hazard or marine craft activity whilst engaged in diving for construction or inspection activity.	Marine accident and incident data collection and stakeholder consultation.	Review of collected data to inform the NRA and EIA
		x	No diving related activities are planned or required during the operational phase of the Project as all operational activities are associated with the storage caverns.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Marine pollution incidents	✓		Pollutants entering the water from a marine incident (for example, a collision) or through an accidental spill from refuelling plant and equipment.	Marine accident and incident data collection and stakeholder consultation.	Review of collected data to inform the NRA and EIA
		x	No vessel activities are planned or required during the operational phase of the Project as all operational activities are associated with the storage caverns and do not require vessels.	N/A	N/A
Payload-related incident	✓		Through the unloading of cargo (for example, construction material or laying pipe), it is possible that construction craft could suffer a loss of stability, resulting in water ingress or capsize.	Stakeholder consultation.	Review of collected data to inform the NRA and EIA
		x	Once pipeline infrastructure is constructed, there are no follow-up payload-related activities associated with the operation of the infrastructure.	N/A	N/A
Accident to the general public	✓		The accessibility of the shoreline for the general public and those engaged in near-shore recreational pursuits (for example, swimming, small manual-powered craft) presents a marine safety risk to the general public during the construction phase.	Marine accident and incident data collection and stakeholder consultation.	Review of collected data to inform the NRA and EIA
		x	Following Construction, there will be no marine activities to cause accidents to the general public.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Fire/explosion	✓		Construction or inspection craft experiencing a fire and/or an explosion onboard, leading to a marine emergency situation.	Stakeholder consultation.	Review of collected data to inform the NRA and EIA
		x	No vessel activities are planned or required during the operational phase of the Project as all operational activities are associated with the storage caverns and do not require vessels.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

13.6 ES Assessment Methodology

The Shipping, Navigation and Safety Chapter of the EIA will follow the methodology set out in Chapter 3. However, specific to the Shipping, Navigation and Safety EIA Chapter, the following guidance documents will also be considered:

Primary guidance: The National Policy Statement for Ports (NPSfP, 2012) provides the overarching policy against which the Project will be determined. Paragraph 5.6.2 (NPSfP, 2012) recognises that there could be an increased risk of spills and leaks of pollutants as a result of infrastructure development. Seaports and harbours provide the interface between the land, near shore and open sea. The UK Marine Policy Statement (2011) identifies in relation to port developments and marine safety that:

"Marine plan authorities and decision makers should take into account and seek to minimise any negative impacts on shipping activity, freedom of navigation and navigational safety; and ensure that their decisions are in compliance with international maritime law" (HM Government, 2011).

Secondary guidance: Relevant sections of the following documents will be considered in the preparation of the NRA for the Project:

- International Maritime Organisation (IMO) Revised Guidelines for Formal Safety Assessment (FSA) for use in the IMO rule-making process (IMO, 2018);
- Maritime and Coastguard Agency (MCA), Marine Guidance Notice 654 (MGN 654 Merchant + Fishing) Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021);
- Department for Transport (DfT) Ports and Marine Facilities Safety Code (DfT, 2025) and its supporting Guide to Good Practice (MCA, 2025); and
- Marine safety guidance and advice from the MCA as the competent authority for marine safety.

A **Navigational Risk Assessment (NRA)** will be required to support the marine licence application for the Project and will be presented as an appendix to the EIA. The NRA will detail and evaluate the pathways shown as potential significant effects. The following data will be required to inform the NRA with relevant sections carried forward to the EIA:

Table 13.2: NRA and EIA data required

Data Type	Data Source
Accident and Incident data	Marine Accident Investigation Branch (MAIB) Royal National Lifeboat Institution (RNLI)
Automatic Identification System (AIS) data	Obtained from commercial suppliers
Vessel movement statistics	From Local operators (if available)
Navigational features and charted information	United Kingdom Hydrographic Office (UKHO) Admiralty Chart 1237

Table 14-1: Summary of Key Desktop Data Sources for Commercial Fisheries

Data Title	Data Time Period	Source
Outputs of the FiSMaDiM Project	2019 to 2021	Centre for the Environment, Aquaculture and Fisheries Science (CEFAS) (2025)
Licensed Aquaculture areas	2025	OpenDataNI (2025)
2019 to 2023 United Kingdom (UK) Fleet Landings by ICES Rectangle Stock and Exclusive Economic Zone (EEZ)	2019 to 2023	MMO (2024)
2014 to 2018 UK Fleet Landings by ICES Rectangle	2014 to 2018	MMO (2019)
Fishing Activity for over 15 metre UK Vessels	2017 to 2020	MMO (2020)

14.4 Baseline Environment

Commercial fisheries data are presented for the last 10 years of available data, where available, between 2014 and 2023, to provide a comprehensive baseline which ensures an accurate representation of fishing activity prior to the Covid-19 pandemic and to incorporate historical data, which is usually requested by the industry. This temporal range is applied during the analysis of all ICES rectangles considered within this Chapter of the Scoping Report to provide a uniform assessment.

The commercial fisheries baseline for this Chapter of the Scoping Report has been primarily characterised by publicly available data for the relevant ICES rectangles (MMO, 2019; MMO, 2024). The MMO data are presented below and include information on various parameters, such as gear type and species caught and provide a sufficient representation of the fisheries activity within the Commercial Fisheries Study Area.

The commercial fisheries topic for the ES takes account of potential impacts to commercial fisheries up to the point of first sale by commercial fishers. Any potential impacts associated with the onward sale of fish and the fisheries supply chain will be included as part of the socio-economic impact assessments and will be considered if any potential impacts to commercial fisheries are concluded to be significant.

14.4.1 Fisheries Data Between 2014 and 2018

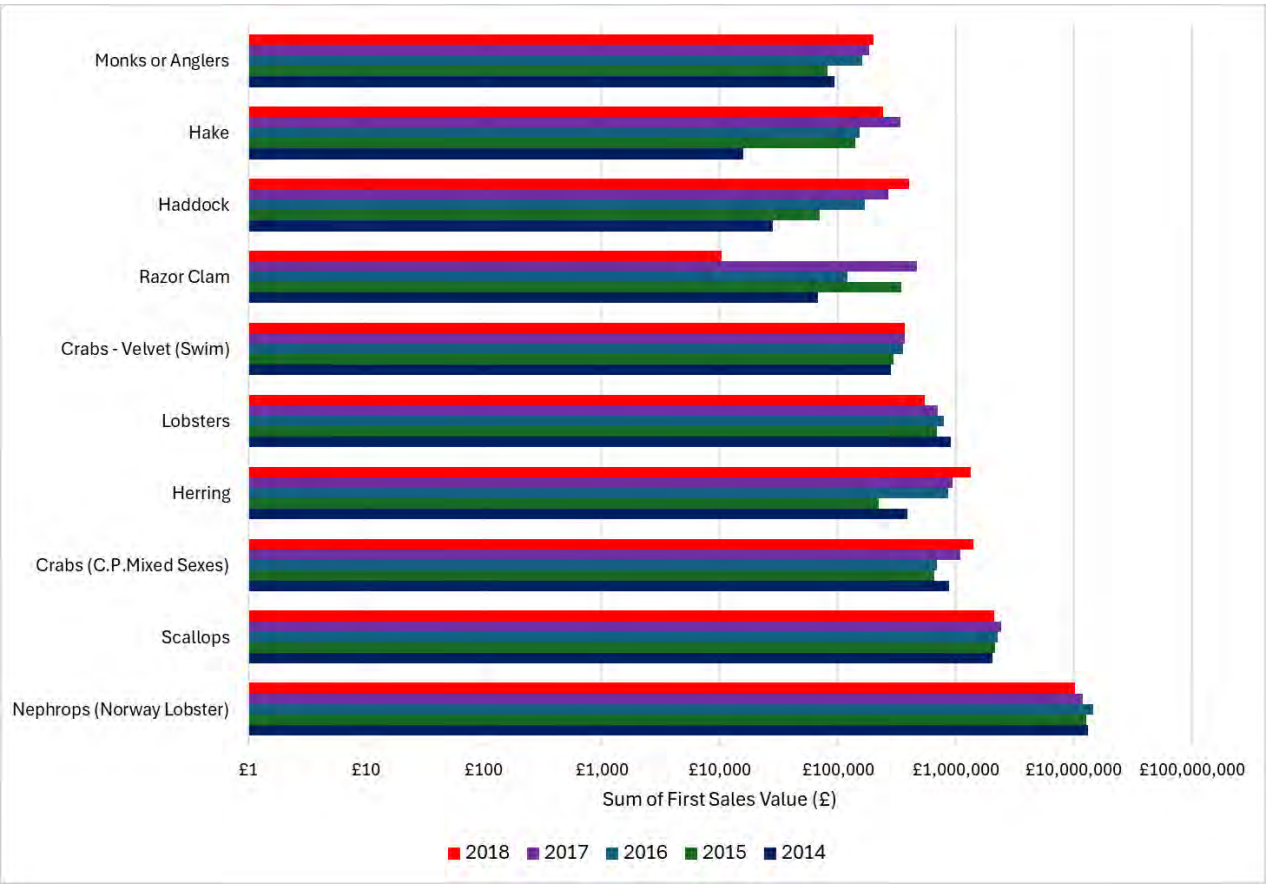
The total landed weight and first sales value between 2014 and 2018 are relatively consistent, as illustrated in Table 14-2 below. The annual average landed weight from all ICES rectangles within the Commercial Fisheries Study Area across the five-year period was 7,533.69 tonnes, with an average first sales value of £18,570,116.65. Shellfish was the dominant species group, averaging £17,001,486.47 over the five years

(91% of landings by average first sales value), followed by pelagic and demersal fisheries at £812,990 and £755,639 respectively.

Table 14-2: Key Summary Statistics for the Commercial Fisheries Study Area from 2014 to 2018

Year	Sum of Landed Weight (tonnes)	Sum of First Sales Value (GBP)
2014	7,068.66	£18,464,748.82
2015	6,190.04	£17,532,190.77
2016	7,516.86	£20,362,462.81
2017	8,285.02	£19,136,715.59
2018	8,607.86	£17,354,465.25

Nephrops (Norway Lobster *Nephrops norvegicus*) contributed the highest first sale value by a significant margin from 2014 to 2018, with an average value of £12,448,464.25 over the five-year period. This was followed by an average of £2,189,494.55 from scallops (*Pectinidae*) and £936,349.72 from crabs (*Cancer Pagurus* (C.P) Mixed Sexes) for the same period. Figure 14-1 illustrates the top 10 species by first sales value over the five-year period. In terms of landed weight, nephrops, herring (*Clupea harengus*) and scallops dominated, with a sum total of 13,080 tonnes, 10,783 tonnes, and 4,495 tonnes respectively over the five-year period. Other key species caught include lesser spotted dogfish (*Scyliorhinus canicular*), velvet crabs (*Necora puber*), razor clams (*Solen* spp.), and haddock (*Melanogrammus aeglefinus*).


