The Great Grid Upgrade

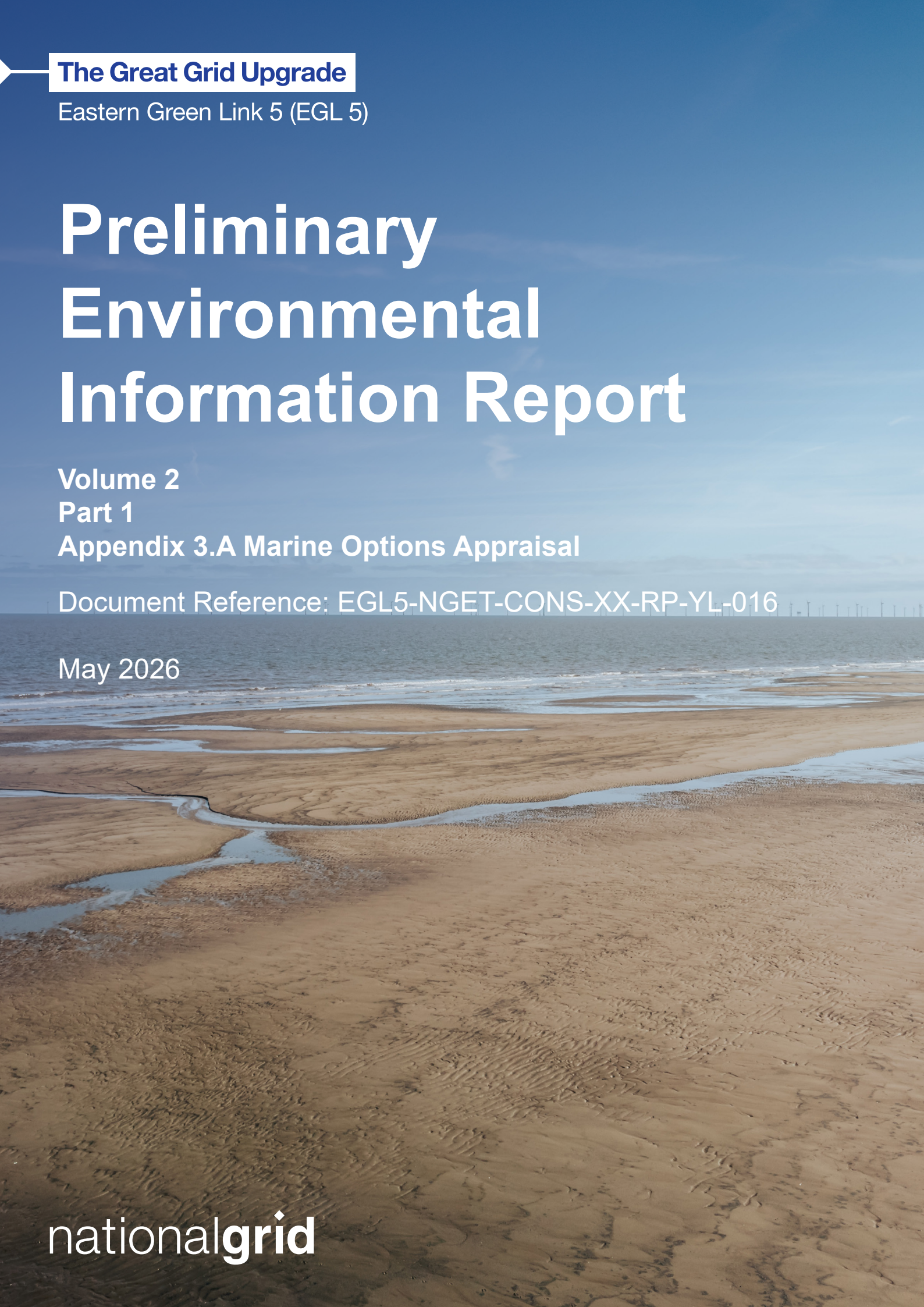
Eastern Green Link 5 (EGL 5)

Preliminary Environmental Information Report

Volume 2
Part 1
Appendix 3.A Marine Options Appraisal

Document Reference: EGL5-NGET-CONS-XX-RP-YL-016

May 2026



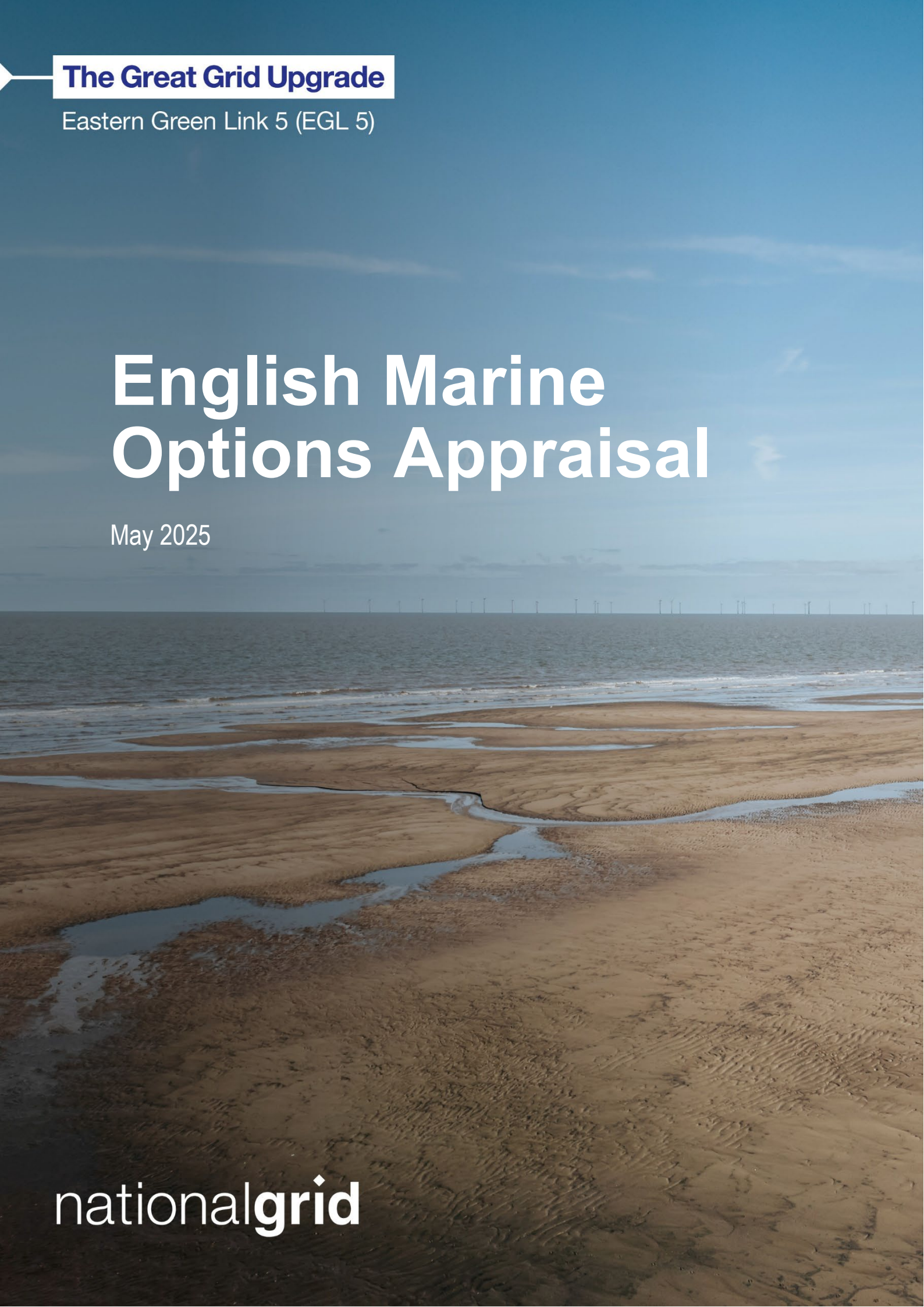
nationalgrid

The Great Grid Upgrade

Eastern Green Link 5 (EGL 5)

English Marine Options Appraisal

May 2025



nationalgrid

Eastern Green Link 5 (EGL 5)

English Marine Options Appraisal

Prepared for: National Grid Electricity Transmission (NGET)

nationalgrid

collaborative environmental advisers

Date: March 2025
Document Reference: C01521_NGET_REP_D0278
Version Number: 4

Point of Contact: Anna Farley
Tel: 077708 872 706
Email: anna.farley@ceaenvironmental.co.uk

Collaborative Environmental Advisers
Registered in England at Suite A, First Floor, 132 Winchester Road, Chandlers Ford, Hampshire, SO53 2DS
Registered number: 11114584

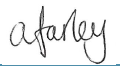
Tel: + 44 (0) 7719 523106 or +44 (0) 7920 714 411
Email: info@ceaenvironmental.co.uk
www.ceaenvironmental.co.uk

Record of Changes

Rev #	Date	Description	Approved
0	26/02/2025	Draft	Julie Drew-Murphy
1	26/03/2025	Second Issue	Anna Farley
2	31/03/2025	Third Issue	Anna Farley
3	07/04/2025	Final	Julie Drew-Murphy
4			
5			
6			

Distribution List

#	Function Title	Company	Name (optional)
1		NGET	Nick Moore
2		NGET	Judith Vokes
3			
4			
5			
6			
7			
Notes:			

Responsible for	Job Title	Name	Date	Signature
Content	Director	Anna Farley	26/02/2025	
Checked & Approved	Director	Julie Drew-Murphy	26/02/2025	
Content	Associate Director	Eric Houston	26/03/2025	
Checked & Approved	Director	Anna Farley	26/03/2025	
Content	Associate Director	Eric Houston	07/04/2025	
Checked & Approved	Director	Julie Drew-Murphy	07/04/2025	
Copyright:	CEA ©	Document Reference:	C01521_NGET_REP_D0279	

This document has been checked in line with internal quality control requirements.

Table of Contents

Abbreviations/Glossary

AIAA	Areas of Intense Aerial Activity
AONB	Area of Outstanding Natural Beauty
ASTI	Accelerated Strategic Transmission Investment
BGS	British Geological Society
CCS	Carbon Capture Storage
CCUS	Carbon Capture and Underground Storage
CEA	Collaborative Environmental Advisers Ltd
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CES	Crown Estate Scotland
CO_2	Carbon Dioxide
DCO	Development Consent Order
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environment Agency
EGL	Eastern Green Link
EIA	Environmental Impact Assessment
EMS	European Marine Site
ESO	Electricity System Operator
FCS	Favourable Conservation Status
GB	Great Britain
GCR	Geological Conservation Review
GDF	Geological Disposal Facility
GIS	Geographical Information System
GW	Gigawatt
HAW	Higher Activity Waste (radioactive)
HDD	Horizontal Directional Drilling
HPMA	Highly Protected Marine Area
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IBA	Important Bird Area
IFCA	Inshore Fisheries and Conservation Authority
IDRBNR	Inner Dowsing, Race Bank and North Ridge
JNCC	Joint Nature Conservation Committee
Km	Kilometre
LLD	Local Landscape Designation
LWT	Lincolnshire Wildlife Trust
m	Metre
MCA	Maritime and Coastguard Agency
MEEB	Measures of Equivalent Environmental Benefit
LNR	Local Nature Reserve
MCZ	Marine Conservation Zone
MHWS	Mean High-Water Springs

MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MNR	Marine Nature Reserve
MoD	Ministry of Defence
MPA	Marine Protected Area
NE	Natural England
NEP	Northern Endurance Partnership
NERC	Natural Environment and Rural Communities
NFFO	National Federation of Fishermen's Organisations
NGET	National Grid Electricity Transmission
NM	Nautical Mile
NNR	National Nature Reserve
NSIP	Nationally Significant Infrastructure Project
NZT	Net Zero Teesside
OAST	Options Appraisal Summary Tables
ODPM	Office of the Deputy Prime Minister
OHL	Overhead Line
OREI	Offshore Renewable Energy Installation
OSPAR	Oslo and Paris Convention for the Protection of the North East
OWF	Offshore Wind Farm
PEXA	MoD Practice and Exercise Area
PINs	Planning Inspectorate
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SOCI	Species of Conservation Importance
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate
TJB	Transition Joint Bay
TSS	Traffic Separation Scheme
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
VMS	Vessel Monitoring System
WHS	World Heritage Site
ZCH	Zero Carbon Humber

Executive Summary

Eastern Green Link 5 (EGL 5) (the Project) is a proposed offshore high voltage electricity link, with associated onshore infrastructure, between Aberdeenshire, Scotland and Lincolnshire, England. The English components of the Project are being developed by National Grid Electricity Transmission (NGET). The EGL 5 project is in its early stage of development, and it is intended to seek consent for the English onshore elements via an application to the Planning Inspectorate for a Development Consent Order (DCO). It is also intended to consent the marine elements of the project within English waters as part of the DCO. This will require a direction from the Secretary of State pursuant to Section 35 of the Planning Act 2008, and the project will request this direction from the Secretary of State (SoS) for Energy Security and Net Zero (DESNZ) during Spring 2025. Only the English components are considered in this document.

The purpose of this English Marine Options Appraisal is to detail the approach and outcomes of the options appraisal process, undertaken to identify the most appropriate marine cable routeing and landfall siting areas in England. This report details the work undertaken so far to identify an emerging preference, focusing on the environmental, socio-economic and technical constraints, that have materially influenced decision making related to the marine routeing and landfall siting areas. It forms part of a suite of documents being prepared for and by NGET that collectively will inform the preferred end-to-end solution for the Project.

Marine route alignments were developed by Intertek, as described in Section 4. Due to the offshore constraints, although several feasible marine route alignments have been developed, many options share areas of commonality. For the purposes of options appraisal, the marine route alignments were segmented, with the assessment carried out on each segment.

The appraisal process used to assess the EGL 5 marine route alignments consisted of data collation, appraisal of each option, internal workshops and stakeholder consultation. NGET is seeking to develop EGL 5 in coordination with the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) projects (similar proposed offshore high voltage direct current electricity links between Scotland and England). The options appraisal process has sought to draw upon data, technical assessments, studies and stakeholder opinions available from EGL 3 and EGL 4 projects where feasible, to accelerate development. The opportunities and risks associated with coordination of the projects has been considered in the evaluation. All relevant decisions made for EGL 3 and EGL 4 have been back-checked and validated to ensure applicability and acceptance for EGL 5. On conclusion of the options appraisal an emerging preferred option was selected.

The emerging preference for EGL 5 is the route as presented in Figure 9-1, which may be subject to modification following further consultation with stakeholders, technical/engineering feasibility studies, survey results and public consultation.

1. Introduction

1.1. Overview and Purpose

Eastern Green Link 5 (EGL 5) (the 'Project') is a proposed offshore high voltage electricity link, with associated onshore infrastructure, between Aberdeenshire, Scotland and Lincolnshire, England. The English components of the Project are being developed by National Grid Electricity Transmission (NGET). Only the English components are considered in this document.

The Clean Power 2030 Action Plan sets out the United Kingdom (UK) Government's ambition to strengthen our grid infrastructure to support the UK's energy security, economic growth and other important infrastructure such as connecting offshore renewables generation to the electricity network by 2030. The Project was specified by the National Energy System Operator (NESO) formerly known as the Electricity System Operator (ESO) as part of the Pathway to 2030 Holistic Network Design[1] as required to provide additional network capacity and greater power transfer capability across the Anglo-Scottish border. EGL 5 would transport enough clean energy from Scotland to power up to two million homes in parts of the North, Midlands and South of England. By doing so, it would play an important role in building a more secure and resilient future energy system and decarbonising the UK. The Project is part of this major reinforcement of the electricity transmission system that will allow renewable power to reach consumers. It has been identified provisionally as an Accelerated Strategic Transmission Investment (ASTI) project by Ofgem, the UK energy regulator.

The marine elements of the Project are not the type of project that would be categorised as Environmental Impact Assessment (EIA) development under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) and could be consented under the Marine and Coastal Access Act. It would not require a statutory EIA. The project does not automatically qualify as a Nationally Significant Infrastructure Project (NSIP) under s14 of the Planning Act 2008 ("the 2008 Act"). However, the project will request a direction pursuant to Section 35 of the 2008 Act from the Secretary of State (SoS) for Energy Security and Net Zero (DESNZ) during Spring 2025, to bring the project into the Development Consent Order (DCO) regime. It is intended that a DCO application for the project would include all English onshore elements of the Project, as well as the offshore elements in English waters by inclusion of a deemed marine licence within the DCO. Should a direction pursuant to Section 35 of the 2008 Act be issued by the SoS, the project would be directed into the 2008 Act and therefore a DCO application would be prepared and submitted to the Planning Inspectorate who acts on behalf of the SoS for the relevant department.

As the consenting regime for the Project has not been confirmed, NGET have assumed that either the Project will require a statutory Environmental Impact Assessment (EIA) under the EIA Regulations in England[2] or as a matter of best practice (and under Schedule 9 of the Electricity Act 1989 which places an obligation to preservation of amenity)[3], and in line with the requirements of the Habitats Regulations and Offshore Habitats Regulations[4], Environmental Appraisals to the same standard would be undertaken. The EIA Regulations require that the developer provide "*an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects*". Under the Habitats and Offshore Habitats Regulations, if the Appropriate Assessment process concludes that a project will have an adverse effect on the integrity of a European site (i.e., Special Areas of Conservation, Special Protection Areas and Ramsar sites), the applicant must be able to demonstrate that all reasonable feasible alternatives have been assessed and that the least damaging option has been selected. A similar requirement exists within Section 126 of the Marine and Coastal Access Act related to activities that could hinder the achievement of the conservation objectives for Marine Conservation Zones (MCZs).

Options appraisal is an integral part of the Project development. The purpose of this English Marine Options Appraisal is to detail the approach and outcomes of the option appraisal process undertaken to identify the most appropriate marine cable routeing and landfall siting areas. The options appraisal process has followed the approach established in the National Grid Our Approach to Consenting[5]. This report details the work undertaken so far to identify an emerging preference, focusing on the environmental, socio-economic and technical constraints, that have materially influenced decision making related to the marine routeing and landfall siting areas in England. It forms part of a suite of documents being prepared for and by NGET that collectively will inform the preferred end-to-end solution for the Project. This English Marine Options Appraisal focuses on the Project in English waters. The emerging preference and alternative options identified in this report will be subject to modification following stakeholder engagement, public consultation, further design development and environmental survey work.

The scope of this report consists of the marine elements of the Project in English waters i.e., the intertidal/nearshore approach to the landfall siting areas, and the marine cable routeing. It has been informed by the Marine Routeing Report prepared for NGET by Intertek, through which the marine route alignment options have been developed. The indicative Project Study Area is shown in Figure 1-1 (Drawing C01521-EGL5-LOC-001). The scope of the options appraisal ends at mean high-water springs (MHWS). The options

[1] Pathway to 2030 Holistic Network Design. July 2022 https://www.neso.energy/document/262681/download
[2] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)
[3] National Grid's commitments when undertaking works in the UK, https://www.nationalgrid.com/electricity-transmission/document/81026/download
[4] Conservation of Habitats and Species Regulations 2017 (as amended) (England) and Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (Scotland) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)
[5] Our Approach to Consenting, April 2022, download (nationalgrid.com).

appraisal for the terrestrial elements of the Project will end at mean low water springs (MLWS) in line with terrestrial planning requirements.

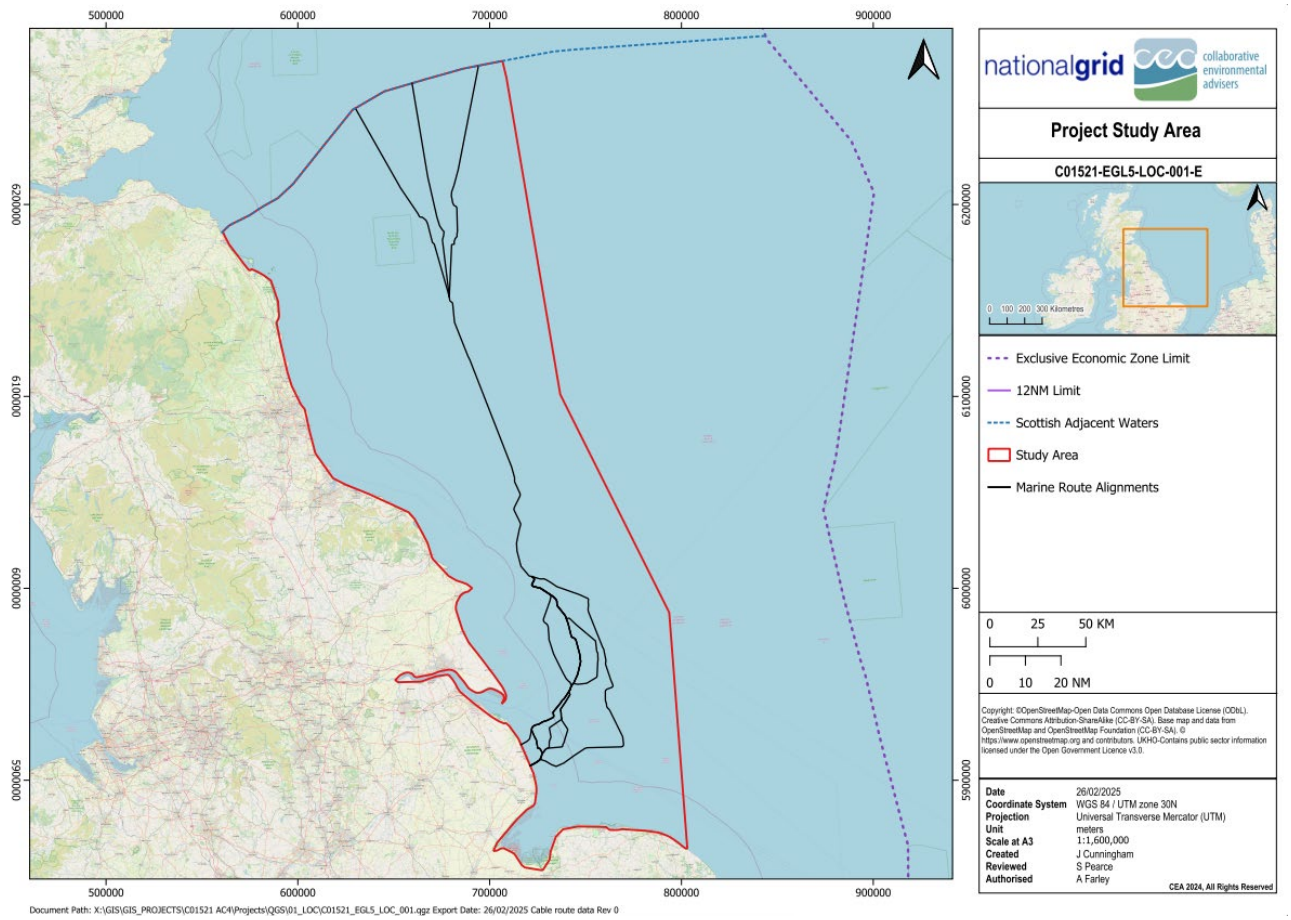


Figure 1-1: Project Study Area (Drawing: C01521-EGL5-LOC-001)

1.2. Background and Need Case

The fundamental need case for the Project is based on providing essential additional electricity transmission capability between Scotland and England. This is due to increasing quantities of electrical power generation, particularly offshore wind generation connecting to the transmission network in Scotland, which will significantly increase the requirement for cross-border transfers of electrical power over time. EGL 5 would transport enough clean energy from Scotland to power up to two million homes in parts of the North, Midlands and South of England. By doing so, it would play an important role in building a more secure and resilient future energy system and decarbonising the UK.

The electricity network system in Britain is split into boundaries. Each boundary has a limit to the amount of electricity that can flow through it. As more electricity is needed and is being generated in Britain, we can assess where the power flows between these boundaries will need to increase. The boundaries shown in Figure 1-2, through the north and the midlands are where we need to increase the capacity of the Grid for this increased amount of electricity. EGL 5 is one of the projects needed to help achieve this.

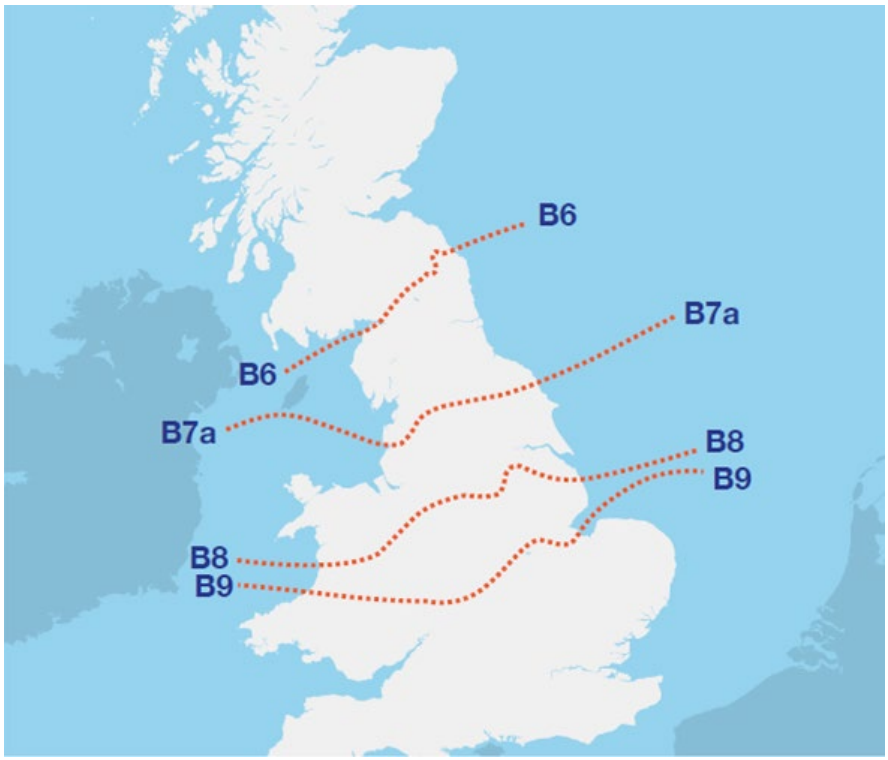


Figure 1-2: Boundaries B6, B7a, B8 and B9 that EGL 5 is designed to transport electricity across from Scotland

1.3. Structure of this Report

This report describes the work undertaken to date to inform the identification of the emerging preference for the marine cable routeing for the Project. The report has been structured as outlined in Table 1-1.

Table 1-1: Report Structure

Chapter	Description / Contents
1	Provides an overview of the Project and sets out the purpose of this report.
2	Describes the components of the Project and sets out the assumptions that have been made during the options appraisal with respect to the construction methods to be used.
3	Sets out the option appraisal process, and the approach taken to appraise the environmental, socio-economic and technical constraints.
4	Sets out the approach taken to identify indicative marine route alignments and landfall siting areas and describes how these have been assessed by the options appraisal.
5	Describes the technical constraints considered when developing and appraising the marine route alignments.
6	Describes the biological, historical, physical and socio-economic constraints considered when developing and appraising the marine route alignments.
7	Describes the stakeholder engagement undertaken for the development of EGL 3 and EGL 4 that informed the development of marine route alignments for EGL 5 and affected how risks were appraised during the options appraisal process.
8	Describes the appraisal process and summarises the conclusions and recommendations reached.
9	Presents the emerging preference for the marine cable routeing and landfall siting.
Appendix 1	Provide relevant data on the biological environment that informed the options appraisal.
Appendix 2	Provide relevant data on the socio-economic environment that informed the options appraisal.

2. Project Description

The existing electricity transmission systems in England and Scotland both operate use predominantly High Voltage Alternating Current (HVAC). Subsea electrical links often use High Voltage Direct Current (HVDC) technology because it is more effective at transmitting large amounts of electricity over longer distances, with lower energy losses than an equivalent HVAC system, and with a greater degree of control over the magnitude and direction of power flow. This flexibility brings operational benefits; however, specialist electrical equipment on land is required to convert from HVDC to HVAC and vice versa. This equipment is contained within a converter station.

The Project will comprise of the construction of new infrastructure consisting of underground terrestrial and offshore subsea HVDC cables, converter stations and HVAC underground cables.

The purpose of the marine cable routeing and landfall siting work has been to identify a preferential location for the submarine HVDC cable route from a landfall on the Lincolnshire coast, England to the England / Scotland Adjacent Water border (for onward route development to an Aberdeenshire landfall). Where required NGET has interacted with SSEN in relation to the alignment of routeing considerations at the border. The options appraisal summarised in this report considers only the siting and routeing of the English marine components of the Project; it does not consider the terrestrial elements such as the converter stations and underground terrestrial cables. Terrestrial elements are considered within the terrestrial options appraisal report completed by WSP (Document Reference: EGL 5-WSP-LAN-CON-010-A).