Monks or Anglers
Hake
Haddock
Razor Clam
Crabs - Velvet (Swim)
Lobsters
Herring
Crabs (C.P.Mixed Sexes)
Scallops
Nephrops (Norway Lobster)
£1
£10
£100
£1,000
£10,000
£100,000
£1,000,000
£10,000,000
£100,000,000
Sum of First Sales Value (£)
2018
2017
2016
2015
2014

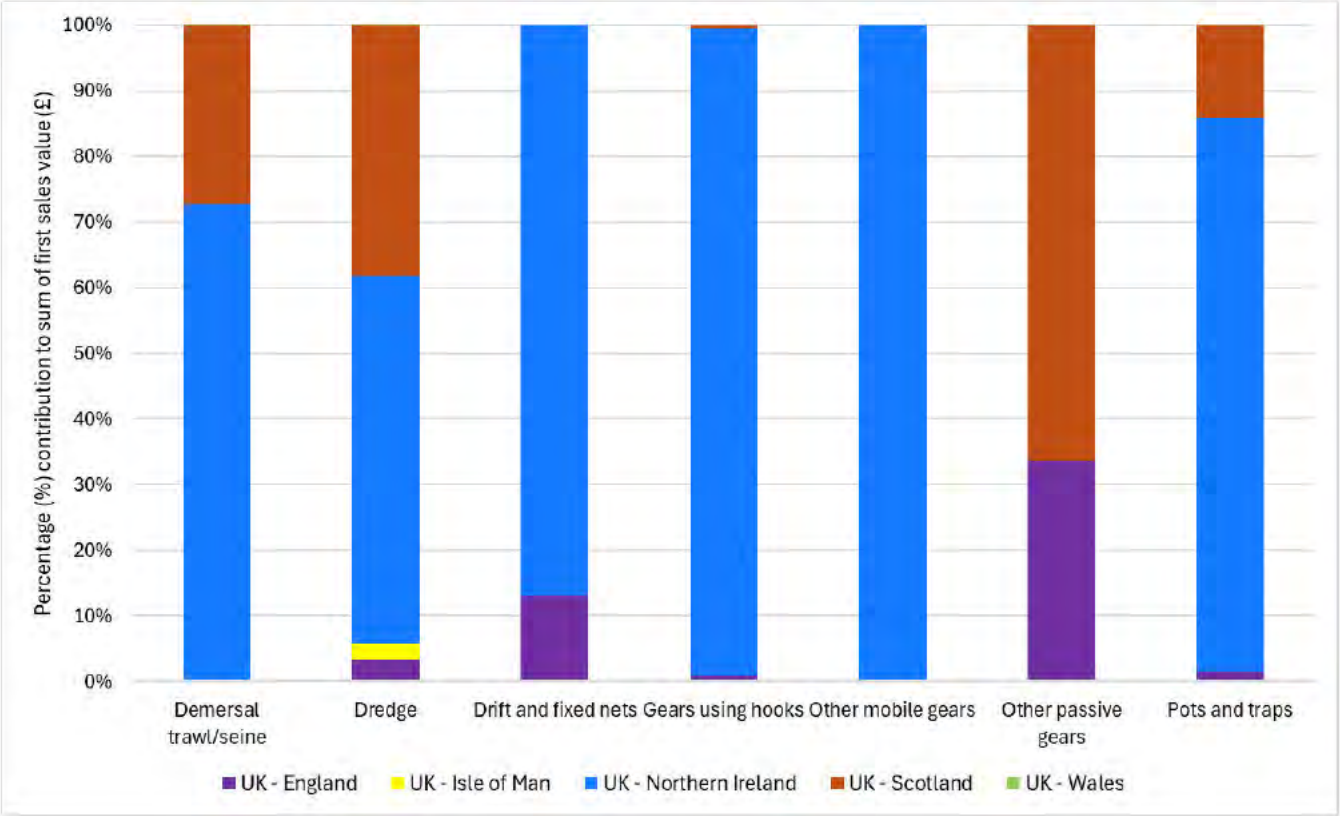


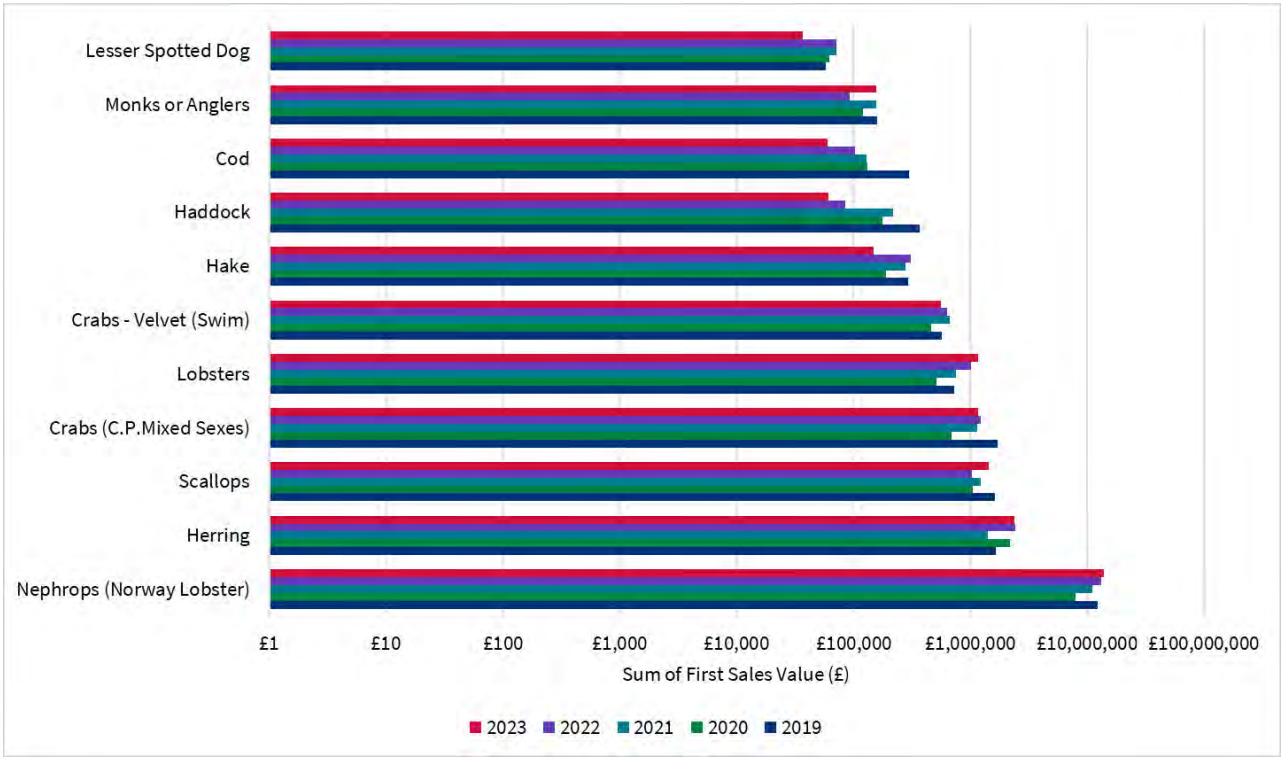
Figure 14-2: Percentage Contribution to the Sum of First Sales Value from 2014 to 2018 for the Commercial Fisheries Study Area by Vessel Nationality and Relative Gear Category

14.4.2 Fisheries Data Between 2019 and 2023

The Fisheries landings from 2019 to 2023 were similarly consistent with the previous five years (Table 14-3), with the exception of 2020, which may be explained by low landing value as a result of restrictions in place during the Covid-19 pandemic. The sum of first sales value across all three ICES rectangles which comprise the Commercial Fisheries Study Area peaked in 2023 at £21,475,612.47, the highest value recorded over the 10-year study period. An average has not been calculated for this five-year period due to the variability in 2020. Shellfish were the dominant species group, averaging £15,636,994.20 over the five years, followed by pelagic and demersal fisheries at £2,011,522 and £941,623 respectively.

Table 14-3: Key Summary Statistics for the Commercial Fisheries Study Area from 2019 to 2023

Year	Sum of Landed Weight (tonnes)	Sum of First Sales Value (GBP)
2019	9,008.11	£20,137,441.80
2020	8,632.78	£13,733,045.67
2021	7,687.57	£17,271,367.85
2022	8,909.05	£20,33,236.53
2023	8,369.26	£21,475,612.47


Lesser Spotted Dog
Monks or Anglers
Cod
Haddock
Hake
Crabs - Velvet (Swim)
Lobsters
Crabs (C.P.Mixed Sexes)
Scallops
Herring
Nephrops (Norway Lobster)
£1
£10
£100
£1,000
£10,000
£100,000
£1,000,000
£10,000,000
£100,000,000
Sum of First Sales Value (£)
2023
2022
2021
2020
2019

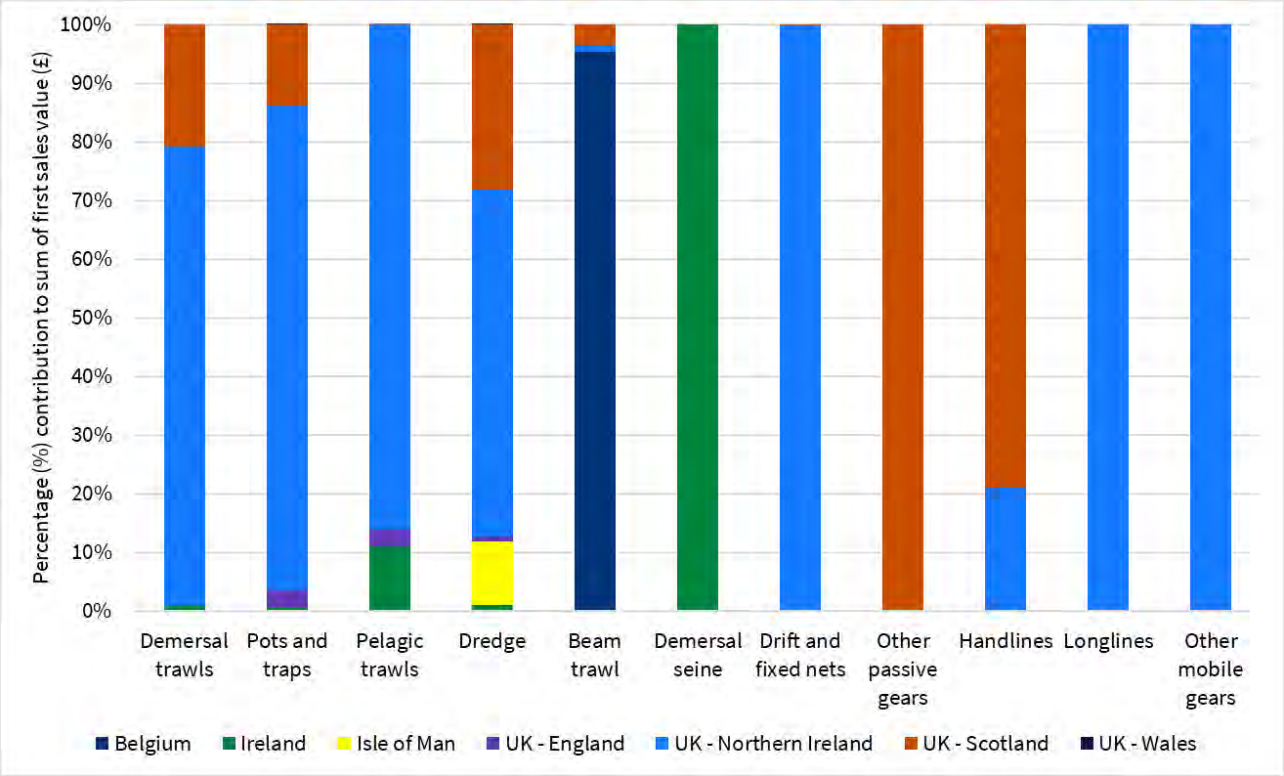

Percentage (%) contribution to sum of first sales value (£)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Demersal trawls
Pots and traps
Pelagic trawls
Dredge
Beam trawl
Demersal seine
Drift and fixed nets
Other passive gears
Handlines
Longlines
Other mobile gears
Belgium
Ireland
Isle of Man
UK - England
UK - Northern Ireland
UK - Scotland
UK - Wales

Table 14-4: Top 10 Ports by Sum of Landed Weight (tonnes) from 2019 to 2023, Displayed with Contributions per ICES Rectangle within the Commercial Fisheries Study Area

Port	37E4	38E4	39E4
Belfast	11,015.10	2,334.06	187.70
Ardglass	7,423.54	125.99	525.42
Portavogie	4,234.61	666.89	876.82
Kilkeel	2,998.94	329.77	49.23
Campbeltown	11.34	47.02	1,844.75
Bangor (Co. Down)	87.41	1,238.02	159.79
Troon and Saltcoats	0.36	8.37	1,362.13
Skaagen	-	979.24	-
Killybegs	849.02	-	-
Florø	784.09	-	-

14.4.3 Vessel Presence and Fishing Intensity

As illustrated in Figure 14-5, the annual average active fishing effort (kW/h) is displayed for the most recent five years available. The full 10-year study period will be illustrated within the ES. From 2017 to 2020, effort has remained steady in the immediate location of the Project. More broadly across the Commercial Fisheries Study Area, there is a significant concentration of active fishing effort north of Stranraer in the Firth of Clyde in 39E4, and in 37E4 in offshore waters, though activity in Dundalk Bay remains low. Passive fishing effort for the same time period is displayed in Figure 14-6, which indicates very low effort around the Project, or in the wider North Channel. Passive effort within the Commercial Fisheries Study Area is primarily concentrated along the coastline in 37E4 between Carlingford Lough and Murlough Bay.