As the Project is still at an early stage a detailed project description of construction activities and methods is not yet developed, however the assumptions set out below have been used when undertaking this marine cable routeing and landfall siting appraisal.

- It has been assumed that all works within the marine environment will be conducted within a 500 m wide corridor.
- It has been assumed that the marine cable system will consist of two HVDC cables. It is possible these power cables will be bundled together so that they can be installed in one trench, however this is still to be decided.
- The marine HVDC cables will be buried into the seabed wherever feasible. There may be some areas where ground conditions (e.g., sub cropping / outcropping rock), or the presence of third-party assets (existing cables or pipelines) may mean that the marine cables are surface laid requiring rock protection.
- It has been assumed that either simultaneous cable lay and burial and/or post-lay burial of the cable will be used.
- The following seabed preparation methods may be used:
  - Pre-lay grapnel run
  - Pre-sweeping of sand waves using trailing suction hopper dredger or controlled / mass flow excavator
  - Boulder removal
  - Unexploded ordnance (UXO) identification and clearance
- The following burial tools may be used:
  - Cable burial plough
  - Jet trencher
  - Mechanical trencher
  - Mass or controlled flow excavator
- As a last resort, in areas where the required depth of burial is not achieved, remedial protection may be used in the form of rock placement, concrete mattresses, or rock / grout bags.
- The Project has made a decision to discount open cut trenching at the landfall this stage. At the landfall, where possible, a trenchless technique such as horizontal directional drilling (HDD) would be used to minimise disturbance to the intertidal area and adjacent terrestrial habitats. The marine HVDC cable would extend up to the transition joint bay (TJB) where it would join the terrestrial underground cables. The HDD would extend to a maximum distance of 1.6 km from mean high-water springs (MHWS).

3. Option Appraisal Approach

Options appraisal is used by National Grid to consider the implications of the selection of certain options when developing infrastructure projects. Figure 3-1 provides an overview of the stages in National Grid's approach to developing, consenting and delivering projects. The options appraisal process can be applied at any stage throughout project development but is typically used when considering strategic options (during the strategic proposal phase) and preliminary marine cable route options (during the option identification and selection phase). The process not only informs the project option decisions but allows for back-checking decisions that ruled out options, which may be reinstated as the project progresses. The aim of the approach is to identify in an auditable, robust, transparent and consistent manner, emerging preferences for siting and routeing infrastructure.

This Project is currently in the 'Options Identification & Selection' Stage. This stage includes determining the Project study area, mapping environmental constraints, and comparing and appraising corridor and siting options to identify a preferred option. Consultation with stakeholders is also undertaken to assist in reaching these decisions.

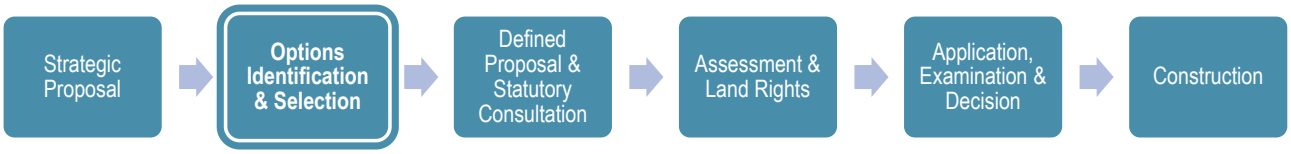


Figure 3-1: National Grid's Project Development Stages

National Grid have developed over-arching guiding principles for options appraisal. These assist in the decision-making process by helping achieve an appropriate balance between the different competing interests that need to be looked at during an options appraisal. There is no hierarchy in the principles, which echo National Grid's statutory obligations, and are as follows:

- Using or adapting existing infrastructure will generally be given priority over creating new infrastructure.
- Shorter routes will generally be given priority over longer ones, as smaller-scale infrastructure projects are likely to have lower environmental, safety, sustainability and cost implications (for comparable technology options).
- Financially less-expensive options, both in terms of capital and lifetime cost, will generally be given priority, as these support National Grid's statutory duty to develop and maintain an 'efficient, coordinated and economical' network.
- Options which avoid or minimise and mitigate impacts on environmental or socio-economic constraints will generally be given priority over those which have likely significant residual effects, as less environmentally and/or socially damaging routes support National Grid's statutory duty to '*have regard to the desirability of preserving amenity'* and will more readily achieve consent.

Options appraisal includes consideration of four topic areas; environment, socio-economic, technical and cost. Within these topic areas there are a list of sub-topics which align with best practice informed by the requirements of the EIA Regulations. The National Grid guidance acknowledges that where appropriate topics and sub-topics may be scoped out if it is evident that there would be no material effect as a result of any of the options. With respect to this marine cable route option appraisal the sub-topics listed in the guidance have been expanded to apply more specifically to the marine environment (having been predominantly developed for the terrestrial environment). Appraisal sub-topics used in the marine options appraisal are described Table 3-1.

Table 3-1: Appraisal Topics - Environmental and Socio-economic Constraints

Sub-topic / Constraint	Description
Biological Environment	
Highly Protected Marine Areas (HPMAs)	HPMAs are areas of the sea that allow the protection and full recovery of marine ecosystems. Three sites were designated in English waters on 6 July 2023; North East of Farnes Deep, Allonby Bay and Dolphin Head.
European Sites Special Areas of Conservation (SACs), Special Protection Areas (SPAs)	SACs with marine components are designated for the protection of habitats listed under Annex I of the European Habitats Directive and benthic, fish and marine mammal species listed under Annex II. SPAs with marine components are designated for the protection of bird species listed under the Birds Directive as Annex I species or those which are regularly occurring migratory species dependent on the marine environment for all or part of their lifecycle and are associated with intertidal or subtidal habitats within the SPA (English Habitats Regulations and UK Offshore Habitats Regulations)[6] Terrestrial SACs and SPAs have been considered when the designation overlaps with the landfall sites. Ramsar sites are 'wetlands of international importance' which contain representative, rare or unique wetland types or are considered to be of importance for conserving biological diversity. They are designated under the criteria of the Ramsar Convention on Wetlands which was ratified in the UK in 1976. In accordance with the Office of the Deputy Prime Minister (ODPM) Circular 06/2005 (ODPM, 2005), Ramsar sites are considered under the definition of European sites. These have been considered when they overlap with the landfall sites.
Marine Conservation Zones (MCZs)	MCZs are designated in English, Welsh and Northern Irish territorial and offshore waters in order to protect a range of nationally important habitats and species, under the Marine & Coastal Access Act 2009
Sites of Special Scientific Interest (SSSI)	Designated by Natural England (NE) under the Wildlife and Countryside Act 1981 (as amended) for English sites. SSSIs are designated for the protection of terrestrial or marine flora, fauna, geological, geomorphological or physiographical features of special interest (JNCC, 2022).
Geological Conservation Review (GCR)	GCR sites are identified to provide a public record of the features of interest and importance in parts of the country already notified or being considered for notification as SSSIs (JNCC, 2020).
National Nature Reserves (NNRs) / Marine Nature Reserves (MNRs)	NNRs are managed by organisations including NE (in England), the National Trust, Forestry Commission, Royal Society for the Protection of Birds (RSPB), Wildlife Trusts, and local authorities. NNRs are areas of land which are set aside for the purpose of nature conservation as well as enabling public and educational access. MNRs are designated under the Wildlife and Countryside Act 1981 for the conservation of marine flora and fauna and geological or physiographical features of special interest whilst providing opportunities for their study (Naturenet, 2023). MNRs may be established within 3 nautical mile (NM) of the coast to the limits of UK territorial waters and encompass both the sea and the seabed.
National Parks	National Parks are funded by central government and managed by their individual authorities (National Parks, 2023). They are designated as protected landscapes with the broad purpose of conserving and enhancing natural beauty, wildlife and cultural heritage and to promote understanding and enjoyment of the special qualities of national parks by the public. There are 15 National Parks in the UK, including Cairngorms, North York Moors and the Norfolk Broads.
Areas of Outstanding Natural Beauty (AONBs)	AONBs (England) are landscapes which are designated for their distinctive character and natural beauty. Their purpose is the identification and protection of such areas from inappropriate development. Areas are designated by NE under the Countryside and Rights of Way Act (2000).
World Heritage Sites (WHS)	WHS are global sites identified by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) which are considered to be of exceptional importance for current and future understanding of cultural, scientific and environmental planetary issues (World Heritage UK, 2023). There are 33 WHSs in the UK which are managed by local organisations.

[6] Conservation of Habitats and Species Regulations 2017 (as amended) (England) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)

Sub-topic / Constraint	Description
UNESCO Biosphere Reserves	UNESCO Biosphere Reserves are "learning areas for sustainable development" which enable the study of interdisciplinary approaches to the sustainable use of biodiversity whilst maintaining its conservation (UNESCO, 2023). Biosphere reserves include terrestrial, marine and coastal ecosystems and are nominated by national governments. Their main functions include: ▪ Conservation of biodiversity and cultural diversity ▪ Economic development that is socio-culturally and environmentally sustainable ▪ Logistic support, underpinning development through research, monitoring, education and training.
Heritage Coasts	Heritage coasts are defined by agreement between NE and relevant maritime local authorities to conserve stretches of undeveloped coast in England (Gov.uk, 2015).
Local Landscape Designations (LLD) England (various names)	LDDs are defined in local plans but have various names. The designations protect the landscape from inappropriate development, may encourage positive landscape management and play an important role in developing an awareness of the landscape qualities that make particular areas distinctive through community involvement.
Important Bird Areas (IBAs)	IBAs are a network of sites identified by the RSPB and BirdLife as being of the greatest significance for the conservation of the world's birds (Birdlife International, 2023).
Annex I habitat	Annex 1 habitats are natural habitat types of community interest whose conservation requires the designation of SACs under the Habitats Regulations, in the marine environment including protected sandbanks, reefs, and submarine structures made by leaking gases.
Species of Conservation Interest (SOCI)/ Priority Coastal Habitats	SOCIs are marine species identified as being particularly threated, rare or declining. Used as a focus in the designation of MCZs in England (MarLin 2023). This category also includes priority coastal habitats, and Water Framework Directive Habitats of higher and lower sensitivity e.g., saltmarsh, seagrass, chalk reef, maerl beds, native oyster beds, mussel beds, subtidal kelp beds and sensitive broadscale habitat types.
Sensitive fish habitat	Sandeel and Atlantic herring are key species often preyed upon by other fish species, marine mammals and seabirds. For this reason they are described as sensitive fish habitat. They require specific sediment conditions for key periods of their life cycle and are therefore vulnerable to seabed disturbance from activities such as cable trenching. Spawning and nursery grounds (areas where eggs are laid and juveniles are present) for these species have been considered by the appraisal.
Historic Environment	
Protected Wrecks	Certain wreck sites in UK territorial waters are protected by designation under the Protection of Wrecks Act 1973. This legislation allows the Secretary of State to designate a restricted area around a wreck to prevent interference. These protected areas are likely to contain the remains of a vessel, or its contents, which are of artistic, archaeological, or historical importance.
Charted Wrecks	Charted wrecks are included in the UK Admiralty Wrecks Database. The database contains information about wrecks within Northwest Europe and the Mediterranean, excluding those within the northeast of the German/Dutch border. The records contain a wide variety of data including position of wreck, type of vessel, name, nationality, and dimensions.
Physical Environment	
Sub cropping or Outcropping bedrock	British Geological Survey (BGS) data has been used to identify the depth of quaternary sediments along the marine route alignments.
Superficial Sediments	BGS data has been used to identify the surface (superficial) sediments along the marine route alignments.
Mobile sediments (sandbanks, sandwaves)	High resolution UK Hydrographic Office (UKHO) bathymetry data has been used to identify potentially mobile features such as sand banks, sand waves, and mega ripples. Where large natural seabed features have been identified, where possible these have been avoided during the development of the marine route alignments.
Bathymetric features e.g., large intertidal expanse, steep slopes	Bathymetric features have been identified using high resolution UKHO bathymetry data. Significant features such as bathymetric deeps (e.g., Silver Pit off the Lincolnshire coast), and steep slopes have been avoided by design during the development of the marine route alignments. Consideration has been given to the distance to the 10m water depth contour. This is the depth at which the

Sub-topic / Constraint	Description
	installation technique changes from a cable lay vessel to a cable lay barge often involving jointing of the cables or a more complex marine campaign (e.g., additional support vessels, use of anchors etc).
Socio-economic Environment	
Infrastructure	Infrastructure that has been identified includes cables, pipelines, oil and gas wells, offshore wind farms, renewable test and development areas, carbon capture storage facilities. This includes existing, planned and infrastructure in construction as well as areas of the seabed earmarked for development.
Shipping and Navigation	Shipping density, navigational features (e.g., traffic separation scheme (TSS), restricted navigation channels, navigational buoys), port authority / harbour limits, anchorages, navigational dredging areas, line of sight markers
Restricted areas	Restricted areas are described as marine aggregate extraction including licensed, option & appraisal areas, aquaculture sites, disposal sites, dumping grounds, military practice and exercise areas (PEXA)
Commercial fisheries	Commercial fisheries include areas used for static and mobile gear.
Marine planning	The following relevant marine plans have been considered for the marine route alignments: North East Offshore Marine Plan and East Inshore and Offshore Marine Plan.
Major projects	Publicly available data sources including scoping boundaries on the Planning Inspectorate (PINS) website and Marine Case Management System, identified through stakeholder engagement, and provided by The Crown Estate (TCE) were used to identify other major projects in close proximity or overlapping the marine route alignments.

The appraisal process was completed following the stages presented in Figure 3-2.

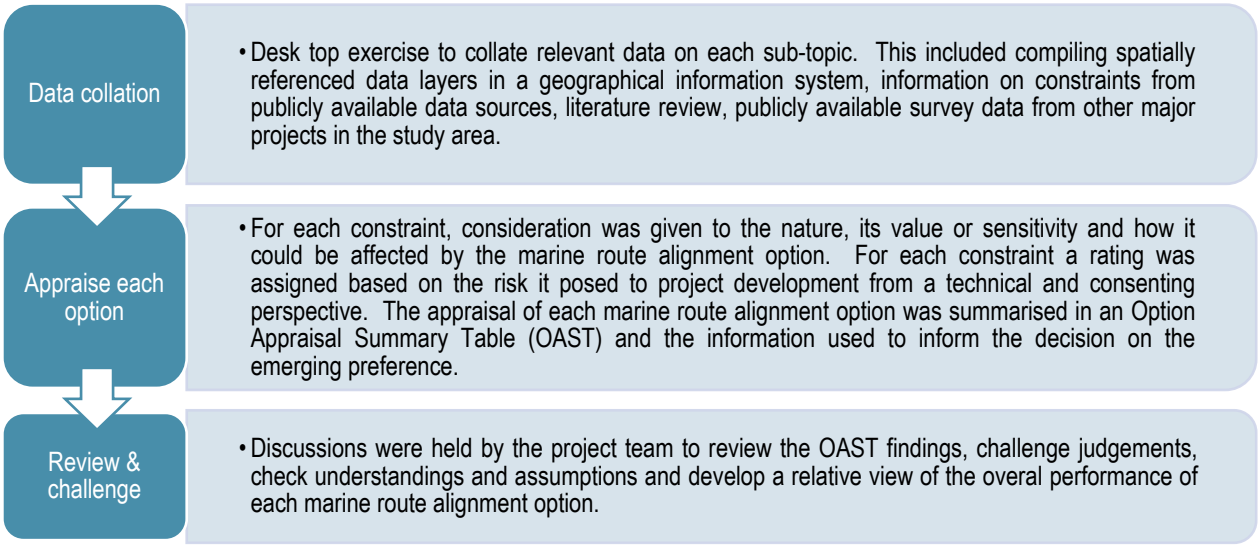


Figure 3-2: Optional appraisal process

During the 'Appraisal' stage of the process, the risk that each sub-topic presented to the viability of the development of an individual marine cable route option was assessed by the project team. Intertek carried out the assessment of risk for technical constraints and Collaborative Environmental Advisers (CEA) carried out the assessment of risk for environmental and socio-economic constraints. The rationale for assigning risk categories is outlined in Table 3-2.

Table 3-2: Risk categories

Risk category	Consent rationale	Technical rationale
Black Show Stopper	Consent cannot be achievable for the development due to very significant constraints.	Constraints that mean that either the technical challenge is such that the cable cannot be installed or the risk from the constraint to the cable during operation is too great and damage is highly likely.
Red Very High Risk	Consenting constraint is likely to preclude the development. Derogation case/Measures of Equivalent Environmental Benefit (MEEB) required – can only be contravened if no feasible alternative.	Constraints which must be avoided. Subjects that cannot be physically moved/removed to install a cable or will have severe financial and legal implications. Examples include location of wrecks and existing Offshore Renewable Energy Installations (OREIs); infrastructure supporting nuclear power stations and offshore oil and gas platforms.
Dark orange Medium – High Risk	Significant consenting constraint which has the potential to have a significant impact on the project i.e., significant timing constraint to work, significant mitigation requirements.	Constraints which should be avoided in principle but could be routed through subject to stakeholder consultation and/or additional technical studies. These areas have the potential to impact development timescales or costs of and/or risk during development and construction of the cable route. Examples could include foul ground areas, anchorages and highly sensitive marine protected areas.
Orange Medium Risk	Consenting constraint will require additional assessment/survey or stakeholder agreement to secure consent, but it is unlikely to stop the development. (e.g., third party asset or licenced area closer than guidance suggests).	Areas that may be subject to negotiation or require further information, surveying or consultation but nonetheless have the potential to impact on development timescales or costs of and/or risk during development and construction of the cable route. These areas may have significance due to their legal, financial, and physical implications on the cable route. Examples include areas of exposed bedrock; areas of large sandwaves; and marine protected sites, which should be avoided if possible. Note that the initial categorisation of a secondary constraint in environmental areas assumes that no rock protection will be required within the protected site. If rock protection is required e.g., at a third-party crossing, the project will need to demonstrate: a) that there are no suitable feasible alternatives both in terms of the route and installation method selected; and b) whether there is any suitable mitigation that could be proposed to avoid an adverse effect on site integrity.
Yellow Low Risk	Consenting constraint may be present but with a low likelihood of being a significant constraint on the development.	Areas that are of less significance, and which will have little legal, financial, or physical impact on cable routeing. These areas will benefit with additional information, surveying or consultation but are presumed to be mitigated during micro-routeing post marine survey. These areas can be routed through where there is no alternative available. Examples include out of service cables; seasonally environmentally designated areas (e.g., marine mammal migration routes); shipping routes (e.g., route with temporal variations); small mobile seabed features (e.g., bedforms less than 1 m in height).
Green Very Low Risk	No consenting constraint identified.	Subject feasibly and practically does not prohibit cable installation.

Marine cable route options were developed by Intertek, as described in Section 4. Due to the offshore constraints, although several feasible English marine cable route options have been developed, many options share areas of commonality. For the purposes of options appraisal, the English marine cable route options were segmented into marine route alignments, with the assessment carried out on each marine route alignment. This then allowed marine route alignments to be easily grouped together to assess multiple marine cable route options. For example, one marine cable route option will comprise of three or more marine route alignments i.e., an offshore approach towards Scottish waters, an offshore route, a nearshore approach and an English landfall. The marine route alignments used in the process are presented in Section 4.

NGET is seeking to develop EGL 5 in coordination with the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) projects (similar proposed offshore high voltage direct current electricity links between Scotland and England). The options appraisal process has sought to draw upon data, technical assessments, studies and stakeholder opinions available from EGL 3 and EGL 4 projects where feasible, to accelerate development. The opportunities and risks association with coordination of the projects has been considered in the evaluation. All relevant decisions made for EGL 3 and EGL 4 have been back-checked and validated to ensure applicability and acceptance for EGL 5.

During the option appraisal process two key definitions were used when scoping out a marine route alignment or landfall, as follows:

- **Discounted** – Constraints are significant, and time needed would cause significant programme delay (could be revisited subject to material change in circumstances).
- **Parked** – The option has not been taken forward as an option for EGL 5, however it is a potential site that can be revisited.

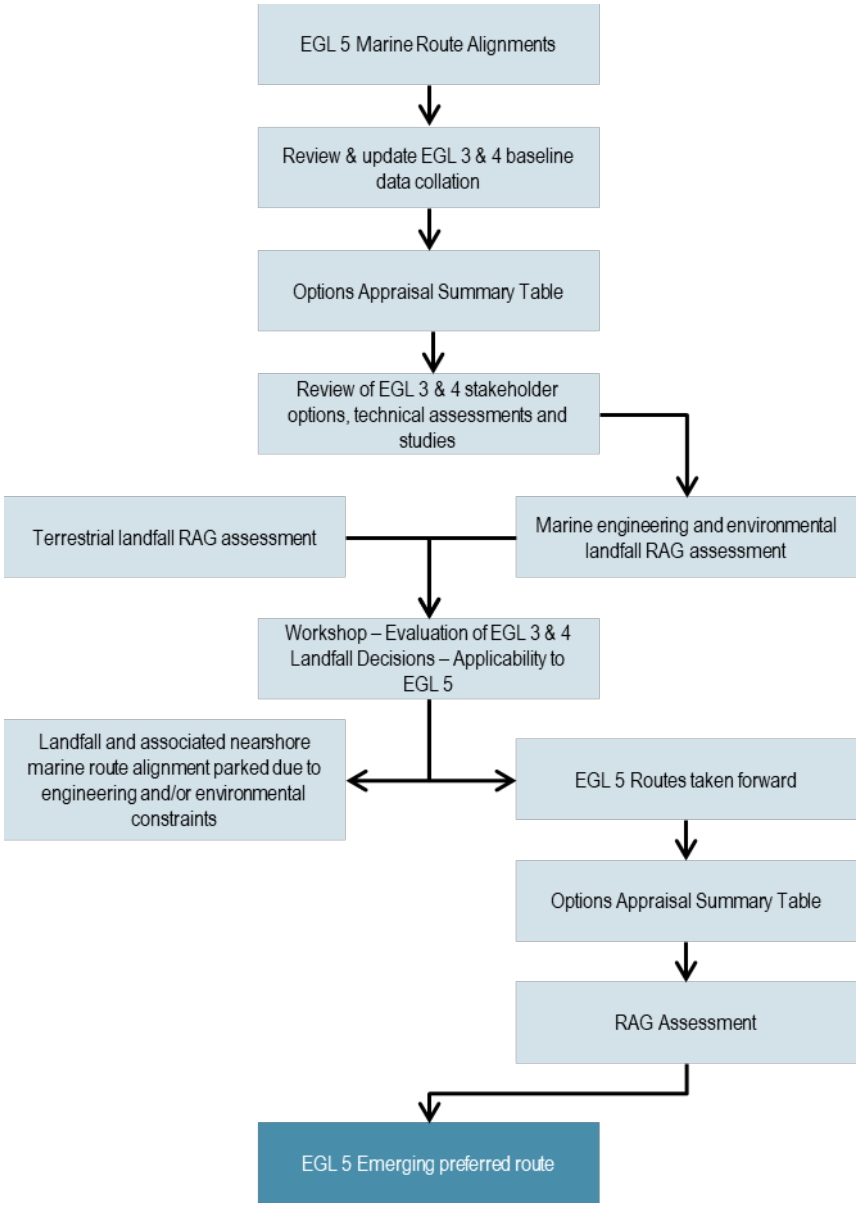


Figure 3-3: Overview of phased approach to marine route alignment and landfall appraisal

4. Route Corridor and Landfall Identification Process

4.1. Overview

The first stage of the project development process is to identify where the reinforcement cables will connect to the transmission network in England. A separate strategic options stage of National Grid's approach identified the section of coastline from Humber to Sheringham for consideration to accommodate landfalls for the EGL 5 project. The strategic options appraisal identified two landfalls in Lincolnshire, Theddlethorpe and Anderby Creek (North and South) for consideration by the options appraisal process. The strategic options stage ruled out landfalls in Norfolk and around The Wash on the basis of significant environmental impacts and stakeholder feedback.

It should be noted that for EGL 3 and EGL 4 an additional landfall at Horse Shoe Point was investigated and marine route alignments developed to the landfall. Consultation with Associated British Ports Humber, the Eastern Inshore Fisheries and Conservation Authority (IFCA), the Lincolnshire Wildlife Trust and Historic England as well as initial options appraisal led to the landfall being Parked. This decision was back-checked for EGL 5 and no new evidence was identified that changed this original decision and therefore NGET did not consider the landfall option at Horse Shoe Point to be an appropriate landfall for further consideration for EGL 5.

When considering the development of marine route alignments, NGET took the decision to parallel the EGL 3 and EGL 4 routes within English waters as far as possible. This decision is in line with National Policy Statement EN-5, including Paragraph 2.12.4 and 2.12.6

In Scotland, NGETs project partner, SSEN – T have identified a connection point on the Aberdeenshire coastline. Along the Scottish / English border two floating offshore wind farm areas are in the pre-application stages of consent; Morven and Ossian. The locations of these wind farm sites constrain the approach into Scottish waters from England.

Intertek undertook an initial data gathering and constraint mapping exercise for the Study Area for EGL 3 and EGL 4. For EGL 5 the data was audited to ensure no new information was available prior to the identification of the marine route alignments. Marine route alignments that were technically suitable, took into consideration stakeholder feedback received for EGL 3 and EGL 4, and allowed coordination with EGL 3 and EGL 4 and onward routeing in Scottish waters, were developed to the English landfalls and England / Scotland border. The methodology and selection process is described in the Intertek report "AC4 Cable Route Selection Methodology"[7] (P2783_R6579_Rev0). CEA reviewed the short-listed landfall areas and marine route alignments from an environmental perspective, examining interactions with sensitive biological and socio-economic features (as outlined in Table 3-1), as well as the previous outcomes of the consenting process for other major developments in the region. The development of the marine route alignments and assessment of options was undertaken in June 2024. It is recognised that since the development of the marine route alignments major developments in the region have provided further details on their individual schemes e.g., cable routes have been published or refined. The changes do not materially alter the conclusions of the assessment, although they would be used in future to refine the selected preferred marine route alignment e.g., to optimise infrastructure crossing locations.

CEA concluded that Intertek had considered all reasonable potential constraints and that the marine route alignments were appropriate for options appraisal.

4.2. Identification of Landfalls

The strategic options appraisal of National Grid's approach identified the section of coastline from Humber to Sheringham for consideration to accommodate landfalls for the EGL 5 project. Optimal landfall locations were identified through a review of publicly available and purchased mapped data by Intertek and WSP. In identifying landfall locations consideration was given to:

- The physical space available to accommodate the temporary works and permanent footprint of the project at the landfall site
- The potential marine and terrestrial routeing to ensure that there are feasible routes to and from the landfall site
- The capacity for the landfall to accommodate EGL 5 as well as EGL 3 and EGL 4 and the capacity for the landfall to accommodate future projects
- Ground condition suitability
- Site access both onshore and offshore
- Alternative access available for landowners
- Avoidance of existing infrastructure where possible
- Potential environmental or socio-economic constraints (e.g., designated sites, populated areas or archaeological restrictions)
- Topography

[7] EGL 5 was originally named AC4 and early reports were conducted under this name.

- Coastal sediments
- Geomorphology of the shoreline including evidence of erosion/accretion
- Potential to support either Open cut or HDD options at the landfall
- Coastal defence or flood features
- Fishing activity

Landfall assessments, studies and stakeholder opinions that informed the selection of the preferred landfall sites for the EGL 3 and EGL 4 Projects were reviewed. Landfalls were visited by Intertek in November 2024 to inform decisions on feasibility and to ground truth desk-based data. Options for landfall locations were selected taking potential mitigation into consideration, whilst also considering the constraints presented.

Two landfall locations were identified on the Lincolnshire coastline in England that met the selection criteria; Theddlethorpe and Anderby Creek (north and south). These landfalls were taken forward to the option appraisal process. Each landfall was assessed based on its own merits, technically and environmentally, taking into consideration any information available from other major developments in the region.

For the purposes of the marine options appraisal, the landfall was considered to include the marine route alignment through the nearshore / coastal area, from where, if appropriate, the marine route alignments branch from a common offshore route. The rationale behind including the nearshore / coastal marine route alignment in the assessment of the landfall was that a landfall cannot be an emerging preferred option if there is no feasible way of accessing it from the marine environment.

The landfalls identified are listed in Table 4-1 and illustrated in Figure 4-2 (Drawing: C01521-EGL5-LOC-002).