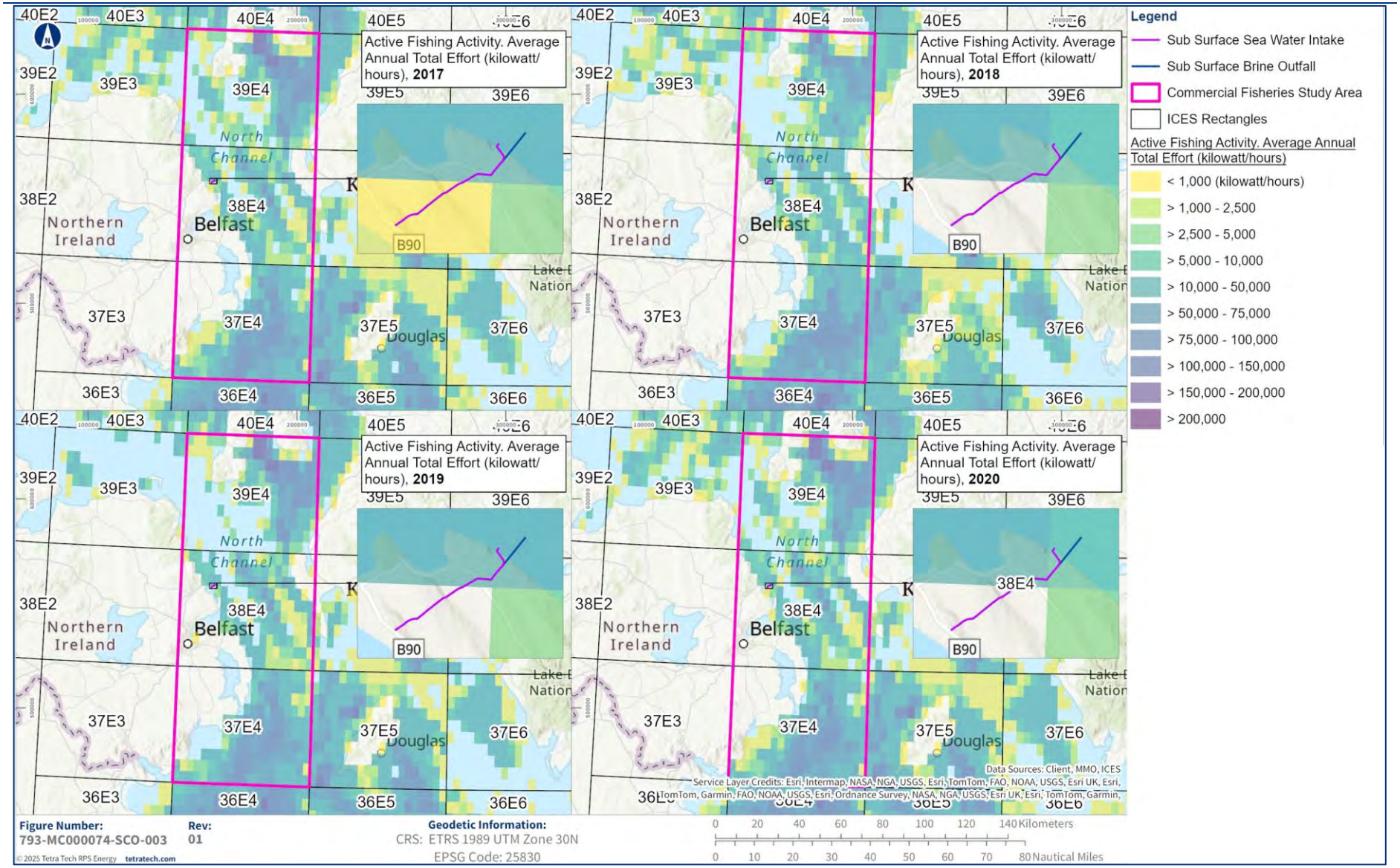


Figure Number: 793-MC000074-SCO-003 **Rev:** 01

Geodetic Information: CRS: ETRS 1989 UTM Zone 30N EPSG Code: 25830

© 2025 Tetra Tech RPS Energy tetratech.com

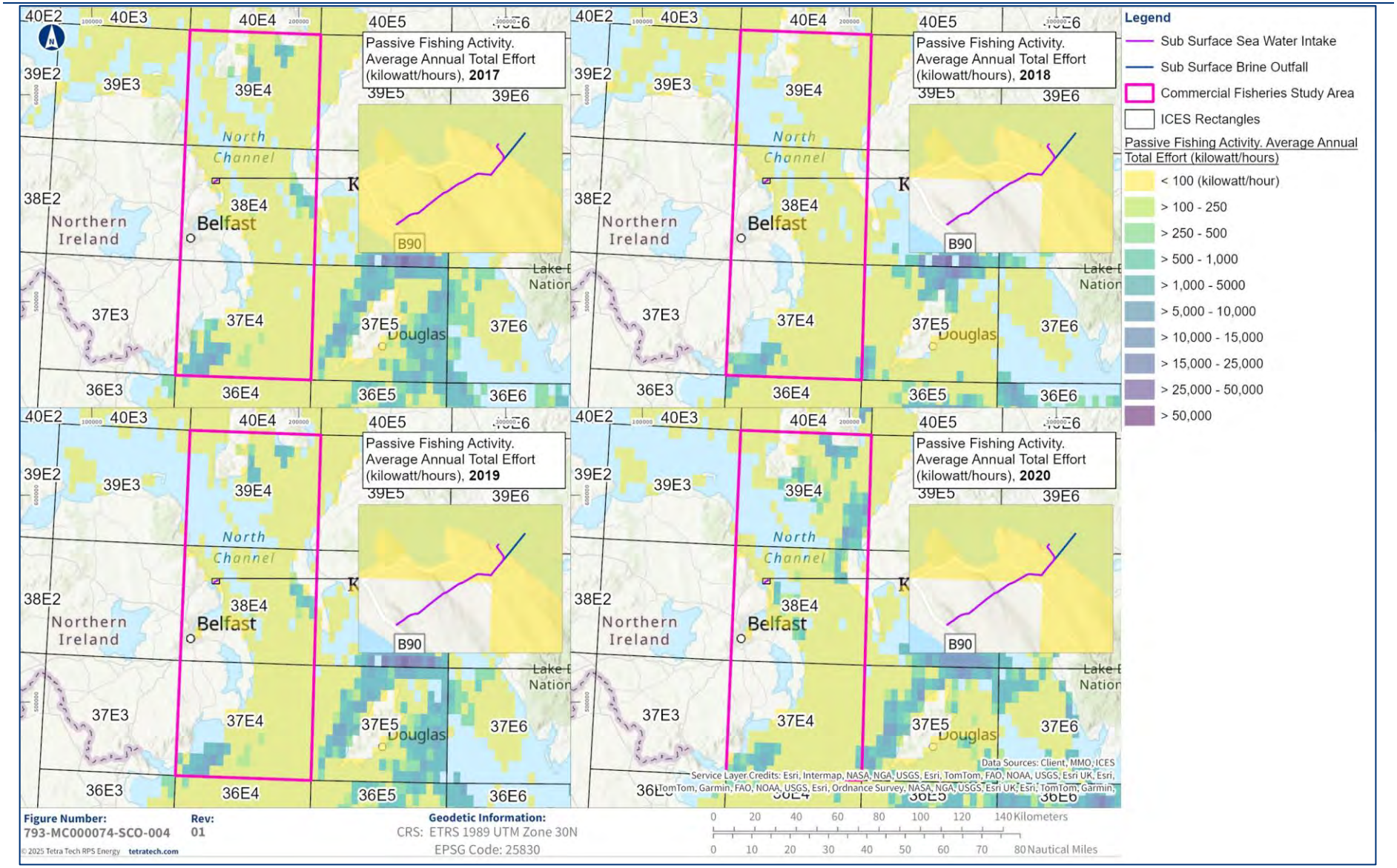
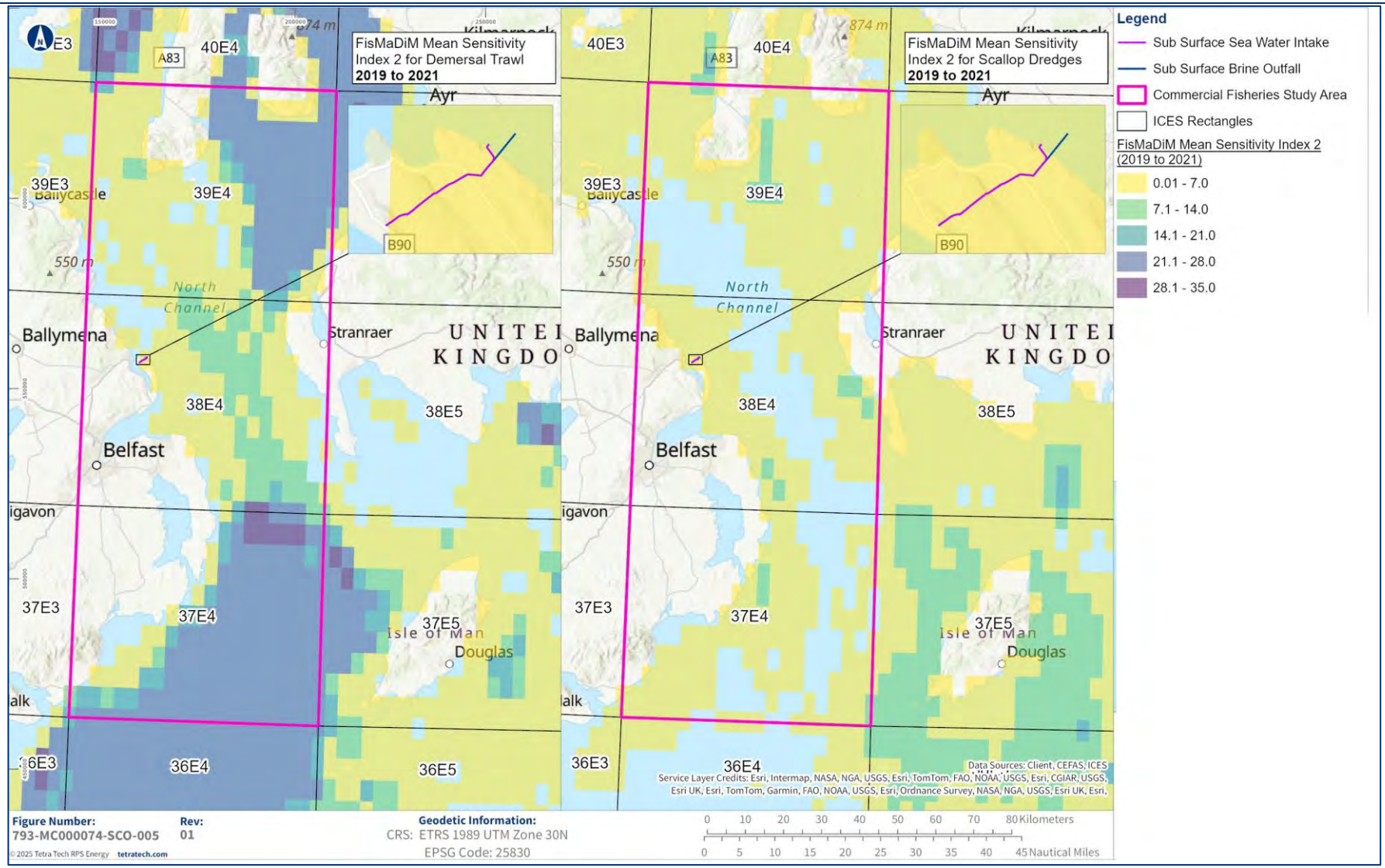


Figure Number: 793-MC000074-SCO-004

Rev: 01

Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830

© 2025 Tetra Tech RPS Energy tetratech.com


FisMaDiM Mean Sensitivity Index 2 for Demersal Trawl
2019 to 2021
FisMaDiM Mean Sensitivity Index 2 for Scallop Dredges
2019 to 2021
B90
A83
Ayr
Ballycastle
Ballymena
Stranraer
Belfast
Isle of Man
Douglas
North Channel
874 m
550 m
40E3
40E4
39E3
39E4
38E4
38E5
37E3
37E4
37E5
36E3
36E4
36E5
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Commercial Fisheries Study Area
ICES Rectangles
FisMaDiM Mean Sensitivity Index 2 (2019 to 2021)
0.01 - 7.0
7.1 - 14.0
14.1 - 21.0
21.1 - 28.0
28.1 - 35.0
Data Sources: Client, CEFAS, ICES
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri, TomTom, FAO, NOAA, USGS, Esri, CGIAR, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, Ordnance Survey, NASA, NGA, USGS, Esri UK, Esri,
Figure Number:
793-MC000074-SCO-005
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 10 20 30 40 50 60 70 80 Kilometers
0 5 10 15 20 25 30 35 40 45 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com