Table 4-1: Landfall options

England	
Name	**Description**
Anderby Creek	Anderby Creek is a small holiday village in Lincolnshire, England, to the north of Skegness. It can be accessed via Roman Bank Road. The area is in a mainly rural setting with the most prominent coastline feature being a beach with sea defence/sand dunes running north-south and with agriculture lands to the west. Two sites were visited – Anderby Creek North and Anderby Creek South. The landfalls are a mix of agricultural land and recreational beach.
Theddlethorpe	The Theddlethorpe Beach site is located approximately 3 miles north of Mablethorpe on the North Sea coast. The beach can be accessed via Crook Bank Road off the A1031. This potential cable landfall location is in a rural setting with the Viking Gas Terminal in the nearby vicinity to the site. The most prominent coastline features are the sea defence sand dunes running north-south along the coast. The landfall area is a mix of agriculture land, sand dunes and recreational beach.

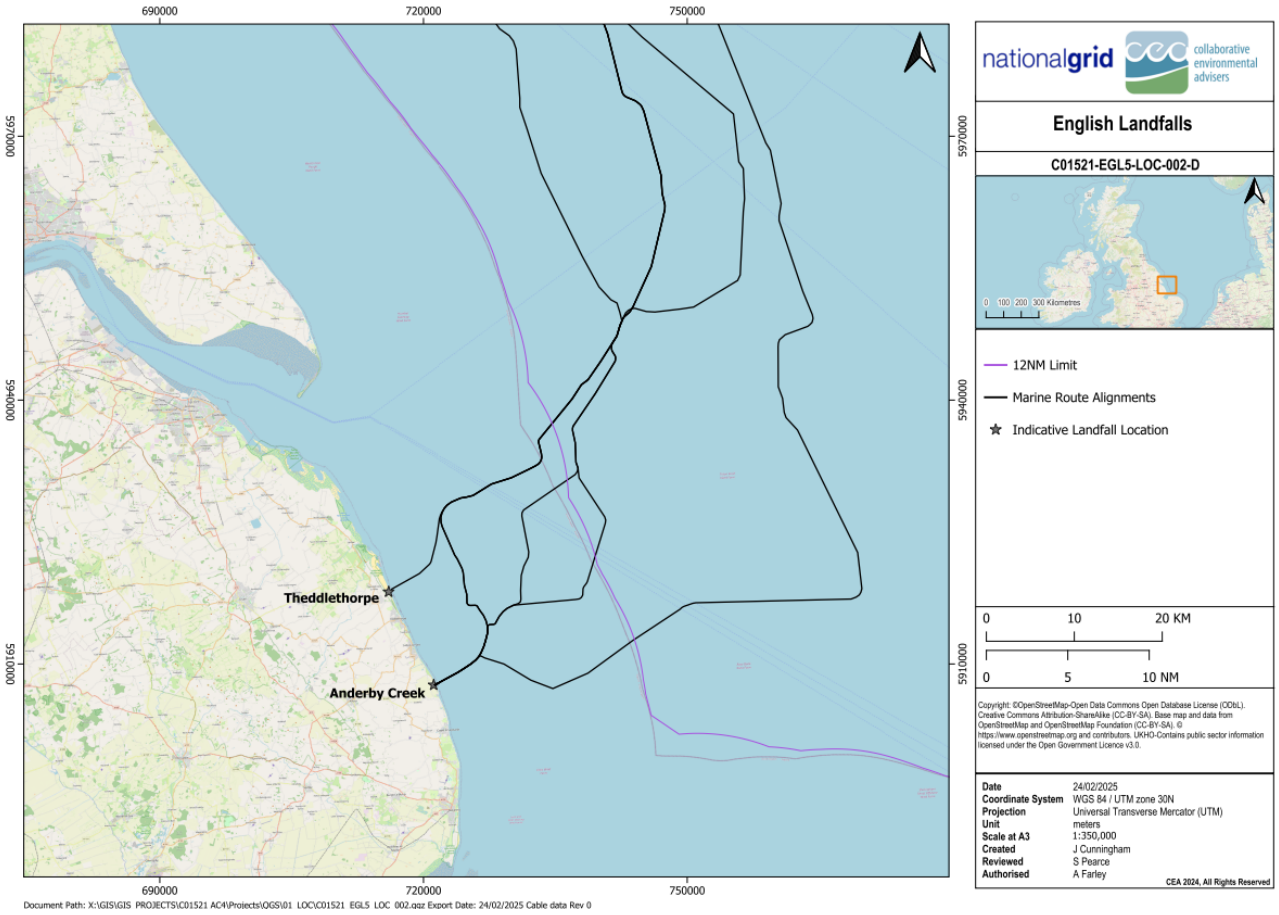


Figure 4-1: English Landfalls (Drawing: C01521-EGL5-LOC-002)

4.3. Identification of Marine Route Alignments

Following the identification of the potential landfall sites it was possible to start identifying potential marine route alignments. The aim of the marine route development phase is to prove that a marine cable route can connect to the landfall sites while avoiding any key constraints. The aim is to create the shortest marine cable route possible which will minimise the length of cable needed, reduce the manufacturing and installation costs, and minimise the environmental footprint of the project.

It should also be designed to:

- Avoid environmentally sensitive areas, where possible.
- Avoid areas which would represent restrictions to vessel movement e.g., anchorages, restricted navigation channels.
- Avoid areas of archaeological importance and wrecks.
- Avoid existing offshore infrastructure e.g., offshore wind farms, oil and gas infrastructure, marine aggregate extraction areas, aquaculture sites.
- Minimise the crossing of in-service cables and pipelines. Where it is not possible to avoid a crossing altogether, then to seek to optimise the crossing angle and to ensure that navigational safety or water depth is not adversely affected.
- Avoid hazardous seabed e.g., mobile sediments or bedrock outcrops and sub crops.
- Minimise any impact on third party considerations a such as seasonal fishing activities or local tourism.

The marine route alignments developed by Intertek in AC4 Cable Routeing Report (P2783_R6582_Rev0) (Intertek, 2025) are shown in Figure 4-3 (Drawing C01521-EGL5-LOC-003-D). The marine route alignments were developed in three distinct areas by Intertek:

- England landfalls
- Offshore section
- Approach to England / Scotland border

The marine route alignments start at the English landfalls and merge to a common point approximately 125 km offshore. From the first common point in English waters, the offshore route extends to another common point in English waters, before splitting into further marine route alignment segments leading to the potential transition points across the border between English and Scottish waters. The three transition points provide optionality on the approach to the Aberdeenshire coastline around the proposed Morven and Ossian Offshore Wind Farms which lie in Scottish waters immediately adjacent to the England / Scotland border.

The offshore marine route alignment is called:

- Offshore Route

The English landfall marine route alignments are called:

- ENG Route A to F

The marine route alignments on the approach to the England / Scotland border are called:

- SCOT Route A to C

For EGL 3 and 4 two offshore routes were developed during options appraisal (Offshore Route A and Offshore Route B). For EGL 5 a decision was taken to parallel the EGL 3 and 4 projects as far as possible. This decision is in line with National Policy Statement EN-5 Paragraph 2.12.4 and 2.12.6. Constraints in the offshore area were extensively investigated for the EGL 3 and 4 projects and the offshore area was identified as relatively benign. One offshore route was therefore developed that routes to the east of EGL 3, to avoid an infrastructure crossing of the proposed cables, avoid potential areas of *Sabellaria spinulosa* reef identified on UKHO high resolution bathymetric data and optimise the route length. Additional options would add route length to EGL 5 without bringing any technical or environmental benefit.

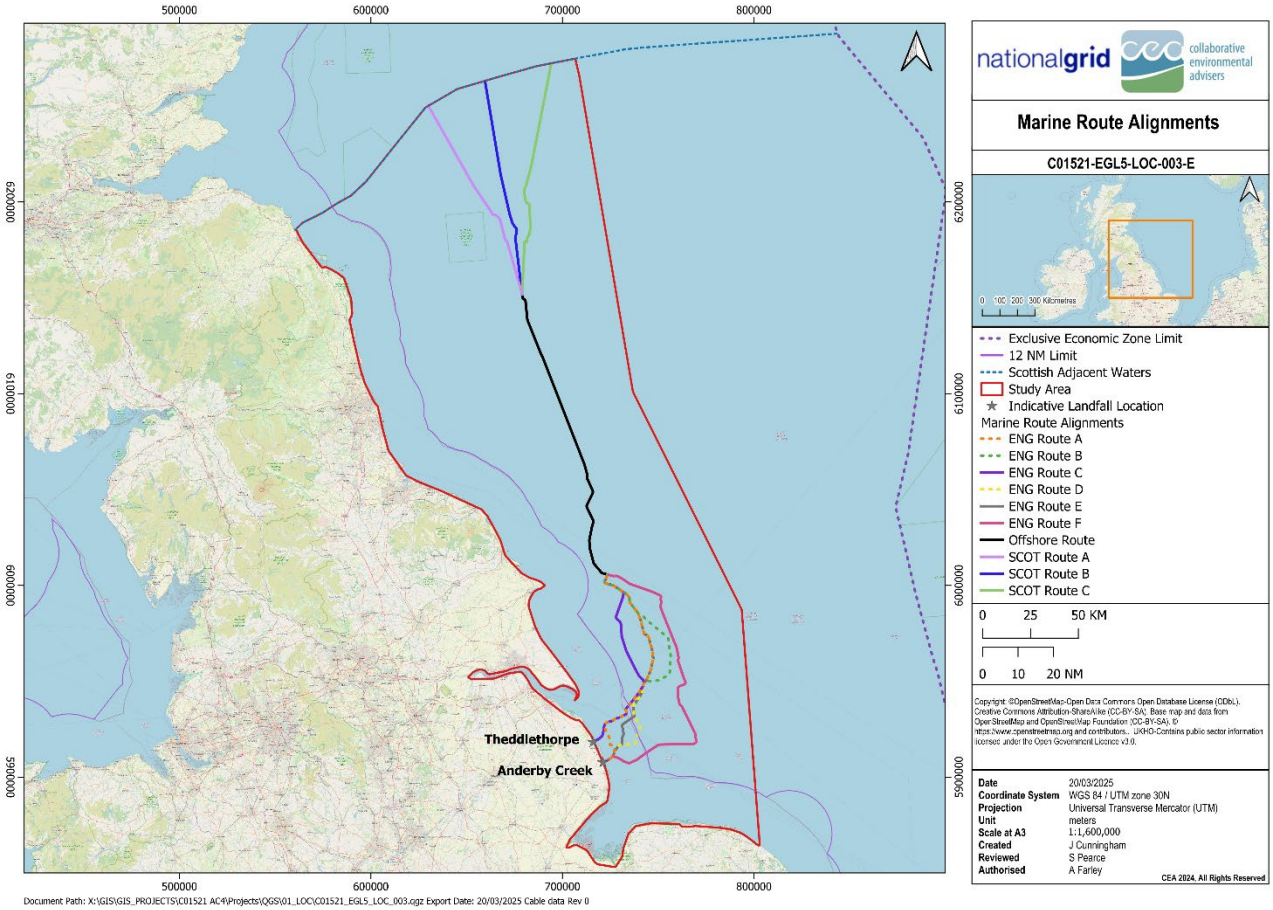


Figure 4-2: Marine Route Alignments (Drawing: C01521-EGL5-LOC-003-E)

5. Technical Constraints Summary

As part of the 'Appraisal' phase the technical constraints within the Study Area, that either interact with the marine route alignments, and/or that have informed the options appraisal process were identified. A desk-based assessment including a review of publicly available and purchased mapped data was completed prior to site visits taking place at the proposed landfall sites. Data was classified according to whether it may be a potential planning, physical, environmental, or human constraint on the development of a marine cable route.

The primary purpose of the landfall site visits was to identify and assess the hazards to which the cable system may be exposed to during its design life and make selections mitigating the hazards whilst also complying with any constraints. Observations made at each possible landfall during the site visit included descriptions of:

- Coastal sediments.
- Geomorphology of the shoreline including evidence of erosion/accretion.
- Topography.
- Onshore and offshore access.
- Existing infrastructure e.g., overhead and undergrounds cables / pipelines, storm drains / outfalls etc.
- Alternative access available for landowners.
- Suitable lay-down areas.
- Suitability of access for geotechnical investigations.
- Water courses and or road crossings.
- Environmental and/or archaeological restrictions / protected sites.
- Other visual observations such as presence of fishing gear, recreational / business use of site.
- Notes on whether the landfall was suitable for different construction methods e.g., open-cut, trenchless/HDD.

Offshore constraints that were identified in the available data were categorised according to their potential for impact on the development of the project, according to the criteria outlined in Table 3-2. The main objective of the route optioneering from an engineering perspective was to ensure that all known and planned constraints were avoided as a key part of the initial design phase of the cable system. Spatial analysis of all constraints using a Geographical Information System (GIS) was undertaken to develop the marine route alignments. The following cable routeing principles (following industry guidance where available) governed the development of the marine route alignments:

- A 250 m separation distance zone was applied around known archaeological sites (wrecks), as stipulated by The Protection of Wrecks (Designation No. 4) Order 1997.
- A 250 m separation distance zone was applied around known in-service and proposed cables, with a 500 m separation distance zone around known oil and gas pipelines. This follows guidance stipulated in The Crown Estate Submarine Cables and Offshore Energy Installations – Proximity Study Report, and UKCS Guidelines for Offshore Marine Operations, respectively.
- A separation distance of 50 m was applied around out of service cables.
- An arbitrary separation distance of 50 m was used around obstructions such as foul ground and underwater rock, as well as around pilot boarding places, navigation buoys and point infrastructure such as harbour facilities, posts/stakes, and outfall pipe diffusers. There is no guidance to define appropriate separation distances and Intertek have used judgement and experience to identify this value. It may be possible to route closer to these features following consultation with appropriate stakeholders.
- Areas of mobile sediments (e.g., sandwaves) were avoided where possible. Dynamic bedform environments can cause several challenges which include defining seabed levels prior to installation; incorporating morphological changes into foundations and potential scour protection design; cable installation and choice of installation tools.
- Known areas of Annex 1 habitat, and associated SACs designated for these seabed features, have been categorised as medium- to high-risk constraints. Other protected sites have been categorised as medium constraints.
- Known areas of hard ground and rock outcrop that may prevent cable burial into the seabed have been avoided or distance through it minimised if unavoidable.
- A 250 m separation distance has been applied around offshore minerals and aggregate site extraction production agreement areas and exploration and option areas (TCE). Open and closed/disused disposal sites (Centre for Environment, Fisheries and Aquaculture Science (Cefas) data)) have been classified as medium and low risk constraints, respectively. Explosive dumping grounds, and spoil grounds (Europa MTV Data) have been classified as a high-risk constraint.

Consideration was also given to the proximity of the EGL 5 cable system to the planned Ossian offshore wind farm export cables and EGL 3 and 4 reinforcement projects in Lincolnshire and the proximity to Eastern Green Link 1 and 2 reinforcement projects between Torness and Hawthorn Pit and Peterhead and Drax , respectively.

6. English Environmental and Socio-Economic Constraints Summary

As part of the 'Appraisal' phase as described in the process flow chart (Figure 3-3), the environmental (biological, historic and physical) and socio-economic constraints within the Study Area were identified, that either interact with the marine route alignments, and / or that have informed the options appraisal process. Further detailed information on these constraints is provided in Appendices 1 and 2, with key information summarised in the following sub-sections.

6.1. Environmental

6.1.1. Biological Environment

A summary of which marine route alignments intersect a protected site with a marine component, is provided in Appendix 1. Details on the marine protected sites, the terrestrial protected sites, Annex 1 habitats, Priority Marine Features, Species of Conservation Interest, Priority Coastal Habitats and sensitive fish habitats are provided in Appendix 1.

6.1.1.1. Protected Sites (with Marine Components)

The marine route alignments interact with the following designations, as illustrated in Figure 6-1 (Drawing C01521-EGL5-PROT-001):

- Greater Wash SPA - marine route alignments were unable to avoid the designation when approaching the Lincolnshire coastline.
- Southern North Sea SAC - marine route alignments were unable to avoid the site due to the extent of this designation.
- Holderness Offshore MCZ – a marine route alignment was developed that could avoid the MCZ but subsequently interacted with different designated site. All other marine route alignments could not avoid interaction with the MCZ.
- Humber Estuary SPA, Humber Estuary Ramsar, Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC and Saltfleetby – Theddlethorpe Dunes SSSI - Marine route alignments were unable to avoid these sites when approaching the Theddlethorpe landfall. All sites could be avoided through selection of Anderby Creek landfall.
- Inner Dowsing, Race Bank and North Ridge SAC - marine route alignments were unable to avoid this site when approaching Anderby Creek landfall from the east. Although selection of an alternative marine route alignment will mean that this SAC can be avoided, the alternative marine route alignments cross the Holderness Offshore MCZ.

Other protected sites identified within the Study Area that the marine route alignments avoid are listed below:

- North East of Farnes Deep HPMA
- Dogger Bank SAC
- Berwick and Northumberland Coast SAC (also partly in Scotland)
- Northumberland Dunes SAC
- Durham Coast SAC
- Beast Cliff-Whitby (Robins Hoods Bay) SAC
- Flamborough Head SAC
- Lindisfarne SPA
- Coquet Island SPA
- Northumberland Marine SPA
- Northumbria Coast SPA
- Teesmouth and Cleveland Coast SPA
- Flamborough and Filey Coast SPA
- Holderness Inshore MCZ
- Fulmar MCZ
- Swallow Sands MCZ
- North East of Farnes Deep MCZ
- Berwick to St Mary's MCZ
- Coquet to St Mary's MCZ
- Farnes East MCZ
- Runswick Bay MCZ
- Chapel Point – Wolla Bank SSSI
- Sea Bank Clay Pits SSSI
- Lindesfarne SSSI
- St Abb's Head to Fast Castle SSSI
- Burnmouth Coast SSSI
- Whitby – Saltwick SSSI
- Horwick to Seaton Point SSSI
- The Farne Islands SSSI

6.1.1.2. Protected Sites (Terrestrial)

Marine route alignment ENG C intersects the Lincolnshire Coronation Coast NNR at the Theddlethorpe landfall. This site consists of coastal grazing marshes, freshwater marshes, sand dunes, saltmarsh and mud flats. A site description is provided in Appendix 1.

6.1.1.3. Annex I Habitats

There are two different Annex I Habitats within the English Study Area (illustrated in Figure 6-2 Drawing C01521-EGL5-PROT-002):

- 1110 – Sandbanks which are slightly covered by sea water all the time.
- 1170 – Reef i.e., rocky marine habitats or biological concretions that rise from the seabed.

However, only known Annex I sandbanks have been intersected by the marine route alignments. These are largely within the Inner Dowsing, Race Bank and North Ridge SAC, with one intersection being with an unnamed sandbank (possibly Triton Knoll) 5 km north of the SAC. All intersections are with the marine route alignment ENG Route F.

Habitats have been identified within the English Study Area as potentially suitable for biogenic reef (mussel beds and *Sabellaria spinulosa* reef), as well as stony reef. Where published data sets identify these within the English Study Area, the UKHO high-resolution bathymetric data has been used to identify whether similar seabed characteristics are present in the vicinity of the marine route alignment. If similar seabed patterning was visible, it has been assumed that this may also represent Annex I reef, and these areas have been avoided.

Marine route alignment ENG Route D routes to the east of marine aggregate Area 106/3. Consultation with the marine aggregate industry for EGL 3 and EGL 4 identified that a previous aggregate extraction option area was relinquished in this location due to the high presence of *Sabellaria spinulosa* through the site. The marine route alignment would cross through this previous aggregate extraction site and therefore there is a high likelihood of encountering Sabellaria reef.

6.1.1.4. Priority Marine Features / Biodiversity Action Plan Priority Habitats / Sensitive Fish Habitat

There are different priority marine features which are within the Study Area some of which are directly intersected by the marine route alignments. Those already related to either a SAC or MCZ designation are not considered in this section. The data sets were used to establish the presence of:

- Raitt's Sandeel and Lesser Sandeel spawning grounds
- Atlantic herring spawning grounds
- Areas suitable for seagrass

Sandeel and Atlantic herring require specific sediment conditions to spawn. They are therefore especially vulnerable to cable installation if the marine route alignments transect these sediment types. As a key prey species for other fish species, marine mammals and seabirds, the location of their spawning grounds has been considered by the options appraisal. Figure 6-3 (Drawing C01521-EGL5-FISH-001) and Figure 6-4 (Drawing C01521-EGL5-FISH-002) illustrate the sandeel and herring spawning grounds respectively within the Study Area.

6.1.1.5. Species of Conservation Importance

The Species of Conservation Importance present in the Study Area are typically also features of the SAC or MCZ designations so are not covered further in this section.

6.1.1.6. Priority Coastal Habitats

Of the priority coastal habitats present within the Study Area, coastal sand dunes are present at both the Theddlethorpe and Anderby Creek landfalls.

6.1.1.7. Seal Haul-Out Sites

There is a seal haul-out site within the Study Area at Donna Nook. Both grey and common seal use the haul-out. The marine route alignments do not intersect with the seal haul-out site.

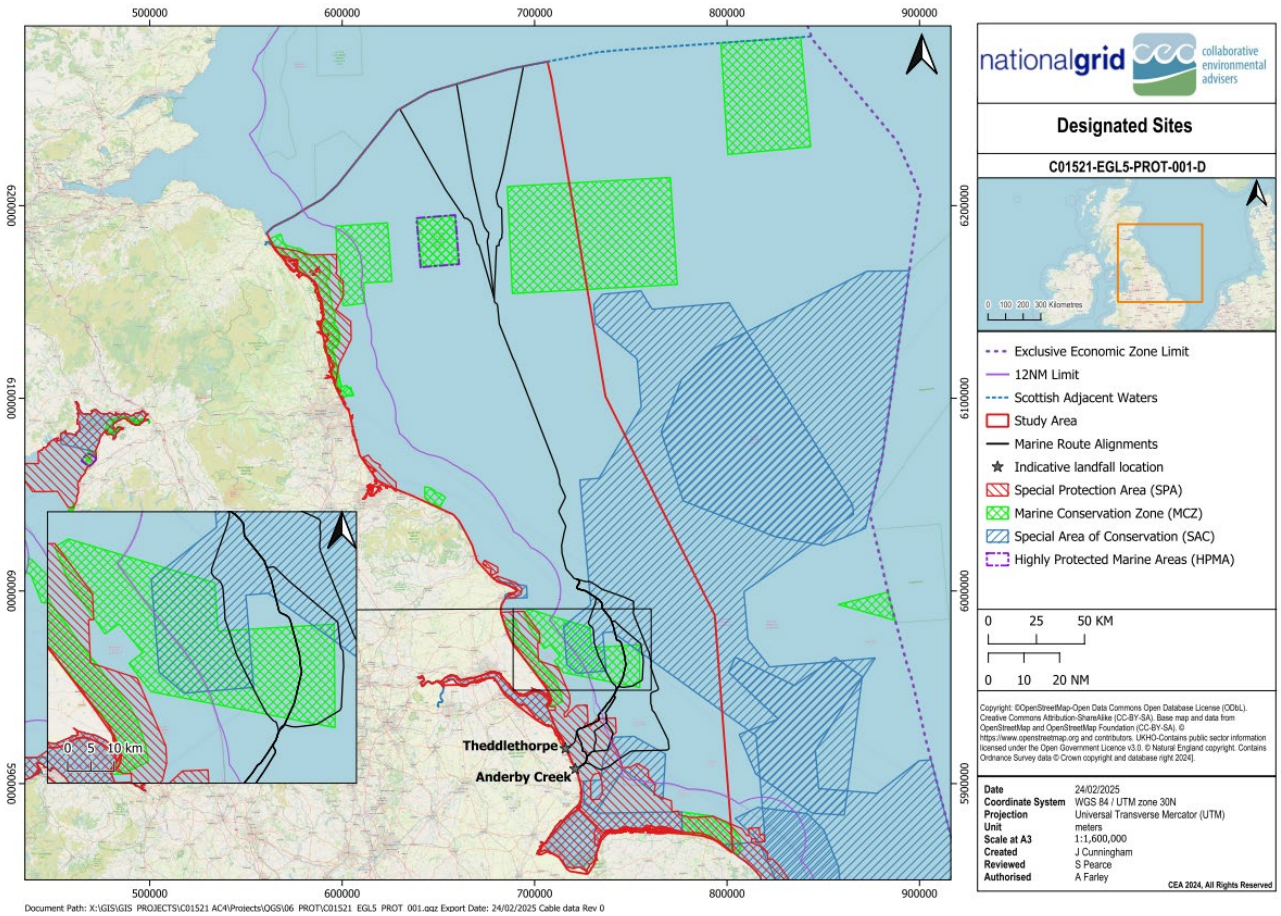


Figure 6-1: Protected Sites (Drawing: C01521-EGL5-PROT-001)

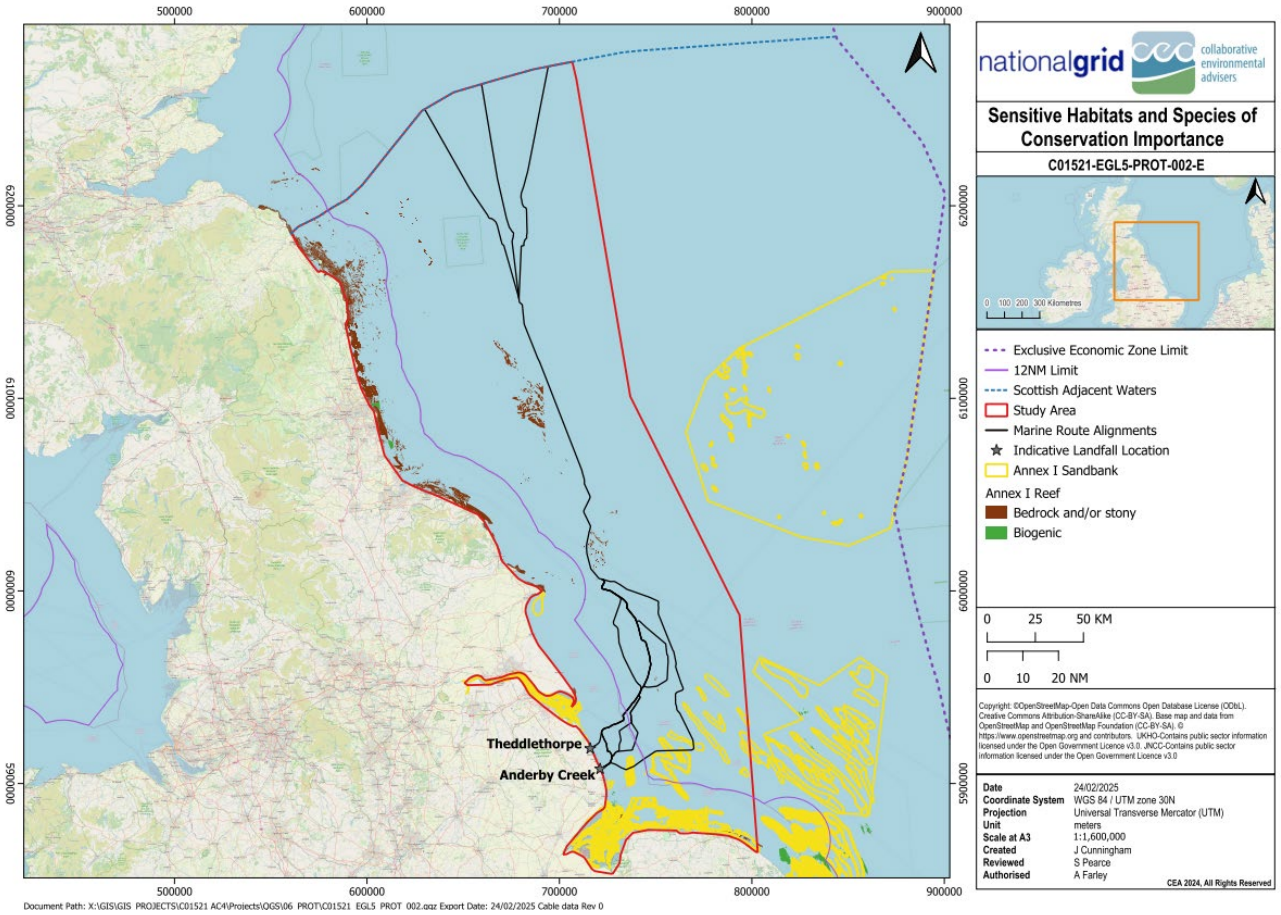


Figure 6-2: Sensitive Habitats and Species of Conservation Importance (Drawing: C01521-EGL5-PROT-002)

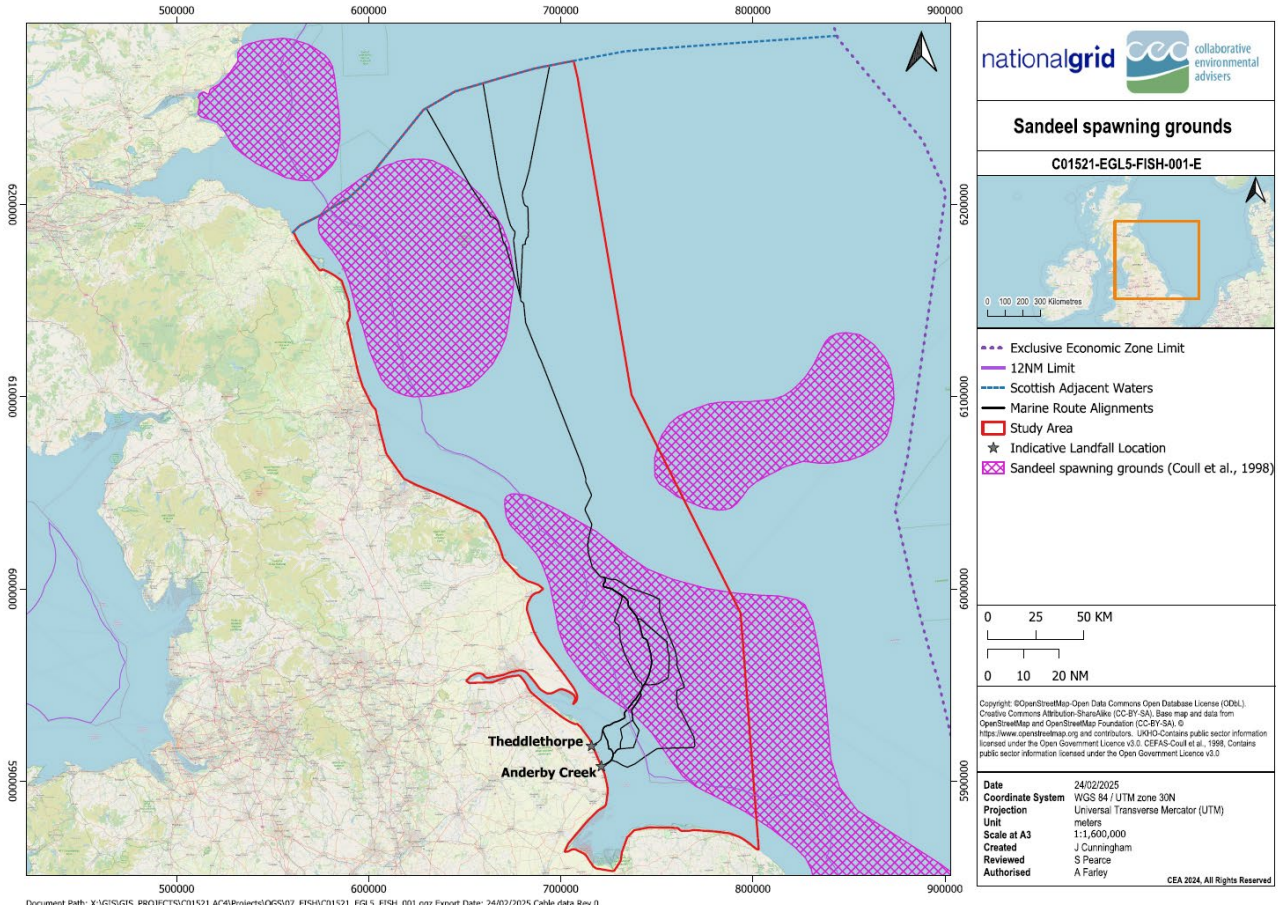


Figure 6-3: Sandeel Spawning Grounds (Drawing C01521-EGL5-FISH-001)

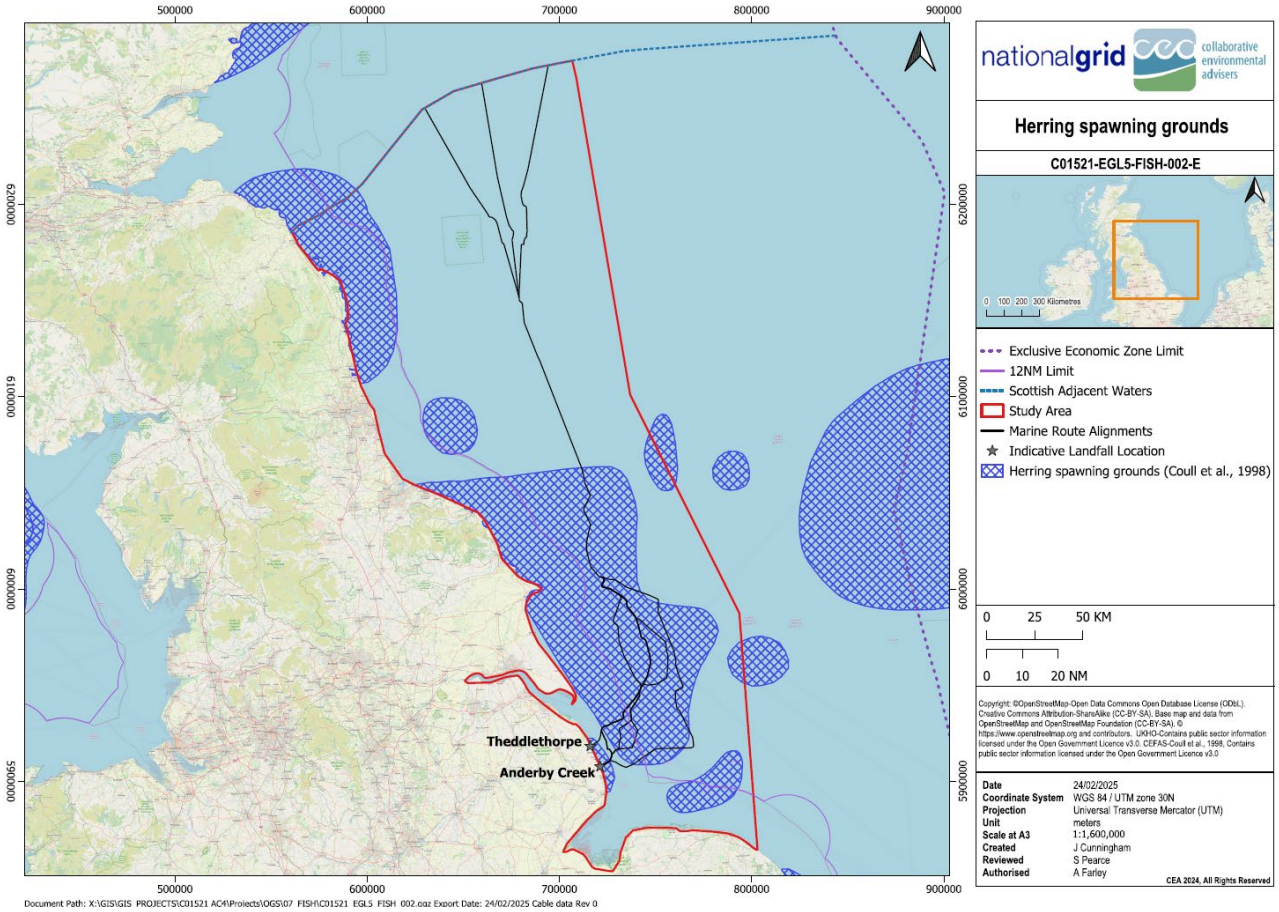


Figure 6-4: Herring Spawning Grounds (Drawing C01521-EGL5-FISH-002)

6.2. Historic Environment

There are no protected wrecks within the Study Area. Charted wrecks are numerous and have been mapped by the project team using the UKHO's wrecks and obstruction database. This provides details of over 94,000 'charted', 'uncharted', 'live' and 'dead' wrecks and obstructions around the UK. All wrecks were assigned a minimum 250 m buffer around them and marine route alignments developed to avoid interaction. A charted wreck lies immediately off the Anderby Creek landfall and was confirmed present in EGL 3 and EGL 4 nearshore geophysical surveys.

6.3. Physical Environment

6.3.1. Bathymetry and Seabed Features

Bathymetric features were identified using high resolution UKHO bathymetry data. The bathymetry data obtained within the Study Area show the depths at the English landfalls in Lincolnshire range between 15-20 m on average. Water depths gradually increase the further north of the study area with depths to around 100 m close to the English / Scottish boundary. See Figure 6-5 (Drawing C01521-EGL5-BATH-001).

Silver and Sole pits off the coast of Lincolnshire are significant geological features deepening to over 90 m from 15 m and have been largely avoided by the design during the marine cable route engineering process. The only marine route alignment that crosses these features is ENG Route B which overlaps with the Silver Pit for approximately 2.84 km, 2.27 km of which is within the Holderness Offshore MCZ.

There are several areas of large natural seabed features observed in the data that are associated with sandbanks and bedforms (likely to be mobile) within the Study Area. These features have been considered while undertaking marine cable route engineering.

Seabed slope has also been calculated using the bathymetry datasets and does not generally exceed 5° across the Study Area. The highest slopes are associated with sandbanks, bedforms, Silver Pit and Sole Pit.

Distance from the 10 m water depth contour to the landfall was noted for each marine route alignment. The 10 m water depth contour is typically the point at which cable installation techniques change from using an offshore cable lay vessel to a cable lay barge, increasing the technical challenges of the operation. The technical preference is to have a short distance from the landfall to the 10m water depth contour so that the offshore cable lay vessel can be used for the whole installation campaign.

6.3.2. Solid Geology and Seabed Sediments

The marine route alignments go through the North Sea Basin whose bedrock geology within the Study Area consists of:

- Sandstone & Limestone
- Chalk
- Mudstone
- Palaeozoic Sedimentary Rocks (Mix of Sandstone, Limestone, mudstone, Shale, Breccia & Dolomite
- Isolated areas of Metamorphic and Igneous rock (Basalt and Granite)

The Quaternary Deposits Thickness (BGS) dataset (1:1,000,000 scale) was used to map the Study Area up to a water depth of 200 m. This showed that the Study Area is dominated by sediment deposits between 5 – 50 m thick. This data set which shows area of hard substrate was used in conjunction with the high-resolution UKHO bathymetry data set to identify areas of potential subcropping / outcropping which were avoided by the marine route alignments. As shown in Figure 6-6 (Drawing C01521-EGL5-GEO-001), the surficial deposits across the Study Area are predominantly made up of sand with areas of gravelly sand and sandy gravel.

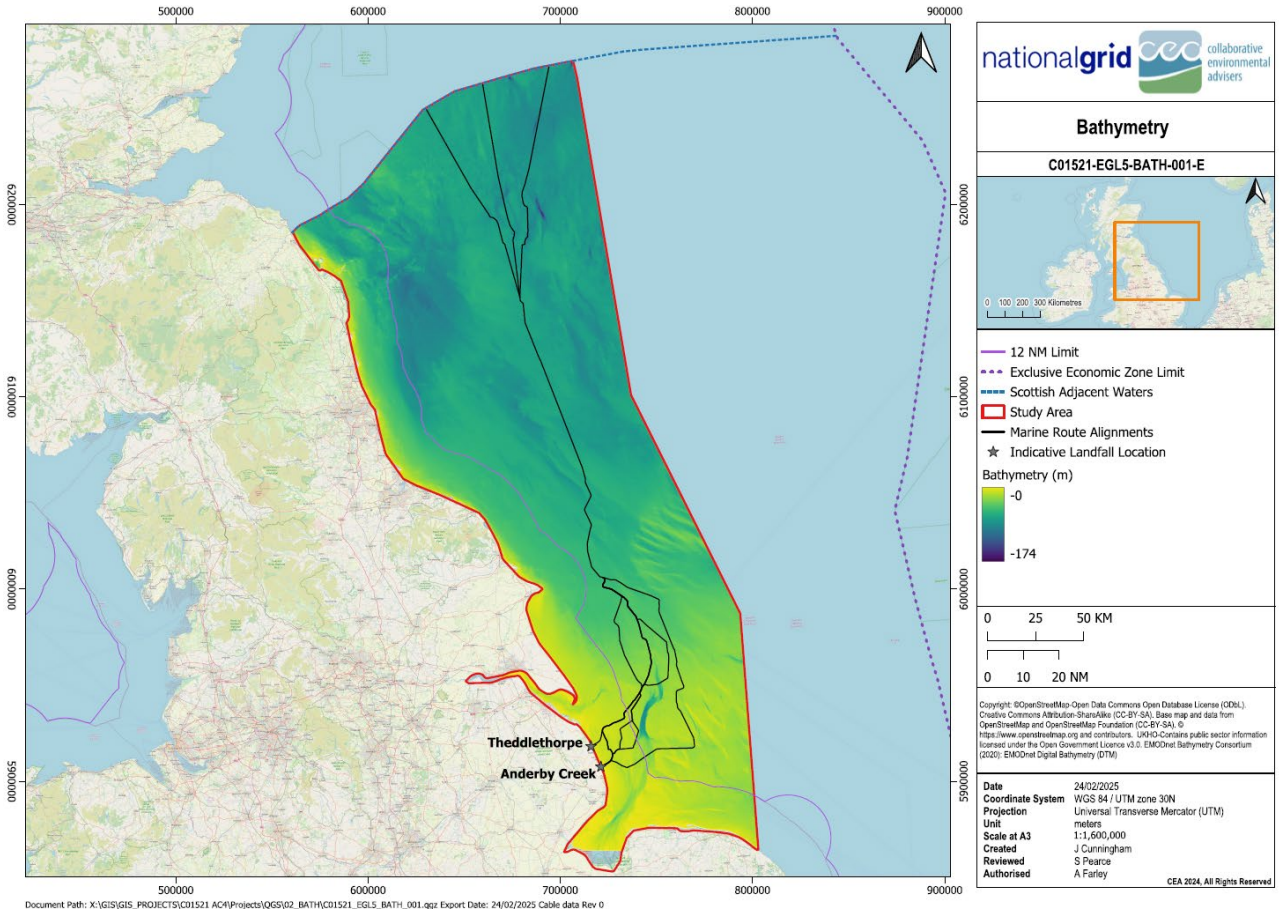


Figure 6-5: Bathymetry (Drawing C01521-EGL5-BATH-001)

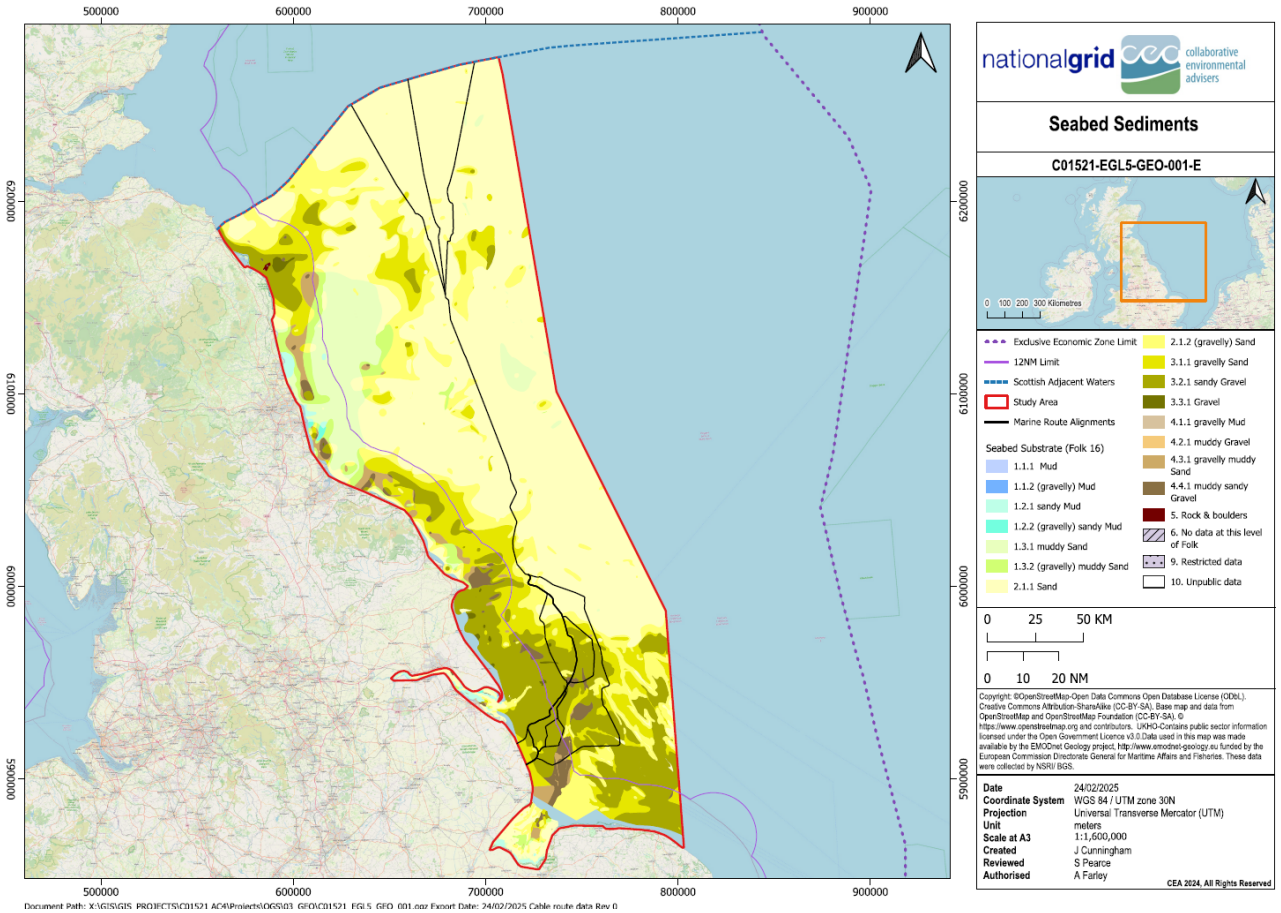


Figure 6-6: Seabed Sediments (Drawing C01521-EGL5-GEO-001)

6.4. Socio-Economic Environment

6.4.1. Infrastructure

6.4.1.1. Cables

There are two operational interconnector cables in the Study Area and in the vicinity of the marine route alignments, namely:

- Viking Link
- North Sea Link

There are two oil and gas power umbilical lines within the Study Area that several of the marine route alignments cross.

There are seven reinforcement projects or interconnector cables and two transmission infrastructure projects that are currently in the planning stages of development as summarised in Table 6-1.

Table 6-1: Reinforcement power cables / interconnectors in early development or planning phase

Name and Developer	Status	Project information
Scotland England Green Link 1 [National Grid and Scottish Power Energy Networks]	Licence Granted	Application submitted to Marine Management Organisation (MMO) 2022 Marine Scotland Licence granted July 2023 Construction between 2023 and 2027. MS Application Ref:00009880
Scotland England Green Link 2 [National Grid and Scottish and Southern Electricity Networks]	Licence Granted	Application submitted to MMO 2022. Marine Scotland Licence granted July 2023. Construction due to start Autumn 2024 to 2029. MS Application Ref: 00009943
Eastern Green Link 3 [NGET and SHE - T]	Pre-Application	DCO application is expected to be submitted 2026. Connection between Scotland and England. Construction to be completed by 2031.
Eastern Green Link 4 [NGET and Scottish Power Transmission]	Pre-Application	DCO application is expected to be submitted 2026. Connection between Scotland and England. Construction to be completed by 2031.
Nu-Link / SENECA [Nu-Link Consortium – Frontier Power]	OFGEM licence granted 2023	Connection agreement at Mablethorpe Substation. Connection between UK and Netherlands (Offshore Energy, 2023).
Aminth [Copenhagen Infrastructure Partners]	OFGEM licence granted 2023	Landfall at Mablethorpe. Connection between UK and Denmark. The project is expected to reach a final investment decision in 2026 and the start of operations between 2030 and 2032 (Offshore Energy, 2023a).
Continental Link Multi-Purpose Interconnector [National Grid Ventures]	Pre-Application	Application is expected to be submitted Q2 2025 Connection between UK and Norway.
Ossian Transmission Infrastructure [SSE Renewables Limited, Marubeni Corporation and Copenhagen Infrastructure Partners]	Pre-Application	DCO Application is expected to be submitted 2026. Export cables from Scottish Offshore Floating Wind Farm. Connection to Lincolnshire coastline.
Morven Transmission Infrastructure [EnBW and bp]	Pre-Application	DCO Application is expected to be submitted 2026. Export cables from Scottish Offshore Floating Wind Farm. Connection to Hawthorn Pit coastline.

There are six operational telecommunication cables which will be crossed by several of the marine route alignments.

There are three operational offshore windfarm export cable routes which will be crossed by several of the marine route alignments:

- Hornsea 1 & 2 (five export cables) (Marine route alignments ENG Routes A, B, C, D, E and F)
- Triton Knoll (two export cables) (marine route alignment ENG Route F)

It should be noted that there are six potential new offshore windfarms (listed in Section 6.4.1.3) currently in the planning stages of development. Where Scoping boundaries have been submitted as part of the planning process, these have been mapped and used as part of the assessment noting that the marine route alignments may in the future be crossed by some of the export cables from these projects based on the proposed construction time frame provided in the planning documentation. For more information about the cable infrastructure please see Appendix 2 of this document.

Since the marine route alignments were developed, Morven Offshore Wind Farm has submitted their Scoping Report publishing the scoping boundary for the transmission infrastructure (February 2025). The Scoping Boundary includes two route options for the transmission infrastructure. Depending on the route selected these would cross or be crossed by marine route alignments SCOT Route A and SCOT Route B.

NGET are also aware that Ossian Offshore Wind Farm are investigating a connection on the Lincolnshire coastline for their transmission infrastructure. At the time the marine route alignments were developed, information was not publicly available (scoping boundaries were published in February 2025). However, NGET were working with EGL 3 and EGL 4 to ensure opportunities for coordination are maximised, including opportunities for the minimisation of potential infrastructure crossings. Further engagement will be undertaken with Ossian as the EGL 5 project progresses.

6.4.1.2. Oil and Gas

There are twenty-seven active pipelines which one or more of the marine route alignments cross and eleven which are not in use or abandoned.

All the marine route alignments in England intersect active oil and gas licence blocks. For more information about the Oil and Gas infrastructure please see Appendix 2 of this document.

6.4.1.3. Offshore Wind Farms (OWF)

As listed in Table 6-2, within the Study Area there are:

- Fourteen operational offshore windfarms within the Study Area off the coast of England.
- Eight offshore windfarms in planning / construction stage within the Study Area off the coast of England.

Table 6-2: Operational and Planned Offshore Wind Farms in the English Study Area

England	
Operational	**Planned / In Construction**
Hornsea 1	Dogger Bank A
Hornsea 2	Dogger Bank B
Westernmost Rough	Dogger Bank C
Humber Gateway	Sofia
Triton Knoll	Hornsea 3
Race Bank	Hornsea 4
Lincs	Outer Dowsing
Lynn	Dogger Bank South
Inner Dowsing	Dogger Bank D
Blyth Demo Phase 1	
Teesside	
Dudgeon	
Sheringham Shoal	

6.4.2. Shipping and Navigation

The proposed marine route alignments were designed to be a minimum of 50 m away from any navigation buoys and point infrastructure such as harbour facilities including posts/stakes and outfall pipe diffusers.

There are various designated TSS's, deep water channels, recommended routes and caution areas within the Study Area. It also includes areas of high vessel intensity (commercial shipping and recreational users) indicating unofficial shipping lanes and pinch points between wind farms. The Humber TSS and shipping activity beyond the designated areas have been considered when undertaking the route engineering study (Intertek, 2025). It should be noted that all the marine route alignments cross shipping lanes at some point. The route engineering has designed crossings to avoid any TSSs and high density shipping areas and to cross shipping lanes perpendicularly to minimise distance through these areas and to minimise disruption to shipping during the survey and installation campaign. In addition, consideration has been given to the design of cable crossings in shallow water so that they a designed in a manner to keep under keel clearance of vessels to a maximum to minimise impact to shipping and navigation especially in those areas of high intensity.

6.4.3. Restricted Areas

6.4.3.1. Aquaculture

There are no aquaculture sites within the vicinity of the marine route alignments.

6.4.3.2. Aggregate extraction

Table 6-3 lists the key aggregate sites present within the English Study Area. Information was sourced from The Crown Estate regarding new exploration areas which may be offered in the next Licence round to the aggregate industry. Whilst these areas are commercially sensitive and cannot be shown in this document, The Crown Estate confirmed that the marine route alignments did not interact with these sites. ENG Route D runs parallel to marine aggregate production Area 106/2 for 2.2 km and Area 106/3 for 5.3 km (overlapping with Area 106/3 for 3 km of the 5.3 km). ENG Route E passes through a gap between marine aggregate production sites Area 197 and Area 106/3 before crossing through Area 197 and Area 400.

Table 6-3: Aggregate sites within the Study Area

Site Name and ID	Site owner	Status
Areas 106/1, 106/2, 106/3	Hanson Aggregates Marine Ltd.	Active
Area 197	Tarmac Marine Ltd.	Active
Area 400	Hanson Aggregates Marine Ltd.	Active
Areas 481/1 and 481/2	Van Oord Ltd.	Active
Area 493	Tarmac Marine Ltd.	Active
Areas 514/1, 514/2, 514/3, 514/4	CEMEX UK Marine Ltd.	Active
Area 515/1 and 515/2	Westminster Gravels Ltd.	Active
Area 1805	Hanson Aggregates Marine Ltd.	Exploration

6.4.3.3. Dredging, spoil and dumping grounds

There are several dredging, spoil and dumping grounds within the Study Area which are mainly related to dumped excavation material from the construction of other marine infrastructure. Many of these are concentrated off the north-east coast of England, Lincolnshire coast and around the offshore windfarm developments. Further details of these sites are provided in Appendix 2.

6.4.3.4. Explosive dumping grounds

There are four small explosive dumping grounds found in the Study Area, however, the cable route alignments have avoided these.

6.4.3.5. PEXA

There are 16 Ministry of Defence (MoD) Military Exercise areas (PEXA) within the Study Area. It is impossible for the marine route alignments to avoid all of these. A full list of these sites is included in Appendix 2.

Following specific consultation with the MoD with respect to the Donna Nook D307 area (for EGL 3 and EGL 4), marine route alignment ENG C avoids the Donna Nook inner military firing area, an active live firing range, with some routeing on the edge of the second boundary around the site.

6.4.4. Commercial Fisheries

NGET commissioned Brown and May Marine to undertake a preliminary review of the commercial fishing activity that takes place in the Study Area to inform decision-making on the proposed marine route alignments for EGL 3 and EGL 4. The report was broken down into three sections, the Scottish landfall, mid-section and English landfall. A summary of the relevant sections (mid-section and Landfall) report from EGL 3 is provided in Appendix 2. The EGL 5 marine route alignments parallel EGL 3 and therefore the information is relevant. Brown and May Marine have also been commissioned to prepare a Desktop Fishing Activity Report for the EGL 5 route the data from which aligns with previously submitted data for EGL 3 and EGL 4.

The relative levels of fishing activity have been assessed through the analysis of available fisheries statistics and Vessel Monitoring System (VMS) data. Vessels from the UK and transboundary fleets which are active in the waters within and surrounding the Study Area have been included, alongside data collected from local stakeholders.

6.4.5. Restricted Fishing Areas and Relevant Byelaws

The Study Area goes through the Eastern and North Eastern Inshore Fisheries Conservation Authority who have approximately 40 Byelaws between them. Additionally, the MMO has marine Byelaws or restricted fishing areas within the Study Area. Information on these Byelaws and restrictions can be found in Appendix 2. The byelaws are within 6 NM of the coastline and the majority of the marine route alignments avoid them.

6.4.6. Shellfish Waters

The marine route alignments do not intersect with any designated shellfish waters.

6.4.7. Bathing Waters

There are four designated 'bathing waters' close to the proposed landfalls, all of which were classified as having an excellent bathing water status in 2022/23.

Three of the designated bathing water are close to the English landfalls:

- Mablethorpe Town
- Sutton-on-Sea
- Huttoft and Marsh Yard (previously Moggs Eye)
- Anderby

Unofficially, it is considered by the Environment Agency that the coastline from Mablethorpe to Anderby is a bathing water.

6.4.8. Marine Planning

During the appraisal, consideration has been given to the relevant marine plans within which the Study Area falls, namely:

- East Offshore Marine Plan
- East Inshore Marine Plan
- North East Offshore Marine Plan

6.4.9. Major Projects

This section includes reference to other major projects that are currently in planning or are environmental restoration projects/schemes that have not been covered in other sections. Please see above sections for major projects such as offshore wind farms or cables in planning. A summary of projects and the Developers are provided in Table 6-4.