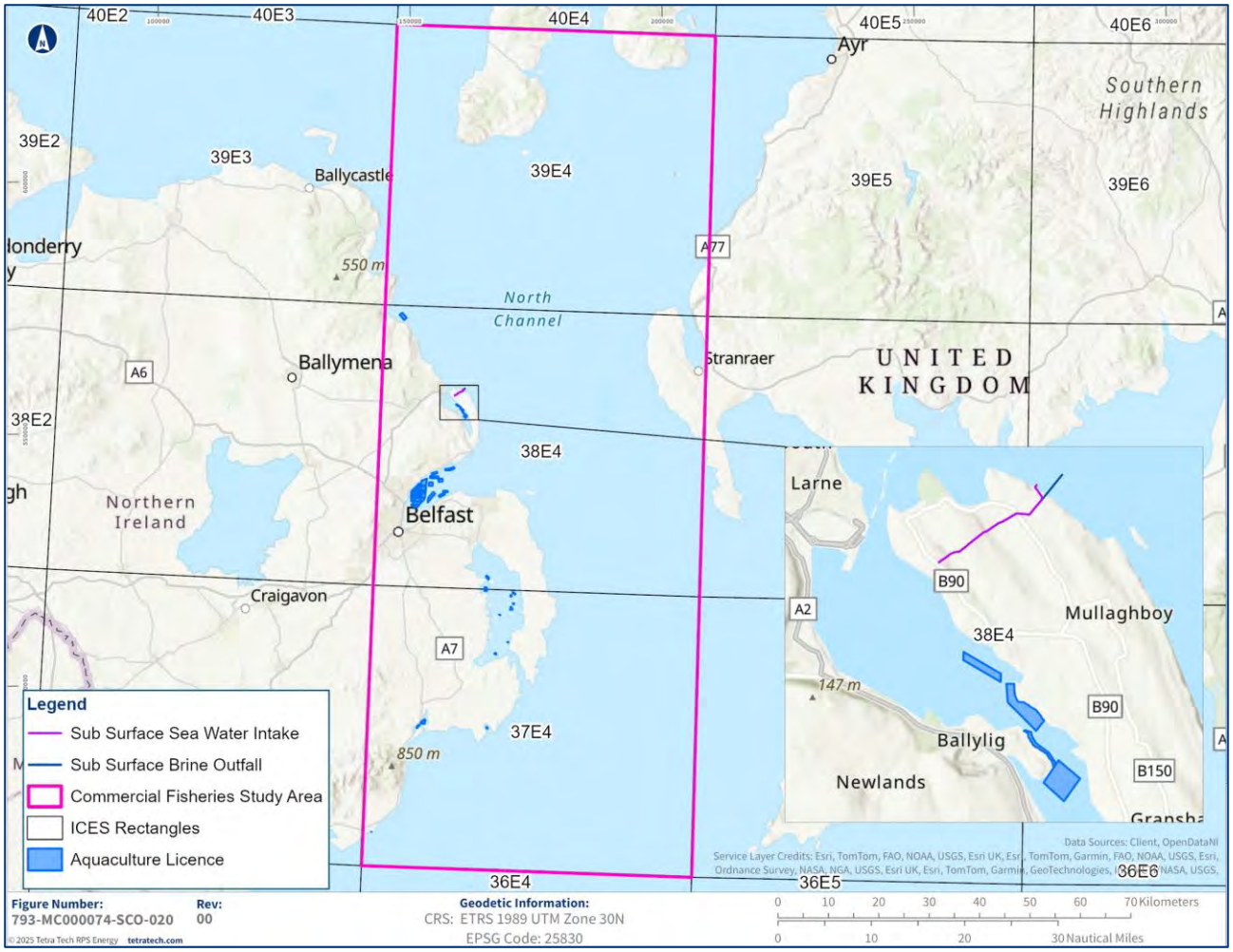

40E2
40E3
40E4
40E5
40E6
39E2
39E3
39E4
39E5
39E6
Ayr
Southern Highlands
Ballycastle
550 m
North Channel
A77
A6
Ballymena
Stranraer
UNITED KINGDOM
38E2
38E4
Larne
Northern Ireland
Belfast
B90
Mullaghboy
A2
38E4
147 m
Craigavon
A7
37E4
850 m
Ballylig
B150
Newlands
36E4
36E5
36E6
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Commercial Fisheries Study Area
ICES Rectangles
Aquaculture Licence
Figure Number:
793-MC000074-SCO-020
Rev:
00
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 10 20 30 40 50 60 70 Kilometers
0 10 20 30 Nautical Miles
Data Sources: Client, OpenDataNI
© 2025 Tetra Tech RPS Energy tetratech.com

Table 14-5: Impacts Proposed to be Scoped In (✓) / Out (x) for Commercial Fisheries

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Effects associated with cavern construction and operation (receptor: Commercial Fisheries)	x	x	The physical construction of the caverns will occur beneath the seabed, and therefore, there is no pathway to the marine environment and no impact upon Commercial Fishery receptors during the physical construction or lifetime operation of the caverns.	N/A	N/A
Temporary loss or restricted access to fishing grounds (receptor: Commercial Fisheries)	✓		The construction/ decommissioning of the Project (specifically the seawater intake pipe and the brine outfall pipe) may temporarily displace fishing activity from the immediate vicinity due to the presence of potential construction vessels and the marine support spread required at the punch out location of the brine outfall pipe. Occasional physical inspection of the pipelines will necessitate a small amount of vessel traffic, however, as this activity will be occasional and by individual or a small number of vessels, a limited impact is anticipated.	Further desktop studies to characterise the baseline in addition to stakeholder engagement and potential acquisition of additional data.	No site-specific modelling or survey work is proposed for this impact. Instead, a qualitative assessment will be undertaken to assess potential impacts upon commercial fisheries receptors. This qualitative assessment will be based on a quantitative and qualitative analysis of fisheries data, utilising the sources listed in Table 14-1, in addition to data requested from stakeholders.
		x	The operation of the Project (namely the lifetime operation of the caverns) is not expected to impact or displace fishing activity as the caverns	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			(and associated activities) are located below the seabed. The sub-sea components of the Project (the seawater intake pipe and the brine outfall pipe) will not operate during the operational phase of the Project, and therefore no impact upon Commercial Fishery receptors is anticipated.		
Long term loss or restricted access to fishing grounds (receptor: Commercial Fisheries)	x	x	The construction and operation of the Project is not expected to result in long-term loss to fishing grounds as, once construction of the seawater intake and brine outfall pipes are completed, fishing activity is expected to resume as normal. The measures described in Section 14.7, for example, concrete mattress protection, will allow for the continuation of fishing activities throughout the Project lifetime. Additionally, the very low levels of demersal trawling in the immediate vicinity (Figure 14-7) indicate that there is unlikely to be a long-term impact on this fishing fleet.	N/A	N/A
Temporary displacement of fishing activity into adjacent areas (receptor: Commercial Fisheries)	✓		As for the impact, 'Temporary loss or restricted access to fishing grounds.'	As for the impact, 'Temporary loss or restricted access to fishing grounds.'	As for the impact, 'Temporary loss or restricted access to fishing grounds.'
		x			

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Increased snagging risk, with the potential to damage gear (receptor: Commercial Fisheries)	✓	✓	The presence of the seawater intake pipe and the brine outfall pipe pose a potential snagging risk to fishing vessels, which could result in loss or damage to gear.	Further desktop studies to characterise the baseline, in addition to stakeholder engagement and potential acquisition of additional data.	No site-specific modelling or survey work is proposed for this impact. Instead, a qualitative assessment will be undertaken to assess potential impacts upon commercial fisheries receptors. This qualitative assessment will be based on a quantitative and qualitative analysis of fisheries data, utilising the sources listed in Table 14-1, in addition to data requested from stakeholders.
Increased steaming or vessel transit times (receptor: Commercial Fisheries)	x	x	The construction and operation of the Project are unlikely to impact upon steaming or vessel transit times due to the relative nearshore location and small-scale nature or the Project. It is unlikely that any significant number of vessels would be required to change course due to the limited activities associated with the Project.	N/A	N/A
Impacts to commercially exploited species populations	✓	✓	The construction and operation of the Project have the potential for the following impacts upon fish ecology, as informed by Chapter 9 (Fish, Shellfish and Plankton Ecology): effects	Further detail is provided in Chapter 9 (Fish and Shellfish Ecology) for impacts upon fish ecology	Further detail is provided in Chapter 9 (Fish and Shellfish Ecology) for impacts upon fish ecology

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
(receptor: Commercial Fisheries)			associated with underwater noise emissions from construction of intake and outfall infrastructure; effects from entrainment or impingement; effects associated with the discharge of brine; temporary and long-term habitat loss; and introduction and colonisation of hard structures. Justification for scoping of these impacts is detailed in Chapter 9 (Fish, Shellfish and Plankton Ecology).	receptors and commercially important species.	receptors and commercially important species.
Increased SSC and associated deposition affecting licensed aquaculture areas (receptor: Commercial Fisheries)	x	x	Activities such as tunnelling, excavation and HDD punchout are all expected to generate sediment plumes, resulting in temporary and localised increases in SSC and subsequent deposition. However, given the short-term and spatially limited nature of these effects during the construction phase, potential impacts to licensed aquaculture areas are considered negligible and have therefore been scoped out of further assessment. Similarly, no activities during the operation phase are expected to cause significant increases in SSCs.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

- marine tourism and recreation;
- port operations;
- other marine infrastructure (including offshore wind farms, oil and gas activities and Carbon Capture and Storage (CCS));
- cable and pipeline operators; and
- the Ministry of Defence (MoD) Practice and Exercise Areas (PEXAs).

15.3 Data Sources

A desk-based review of data sources (Table 15-1) has been undertaken, which identified data sources of relevance to the Infrastructure and Other Users Study Areas. These sources have been used to inform this Chapter of the Scoping Report.

Table 15-1: Summary of Key Desktop Data Sources for Infrastructure and Other Users

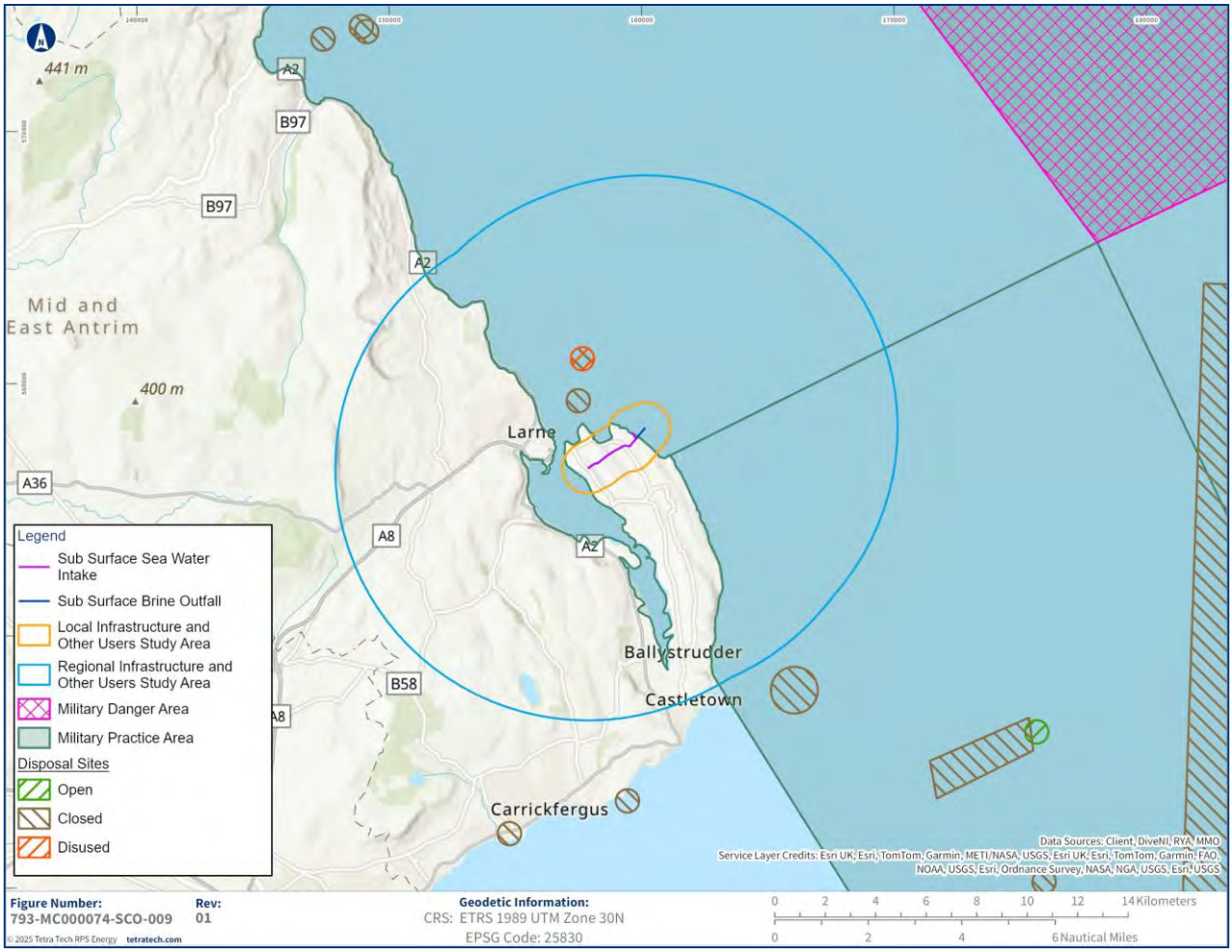
Data Title	Data Time Period	Source
Tourism and recreational activities	2024	DAERA (2024)
Designated bathing waters	2025	DAERA (2025)
Recreational dive sites	2025	DiveNI (2025)
Offshore wind farms	2025	4C Offshore (2025)
Marine aggregate extraction	2021	The Crown Estate (2021)
Marine disposal sites	2023	Centre for Environment, Fisheries and Aquaculture Science (CEFAS) (2023)
Oil and gas activity	2025	North Sea Transition Authority (NSTA) (2025)
Cable routes	2025	Kingfisher Information Service – Offshore Renewable and Cable Awareness (KIS-ORCA) (2025)
Military PEXAs	2025	Oceanwise (2025)

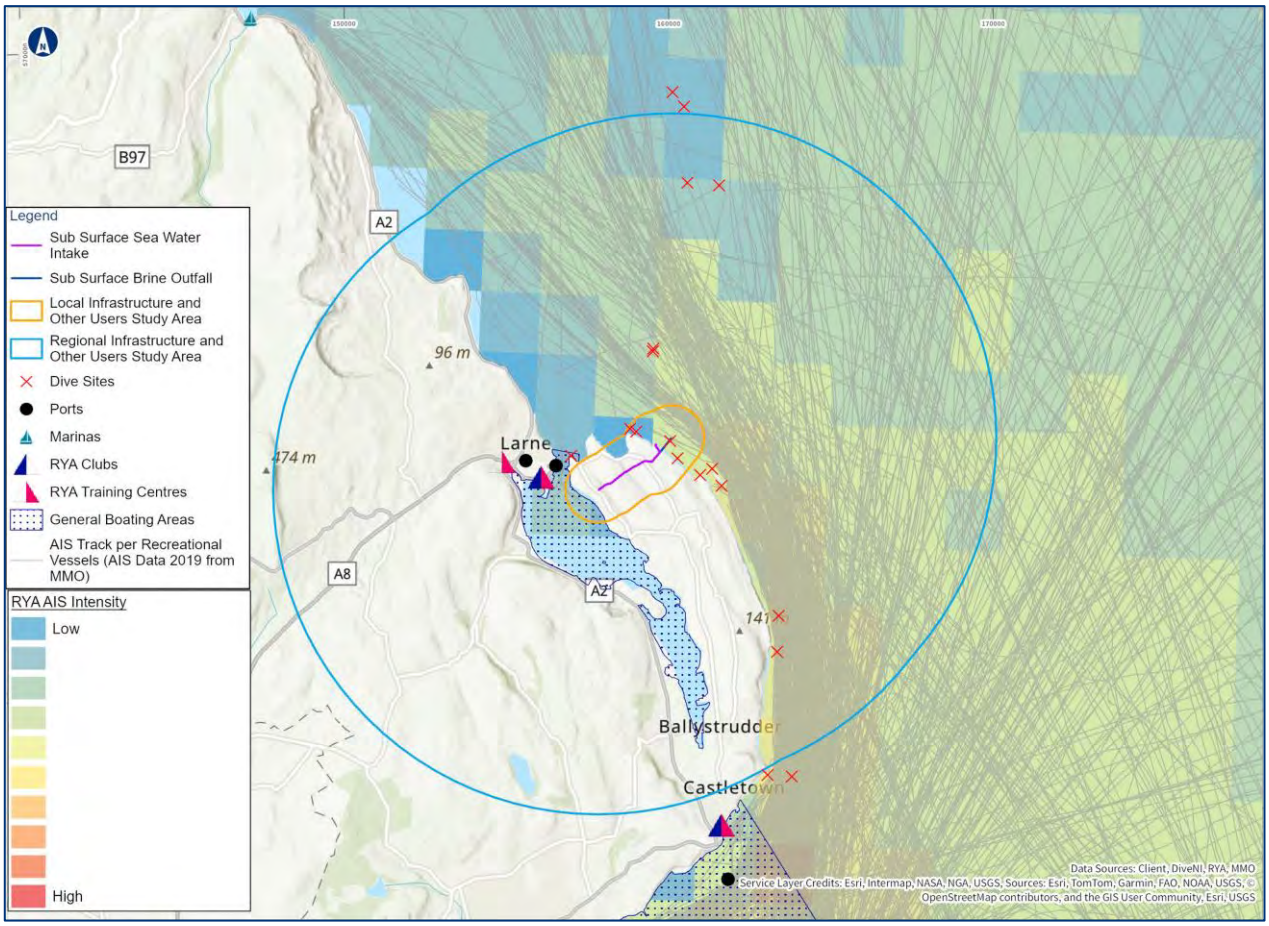
15.4 Baseline Environment

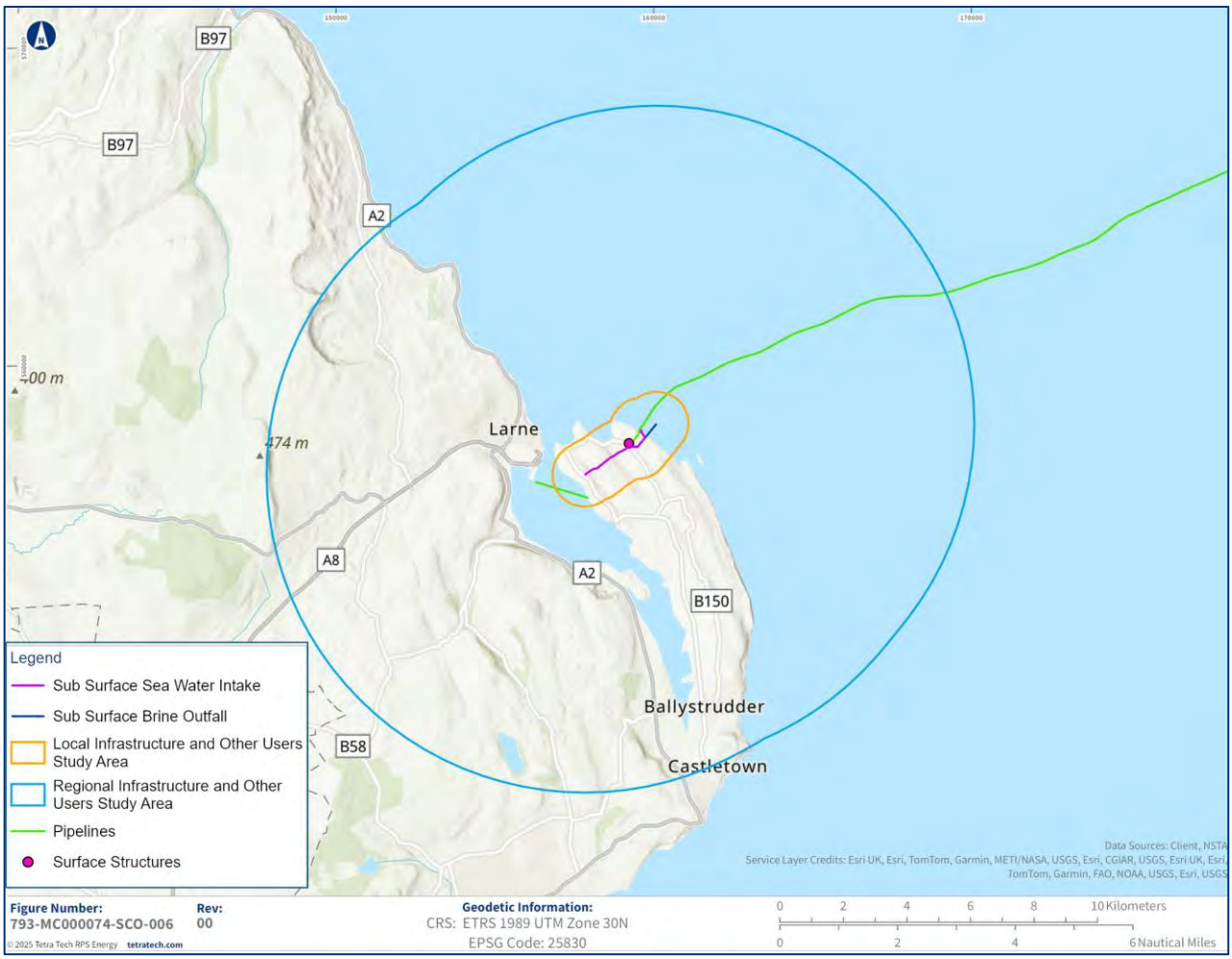
15.4.1 Regional Infrastructure and Other Users Study Area

15.4.1.1 Marine aggregate extraction

There are no marine aggregate sites within the Regional Infrastructure and Other Users Study Area. The closest marine aggregate license is Liverpool Bay (Area Number: 457), located 193km from the Project.


441 m
400 m
A2
B97
B97
A2
Mid and
East Antrim
Larne
A36
A8
A2
Ballystrudder
B58
Castletown
A8
Carrickfergus
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Local Infrastructure and Other Users Study Area
Regional Infrastructure and Other Users Study Area
Military Danger Area
Military Practice Area
Disposal Sites
Open
Closed
Disused
Data Sources: Client, DiveNI, RYA, MMO
Service Layer Credits: Esri UK, Esri, TomTom, Garmin, METI/NASA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, Ordnance Survey, NASA, NGA, USGS, Esri, USGS
Figure Number:
793-MC000074-SCO-009
Rev:
01
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 2 4 6 8 10 12 14 Kilometers
0 2 4 6 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com


Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Local Infrastructure and Other Users Study Area
Regional Infrastructure and Other Users Study Area
Dive Sites
Ports
Marinas
RYA Clubs
RYA Training Centres
General Boating Areas
AIS Track per Recreational Vessels (AIS Data 2019 from MMO)
RYA AIS Intensity
Low
High
B97
A2
A8
A2
96 m
474 m
Larne
Ballystrudder
Castletown
Data Sources: Client, DiveNI, RYA, MMO
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS


B97
B97
A2
Larne
A8
A2
B150
B58
Ballystrudder
Castletown
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Local Infrastructure and Other Users Study Area
Regional Infrastructure and Other Users Study Area
Pipelines
Surface Structures
Data Sources: Client, NSTA
Service Layer Credits: Esri UK, Esri, TomTom, Garmin, METI/NASA, USGS, Esri, CGIAR, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS
Figure Number:
793-MC000074-SCO-006
Rev:
00
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 2 4 6 8 10 Kilometers
0 2 4 6 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com