Table 6-4: Major projects

Project	Developer/Organisation	Information
Theddlethorpe Geological Disposal Facility (GDF)	Theddlethorpe GDF Community Partnership	The Working Group has identified a search area that covers the wards of Wilthern &Theddlethorpe and Mablethorpe, initially focused on the former Theddlethorpe gas terminal site and deep geology within the inshore area up to 22 km beyond the coast. The partnership is aimed at investigating the suitability of the area for development of a disposal site for higher activity radioactive waste (HAW) (Theddlethorpe GDF Community Partnership, 2023).
Lincolnshire – Viking Carbon Capture and Storage (CCS) Project	Harbour Energy	This project includes local industrial operators Humber Zero (Phillips 66's Humber Oil Refinery and VPI Immingham's gas-fired combined heat and power plant) EP UK Investment's gas-fired power plant and Prax's Lindsey Oil Refinery working together with Harbour Energy (Harbour Energy, 2023). The project, if sanctioned, would progress towards first capture and storage from 2027 (Viking CCS, 2023). The DCO has progressed through examination and the Planning Inspectorate is scheduled to publicize their decision on 05 March 2025.
Endurance CCS	Northern Endurance Partnership (NEP)	bp, Eni, Equinor, National Grid, Shell and Total have formed the Northern Endurance Partnership (NEP) to develop the offshore infrastructure to transport and store millions of tonnes of carbon dioxide (CO_2) under the North Sea (Northern Endurance Partnership, 2025). The proposed Net Zero Teesside (NZT) and Zero Carbon Humber (ZCH) projects aim to commence in 2026. There is currently no information on the Planning Inspectorate Website suggesting that a DCO has not yet been submitted.
Seagrass planting – restoration projects	Ørsted	Ørsted received their DCO in July 2023. The project will be supporting Yorkshire Wildlife Trust to develop a seagrass restoration project of up to 74 acres in the Humber Estuary (Ørsted, 2022).
South Humber Gateway Strategy	North Lincolnshire Council, North East Lincolnshire Council, NE, Environment Agency, RSPB, Lincolnshire Wildlife Trust and Humber Nature partnership.	The South Humber Gateway Strategy helps identify the scope of potential habitat creation needed to enable developers/investors to achieve sustainable economic development in the region (Humber Nature Partnership, 2025). Development compensation packages have included creation of intertidal mudflat, saltmarsh and grassland (e.g., 66 ha of farmland converted into a new inter-tidal habitat to compensate for the 22 ha of land lost to the new ports construction).

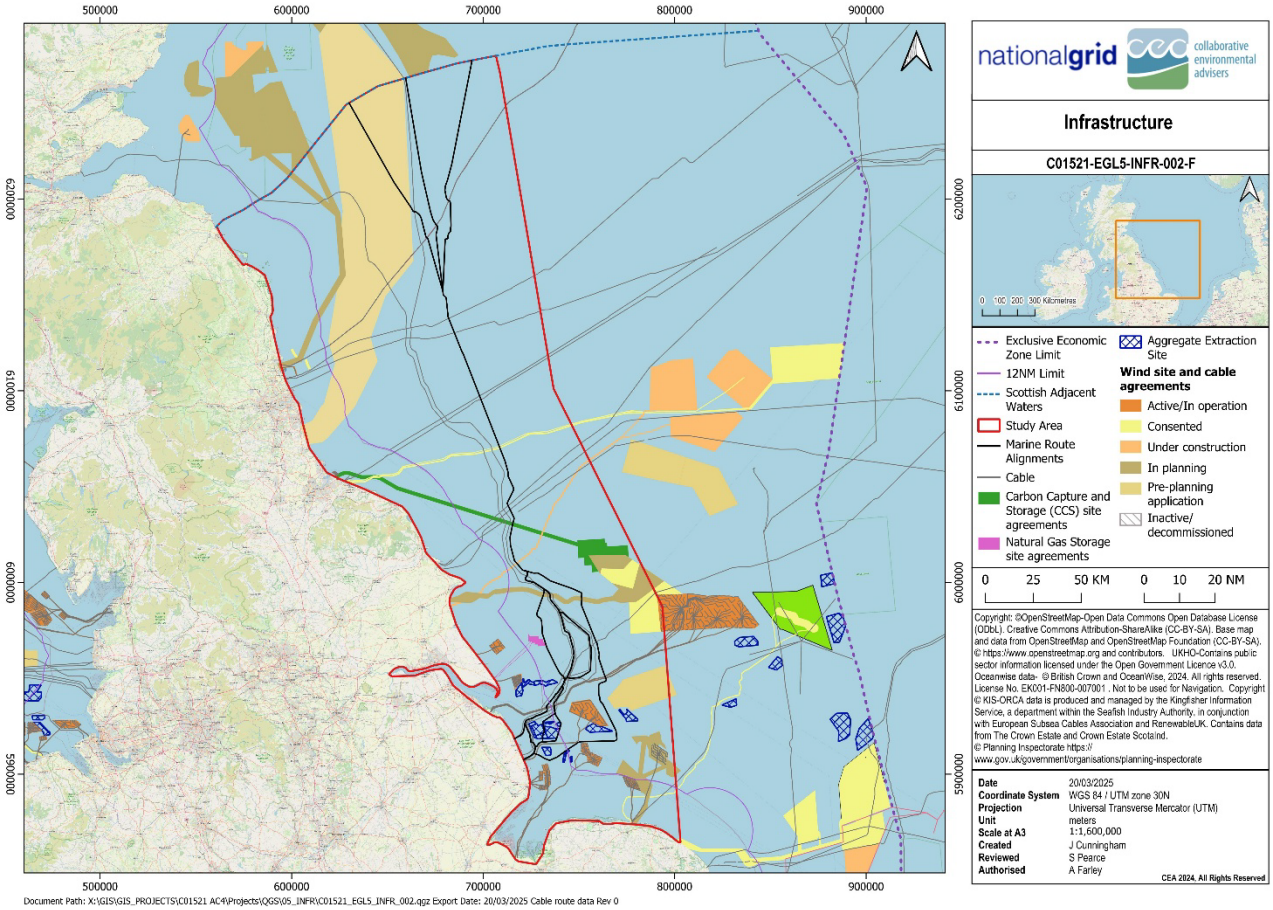


Figure 6-7: Infrastructure (Drawing C01521-EGL5-INFR-002-F)

7. Stakeholder Engagement

EGL 3 and EGL 4 undertook extensive stakeholder consultation to inform the development of marine route alignments and to categorise consenting risk. Stakeholder engagement commenced in March 2023 and continued through 2024. For EGL 3 and EGL 4 this led to a second phase of marine route alignment development and appraisal. EGL 5 applied the recommendations and advice gathered for EGL 3 and EGL 4 in the development and appraisal of marine route alignments, starting from the position reached at the end of the second phase of EGL 3 and EGL 4's marine route alignment development. The relevant stakeholder comments from EGL 3 and EGL 4 that informed the development of the EGL 5 marine route alignments are listed in Table 7-1.

It should be noted that consultation was also undertaken with the Eastern, North Eastern and Northumberland IFCAs, Historic England, Trinity House, Maritime and Coastguard Agency (MCA), Outer Dowsing OWF, Nu-Link interconnector, Aminth interconnector which did not directly affect marine route alignment development.

Table 7-1: Summary of stakeholder engagement from EGL 3 and EGL 4 which has informed EGL 5

Date	Organisation	Comments
23/03/2023	National Federation of Fishermen's Organisations (NFFO)	• All routes will affect fisheries, as are not being done in isolation. The region will experience massive displacement from all the windfarm operations (Dogger Bank, Hornsea etc) that are being constructed. Spatial squeeze is a huge issue in the region. • Region is heavily populated with static gear, cockle fisheries in Wash. NFFO would not have a preferred English landfall site as all routes will affect fisheries, just at different levels.
21/04/2023	Environment Agency (EA)	• Coastal defence (soft as well as hard) must be crossed by HDD. Environment Agency will not permit open-cut through sea defences, no matter what the make-up. • Although not all of the coastline from Theddlethorpe along to Anderby Creek is designated as a bathing water, it should be treated as such. • As part of the Saltfleet to Gibraltar Point Strategy scheme, beach renourishment is completed annually. Timings tend to be after the Easter holidays until September although generally aim for May / June time. ***[Post meeting note: Would affect Anderby Creek landfall only, scheme does not go as far north as Theddlethorpe landfall]***
26/04/2023	Joint Nature Conservation Committee (JNCC), NatureScot and NE	Inner Dowsing, Race Bank and North Ridge SAC • North Ridge is a special feature and should not be damaged. • Conservation advice package for the Inner Dowsing, Race Bank and North Ridge SAC is being revised and will be released this year (summer). The advice will note that the SAC is no longer in a favourable condition due to the level of anthropogenic activity within the boundaries. **Post meeting note: The feature condition and conservation advice for the site was updated in September 2024. Confirming NE's advice that the site features are in an unfavourable condition with targets set to restore feature attributes.** • Byelaw prohibiting use of bottom towed gear has been introduced to protect Sabellaria reef and allow for restoration. ▪ Any cable installation through the SAC is likely to result in an adverse effect on site integrity and will require a Habitats Derogation. ▪ ***Post meeting note: Led to development of phase 2 marine route alignments for EGL 3 and EGL 4 that avoided the SAC; equivalent to EGL 5 marine route alignments ENG Route D and ENG Route E.*** Holderness Offshore MCZ • NE raised concerns that remedial rock protection would be required as sediments would not be conducive to full cable burial. If rock protection is required, then the project would need to carry out Stage 2 MCZ Assessment and provide MEEB. JNCC noted an email to MMO stated any further lasting effects to the MCZ would require MEEB. ▪ ***Post meeting note: Led to development of phase 2 marine route alignment for EGL 3 and EGL 4 to avoid the MCZ; equivalent to EGL 5 marine route alignment ENG Route B.*** Greater Wash SPA (red-throated diver) ▪ All routes would have to cross the Greater Wash SPA, meaning the loss of supporting habitat. • NE is going through a process of updating guidance on advice on assessments. Several papers have noted that 94% of red-throated divers have been displaced as a result of OWF.

Date	Organisation	Comments
		The Greater Wash SPA is under significant pressure. It would likely be a requirement to avoid construction during over-wintering period of red-throated diver. ▪ New guidance should become available from end of June 2023. Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC • Raised serious concerns regarding impacts on the sand dunes. Would expect that impacts on the dune system are avoided entirely by HDD underneath. • Concerned about access across the dunes during construction e.g., during HDD unplanned events, to acquire geotechnical boreholes for design, construction access etc. Noted that any disturbance of the dunes would likely be considered significant. • ***Led to extensive additional studies undertaken to inform the options appraisal for Theddlethorpe for EGL 3 and EGL 4 from a terrestrial perspective.***
17/05/2023 & 26/05/2023	Harbour Energy	• Introductory and follow-up meeting to discuss landfall and nearshore coexistence opportunities at Theddlethorpe landfall location. • NGET queried possibility of using unused pipelines as potential cable ducts. Unused pipelines are unblocked and in good condition.
17/05/2023	Hanson Aggregates Marine Ltd.	Area 482 • Hanson gave this site up due to extensive presence of *Sabellaria spinulosa* reef. The site lay directly to the east of Area 106/3. A route between Area 106/3 and Silver Pit might therefore have significant areas of *Sabellaria*. Area 106/3 • Area 106 is one of Hanson's key areas for aggregate resource – a long standing resource which is still highly productive. • Broad plan working in south and east of site. • Hanson are approaching own re-licensing scenario for the Area so do need to consider what the site could look like in future. ▪ There is the possibility that due to the deposit depths on the eastern side of the site it could feasibly be worked to exhaustion before 2030, so a route within the site on the eastern edge might be possible. Would need to look at resource profiles to confirm this. Area 400 • Area 400 has not yet been exploited. Consists of two deposits to the east and west with a shallow effectively barren deposit/corridor through the middle. It is possible that the cable could be routed through the middle (barrier between two separate deposits is right down centre), although Hanson thought that the middle section might be exposed bedrock. ▪ 400 and 106/3 are considered same licence. Area 1805 • Submitting application imminently. This is a strategic replacement for Area 106/3 and therefore needs to be avoided completely.
17/05/2023	Tarmac Marine Ltd.	Tarmac have 18 distinct marine licences around the UK and operate four ships providing sand and gravel to UK, Belgium and Netherlands. Currently providing sand for the Lincshore programme from their Inner Dowsing aggregate site. • Tarmac advised that the tide means that most of dredging is north-north west; south-south west direction and they don't dredge across both Areas 493 to 197, or vice versa, in one run due to licencing administration complications. • Tarmac advised they are currently targeting resource in the northeast corner of Area 493 and they also don't dredge up to the boundary of the licensed area, there is an in-built buffer. • Tarmac are willing to explore proximity to the edge of the Area and cooperate to find a potential solution that might work for both parties.
19/05/2023	Lincolnshire Wildlife Trust (LWT)	▪ LWT preference is to cross pipelines in Holderness Offshore MCZ rather than traverse across glacial valley. However, acknowledged that if the project are getting strong advice from NE and JNCC about concerns regarding rock protection in the Holderness Offshore MCZ then there may not be much option.

Date	Organisation	Comments
		▪ Advised that if the project does have to cross Silver Pit, then the area selected as the Silver Pit HPMA should be avoided. ▪ Noted that Silver Pit is a commercial fisheries area so construction work here may trigger fishing industry concerns.
25/05/2023	Ossian OWF	▪ Shared possible export cable routes to English connection point flagging potential for infrastructure congestion in the 'narrows' between Morven and Ossian OWF lease areas.
31/05/2023	JNCC, NE	▪ Presented Phase 2 marine route alignments and requested opinion on routes through Silver Pit glacial tunnel feature, relative to infrastructure crossing in Holderness Offshore MCZ. ▪ JNCC agreed to take points away and provide formal advice following consultation internally with colleagues. ▪ JNCC preference is to reduce distance through the Holderness Offshore MCZ and remedial rock protection requirements. Noted that several OWFs are also looking to construct through the MCZ. ▪ NE reiterated previous concerns over the Theddlethorpe landfall due to the protected sand dunes. ▪ Mentioned the potential for *Sabellaria* reef to be identified between Silver Pit and Area 106/3. As the area is outside any protected sites and the 12 NM limit, NGET would need to follow the advice under Section 41 of the Natural Environment and Rural Communities (NERC) Act.
05/06/2023	Morven Offshore Windfarm	▪ Morven acknowledged that the marine route alignments were proposed to be installed in the channel between the proposed Morven and Ossian OWF avoiding conflict with these developments. ▪ Morven raised potential issues associated with several projects that want to also install infrastructure in the Morven/Ossian 'narrow'. In addition other marine users such as shipping, fisheries also want to utilise the 'narrow'. Morven indicated at its narrowest point, the gap would be approximately 5.5 km which would need to be carefully considered in relation to other infrastructure and cable spacing restrictions. Morven noted that if more cables could be bundled at this pinch-point then this would enable more cables to be accommodated. ▪ Morven stated that the export cable route had yet to be defined although they do have a connection point identified the location of which has been shared with NGET.
14/06/2023 Email follow-up to initial meeting	Hanson Aggregates Marine Ltd.	Actively encourage a route to the north of Tarmac's licence (Area 493). If this is not possible then we are open to further discussion, but any crossing of Area 106 and Area 400 is difficult for operations and could only work if strict controls and compensation were agreed.
26/05/2023 Email follow-up to initial meeting	Tarmac Marine Ltd.	▪ Tarmac would have no objection to a cable route between Area 493 and Viking Link subject to the following considerations: o Burial of the cable(s) to a depth of at least one metre into a stable substrate, where there is no risk of the cable becoming shallower or even exposed in the future. o Laying of the cable(s) as far as possible from the boundary of Area 493, particularly to the north-north-west. ▪ Consider the risk of striking a buried cable outside Area 493 to be very low.
22/06/2023 Written advice JNCC ref OIA-09512	JNCC and NE	▪ Advised that at this time JNCC do not believe Silver Pit will be recommended again as a future HPMA. ▪ Regarding the geology feature 'North Sea glacial tunnel valleys' of Holderness Offshore MCZ advised "*that operational activities should not be capable of hindering site objectives. It is our determination that the geological feature is a topographic bedform and therefore activities such as cable trenching and burial in the surficial habitats should not affect the feature.*" ▪ JNCC would suggest the shortest crossing possible across the MCZ in the South-East corner. ▪ Reiterated "*that any routing within the Holderness Offshore MCZ carries licensing risk where the potential for rock protection requirements exist. As discussed in the meeting we suggest any external rock protection within the site on designated features (especially those with a 'Recover' objective or General Management Approach) may require a Stage 2 MCZ*

Date	Organisation	Comments
		assessment and potentially MEEB. Where possible, we recommend all cable or pipeline crossings be planned for outside of the MCZ to reduce unavoidable rock use."
12/11/2024 Written advice JNCC ref OIA-10513	JNCC and NE	▪ Advice on the preference between two EGL 4 route options that interact with the Holderness Offshore MCZ; one through and one around the site but through the southeast corner. **These route options align with EGL 5 marine route alignments ENG Route A and ENG Route B respectively.** ▪ JNCC maintain that routes located within the Holderness Offshore MCZ could impact site features, potentially including features that have a 'Recover' objective. ▪ JNCC would therefore suggest taking the shortest crossing possible across the MCZ in the South-East corner. ▪ It should be a priority to minimise the introduction of rock protection into the Holderness Offshore MCZ. ▪ Reiterated previous advice that any routing within the Holderness Offshore MCZ carries licensing risk where the potential for rock protection requirements exist. They suggest any external rock protection within the site on designated features (especially those with a 'Recover' objective or General Management Approach) may require a Stage 2 MCZ assessment and potentially Measures of Equivalent Environmental Benefit (MEEB). Where possible, they recommend all cable or pipeline crossings are planned outside of the MCZ to minimise the risk to the MCZ features from deposits of rock.

8. Options Appraisal

8.1. English Landfalls

In November 2024, an exercise was undertaken to consider the landfalls in isolation to the marine route alignments. As the approach to a landfall is an integral part of the assessment, two short sections of marine route alignments were considered as part of the landfall assessment. The nearshore section of marine route alignment ENG Route C to Theddlethorpe and a short section of marine route alignment common to both ENG Route A and ENG Route B to Anderby Creek were used. The following assumptions were made in relation to the marine route alignments to the landfalls:

- The marine route alignments to Anderby Creek would cross five pipelines in water depths of 11.9 m to 13.81 m approximately 8.5 km from the coastline. A crossing of this infrastructure has previously been undertaken by Viking Link. The appraisal assumed that due to pipeline spacing one continuous berm would be created across four pipelines with a footprint of 4,200 m^2, with a second berm of 1,200 m^2 across the Viking AR to Theddlethorpe pipeline. A third infrastructure crossing, comprising of a separate rock berm, circa 10 m wide and 120 m long, would also be required to cross the Viking Link interconnector.
- The marine route alignment to Theddlethorpe would cross four infrastructure crossings, one long crossing approximately 300 m long by 10 m wide to cross a confidential project in planning (assumed 3 cables), and a crossing of EGL 4 assumed to be 10 m wide by 120 m long.

Table 8-1 presents the conclusions of the options appraisal, noting that additional topics were considered to provide more granularity in the technical category and to align with terrestrial assessments.

It should be noted that the coastline is also being investigated by several other major projects as a potential landfall location including Outer Dowsing OWF, Ossian OWF, the Aminth and Nu-Link interconnectors and the EGL 3 and EGL 4 cable projects. Where information was available on these projects it was used to inform technical decisions.

Whilst Theddlethorpe and Anderby Creek share many of the same marine ecological constraints, the marine route alignment to Anderby Creek was marginally more ecologically constrained under the categories 'water' and 'coastal processes'. The higher 'water' risk was associated with the higher density of bathing waters compared to Theddlethorpe, whilst the coastal processes risk were due to the beach at Anderby Creek being subject to annual beach nourishment / replenishment as part of the Saltfleet to Gibraltar Point Beach Management Strategy.

The preference from a marine perspective was therefore driven by the technical complexity of a trenchless landfall technique such as HDD. At Theddlethorpe a longer drill would be required (1700 m) to navigate beneath terrestrial protected features. However, initial designs indicated that the HDD would still only exit in shallow water, or within the intertidal zone. This would make the marine construction challenging with the need for different installation tools and vessels. At Anderby Creek, a shorter, less complex trenchless landfall technique could be undertaken, with the exit point being in relatively deeper water, simplifying the construction methodology. Several other projects have successfully completed HDDs in the Anderby Creek area, demonstrating the feasibility of the technique.

In conclusion, Anderby Creek was the preferred landfall from a marine perspective.

Table 8-1: Landfall – Summary of options assessment

Subtopic	Theddlethorpe	Anderby Creek
Environmental		
Ecology	Medium/High Risk	Medium/High Risk
Historic Environment	Low Risk	Low Risk
Water	Medium/Low Risk	Medium Risk
Coastal Processes	Low Risk	Medium/Low Risk
Socio-Economic		
Economic Activity	Medium/Low Risk	Medium/Low Risk
Traffic & Transport	Medium/Low Risk	Medium/Low Risk
Aviation & Defence	Medium/Low Risk	Medium/Low Risk
Transmission Infrastructure	Medium/Low Risk	Medium/Low Risk

Technical		
Technical Complexity	High Risk	Low Risk
Construction / Delivery issues	High Risk	Medium Risk
Technology Issues	Medium Risk	Low Risk
Capacity Issues	Low Risk	Low Risk

8.2. English Marine Route Alignments Appraisal

Each of the marine route alignments to the landfalls in Lincolnshire, England were assessed using the risk categories described in Table 3-2. Table 8-2 summarises the conclusions of the options appraisal process.

Table 8-2: English Marine Route Alignments – Summary of options assessment

Key to Risk Categories (as defined in Table 3-2)	Showstopper	Very High Risk	Medium – High Risk	Medium Risk	Low Risk	Very Low Risk

	Theddlethorpe Beach	Anderby Creek				
	ENG Route C	ENG Route A	ENG Route B	ENG Route D	ENG Route E	ENG Route F
Route length (km)	111.7	126.4	141.7	126.1	121.7	168.6
No. of crossings	7 (2)*	13 (5)*	14 (5)*	13 (5)*	13 (5)*	14 (9)*
No. of crossings in protected sites	2 (3)*	8 (3)*	7 (3)*	8 (3)*	8 (3)*	5 (3)*
Biological Environment						
Historic Environment						
Physical Environment						
Socio-Economic Environment						
Overall Environmental Implications						

* numbers in bracket indicate potential crossings with major developments if infrastructure is constructed in advance of EGL 5.

The options appraisal concluded that all landfalls and marine route alignments had significant challenges associated with them which resulted in the categorisation of very-high risk for all options appraised with the exception of ENG Route B which had an overall categorisation of medium – high risk. Many of the marine route alignments had the same constraints and challenges e.g. all cross the Southern North Sea SAC and Greater Wash SPA. The discussion below therefore focuses on the differentiators rather than listing all constraints.

Marine route alignment ENG Route F to Anderby Creek was assessed as the least preferred of the marine route alignments. Although the marine route alignment was technically feasible, the marine route alignment crosses the Inner Dowsing, Race Bank and North Ridge SAC, designated for the protection of Annex I 1170 reef and 1110 sandbank for approximately 32 km. The very-high risk category assigned to the 'biological environment' reflected the potential that the conservation objectives of the site may be hindered if the project was to be constructed through the SAC. Installation would require as a minimum pre-sweeping / dredging across the protected sandbank features, but also the potential for infrastructure crossings. There would be the potential for permanent loss of habitats and supporting habitats. Consultation with the Statutory Nature Conservation Bodies (SNCBs) (NE and JNCC) for EGL 3 and EGL 4 confirmed that they believed a HRA would be unlikely to be able to conclude no effect on site integrity and as a minimum Appropriate Assessment would be required. Based on experience on other projects in the region, the SNCBs would be pushing strongly for compensation via a Habitats Regulation Derogation. To successfully secure a Derogation, a project would need to

demonstrate that there are no feasible alternatives. As alternative marine route alignments have been developed that avoid interaction with the site it would be difficult to demonstrate that this was the only feasible option. The very-high risk category reflects this consenting risk. The marine route alignment also crosses a protected sandbank outside of the SAC, in the nearshore it crosses the Greater Wash SPA, requiring four infrastructure crossings within the SPA, and is the longest of the landfall approach marine route alignments.

Marine route alignments ENG Routes A, C, D and E share a common constraint which drives the very-high risk category assigned to the 'biological environment'. These four marine route alignments cross the broadscale habitats within the Holderness Offshore MCZ for approximate 20 km. SNCB guidance is that development should be avoided within MCZs where possible, and if a site cannot be avoided (i.e. there are no feasible alternatives) then impacts should be minimised e.g., by taking the shortest route through the site, avoiding certain activities which could hinder the achievement of the conservation objectives. Each marine route alignment would require a crossing of the West Sole to Easington 24 inch and 16 inch pipelines, within the MCZ. In addition, experience from Viking Link installation suggests that full cable burial may not be achievable throughout the entire site due to ground conditions, necessitating the requirement for remedial external cable protection deposits. Consultation for EGL 3 and EGL 4 identified that the SNCBs have concerns regarding the volume and need for cable protection within the MCZ, with the SNCBs noting on several occasions during meetings that the threshold for anthropogenic deposits has been reached. Any additional deposits of external cable protection either for infrastructure crossings or for remedial cable protection would require a Stage 2 MCZ Assessment and the applicant would be required to provide Measures of Equivalent Environmental Benefit (MEEB).

Whilst marine route alignment ENG Route B intersects the MCZ, the route length within the MCZ is significantly shorter at 4.5 km. This factor significantly reduces the likelihood that external cable protection would be required within the MCZ, making it a feasible alternative marine route alignment to ENG Routes A, C, D and E. However, ENG Route B interacts with a geological feature the 'North Sea glacial tunnel valley'; a protected feature of the MCZ. JNCC advice (Ref OIA-09512 dated 22 June 2023 and OIA-10513 dated 12 November 2024) to EGL 3 and EGL 4 confirmed for similar marine route alignments, that JNCC MPA specialists and NE counterparts believe that construction activities should not be capable of affecting the North Sea glacial tunnel valley feature and therefore installation through the feature would not hinder the site objectives. JNCC were therefore of the opinion that although the shortest route through the MCZ interacted with the North Sea glacial tunnel valley, it was the preferred marine route alignment through the Holderness Offshore MCZ. Applying this advice to EGL 5, with respect to the Holderness Offshore MCZ, the preferred marine route alignment for EGL 5 would therefore be ENG Route B.

This decision was back-checked for EGL 5 post-options appraisal when a new study was undertaken by Intertek to support the final decision on the preferred route for EGL 4. The study reviewed the geophysical and geotechnical data acquired by the EGL 4 project in 2024 to evaluate the potential requirements for remedial cable protection on an approximately 20 km route through the MCZ (referred to as Option 1 and similar to EGL 5 ENG Route A) and an approximately 8.7 km route through the southeast corner of the MCZ (referred to as Option 2 and similar to EGL 5 ENG Route B). The study considered several factors that may influence successful burial including seabed and subsurface geology, infrastructure crossings within the MCZ, presence of boulders and presence of sandwaves along each route option. The study concluded that a high risk of requiring remedial rock placement is present for ~10.8 km of Option 1 and for ~4.8 km of Option 2. There was also a medium risk of requiring remedial rock placement for ~6.6 km of Option 1 and ~2.0 km of Option 2. In conclusion, Option 2, similar to ENG Route B, had the greatest potential for successful cable burial, and therefore the lower environmental impact.

Marine route alignment ENG Route E was the second least preferred option. Whilst it avoided the constraints associated with the Inner Dowsing, Race Bank and North Ridge SAC associated with marine route alignment ENG Route F, it was one of the least preferred routes with respect to the Holderness Offshore MCZ constraint and in addition it routes directly through marine aggregate Area 106/3 and Area 400. Hanson Aggregates Marine Ltd actively discouraged the selection of this marine route alignment for EGL 3 and EGL 4 due to the significant impact it would have on ongoing and future operations in the marine aggregate licensed areas.

Marine route alignment ENG Route C was in the middle of the options along with marine route alignment ENG Route D. As well as the constraints previously discussed associated with the Holderness Offshore MCZ (applicable to both marine route alignments), marine route alignment ENG Route C routed to Theddlethorpe (the least preferred landfall) and crossed the Donna Nook Firing Range. Marine route alignment ENG Route D overlaps with the eastern edge of marine aggregate production Area 106/3 and based on consultation it is thought highly likely that Sabellaria reef would be present along the route.