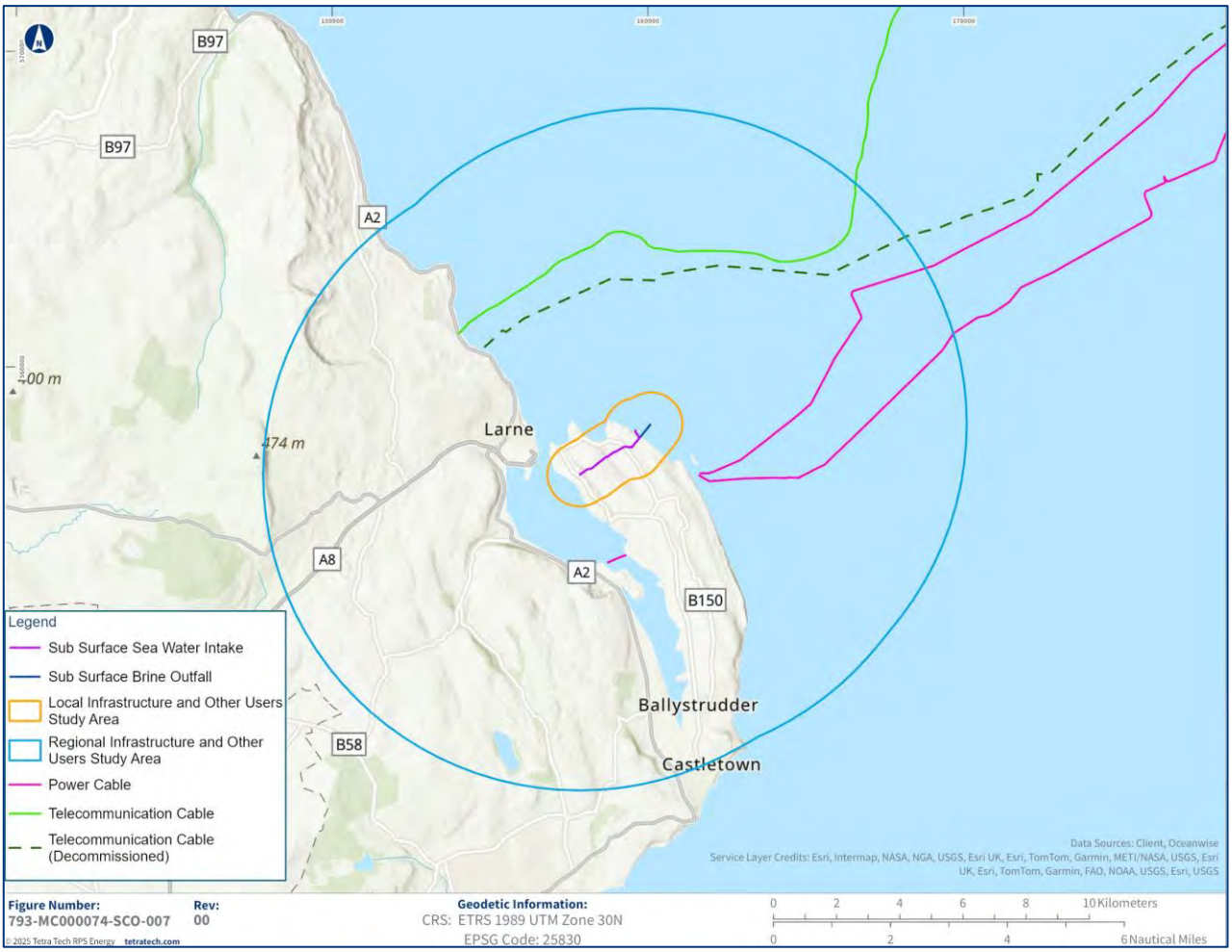

B97
B97
A2
Larne
A8
A2
B150
Ballystrudder
Castletown
B58
474 m
Legend
Sub Surface Sea Water Intake
Sub Surface Brine Outfall
Local Infrastructure and Other Users Study Area
Regional Infrastructure and Other Users Study Area
Power Cable
Telecommunication Cable
Telecommunication Cable (Decommissioned)
Data Sources: Client, Oceanwise
Service Layer Credits: Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, TomTom, Garmin, METI/NASA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS
Figure Number:
793-MC000074-SCO-007
Rev:
00
Geodetic Information:
CRS: ETRS 1989 UTM Zone 30N
EPSG Code: 25830
0 2 4 6 8 10 Kilometers
0 2 4 6 Nautical Miles
© 2025 Tetra Tech RPS Energy tetratech.com

Table 15-2: Impacts Proposed to be Scoped In (✓) / Out (x) for Infrastructure and Other Users

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Temporary displacement of recreational activities (including sailing, canoeing and motor cruising) **(Receptor: recreational users)**	✓	x	Temporary safety areas or exclusion zones established during the construction phase around the brine outfall and seawater intake may displace recreational activities and result in a loss of access to recreational grounds.	Further review of desktop studies to characterise the baseline, in addition to stakeholder engagement.	Qualitative assessment informed by the results of baseline data review and consultation.
Effects on infrastructure and other users associated with cavern construction and operation	x	x	The caverns (and any associated activities) will occur beneath the seabed, as described in Section 15.2. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A
Increased SSCs and associated deposition affecting recreational diving sites	x	x	Activities such as tunnelling, excavation and HDD punchout are all expected to generate sediment plumes, resulting in temporary and localised increases in SSCs and subsequent deposition. However, given the short-term and spatially limited nature of these effects during the construction phase, potential impacts to dive sites are considered negligible and have therefore been	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
(Receptor: recreational divers)			scoped out of further assessment. Similarly, no activities during the operational phase are expected to cause significant increases in SSCs.		
Increased SSCs and associated deposition affecting aggregate extraction areas **(Receptor: aggregate sites)**	x	x	There are no aggregate extraction sites within the Regional Infrastructure and Other Users Study Area, as described in Section 15.4.1.1. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A
Increased SSCs and associated deposition affecting designated bathing waters **(Receptor: recreational users)**	x	x	Activities such as tunnelling, excavation and HDD punchout are all expected to generate sediment plumes, resulting in temporary and localised increases in SSCs and subsequent deposition. However, given the short-term and spatially limited nature of these effects during the construction phase, potential impacts to designated bathing waters are considered negligible and have therefore been scoped out of further assessment. Similarly, no activities during the operational phase are expected to cause significant increases in SSCs.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Impacts on marine disposal sites (Receptor: marine disposal sites)	x	x	There are no active marine disposal sites within the Regional Infrastructure and Other Users Study Area, as described in Section 15.4.1.2. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A
Reduction or restriction of oil and gas exploration activities (Receptor: oil and gas operators)	x	x	There are no active oil and gas exploration blocks within the Local Infrastructure and Other Users Study Area, as described in Section 15.4.2.3. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A
Impacts on CCS (Receptor: CCS projects)	x	x	There are no CCS projects within the Local Infrastructure and Other Users Study Area, as described in Section 15.4.2.3. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A
Impacts to cables or restrictions on access to cables	x	x	There are no power or telecommunication cables within the Local Infrastructure and Other Users Study Area, as described in Section 15.4.2.4. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
(Receptor: cable operators)					
Impacts to pipelines or restrictions on access to pipelines **(Receptor: pipeline operators)**	**x**	**x**	One operational pipeline (SNIP) is located within the Local Infrastructure and Other Users Study Area, as described in Section 15.4.2.4. However, the proposed works are temporary in nature and will be carefully scheduled to avoid any interference with pipeline activities. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A
Impacts to military practise areas **(Receptor: MoD)**	**x**	**x**	A military practice area (X5527: Maiden) is located within the Local Infrastructure and Other Users Study Area, as described in Section 15.4.2.5. However, the proposed works are temporary and will be scheduled to avoid any conflict with activities in the area. As such, there is no potential impact pathway, and, therefore, it is proposed that this impact is scoped out of the ES.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).


N
P&O La
Seawater Intake
Brine Outfall
Ballylumford
Ballylumford Power Station
A8
B90
B90
Caverns
Mullaghboy
0 0.25 0.5 1 1.5 2
Kilometers
Agriculture and Land Use Study Area (Marine Application Areas)
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Table 16-1: Data sources used to categorise the Agriculture and Land Use baseline

Data title	Source
CORINE Land Cover 2018	Copernicus (2020)
2024 Land Cover Map	UK Centre for Ecology and Hydrology (CEH) (2025)
Orthophotography Current	Ordnance Survey of Northern Ireland (OSNI)
The Agricultural Census in NI: Results for June 2024	Department of Agriculture, Environment and Rural Affairs (DAERA) (2024)
Islandmagee Storage Project Environmental Impact Statement, Chapter 12: Geology and Hydrogeology	RPS (2010)

16.4 Baseline Environment

The Study Area is located within Larne Lough to the west and the waters of the North Channel to the east of Islandmagee. Given that this is a marine development, there are no terrestrial land uses or agricultural land/activities located within the Agriculture and Land Use Study Area. However, some are present in the surrounding terrestrial environment.