The remaining two marine route alignments, ENG Route A and ENG Route B, were finely balanced. Both follow a similar nearshore approach to the Anderby Creek landfall. The only significant difference in the options is how they interact with the Holderness Offshore MCZ, with marine route alignment ENG Route A routeing directly through the middle and marine route alignment ENG Route B avoiding the majority of the MCZ and only crossing the south-east corner for a short distance.

At this stage of the Project it is considered that further information on ground conditions is needed to assess the relative impact of the cable installation methods and likely associated remedial external cable protection of both marine route alignment options through Holderness Offshore MCZ before discounting either one of these.

Two features offshore Lincolnshire, the Holderness Offshore MCZ and the Silver Pit bathymetric deep significantly constrain cable route development to the landfalls. Statutory Nature Conservation Body (SNCB) guidance is that development should be avoided within MCZs where possible, and if a site cannot be avoided (i.e. there are no feasible alternatives) then impacts should be minimised e.g., by taking the shortest route through the site, avoiding certain activities which could hinder the achievement of the conservation objectives. The MCZ is at the northern end of Silver Pit, with part of the North Sea glacial tunnel valley entering the MCZ. Silver Pit has very steep slopes at the sides which are technically challenging for cable burial. There is therefore a pinch point at the southeastern corner of the MCZ between the site boundary and the Hornsea 1 and 2 OWF export cables which cross Silver Pit slightly to the southeast. EGL 3 have taken the optimal route to avoid the MCZ and cross the Silver Pit in this gap. EGL 4 have chosen the second technically preferential route across the Silver Pit (where slope angles are reduced) but in doing so cross Silver Pit within the MCZ.

Whilst EGL 5 has sought to parallel the EGL 3 cable route within English waters, for security of supply reasons it cannot be installed in proximity, space between the two cable systems is required in this specific area. Therefore, whilst still the preference for the reasons provided above, marine route alignment ENG Route B could not avoid the Holderness Offshore MCZ completely.

The options appraisal concluded, from a marine technical and consenting perspective, that both **ENG Route A and ENG Route B are taken forward for further consideration as the preferred English marine route alignment** until further site specific survey data can be acquired to discount one of those marine route options as less preferred due to increased installation and cable protection constraints and their associated risks.

8.3. Offshore Marine Route Alignments Appraisal

Table 8-3 summarises the conclusions of the options appraisal process for the offshore marine route alignment.

Table 8-3: Offshore Marine Route Alignment – Summary of options assessment

Key to Risk Categories (as defined in Table 3-2)	Showstopper	Very High Risk	Medium – High Risk	Medium Risk	Low Risk	Very Low Risk

	OFFSHORE ROUTE A
Route length (km)	157.8
No. of crossings	14 (11)*
No. of crossings in protected sites	0
Biological Environment	
Historic Environment	
Physical Environment	
Socio-Economic Environment	
Overall Environmental Implications	

* numbers in bracket indicate potential crossings with major developments if infrastructure is constructed in advance of EGL 5.
Figures assume Dogger Bank A & B cables will be constructed in 2024.

The overall environmental implications of marine route alignment Offshore Route A were assessed as low risk. Offshore Route A avoids crossing any designated sites and mapped Annex I habitat. BGS data indicates quaternary sediment thickness along the southern portion of the marine route alignment may be <5 m, but the UKHO high-resolution bathymetric data has been used to avoid any visible outcropping areas.

No additional offshore routes were considered - see justification in Section 4.3.

The options appraisal concluded, from a marine technical and consenting perspective, **Offshore Route A is the preferred offshore marine route alignment**.

8.4. Scottish Water Approaches Marine Route Alignments Appraisal

Each of the marine route alignments (Figure 4-3 Drawing C01521-EGL5-LOC-003) to the Scottish border were assessed using the risk categories described in Table 3-2. Table 8-4 summarises the conclusions of the options appraisal process.

Table 8-4: Scottish Water Approaches Marine Route Alignments – Summary of options assessment

Key to Risk Categories (as defined in Table 3-2)	Showstopper	Very High Risk	Medium – High Risk	Medium Risk	Low Risk	Very Low Risk

	SCOT A	SCOT B	SCOT C
Route length (km)	111.6	113.8	124.5
No. of crossings	1 (3)*	1 (3)*	1 (3)*
No. of crossings in protected sites	0	0	0
Biological Environment			
Historic Environment			
Physical Environment			
Socio-Economic Environment			
Overall Environmental Implications			

* Numbers in bracket indicate potential crossings with major developments if infrastructure is constructed in advance of EGL 5.

The marine options appraisal concluded that there is little to differentiate the three Scotland approaches marine route alignments in English waters. All routes pass through areas important for commercial fisheries. Marine route alignment SCOT Route A crosses an area identified as a potential sandeel spawning ground, which the other marine route alignments avoid.

The selection of a preferred marine route alignment in English waters has therefore been driven by the conclusions from SSEs option appraisal process. SSE are NGET's partner in the EGL 5 project, who have undertaken a similar options appraisal process for the marine route alignments as they continue into Scottish waters. In Scottish waters marine route alignment SCOT Route A would pass through the Firth of Forth Banks Complex MPA, designated for a variety of benthic habitat features, large scale features and the ocean quahog (*Arctica islandica*) a species with low or limited mobility and significant life span of around 400 years. For this reason, marine route alignment SCOT Route A was identified as the least preferred of the three options. SSE also identified marine route alignment SCOT Route C as less preferential from a Scottish perspective. This decision was driven by the length of the marine alignment. As there was no differentiator between SCOT Route B and SCOT Route C the shortest most economical route was chosen.

As SSE identified SCOT Route A and SCOT Route C as least preferred in Scottish waters and there is no differential between the marine route alignments in English waters, the preferred marine route alignment was SCOT Route B. The marine route alignment avoids direct interaction with any designated sites and has no evidence of hard substrate or sub cropping or outcropping along its entirety. It also lies outside of potential sandeel habitat. In Scottish waters the marine route alignment continues up to route between the Ossian and Morven offshore wind farm arrays; following a similar route to EGL 3. Technically, there is sufficient space to allow EGL 5, EGL 3, Ossian and Morven projects to cable-lay in the pinch point between the Ossian and Morven offshore wind farm array areas, without impacting each other's infrastructure.

The options appraisal concluded, from a marine technical and consenting perspective, marine route alignment **SCOT Route B is the preferred Scottish marine route alignment**.

9. Emerging Preference

The option appraisal process identified an end-to-end preference for a marine cable route that comprises of the following marine route alignments in English waters, as illustrated in Figure 9-1 (Drawing C01521-EGL5-LOC-005):

- Landfall at Anderby Creek
- Marine Route Alignment ENG Route A or ENG Route B
- Offshore Route A
- Marine Route Alignment SCOT Route B

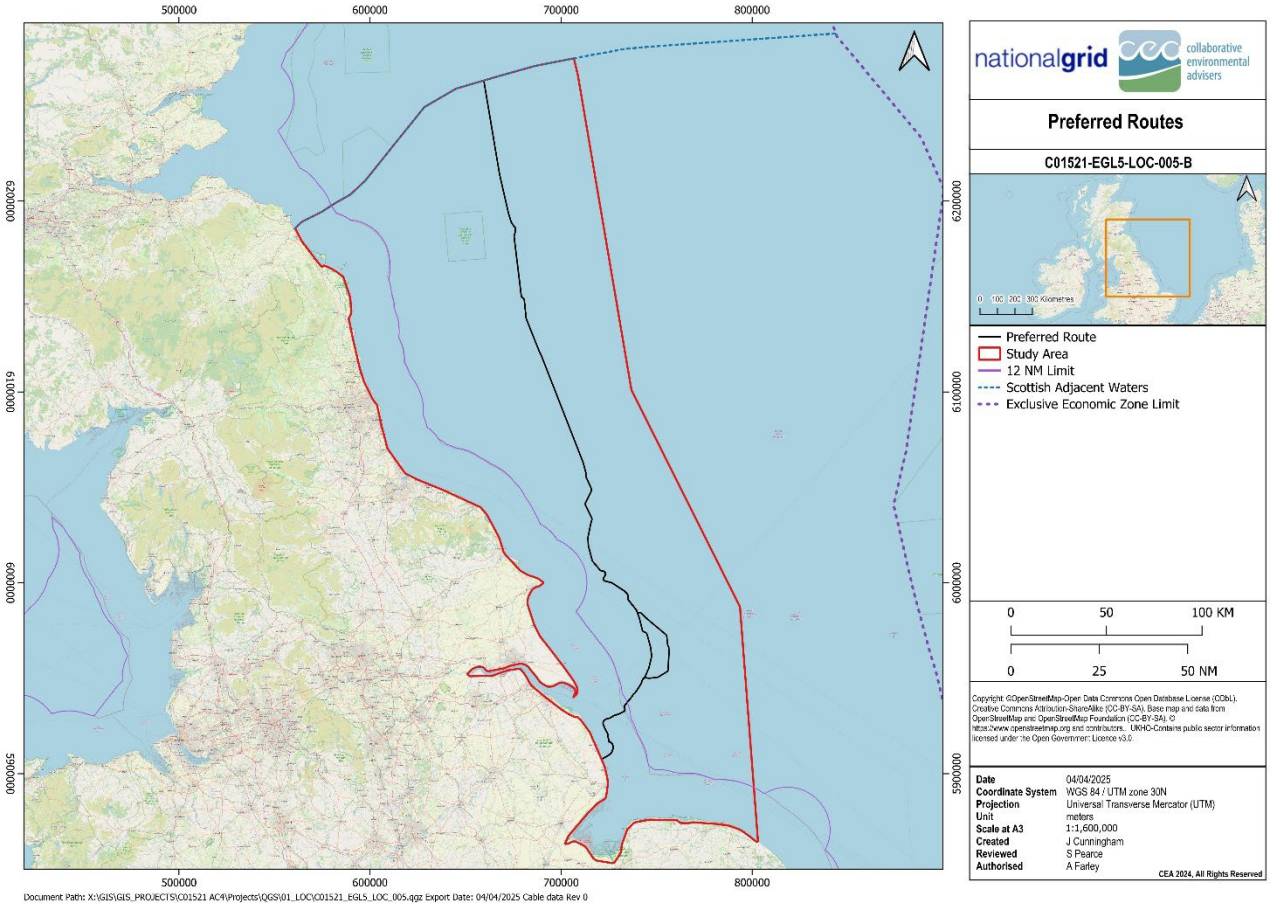


Figure 9-1: EGL 5 Emerging Preference (Drawing C01521-EGL5-LOC-005)

References

Birdlife International (2023) Protecting the most important habitats for birds. Available at: Protecting birds where they live and migrate - BirdLife International [Accessed February 2025]

GOV.UK (2015) Heritage coasts: definition, purpose and Natural England's role. Available at: Heritage coasts: definition, purpose and Natural England's role - GOV.UK (www.gov.uk) [Accessed February 2025]

Harbour Energy (2023) Viking CCS. Available at: Viking CCS Project | Harbour Energy | Harbour Energy [Accessed February 2025]

Intertek (2025) AC 4 Cable Routeing Report (P2783_R6582_Rev0, 13 January 2025).

JNCC (2020) Geological Conservation. Available at: Geological Conservation | JNCC - Adviser to Government on Nature Conservation [Accessed February 2025]

JNCC (2022) SSSI guidelines. Available at Guidelines for selection of SSSIs | JNCC - Adviser to Government on Nature Conservation [Accessed February 2023]

MarLin (2023) Species listed as Features of Conservation Interest (FOCI). Available at: Species listed as Features of Conservation Interest (FOCI) - MarLIN - The Marine Life Information Network [Accessed February 2025]

National Parks (2023) National Parks UK. Available at: National Parks UK // British National Parks [Accessed February 2025]

Naturenet (2023) mnr - marine nature reserve. Available at: Naturenet: Marine Nature Reserve [Accessed February 2025]

Humber Nature Partnership (2025) South Humber Gateway. Available at: https://humbernature.co.uk/projects/south-humber-gateway [Accessed February]

Northern Endurance Partnership (2025) The Northern Endurance Partnership. Available at: https://northernendurancepartnership.co.uk/ [Accessed February 2025]

ODPM (2005) Government Circular 06/2005: Biodiversity and geological conservation – statutory obligations and their impact within the planning system. Available at: Biodiversity and geological conservation: circular 06/2005 - GOV.UK (www.gov.uk) [Accessed February 2025].

Ørsted (2022) Proposal for Largest Seagrass Restoration Project in the UK and Europe focuses on the Humber Estuary. Available at: Spurn Point Seagrass (orsted.co.uk) [Accessed February 2025Theddlethorpe GDF Community Partnership (2023) Welcome. Available at: Theddlethorpe GDF Community Partnership (workinginpartnership.org.uk) [Accessed February 2025]

Unesco (2023) Biosphere Reserves. Available at: Biosphere Reserves (unesco.org) [Accessed February 2025]

World Heritage UK (2023) Welcome to World Heritage UK. Available at: Welcome to World Heritage UK | World Heritage UK [Accessed February 2025]

Appendix 1. Relevant Data – Biological Environment

Natural England and JNCC advice report

This report was produced by Natural England and JNCC to help inform future offshore wind farm developments associated with Round 4. The document contains high level advice in relation to potential cable routeing and turbine foundations. It specifically includes advice relating to marine features and Marine Protected Areas (MPAs) that are likely to be highly sensitive to pressures associated with offshore windfarm cabling which would be directly attributed to other energy cable installation. The report sets out the process that should be followed when selecting and defining cable routes (NE and JNCC, 2019[8]).

The "highest risk" (as defined as being of greatest risk of significant adverse effects from cable installation) protected areas highlighted in the report located in the study area are listed in Table B-1 below.

Table B-1: 'Highest risk' designations within the study area

Name	Key concern
Holderness Offshore MCZ	The highly sensitive features of this MCZ are subtidal coarse sediment, subtidal mixed sediments and subtidal sand. The features all have a recover to favourable condition objective. The protected features are sensitive to all cabling pressures identified except smothering and siltation rates.
Holderness Inshore MCZ	The highly sensitive features within this MCZ are intertidal sand and muddy sand, subtidal coarse sediment, subtidal mixed sediments, subtidal mud, subtidal sand, high energy circalittoral rock and moderate energy circalittoral rock. There is one geomorphological feature; Spurn Head (subtidal). All the protected features above are highly sensitive to abrasion/disturbance of the substrate on the surface of the seabed and penetration and/or disturbance of substratum below the surface of the seabed, including abrasion, except high energy circalittoral rock for which penetration was not deemed relevant. The identified features are all highly sensitive to the other cabling pressures to various extents. There are existing impacts on this MCZ due to offshore wind cables and potential oil and gas pipelines. The moderate energy circalittoral rock feature comprises areas of stiff clay exposure as well as more standard stony reef. These clay areas can run parallel to the Holderness coast for considerable lengths, particularly towards the southern portion, meaning that in some areas they are hard to avoid when installing linear infrastructure. The existing offshore windfarm cable route through Holderness Inshore MCZ (which was consented and installed pre-designation) has also demonstrated that the impacts of boulder clearance/cable burial have been found to be more long term than was anticipated on certain biotopes/features17 (stony reef and clay ridges) and therefore further impacts should be avoided. Spurn Point geological feature has been designated as part of Holderness Inshore MCZ and also forms a component of the Humber Estuary SSSI. Ensuring geomorphological processes are maintained in the near shore area is therefore essential, and Natural England will always advice that mitigation is required to ensure this.
Humber SAC	This estuary SAC is designated for its dune, saltmarsh and sediment habitats. Potential impacts on this SAC need to be carefully considered. The maintenance of coastal/nearshore geomorphology along the Holderness Coast is critical for sediment supply into the Humber. Mitigation may be required to ensure these processes are maintained. Continuation of the sediment supply is also important for the supporting habitats of the Humber SPA. It should also be noted that the Spurn Point geological feature has been designated as part of Holderness Inshore MCZ and forms a component of the Humber Estuary SSSI. Ensuring geomorphological processes are maintained in the near shore area is therefore essential, and Natural England will always advise mitigation is required to ensure this.

[8] NE and JNCC, (2019) Natural England and JNCC advice on key sensitivities of habitats and Marine Protected Areas in English Waters to offshore wind farm cabling within Proposed Round 4 leasing areas. Available at: https://data.jncc.gov.uk/data/3c9f030c-5fa0-4ee4-9868-1debedb4b47f/NE-JNCC-advice-key-sensitivities-habitats-MPAs-offshore-windfarm-cabling.pdf

Name	Key concern
Inner Dowsing, Race Bank and North Ridge SAC	This SAC is designated for its sandbank feature (including subtidal coarse sediment, subtidal mixed sediment, subtidal sand) and subtidal biogenic reefs: *Sabellaria spp.* The sandbank feature is in an unfavourable condition. The site is under pressure from ongoing activities from a number of industries including aggregate extraction and impacts associated with an existing offshore windfarm (where sandwave clearance was necessary and achieving cable burial was an issue). Fishing activities are resulting in the implementation of management measures for biogenic reef features (often located on mixed sediment in the sandbanks troughs) in the form of byelaws. We therefore advise that other activities should not impede restoration of the SAC features. This includes direct and indirect impacts from the depositing of sandwave levelling sediment. Cabling activities in sandbank MPAs has been shown to be challenging due to impacts associated with cable installation such as sandwave clearance and use of hard substrate as cable protection. It may be possible to avoid an adverse effect from cabling through sandbank features of this SAC if sufficient evidence is provided that impacts are short-lived and the feature will recover. Consideration would need to be given as to how sufficient cable burial is achieved without the need for cable protection. Should sandwave clearance be necessary to achieve burial depth and avoid the use of cable protection then, as above, it would need to be demonstrated that impacts are short-lived, the feature can recover, and extracted material is retained in the system and can be deposited on material of the same grain size to avoid changes in habitat.

Summary of Designated Sites that Intersect with Marine Route Alignments

A summary of how each of the marine route alignments insect the environmental designations within the study area is summarised in Table B-2.

Table B-2: Marine route alignments – intersections with environmental designations

Designated Site	Approach to England / Scotland Border			Offshore Route	England					
	SCOT A	SCOT B	SCOT C		A	B	C	D	E	F
Holderness Offshore MCZ										
Southern North Sea SAC										
Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC										
Inner Dowsing, Race Bank and North Ridge SAC										
Humber Estuary SPA										
Greater Wash SPA										
Humber Estuary Ramsar										
Saltfleetby – Theddlethorpe Dunes SSSI										
Total	**0**	**0**	**0**	**0**	**3**	**3**	**7**	**3**	**3**	**3**

Protected Site Descriptions

Highly Protected Marine Areas (HPMA)

North East of Farnes Deep HPMA (less than 0.5km away)

North East of Farnes Deep was originally designated as an MCZ however, in June 2023 it was also designated as a HPMA, extending protection to the entire marine ecosystem (seabed, water column, processes and all species) within the site. Located approximately 55 km offshore from the north Northumberland Coast, in the northern North Sea, the North East of Farnes Deep HPMA covers an area

of 492 km^2 and is situated in an area of predominantly sandy sediment, and also includes patches of gravelly sand and mud (JNCC, 2023). The boundary and location of the HPMA can be seen below in Figure B-1.

The seabed within the HPMA is a mix of highly mosaiced habitats, ranging from coarse sediments through to mixed sediments and mud. These are relatively stable habitats, which support a diverse range of marine flora and fauna such as anemones, worms, molluscs, echinoderms and fish species. These habitats also support birds and marine mammals, with at least seven nationally important seabird species and five marine mammal species recorded within the area. The site depth ranges between 50 m to 100 m below chart datum; the deepest section of the site runs parallel to the western boundary and the shallowest section is in the south-east quarter. The large areas of muddy habitats cover 27 km ^{2} of the HPMA (equivalent to 5% of the site) and are thought to be important for the storage of carbon. At present, this is the only offshore HPMA with blue carbon habitats. The protected features and conservation objectives for this HPMA are summarised in Table B-3.

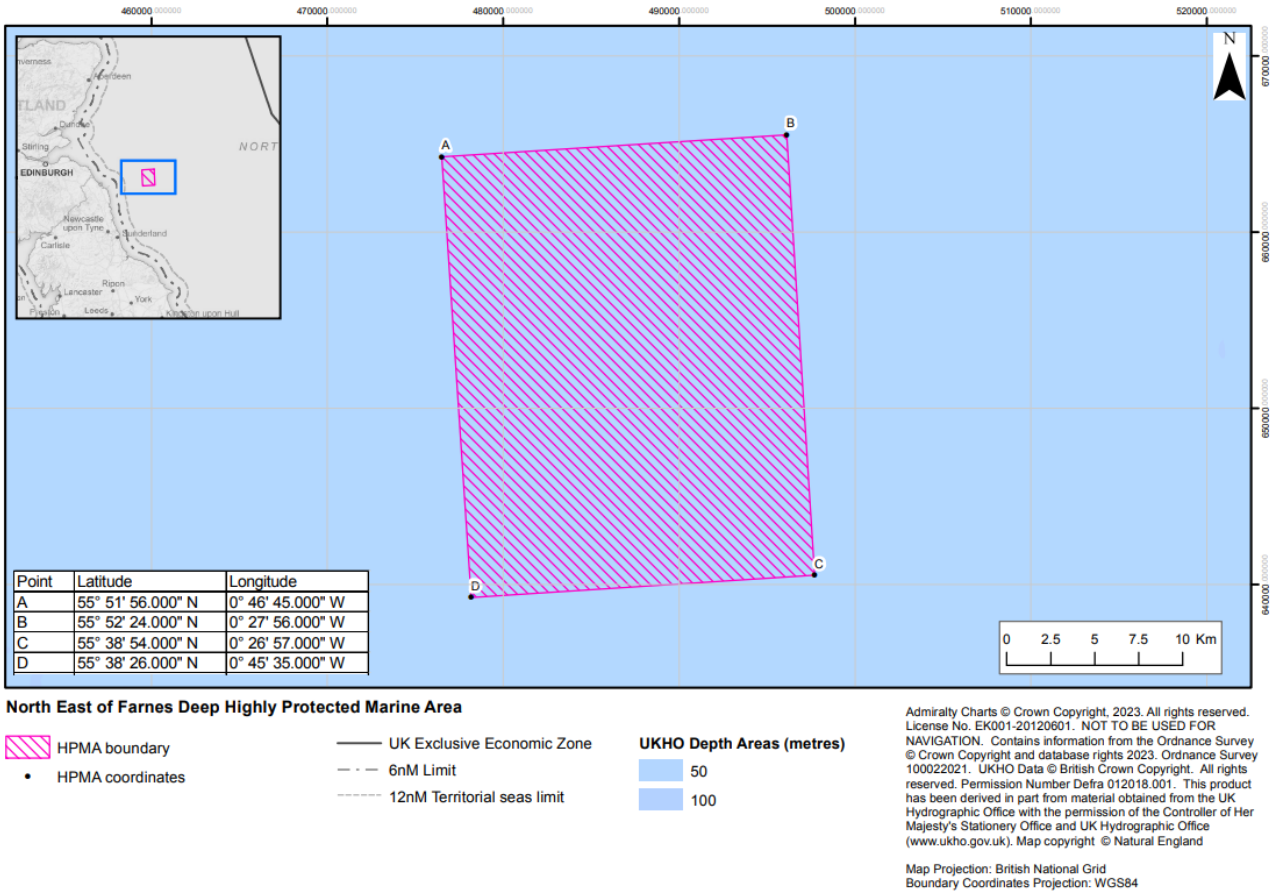


Figure B-1: Map illustrating the boundary and location of the North East of Farnes Deep HPMA. Taken from DEFRA, (2023)

Table B-3: Protected features for North East of Farnes HPMA. Information taken from JNCC, (2023a)

Protected Feature	Conservation Objectives
The marine ecosystem of the area, which includes: All marine flora and fauna, all marine habitats and all geological or geomorphological interests, including all abiotic elements and all supporting ecosystem functions and processes, in the seabed, water column and the surface of the sea.	The conservation objective for the North East of Farnes HPMA is to: a. Achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the North East of Farnes Deep Highly Protected Marine Area, to a natural state, and b. Prevent further degradation and damage to the protected feature, subject to natural change. Such that within the site: 1. The ecosystem is allowed to fully recover in the absence of damaging activities such that: • The ecosystem structure consists of a diverse range of benthic and pelagic communities, habitats and species, including biotic and abiotic components of the ecosystem. These fulfil a variety of functional roles, including supporting key life cycle stages and/or behaviours of marine species. • The physical, biological and chemical ecosystem processes and functions proceed unhindered, so that the site realises its full ecological potential to deliver goods and services, including habitats and species considered important to the long-term storage of carbon. • The ecosystem is resilient to change and stressors. 2. Any ecosystem changes brought about by the process of removing anthropogenic pressures should be considered in the context of a naturally recovering ecosystem. 3. The HPMA supports our understanding of how marine ecosystems change and recover in the absence of impacting activities. Note that this does not prevent human intervention to enable or facilitate recovery or the prevention of degradation or damage.

SACs

Southern North Sea SAC (UK0030395)

The Southern North Sea SAC is an area of importance for harbour porpoise. This site includes key winter and summer habitat for this species. Located to the east of England, this site stretches from the central North Sea (north of Dogger Bank) to the Straits of Dover in the south, covering an area of 36,951 km^2. The majority of this site lies offshore, though it does extend into coastal areas of Norfolk and Suffolk crossing the 12 nautical mile boundary and hence, both Natural England and JNCC are responsible for providing statutory advice. A mix of habitats, such as sandbanks and gravel beds, are included in the site, which overlaps with Dogger Bank SAC; Haisborough, Hammond and Winterton SAC; and North Norfolk Sandbanks and Saturn Reef SAC (JNCC, 2023b).

The SAC ranges in depth from mean low water down to 75 m, with the majority of the site shallower than 40 m, and is characterised by its sandy, coarse sediments which cover much of the site. These physical characteristics are thought to be preferred by harbour porpoise, likely due to availability of prey. Animals are thought to move latitudinally between preferred summer and winter grounds (as shown in Figure B-2) which cover an area of 27,028 and 12,696 km^2 respectively. The protected features and conservation objectives for this SAC are summarised in Table B-4.

Table B-4: Protected features for Southern North Sea SAC. Information taken from JNCC, (2023b)

Protected Feature	Conservation Objectives
1351 Harbour Porpoise *Phocoena phocoena*	The conservation objectives for the Southern North Sea SAC are: to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for harbour porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that: • Harbour porpoise is a viable component of the site; • There is no significant disturbance of the species; and • The condition of supporting habitats and processes, and the availability of prey is maintained.

.

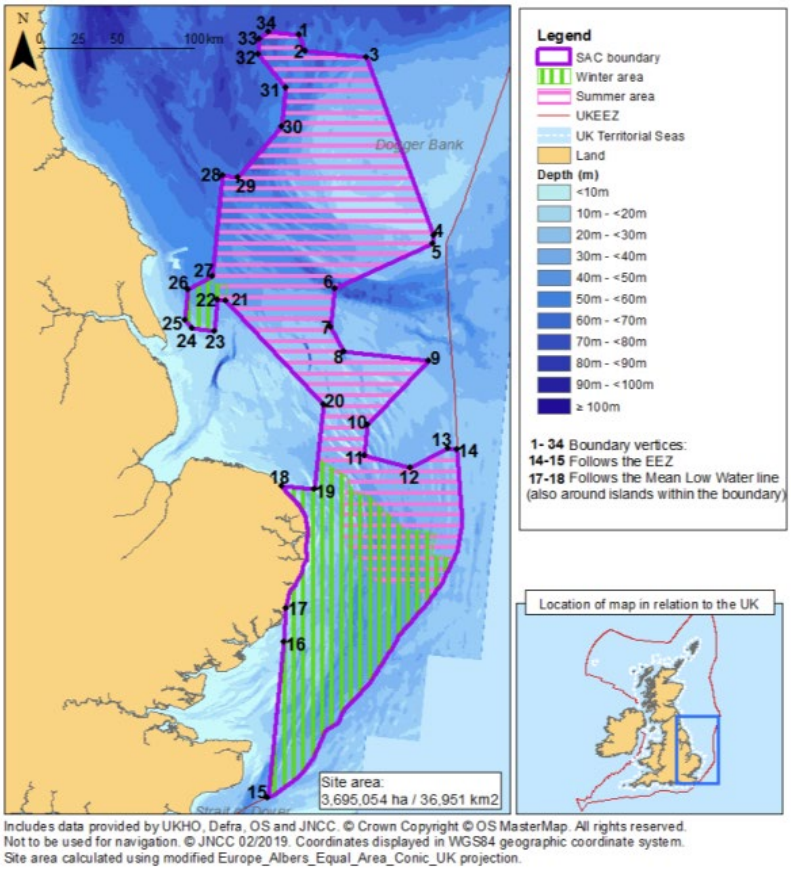


Figure B-2: Map illustrating the location of the harbour porpoise summer and winter grounds within the Southern North Sea SAC. Taken from JNCC, (2019)

Humber Estuary SAC (UK0030170)

The Humber Estuary European Marine Site (EMS) comprises of the Humber Estuary Special Area of Conservation (SAC), Humber Estuary Special Protection Area (SPA), Humber Estuary Ramsar Site and Humber Estuary Site of Special Scientific Interest (SSSI). Figure B-3 below displays the boundary of the Humber Estuary SAC.

The Humber is the second largest coastal plain Estuary in the UK, and the largest coastal plain estuary on the east coast of Britain, covering an area of 366.57 km^2. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea

lamprey, grey seals, vascular plants and invertebrates (Natural England, 2014).

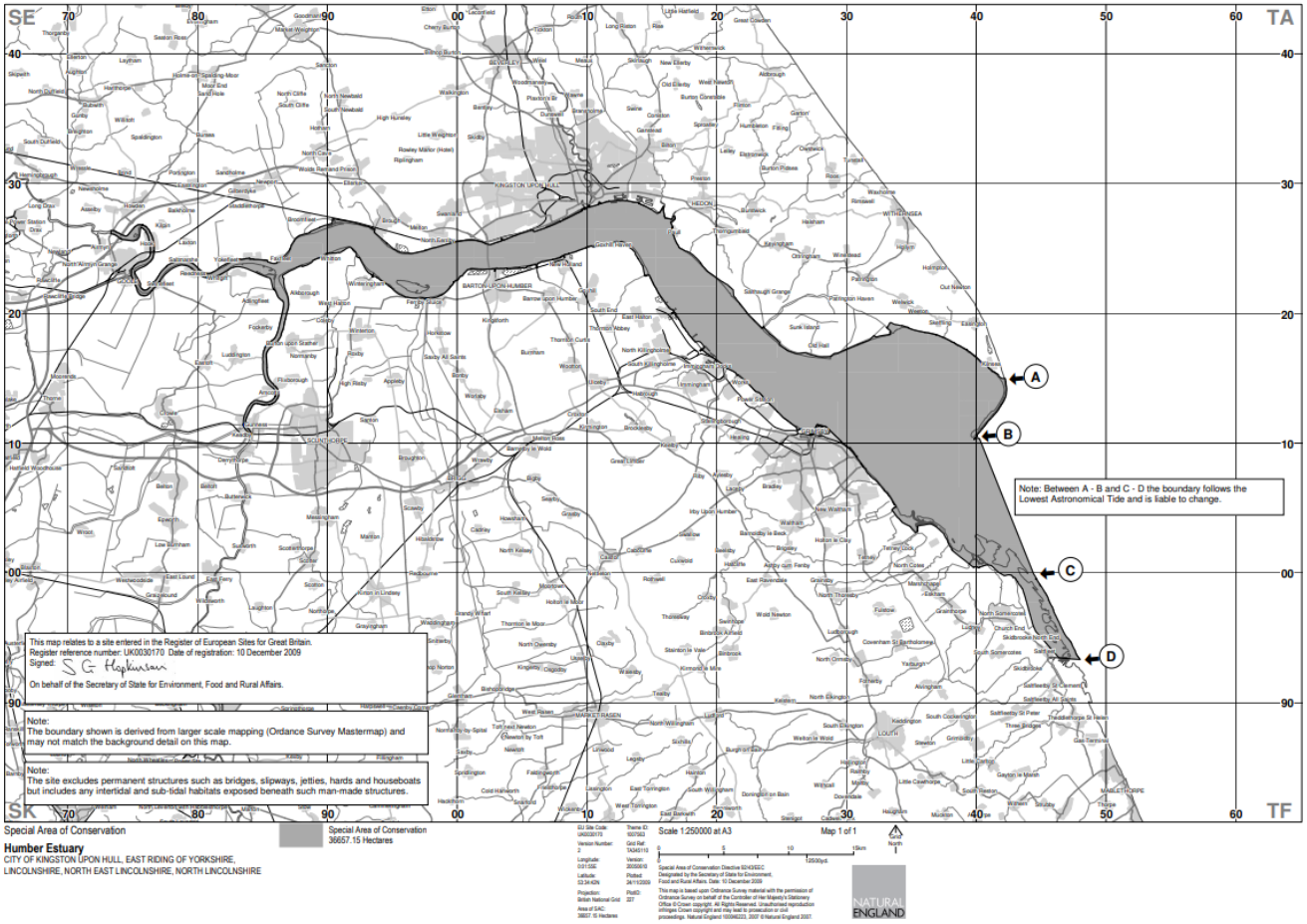


Figure B-3: Map illustrating the boundary of the Humber Estuary SAC. Taken from Natural England, (2012)

The Humber is a muddy, macro-tidal estuary, fed by a number of rivers including the Rivers Ouse, Trent and Hull. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines. The extensive mud and sand flats support a range of benthic communities, which in turn are an important feeding resource for birds and fish. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers.

Habitats within the Humber Estuary include Atlantic salt meadows and a range of sand dune types in the outer estuary, together with Sandbanks which are slightly covered by sea water all the time, extensive intertidal mudflats, *Salicornia* and other annuals colonising mud and sand, and Coastal lagoons. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary. These are best-represented at the confluence of the Rivers Ouse and Trent at Blacktoft Sands.

Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands. The sand dunes are features of the outer estuary on both the north and south banks particularly on Spurn peninsula and along the Lincolnshire coast south of Cleethorpes. Examples of both Fixed dunes with herbaceous vegetation (`grey dunes`) and Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes) occur on both banks of the estuary and along the coast. Native sea buckthorn Dunes with *Hippophae rhamnoides* also occurs on both sides of the estuary.

Significant fish species include river lamprey *Lampetra fluviatilis* and sea lamprey Petromyzon marinus which breed in the River Derwent, a tributary of the River Ouse.

Grey seals *Halichoerus grypus* are listed as a protected feature of the SAC. In general they have a coastal distribution although they are known to travel considerable distances whilst feeding. The main haul out site used throughout the year by grey seals on the Lincolnshire coast is Donna Nook (Humber Nature, 2023a). The protected features and conservation objectives for this SAC are summarised in Table B-5 and the seasonality of the protected features are summarised in Table B-6.

Table B-5: Protected features in Humber Estuary SAC. Information taken from Natural England, (2018)

Protected Feature	Conservation Objectives
Habitats	
1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	With regard to the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site
1150 Coastal lagoons **Priority Feature**	
2160 Dunes with *Hippophae rhamnoides*	
2110 Embryonic shifting dunes	
1130 Estuaries	
1140 Mudflats and sandflats not covered by seawater at low tide	
2130 Fixed dunes with herbaceous vegetation (`grey dunes`) **Priority Feature**	
1310 Salicornia and other annuals colonising mud and sand	
1110 Sandbanks which are slightly covered by sea water all the time	
2120 Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes')	
Species	
1364 Grey seal *Halichoerus grypus*	With regard to the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site
1099 River lamprey *Lampetra fluviatilis*	
1095 Sea lamprey *Petromyzon marinus*	

Table B-6: Seasonality of protected species in Humber Estuary SAC. Information taken from Natural England, (2018)

Feature	Life stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grey Seal	All	■	■	■	■	■	■	■	■	■	■	■	■
River Lamprey	Downstream Migration (Juveniles)	■	■	■	■	■	■	■	■				
River Lamprey	Spawning (Freshwater)			■	■								
River Lamprey	Upstream migration (Adults)	■	■	■				■	■	■	■	■	■
River Lamprey	Estuarine feeding	■	■	■	■	■	■	■	■	■	■	■	■
Sea Lamprey	Downstream Migration (Juveniles)	■	■	■	■						■	■	■
Sea Lamprey	Spawning (Freshwater)					■	■	■					
Sea Lamprey	Upstream migration (Adults)		■	■	■	■	■						

The SAC is particularly sensitive to the introduction of industrial areas, changes in the oxygen content of the water, human-induced changes to hydraulic conditions and pollution to groundwater (JNCC, 2015a).

Hornsea TWO OWF export cables make landfall at Horseshoe Point in the Humber Estuary SAC. The landfall assessments for the project characterises Horseshoe Point as consisting of a 3 - 4 m high coastal defence embankment and sandy foreshore (PINNS, 2021). The Hornsea Two landfall report found that the intertidal area is dynamic and that variations in beach elevation of up to around 3 m can occur due to tidal flows. The report recommends that cables are buried at least 2m below minimum recorded beach/bed levels to allow for seasonal variation and storm events. Assessments concluded that there would be an adverse impact to '*Salicornia* and other annuals colonising mud and sand' features. Suggested mitigation measures including restricting intertidal works to the convergence zone and temporary working corridor, undertaking pre- and post-construction monitoring surveys and establishing a '*Salicornia*' reinstatement plan. The Site Selection and Consideration of Alternatives Chapter also states that the decision was taken not to route through the Humber Estuary following consultation with ABP and Natural England as a result of impacts on navigation, physical processes and nature conservation.

Saltfleetby – Theddlethorpe Dunes and Gibraltar SAC (UK0030270)

Saltfleetby – Theddlethorpe Dunes and Gibraltar SAC covers an area of 9.66 km^2. The dune system on this composite site contains good examples of shifting dunes within a complex site that exhibits a range of dune types. The marram *Ammophila arenaria*-dominated dunes are associated with lyme-grass *Leymus arenarius* and sand sedge *Carex arenaria.* These shifting dunes are part of a successional transition with fixed dunes with dune grassland and sea-*buckthorn Hippophae rhamnoides*. The rapidly-accreting dunes on the seaward sand bars and shingle banks make this an important site for research into the processes of coastal development (Natural England, 2019).

There are extensive areas of fixed dune vegetation within largely intact geomorphologically-active systems, with representation of early successional stages on the seaward side, and more stable areas. The lime-rich dunes support a rich and diverse flora, dominated in places by red fescue Festuca rubra and with unusual species including pyramidal orchid *Anacamptis pyramidalis*, bee orchid *Orchis apifera,* sea-holly *Eryngium maritimum*, lesser meadow-rue *Thalictrum minus* and sea campion *Silene maritima.*

This site also supports a good example of dunes with sea-buckthorn *Hippophae rhamnoides* in the main part of its natural range in the UK. This habitat develops on dune areas and is present in a range of successional stages from early colonisation to mature scrub associated with other species such as elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and ivy *Hedera helix*, typically associated with an understorey of ruderal species.

The dune slacks at this site are part of a successional transition between a range of dune features, and some have developed from saltmarsh to freshwater habitats after becoming isolated from tidal inundation by sand deposition. There is a range of different communities and the species present depend on the wetness of the slack, its location within the system and the management history. Some of the drier slacks support a very wide range of species; this has been encouraged by management. The wetter slacks often have more permanent standing water and are composed of stands of sedges and rushes. The location of the SAC is shown in Figure B-4 below and the protected features and conservation objectives for this SAC are summarised in Table B-7.

Table B-7: Protected features of Saltfleetby – Theddlethorpe Dunes and Gibraltar SAC. Information taken from Natural England, (2019)

Protected Feature	Conservation Objectives
2110. Embryonic shifting dunes **2120**. Shifting dunes along the shoreline with Ammophila arenaria ("white dunes"); Shifting dunes with marram **2130**. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland ***Priority Species** **2160**. Dunes with Hippophae rhamnoides; Dunes with sea-buckthorn **2190**. Humid dune slacks	With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change; Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the qualifying natural habitats • The structure and function (including typical species) of the qualifying natural habitats, and, • The supporting processes on which the qualifying natural habitats rely

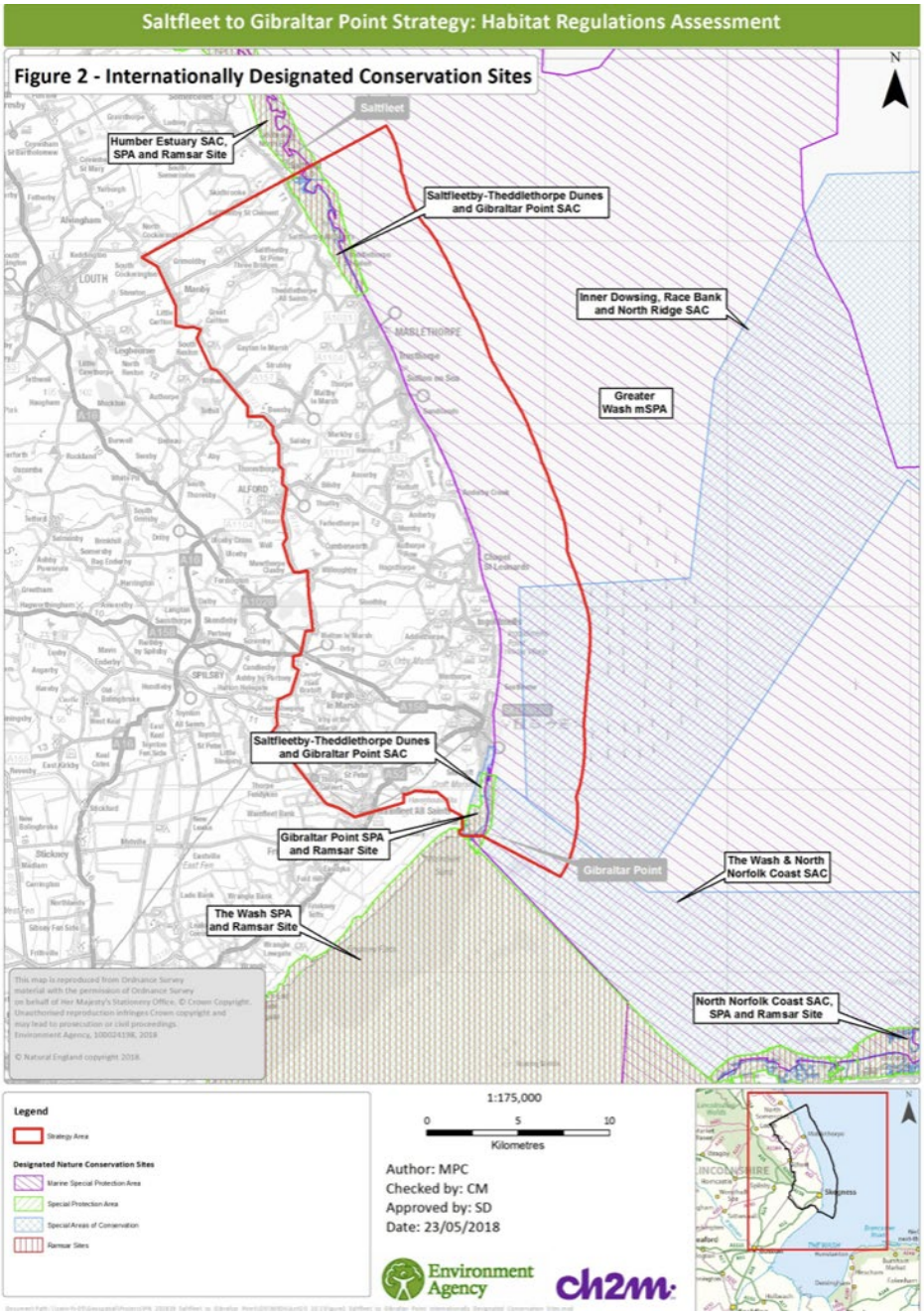


Figure B-4: Map showing the location of Saltfleetby – Theddlethorpe Dunes and Gibraltar SAC. Taken from Environment Agency, (2025)

Inner Dowsing, Race Bank and North Ridge SAC (UK0030370)

Located off the south Lincolnshire coast, the Inner Dowsing, Race Bank and North Ridge (IDRBNR) SAC encompasses a wide range of sandbank types and biogenic reef. The site lies across the 12 NM territorial sea limit and therefore advice is jointly delivered by JNCC and Natural England.

The main sandbank features of this SAC occur within the Wash Approaches, the Race Bank-North Ridge-Dudgeon Shoal system and at Inner Dowsing. The tops of the sandbanks are characterised by low diversity communities of polychaete worms and amphipod crustaceans. The trough areas between the sandbank features contain a diverse mosaic of biotopes on mixed and gravelly sands. A margin of 500 m has been added around the edges of all sandbanks within the site to reflect current uncertainty in feature extent. While the areas inside these margins are not confirmed as potential feature, JNCC advises a precautionary approach to their management i.e., treat them as if they were confirmed feature to ensure appropriate protection now and into the future. Biogenic reef created by the ross worm *Sabellaria spinulosa* has consistently been recorded within the site. These reefs support a variety of bryzoans, hydroids, sponges and anemones as well as the common lobster *Homarus gammarus* and the commercially exploitable pink shrimp

Pandalus montagui. A margin of 50 m has also been applied to the point and line records of Sabellaria. Similarly, while the areas inside these margins are not confirmed as potential feature, JNCC advises a precautionary approach to their management. A map showing the boundary and location of features within this SAC are shown below in Figure B-5 and the protected features and conservation objectives for this SAC are summarised in Table B-8.

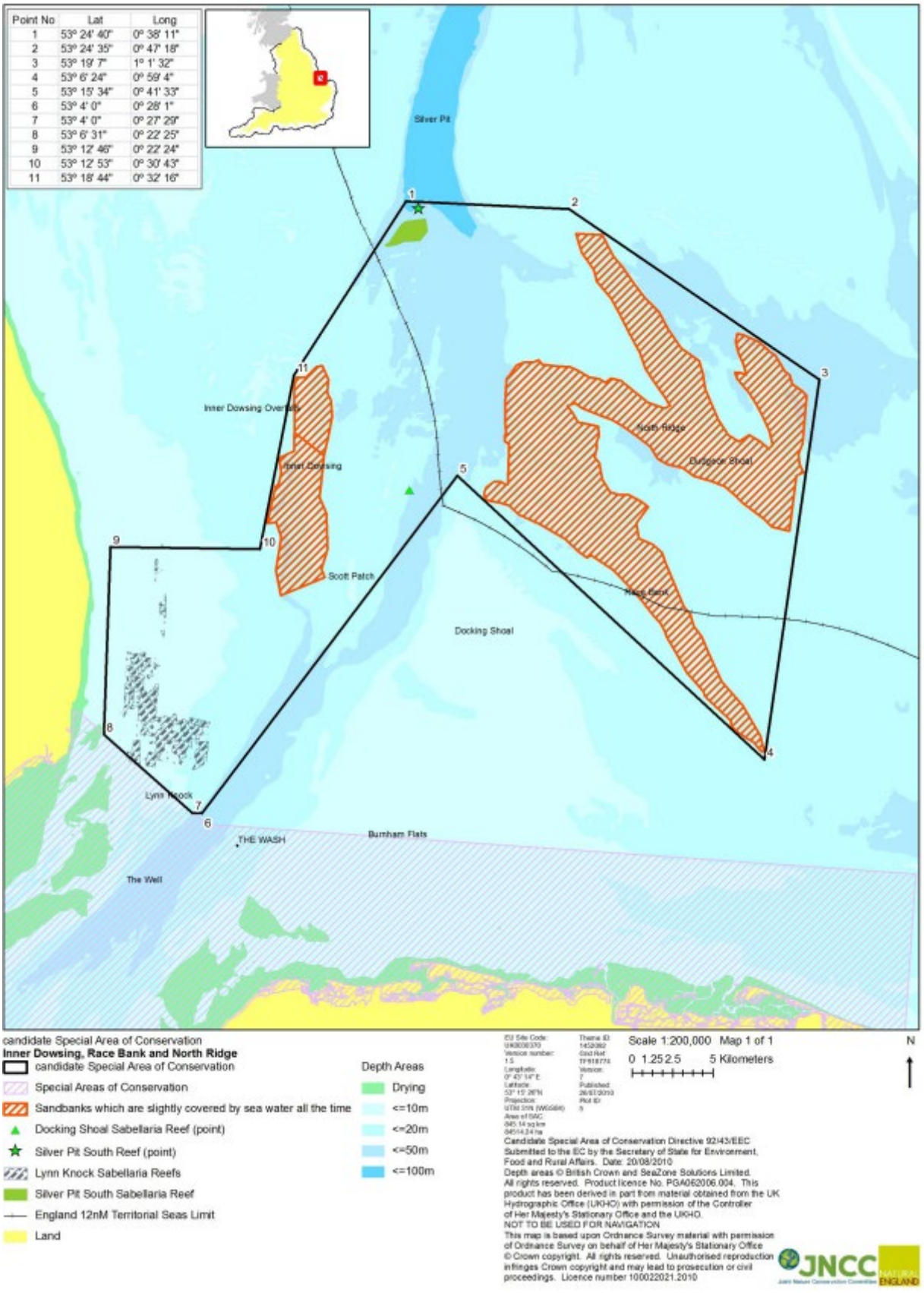


Figure B-5: Map illustrating the boundary of Inner Dowsing, Race Bank and North Ridge SAC. Taken from Natural England, (2012a)

Table B-8: Protected features of the Inner Dowsing, Race Bank and North Ridge SAC. Information taken from Natural England (2019)

Protected Feature	Conservation Objectives
1170 Reefs **1110** Sandbanks which are slightly covered by sea water all the time	To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate and that it makes the best possible contribution to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring: ▪ the extent and distribution of qualifying natural habitats and habitats of the qualifying species ▪ the structure and function (including typical species) of qualifying natural habitats ▪ the structure and function of the habitats of the qualifying species ▪ the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely ▪ the populations of each of the qualifying species ▪ the distribution of qualifying species within the site

In September 2024, JNCC and Natural England published revised conservation advice for this site. This followed decisions by the Secretary of State on offshore windfarm Nationally Significant Infrastructure Projects (NSIPs) requiring a derogation case as a result of 'lasting effects' and 'impeding restoration' impacts relating to the placement of cable protection within the designated site. Post-installation monitoring between 2018 and 2022 demonstrated that, in addition to the turbine footprint, the scour/cable protection is still visible and distinct from the surrounding seabed.

The SNCBs consider that it is likely that the extent, distribution, structure and function attributes of the Annex I sandbank feature have been adversely affected. Thereby, hindering site integrity and compromising the ability of the site to meet its conservation objectives. As a result of this, the SAC's contribution to delivering the Favourable Conservation Status (FCS) of Annex I sandbanks is predicted to be reduced.

At this stage, no measures or mechanisms to offset the habitat loss/predicted habitat loss have been put in place. The SNCB advise that additional reductions to the extent of the feature are likely to further compromise the ability of the site to fulfil its conservation objectives.

The changes to the conservation objectives cover the following features Subtidal Coarse sediment, Subtidal mixed sediments, Subtidal sand, Sandbanks which are slightly covered by sea water all the time. (Natural England, 2024).

SPAs

Humber Estuary SPA (UK9006111)

The Humber Estuary is located on the east coast of England and comprises extensive wetland and coastal habitats. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. Parts of the estuary are owned and managed by conservation organisations. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter. In summer, it supports important breeding populations of bittern *Botaurus stellaris*, marsh harrier *Circus aeruginosus,* avocet *Recurvirostra avosetta* and little tern *Sterna albifrons* (Natural England, 2019a). The SPA covers an area of 37,630.24 ha. The protected features and conservation objectives for this SPA are summarised in Table B-9.

Table B-9: Protected features of Humber Estuary SPA. Information taken from Natural England, (2019a)

Protected Feature	Conservation Objectives
A021 Great bittern *Botaurus stellaris;* (Breeding) **A048** Common shelduck *Tadorna tadorna*; (Non-breeding) **A081** Eurasian marsh harrier *Circus aeruginosus*; (Breeding) **A082**; Hen harrier *Circus cyaneus* (Non-breeding)	With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change; Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; • The extent and distribution of the habitats of the qualifying features

Protected Feature	Conservation Objectives
A132 Pied avocet *Recurvirostra avosetta;* (Non-breeding)	• The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site.
A132 Pied avocet *Recurvirostra avosetta*; (Breeding)	
A140 European golden plover *Pluvialis apricaria*; (Non-breeding)	
A143; Red knot *Calidris canutus* (Non-breeding)	
A149; Dunlin *Calidris alpina alpina* (Non-breeding)	
A151; Ruff *Philomachus pugnax (*Non-breeding)	
A156; Black-tailed godwit *Limosa limosa islandica* (Non-breeding)	
A157 Bar-tailed godwit *Limosa lapponica*; (Non-breeding)	
A162 Common redshank *Tringa totanus;* (Non-breeding)	
A195; Little tern *Sterna albifrons* (Breeding)	
Waterbird assemblage	

The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season:

In the non-breeding season, the area regularly supports 153,934 individual waterbirds (five year peak mean 1996/97 – 2000/01), including dark-bellied brent goose *Branta bernicla bernicla*, shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, mallard *Anas platyrhynchos*, pochard *Aythya ferina,* scaup *Aythya marila*, goldeneye *Bucephala clangula*, bittern *Botaurus stellaris*, oystercatcher *Haematopus ostralegus*, avocet *Recurvirostra avosetta*, ringed plover *Charadrius hiaticula*, golden plover *Pluvialis apricaria*, grey plover *P. squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, sanderling *C. alba*, dunlin *C. alpina*, ruff Philomachus pugnax, black-tailed godwit Limosa limosa, bar-tailed godwit L. lapponica, whimbrel Numenius phaeopus, curlew N. *arquata*, redshank *Tringa totanus*, greenshank *T. nebularia* and turnstone *Arenaria interpres*.

Non-qualifying species of interest: The SPA is used by non-breeding merlin *Falco columbarius*, peregrine *F. peregrinus* and short-eared owl *Asio flammeus*, and breeding common tern *Sterna hirundo* and kingfisher *Alcedo atthis* (all species listed in Annex I to the EC Birds Directive) in numbers of less than European importance (less than 1% of the GB population).

Greater Wash SPA (UK9020329)

The Greater Wash SPA lies along the east coast of England, predominantly in the coastal waters of the mid–southern North Sea between the counties of Yorkshire to the north and Suffolk to the south. It covers an area of c. 3,536 km^2, classified for the protection of red-throated diver (*Gavia stellata*), common scoter (*Melanitta nigra*), and little gull (*Hydrocoloeus minutus*) during the non-breeding season, and for breeding Sandwich tern (*Sterna sandvicensis*), common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*). This area supports the largest breeding populations of little terns within the UK SPA network by protecting important foraging areas. It also supports the second largest aggregations of non-breeding red-throated diver and little gull (JNCC, 2018). The protected features and conservation objectives for this SPA are summarised in Table B-10.

The area of the SPA includes a range of marine habitats, including intertidal mudflats and sandflats, subtidal sandbanks and biogenic reef, including Sabellaria reefs and mussel beds. Much of the area is less than 30m water depth, with a deep channel of 90m depth at the Wash approaches.

The population estimates and important usage areas, for non-breeding red-throated diver, common scoter and little gull in the Greater Wash SPA were based on data collected from visual aerial surveys over five winter seasons (2002/03, 2004/05, 2005/06, 2006/07 and 2007/08). These data demonstrate that the Greater Wash SPA regularly supports numbers of red-throated diver that are well in excess of the percentage population threshold (>1% of the GB population of this species) identified under the UK SPA selection guidelines JNCC, 2018) . There is no GB population estimate against which to assess the numbers of little gull using the site, however comparison with non-breeding numbers in other areas around the UK indicates this is an important site for little gull in the non-breeding season and thus little gull was added as a feature of the site under stage 1.4 of the SPA selection guidelines. Likewise, considerations under stage 1.4 of the SPA selection guidelines supported common scoter as a feature of this site.

Table B-10: Protected features of Greater Wash SPA. Information taken from JNCC, (2018)

Protected Feature	Conservation Objectives
Red-throated diver *Gavia stallata* (Non-breeding)	The overarching conservation objectives for the protected features of this site are to ensure they either remain in, or reach favourable condition. The ability of a designated feature to remain in, or reach favourable condition can be affected by its sensitivity to pressures associated with activities taking place within or in close proximity to a protected site.
Little gull *Hydrocoloeus minutus* (Non-breeding)	
Common scoter *Melanitta nigra* (Non-breeding)	
Sandwich tern *Sterna sandvicencis* (Breeding)	
Little tern *Sternula albifrons* (Breeding)	
Common tern *Sterna hirundo* (Breeding)	

The Common tern distribution in The Wash SPA is concentrated in the southern extent (as shown in Figure B-6) and the predicted relative usage of red-throated diver in the SPA is shown in Figure B-7.