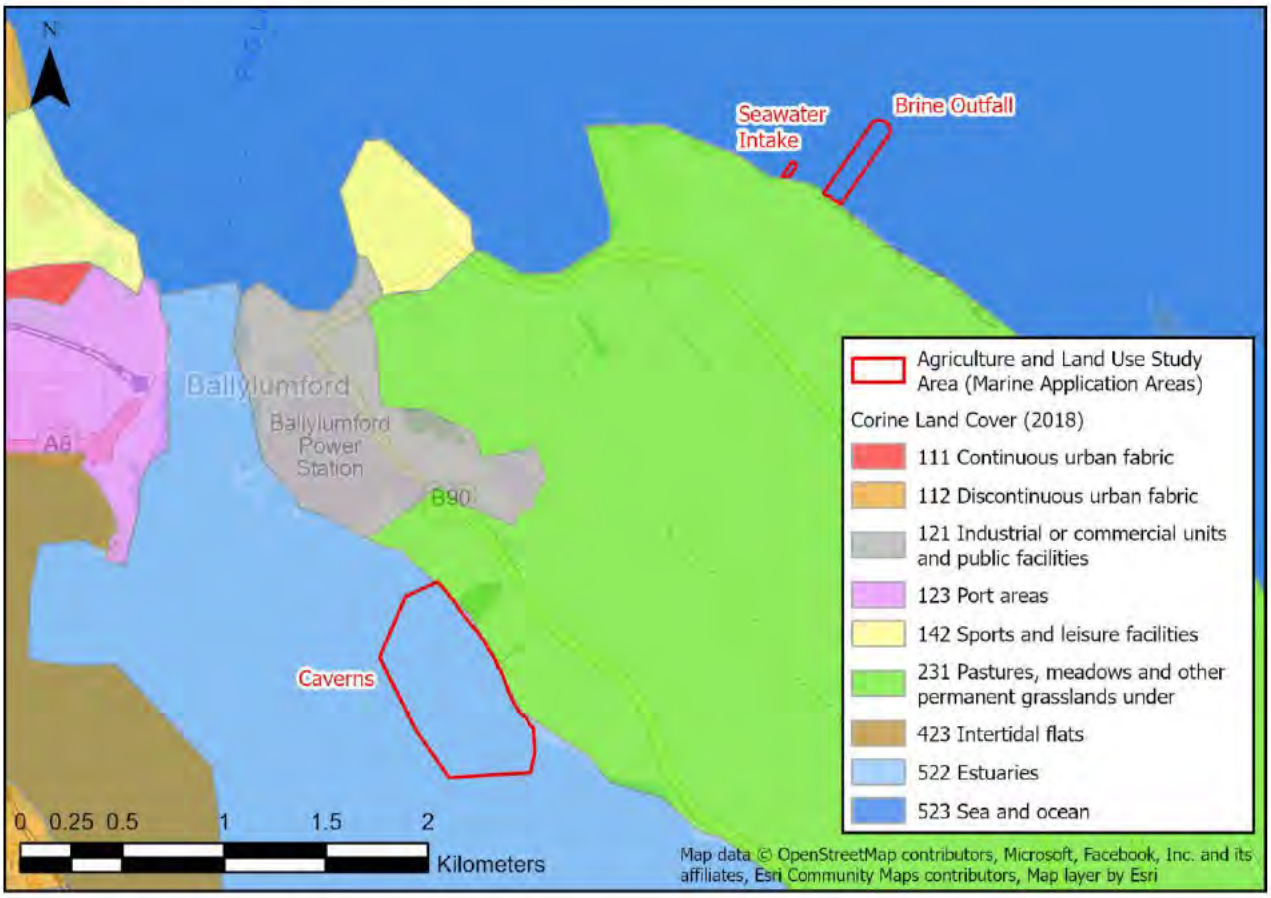


Figure 16-2: Corine (2018) Land Cover within the vicinity of the Study Area

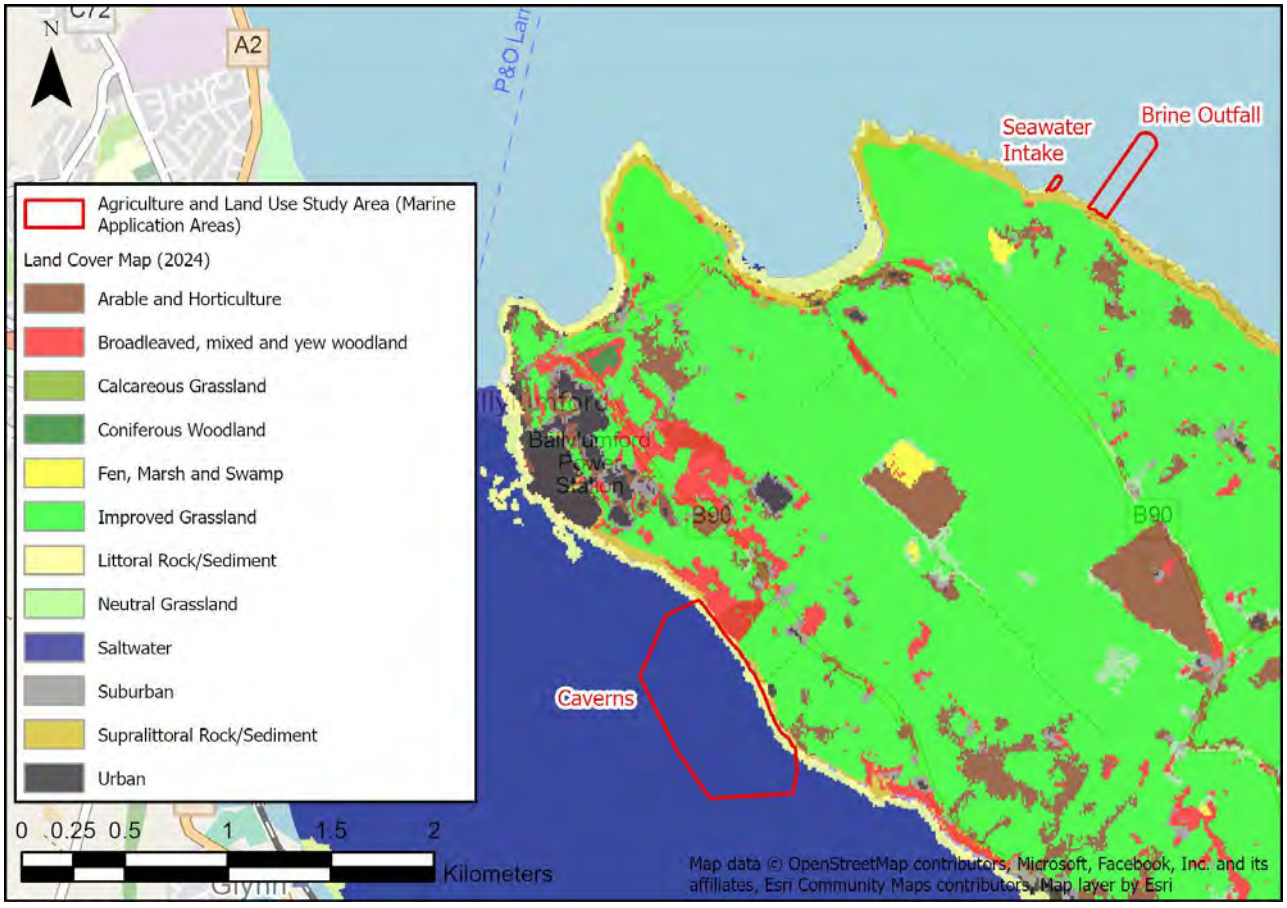

N
A2
P&O Lam
Seawater Intake
Brine Outfall
Agriculture and Land Use Study Area (Marine Application Areas)
Land Cover Map (2024)
Arable and Horticulture
Broadleaved, mixed and yew woodland
Calcareous Grassland
Coniferous Woodland
Fen, Marsh and Swamp
Improved Grassland
Littoral Rock/Sediment
Neutral Grassland
Saltwater
Suburban
Supralittoral Rock/Sediment
Urban
Ballylumford Power Station
B90
B90
Caverns
0 0.25 0.5 1 1.5 2
Kilometers
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Table 16-2: Impacts Proposed to be Scoped In (✓) / Out (x) for Material Assets – Agriculture and Land Use

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Disturbance, damage or loss of agricultural land through activities to facilitate the construction and operation of the Sea Water Intake, Brine Outfall and Caverns	x		The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. There is potential for drilling activities associated with the construction of the caverns, seawater intake and brine outfall to damage agricultural land within the terrestrial environment; however, terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
		X	The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
Disturbance of or damage to industrial land through activities to facilitate the construction and operation of the Sea Water Intake, Brine Outfall and Caverns	x		The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
		x	The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
			to environmental impact assessment and are consented under the 2012 Planning consent.		
Disturbance, damage or loss of woodland through activities to facilitate the construction and operation of the Sea Water Intake, Brine Outfall and Caverns	x		The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
		X	The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
Disturbance, damage or loss of recreational land (caravan park and Larne Golf Course) through activities to facilitate the construction and operation of the Sea Water Intake,	x		The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject to environmental impact assessment and are consented under the 2012 Planning consent.	N/A	N/A
		x	The Project only has marine elements and so has no pathway to impact terrestrial material assets (agricultural and land use) receptors. The terrestrial elements and activities of the Project are excluded on the grounds that they have previously been subject	N/A	N/A

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Brine Outfall and Caverns			to environmental impact assessment and are consented under the 2012 Planning consent.		

* The project phase refers to construction/decommissioning (C) and operation (O).


Browns Bay Road / Low Road (@ Four Corners)
Browns Bay Road / Low Road (@ Four Corners)
Lough Road / Ballystrudder Road / Low Road Mini Roundabout
Lough Road / Ballystrudder Road / Low Road Mini Roundabout
N

Table 17-1: Impacts Proposed to be Scoped In (✓) / Out (x) for Traffic and Transportation

Potential Effect and Receptor	Project Phase* C	Project Phase* O	Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
Transport and traffic effects due to activities to facilitate the construction of the seawater intake.	x		Scoped out of the EIA. The traffic impact of the construction and operation of the seawater intake during the construction phase has already been assessed and approved as part of the extant planning permission.	N/A	N/A
		x	Scoped out of the EIA. The traffic impact of the seawater intake during the operational phase has already been assessed and approved as part of the extant planning permission.	N/A	N/A
Transport and traffic effects due to activities to facilitate the construction of the brine outfall	x		Scoped out of the EIA. The traffic impact of the construction and operation of the brine outfall during the construction phase has already been assessed and approved as part of the extant planning permission.	N/A	N/A
		x	Scoped out of the EIA. The traffic impact of the brine outfall during the operational phase has already been assessed and approved as part of the extant planning permission.	N/A	N/A
Transport and traffic effects due to activities to facilitate the construction of the Caverns.	x		Scoped out of the EIA. The traffic impact of the construction of the caverns has already been assessed and approved as part of the extant planning permission.	N/A	N/A

Potential Effect and Receptor	Project Phase*		Justification (including consideration of embedded mitigation measures)	Data collection and analysis required to characterise the baseline environment	Summary of the proposed approach to assessment
	C	O			
		x	Scoped out of the EIA. The traffic impact of the caverns during the operational phase has already been assessed and approved as part of the extant planning permission.	N/A	N/A

* The project phase refers to construction/decommissioning (C) and operation (O).

18 Land, Soils, Geology and Hydrogeology

18.1 Introduction

This Chapter of the Scoping Report identifies the land, soils, geology and hydrogeology of relevance to the Project and considers the potential impacts arising from the construction/decommissioning, and operation and maintenance of the Project.

A desk study of published material held on the Geological Survey Northern Ireland (GSNI) Spatial Resources (online portal) was undertaken to provide an initial overview of ground conditions at the site. The following describes the findings of this preliminary research.

18.2 Study Area

The Study Area focuses on the Marine Application Areas associated with the marine components that form the Project in respect to the Marine Consent applications for the proposed underground gas storage facility at Islandmagee, County Antrim, which comprise the seawater intake, brine outfall and the storage caverns (Figure 4-1).

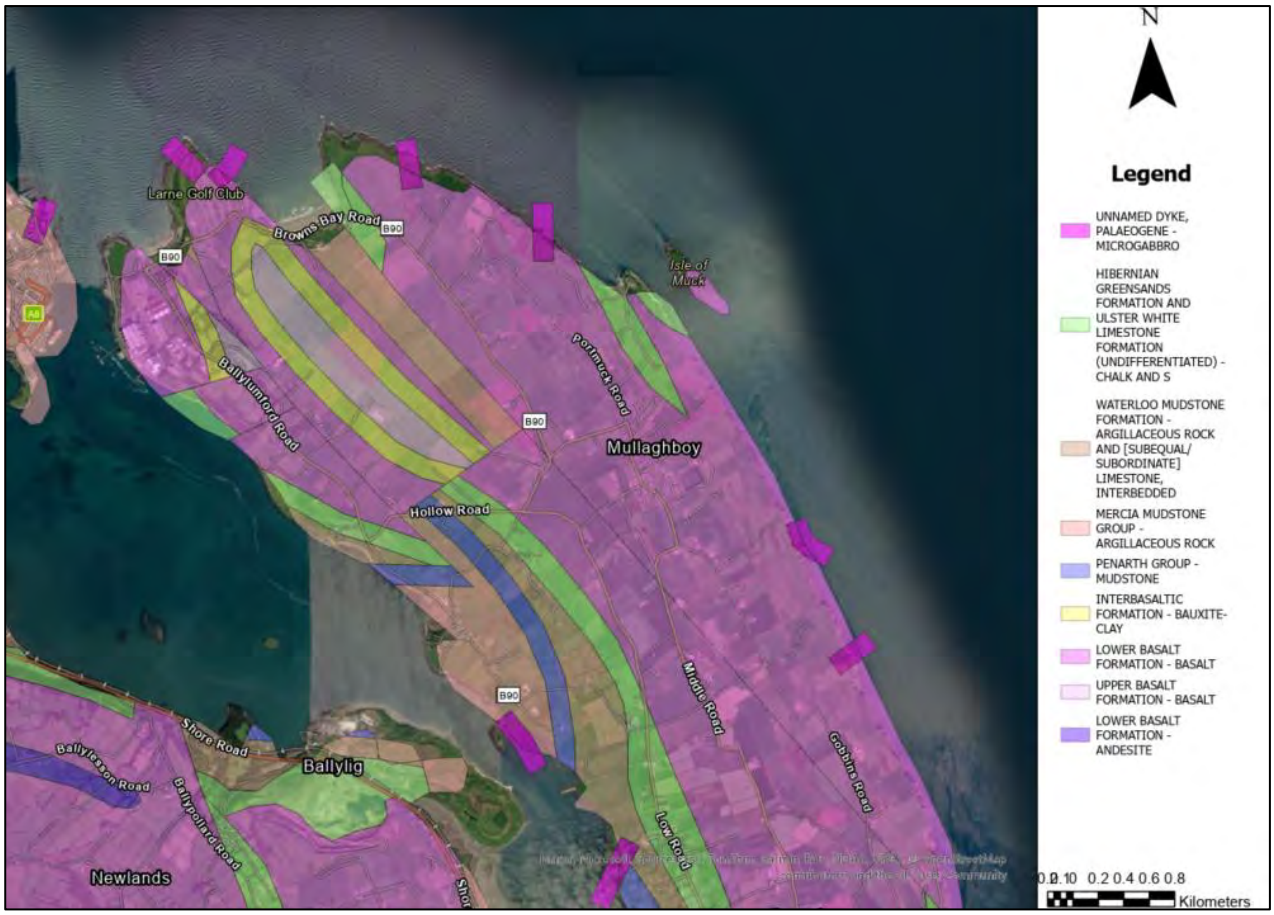
The main above-ground and land-based elements of the IGSF have already been consented under planning permission reference F/2010/0092/F and are not considered within this report.

18.3 Data Sources

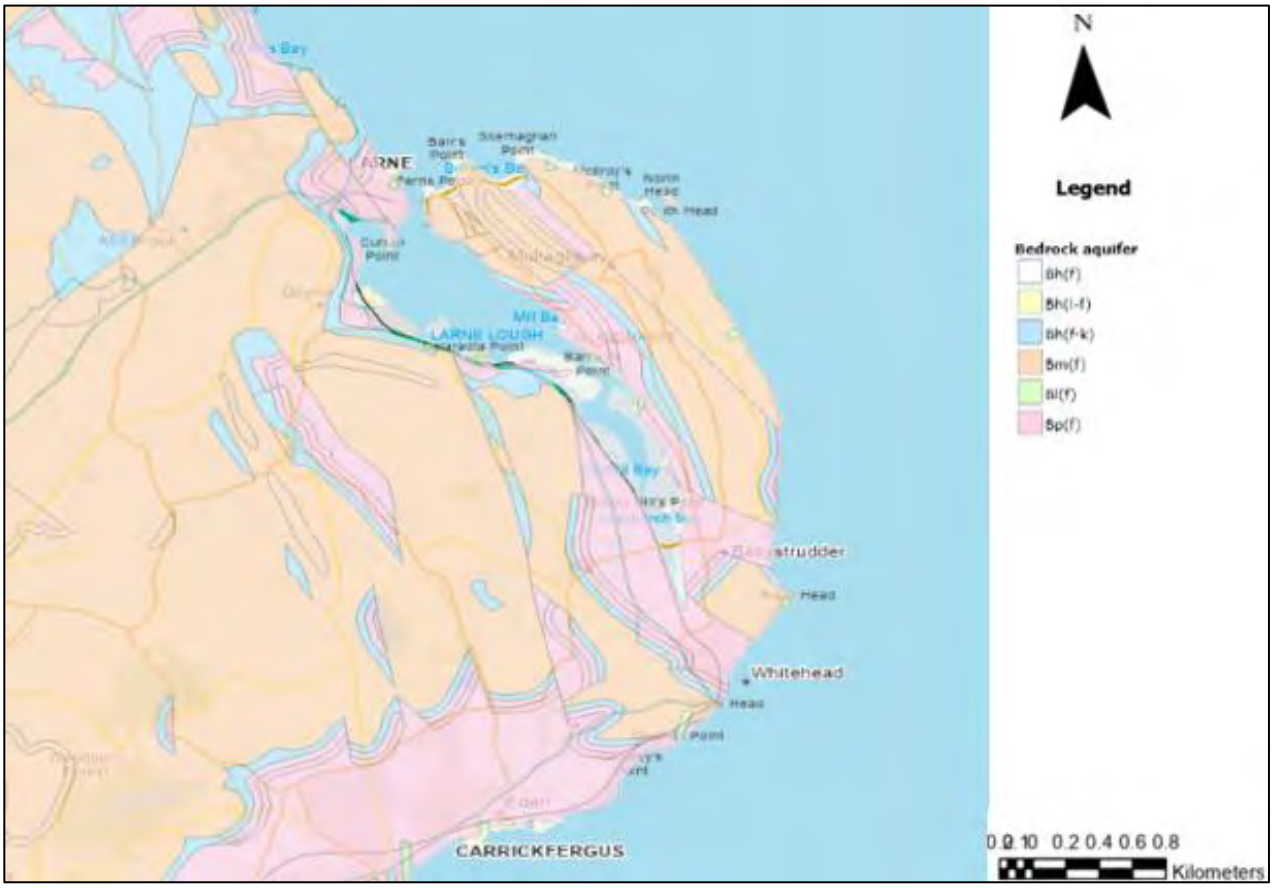
Key data sources relating to land, soils, geology and hydrogeology are listed in Table 18-1. As detailed in Chapter 1, planning consent has previously been granted for the onshore elements of the facility.

Table 18-1: Data Sources

Data Source	Reference
British Geological Survey – GSNI GeoIndex Report Online Database	(http://mapapps2.bgs.ac.uk/GSNI_Geoindex/home.html)
BGS Hydrogeological Map of NI, Scale 1:250000, 1994	http://mapapps2.bgs.ac.uk/GSNI_Geoindex/home.html)
BGS Groundwater Vulnerability Map of NI, Scale 1:250000	http://mapapps2.bgs.ac.uk/GSNI_Geoindex/home.html)
NI Environment Agency's River Basin Viewer	(https://appsd.daera-ni.gov.uk/RiverBasinViewer/)
Internet based Aerial photography	Google Maps/Google Earth Pro
Islandmagee Storage Project Environmental Impact Statement 2010	RPS, 2010

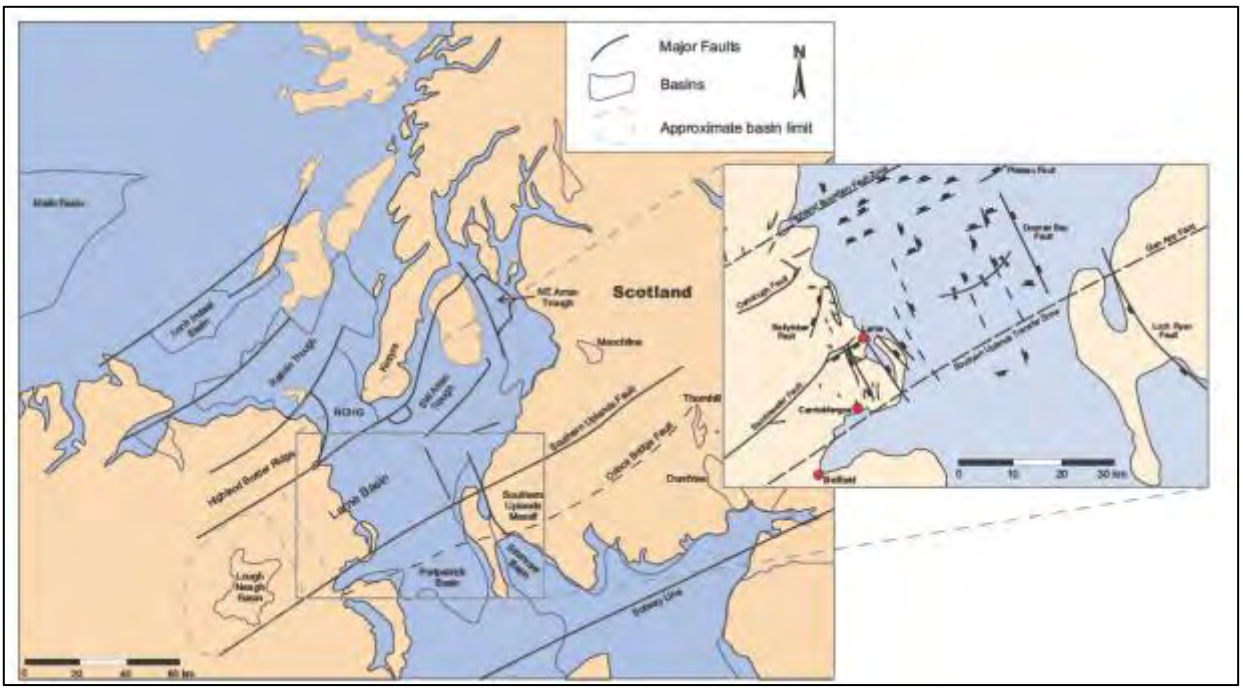

N
Legend
UNNAMED DYKE, PALAEOGENE - MICROGABBRO
HIBERNIAN GREENSANDS FORMATION AND ULSTER WHITE LIMESTONE FORMATION (UNDIFFERENTIATED) - CHALK AND S
WATERLOO MUDSTONE FORMATION - ARGILLACEOUS ROCK AND [SUBEQUAL/ SUBORDINATE] LIMESTONE, INTERBEDDED
MERCIA MUDSTONE GROUP - ARGILLACEOUS ROCK
PENARTH GROUP - MUDSTONE
INTERBASALTIC FORMATION - BAUXITE-CLAY
LOWER BASALT FORMATION - BASALT
UPPER BASALT FORMATION - BASALT
LOWER BASALT FORMATION - ANDESITE
0.2 0.4 0.6 0.8
Kilometers
Larne Golf Club
Browns Bay Road
B90
Isle of Muck
Portmuck Road
Ballylumford Road
Mullaghboy
Hollow Road
Middle Road
Gobbins Road
Shore Road
Ballyloson Road
Ballyglass Road
Ballylig
Low Road
Newlands


N
Legend
Till - DMTN
Larne Golf Club
Browns Bay Road
B90
Isle of Muck
Portmuck Road
Ballylumford Road
Mullaghboy
Hollow Road
Middle Road
Gobbins Road
Shore Road
Ballylig
Ballypollard Road
Low Road
Gransha
0 0.1 0.2 0.4 0.6 0.8
Kilometers


N
Legend
Bedrock aquifer
Bh(f)
Bh(l-f)
Bh(f-k)
Bm(f)
Bl(f)
Bp(f)
ARNE
LARNE LOUGH
Whitehead
CARRICKFERGUS
0 0.1 0.2 0.4 0.6 0.8
Kilometers


N
Legend
Superficials aquifer
LARNE
Brown's Bay
Mullaghboy
Glynn
LARNE LOUGH
Ballystrudder
Black Head
Whitehead
0 0.10 0.2 0.4 0.6 0.8
Kilometers


LARNE
Barr's Point
Skernaghan Point
Brown's Bay
Ferris Point
Port Narrow
McIlroy's Point
North Head
Portmuck Bay
South Head
Larne Harbour
urran Point
Mullaghboy
Millbay
Mill Bay
B90
LARNE LOUGH
Dalaradia Point
ISLANDMAGEE
Heddles Port
Barney's Point
N
Legend
Shafts and Adits
ADIT
COLLAPSE
SHAFT
WORKING
0 0.1 0.2 0.4 0.6 0.8
Kilometers


Major Faults
Basins
Approximate basin limit
N
Scotland
Malin Basin
Inner Hebrides Basin
Sea of the Hebrides Trough
NCHG
Minch Fault
Old Head Trough
NE Arran Trough
Southern Uplands Fault
Highland Border Ridge
Larne Basin
Ottrey Bridge Fault
Southern Uplands Massif
Portpatrick Basin
Stranraer Basin
Lough Neagh Basin
Solway Line
Thornhill
Dumfries
Moniaive
Larne
Carrickfergus
Belfast
Dooran Bay Fault
Orlock Fault
Ballyclare Fault
Ballygalley Head Fault
Portaferry Fault
Ards Fault
Deer Bay Fault
Loch Ryan Fault
Southern Uplands Thrust Zone
0 10 20 30 km
0 20 40 60 km

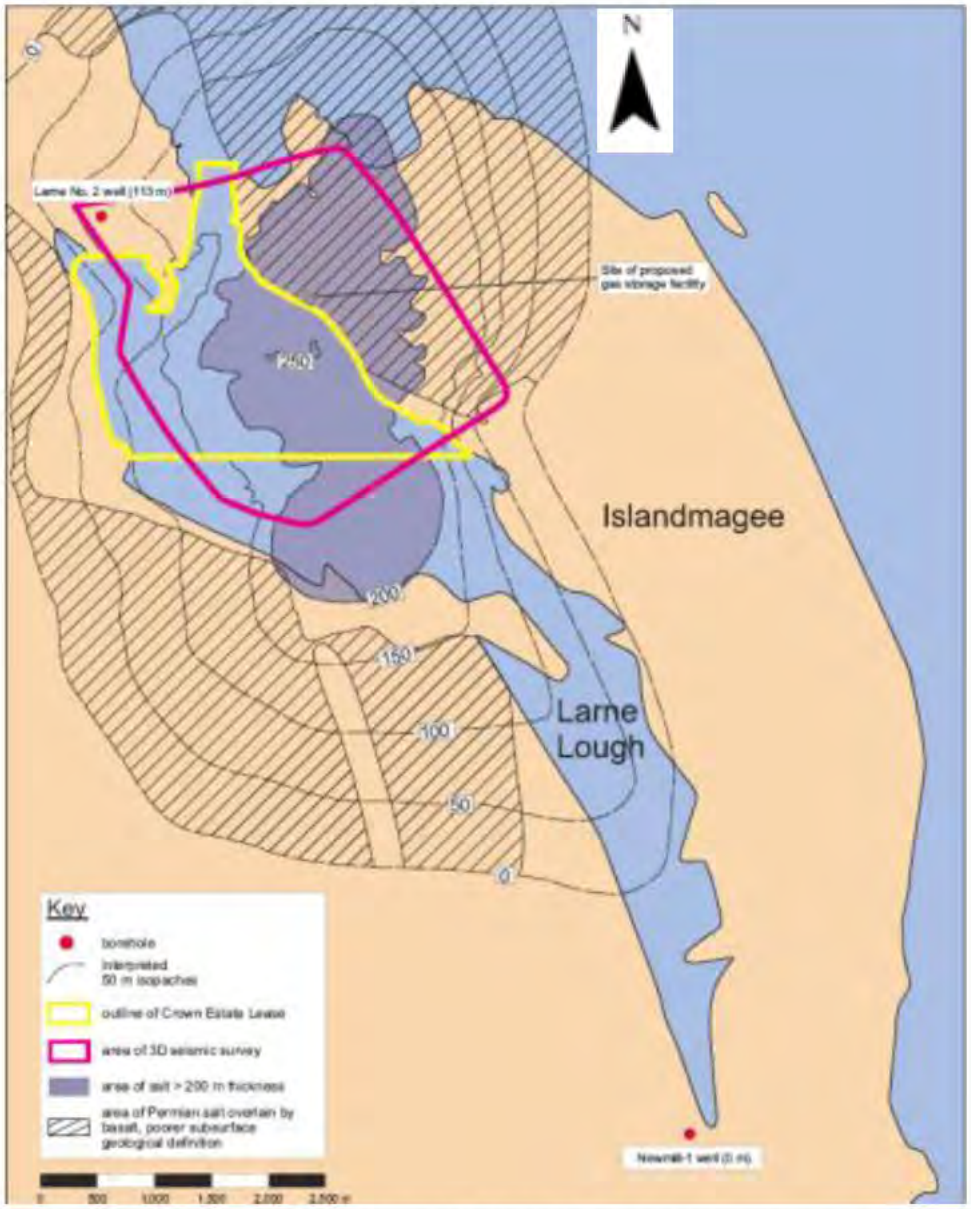


Figure 18-7: Regional Isopach Map for Permian Salt in the Vicinity of Larne Lough (RPS, 2010)

The Larne No. 2 well, Table 18-2, located near the Project area, encountered a highly uniform and pure Permian salt sequence, with minimal clay or anhydrite content. This salt is considered analogous to bedded Permian salt formations found in the Netherlands.

The salt mine development in the Carrickfergus area is located in the saliferous beds of the Triassic MMG.