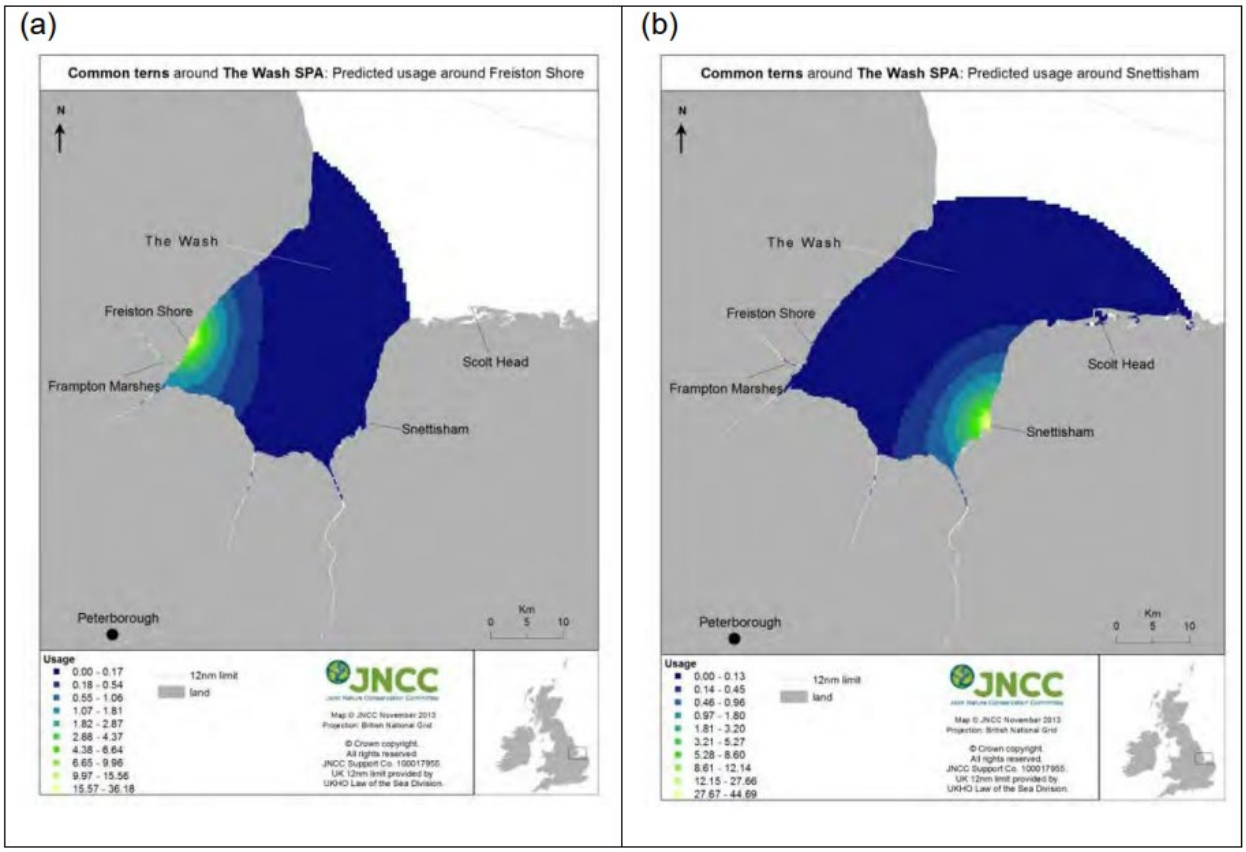


Figure B-6: Predicted relative usage of the waters around Freiston Shore (a) and Snettisham (b) within The Wash SPA for common terns. Taken from JNCC, (2014)

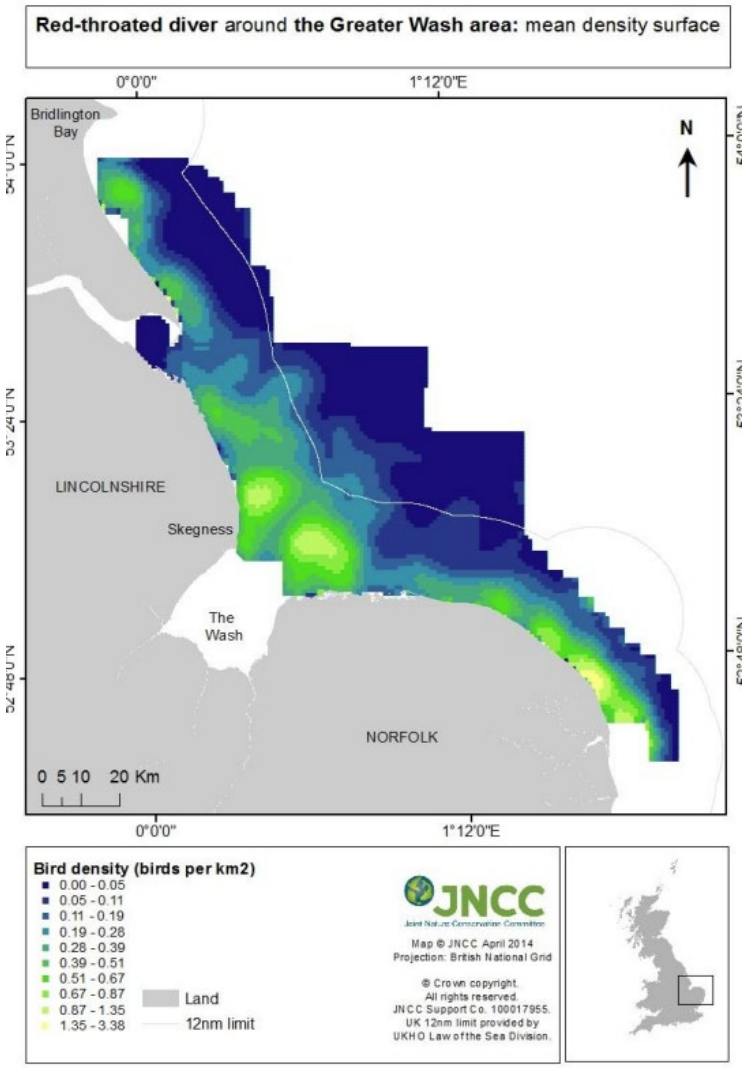


Figure B-7: Predicted relative usage of red-throated diver in the waters around Greater Wash SPA. Taken from JNCC, (2016)

RAMSAR

Humber Estuary RAMSAR (UK11031)

The Humber Estuary RAMSAR covers an area of 379.88 km^{2,} with the boundary of the site shown below in Figure B-8. It drains a catchment of some 24,240 km^2 and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. Vegetation includes extensive reedbeds, areas of mature and developing saltmarsh, backed by grazing marsh or low sand dunes with marshy slacks and brackish pools. The area regularly supports internationally important numbers of various species of breeding and wintering waterbirds. Many passage birds, notably internationally important populations of ringed plover, *Charadriu hiaticula,* and sanderling *Caldris alba* stage in the area. The site supports Britain's most southeasterly breeding colony of grey seal *Halichoerus grypus*. Human activities include tourism, recreation, commercial and recreational fishing, livestock grazing, and hunting (RAMSAR, 2023). This site meets five Ramsar criterion (Ramsar, 2007).

Ramsar criterion 1

The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.

It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass *Spartina anglica* and annual glasswort *Salicornia* communities. Low to mid marsh

communities are mostly represented by sea aster *Aster tripolium*, common saltmarsh grass *Puccinellia maritima* and sea purslane *Atriplex portulacoides* communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch *Elytrigia atherica* (*Elymus pycnanthus*) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed Phragmites australis fen and sea club rush *Bolboschoenus maritimus* swamp with the couch grass *Elytrigia repens* (*Elymus repens*) saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon.

Ramsar criterion 3

The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.

Ramsar criterion 5

Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

- Common shelduck, *Tadorna tadorna*, Northwestern Europe (breeding) population 4,464 individuals, wintering, representing an average of 1.5% of the population (5 year peak mean 1996/7-2000/1)
- Eurasian golden plover, *Pluvialis apricaria, altifrons* subspecies – NW Europe, W Continental Europe, NW Africa population 30,709 individuals, wintering, representing an average of 3.3% of the population (5 year peak mean 1996/7-2000/1)
- Red knot, *Calidris canutus. islandica* subspecies 28,165 individuals, wintering, representing an average of 6.3% of the population (5 year peak mean 1996/7-2000/1) Dunlin, Calidris alpina, alpina subspecies – Western Europe (non-breeding) population 22,222 individuals, wintering, representing an average of 1.7% of the population (5 year peak mean 1996/7-2000/1)
- Black-tailed godwit, *Limosa limosa islandica* subspecies 1,113 individuals, wintering, representing an average of 3.2% of the population (5 year peak mean 1996/7-2000/1)
- Bar-tailed godwit , *Limosa lapponica lapponica* subspecies 2,752 individuals, wintering, representing an average of 2.3% of the population (5 year peak mean 1996/7-2000/1)
- Common redshank, *Tringa tetanus brittanica* subspecies 4,632 individuals, wintering, representing an average of 3.6% of the population (5 year peak mean 1996/7-2000/1)

Ramsar criterion 8

The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.

The Hornsea Two OWF HRA Screening Report identified potential LSE on the Humber Estuary SPA and Ramsar site as a result of disturbance during construction in the intertidal zone.

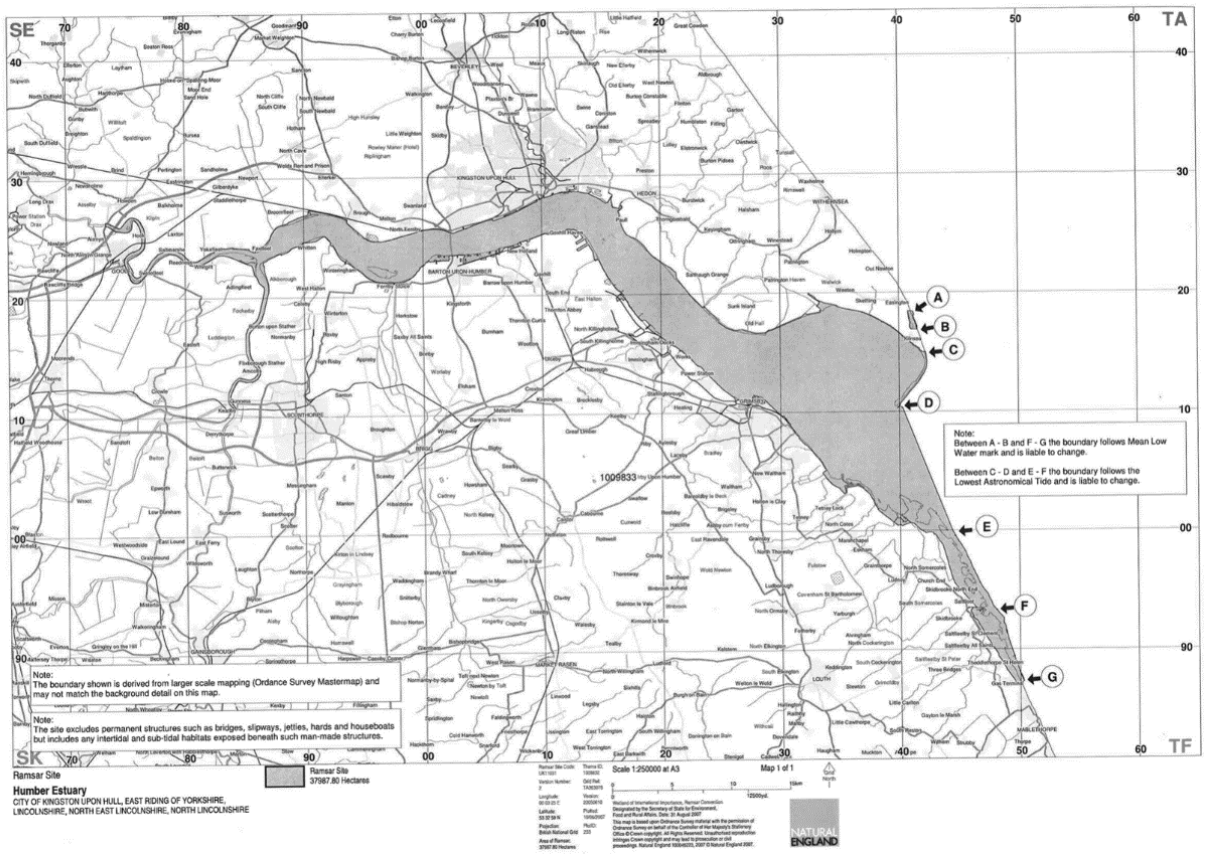


Figure B-8: Map illustrating the boundary of the Humber Estuary RAMSAR site. Taken from Ramsar, (2007a)

MCZ

Holderness Offshore MCZ

Holderness Offshore MCZ covers an area of 1,176 km^2 and is located approximately 11km offshore from the Holderness coast in the Southern North Sea region. The site crosses the 12 NM territorial seas limit and overlaps with the Southern North Sea SAC (JNCC, 2019a) and has a site depth between 5.1 and 50 m.

The seabed of Holderness Offshore MCZ is predominantly composed of sediment habitats ranging from subtidal sand to subtidal coarse sediment and contains part of a glacial tunnel valley. The varied nature of the seabed means it supports a wide range of species, both on and in the sediment, such as multiple species of worms, mussel beds, sponges, starfish and crustaceans (such as crabs and shrimp). The site is also a spawning and nursery ground for a number of fish species, including lemon sole, plaice and European sprat. Ocean quahog has also been recorded within the site. This bivalve mollusc is particularly slow growing and can take up to 50 years to reach full size, growing up to 13 cm in width. Ocean quahog are listed by the Oslo and Paris Convention for the Protection of the North East Atlantic (OSPAR) as a threatened and/or declining species. A map illustrating the Holderness Offshore MCZ boundary and protected features can be seen below in Figure B-9. The protected features, conservation objectives and current management objectives for this MCZ are summarised in Table B-11.

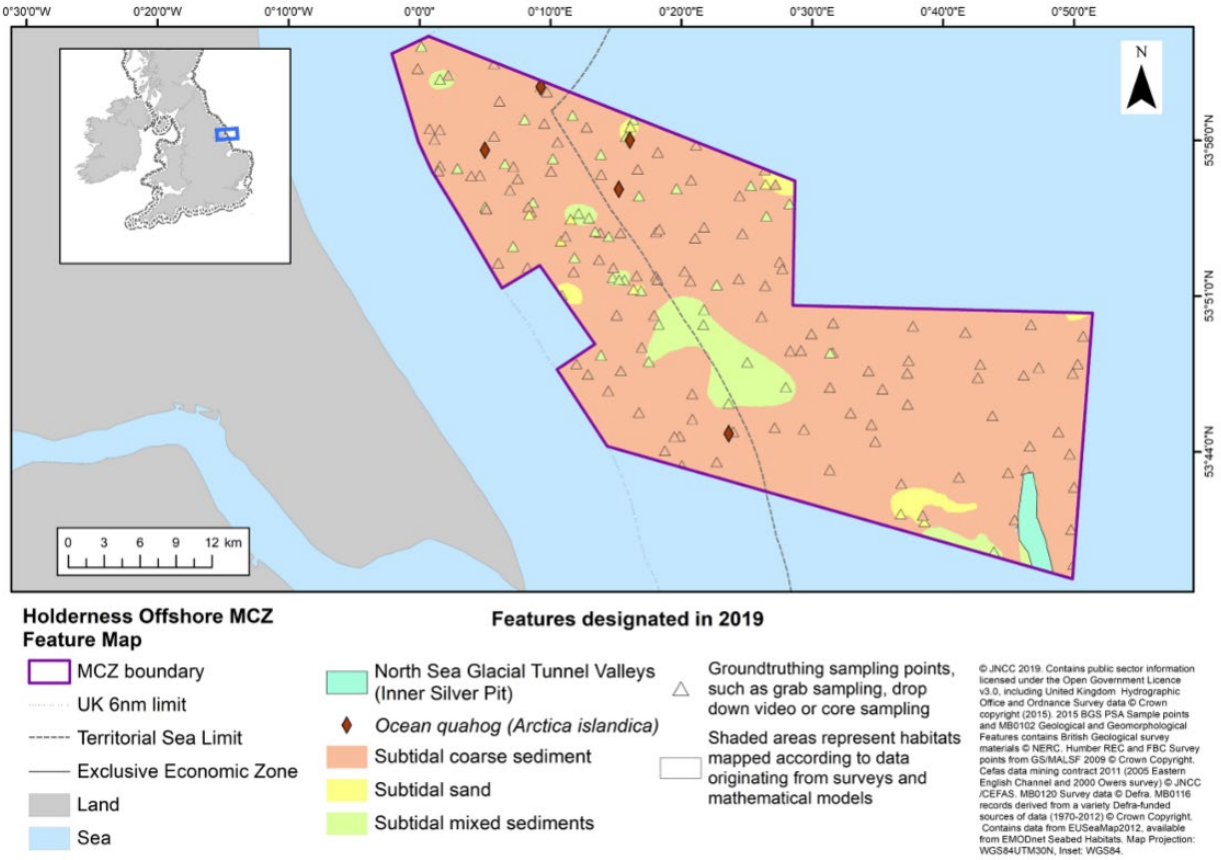


Figure B-9: Map illustrating the Holderness Offshore MCZ boundary and protected features. Taken from JNCC, (2019b)

Table B-11: Protected features of Holderness Offshore MCZ. Information taken from, JNCC, (2020)

Protected Feature	Conservation Objectives	Current Objective
Subtidal Coarse Sediment Subtidal Sand Subtidal mixed sediments	The Conservation Objective for the Holderness Offshore Marine Conservation Zone is that the protected features: • so far as already in favourable condition, remain in such condition; and • so far as not already in favourable condition, be brought into such condition, and remain in such condition. With respect to Subtidal coarse sediment, Subtidal sand and Subtidal mixed sediments within the Zone, this means that: i. its extent is stable or increasing; and ii. its structures and functions, its quality, and the composition of its characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat) are such as to ensure that it remains in a condition which is healthy and not deteriorating. Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery. Any alteration to that feature brought about entirely by natural processes is to be disregarded.	Recover
Ocean quahog (*Arctica islandica*)	The Conservation Objective for the Holderness Offshore Marine Conservation Zone is that the protected features: • so far as already in favourable condition, remain in such condition; and	Recover

Protected Feature	Conservation Objectives	Current Objective
	• so far as not already in favourable condition, be brought into such condition, and remain in such condition. With respect to the Ocean quahog (*Arctica islandica*) within the Zone, this means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive. Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery. Any alteration to that feature brought about entirely by natural processes is to be disregarded.	
North Sea glacial tunnel valleys	The Conservation Objective for the Holderness Offshore Marine Conservation Zone is that the protected features: • so far as already in favourable condition, remain in such condition; and • so far as not already in favourable condition, be brought into such condition, and remain in such condition. With respect to the North Sea glacial tunnel valleys within the Zone, this means that: i. its extent, component elements and integrity are maintained; ii. its structure and functioning are unimpaired; and iii. its surface remains sufficiently unobscured for the purposes of determining whether the conditions in paragraphs (i) and (ii) are satisfied. Any obscurement of that feature brought about entirely by natural processes is to be disregarded. Any alteration to that feature brought about entirely by natural processes is to be disregarded.	-

North East of Farnes Deep MCZ

The MCZ is located approximately 55 km offshore from the north Northumberland Coast, in the northern North Sea covering an area of 492 km^2. The North East of Farnes Deep was designated as a MCZ in January 2013 for subtidal coarse sediment and subtidal sand. Additional features of mixed sediments, subtidal mud and ocean quahog were designated in January 2016. A map illustrating the North East of Farnes Deep MCZ boundary and protected features can be seen below in Figure B-10. The protected features and conservation objectives for this MCZ are summarised in Table B-12.

The seabed within the MCZ is a mix of highly mosaiced habitats, ranging from coarse sediments through to mixed sediments and mud. These are relatively stable habitats, which support a diverse range of marine flora and fauna such as anemones, worms, molluscs, echinoderms and fish species. These habitats also support birds and marine mammals, with at least seven nationally important seabird species and five marine mammal species recorded within the area.

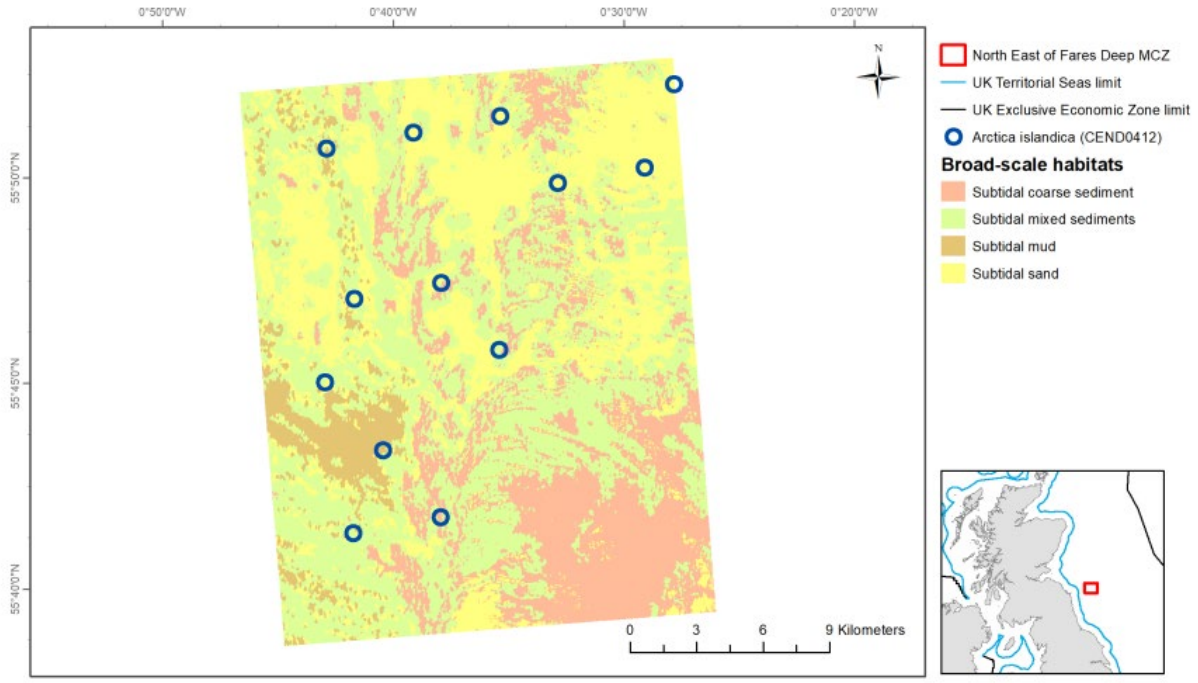


Figure B-10: Map illustrating the North East of Farnes Deep MCZ boundary and protected features. Taken from Wood et al., (2020)

Table B-12: Protected features of North East of Farnes Deep MCZ. Information taken from JNCC, (2023)

Protected Feature	Conservation Objectives	Current Objective
Subtidal coarse sediment Subtidal mixed sediments Subtidal mud Subtidal sand	The Conservation Objective for the North East of Farnes Deep Marine Conservation Zone is that the protected features: • so far as already in favourable condition, remain in such condition; and • so far as not already in favourable condition, be brought into such condition, and remain in such condition With respect to Subtidal coarse sediment, Subtidal sand, Subtidal mixed sediments and Subtidal mud within the Zone, this means that— • Extent is stable or increasing; and • Structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting each habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating. Any temporary deterioration in condition is to be disregarded if the habitats are sufficiently healthy and resilient to enable recovery. Any alteration to the features brought about entirely by natural processes is to be disregarded.	Maintain
Ocean quahog (*Arctica islandica*)	The Conservation Objective for the North East of Farnes Deep Marine Conservation Zone is that the protected features: • so far as already in favourable condition, remain in such condition; and • so far as not already in favourable condition, be brought into such condition, and remain in such condition. With respect to the Ocean quahog (*Arctica islandica*) within the Zone, this means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure	Maintain

Protected Feature	Conservation Objectives	Current Objective
	that the population is maintained in numbers which enable it to thrive. Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery. Any alteration to that feature brought about entirely by natural processes is to be disregarded.	

Swallow Sand MCZ

Swallow Sands MCZ covers an area of 4,746 km^2 and is located in the northern North Sea region, approximately 100 km offshore from the Northumberland coast. The MCZ has depths ranging from 50-100 m with a drop down to 150 m in the Swallow Hole Glacial Tunnel Valley, which is situated in the north-west corner of the site. The seabed within the MCZ is predominantly subtidal sand with patches of coarse and mixed sediment and mud (JNCC, 2017). A map illustrating the Swallow Sand MCZ boundary and protected features can be seen below in Figure B-11. The protected features and conservation objectives for this MCZ are summarised in Table B-13.

The low energy site provides stable sediment habitats that support a diverse range of fauna. Four EUNIS Level 4 sub biotopes were identified; SS.SMu.CFiMu.SpnMeg (seapens and burrowing megafauna in circalittoral fine mud), SS.SSa.Osa.Dari (deep circalittoral muddy sand with *Ditrupa arietina*, a polychaete worm), SS.SSa.Osa.(MalDef) (Maldanid polychaetes and *Eudorellopsis deformis* in deep circalittoral sand or muddy sand) and SS.SMu.Omu.PjefThyAfil (*Paramphinome jeffreysii*, *Thyasira* spp. and *Amphiura filiformis* in offshore circalittoral sandy mud).

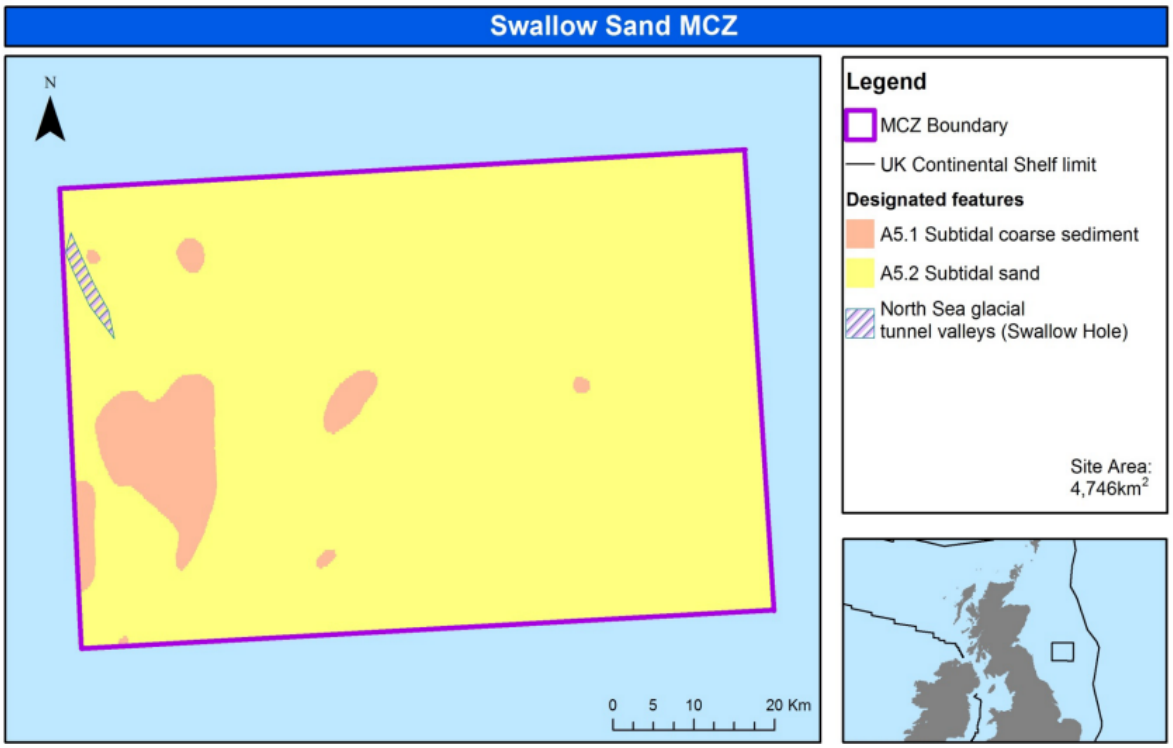


Figure B-11: A map illustrating the Swallow Sand MCZ boundary and protected features. Taken from JNCC, (2013)

Table B-13: Protected Features of Swallow Sand MCZ. Information taken from JNCC (2018a)

Protected Feature	Conservation Objectives	Current Objective
Subtidal coarse sediment Subtidal sand	The Conservation Objective for the Swallow Sand Marine Conservation Zone is that the protected features: • so far as already in favourable condition, remain in such condition; and • so far as not already in favourable condition, be brought into such condition, and remain in such condition With respect to Subtidal coarse sediment and Subtidal sand within the Zone, this means that— • Extent is stable or increasing; and • Structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting each habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating. Any temporary deterioration in condition is to be disregarded if the habitats are sufficiently healthy and resilient to enable recovery. Any alteration to the features brought about entirely by natural processes is to be disregarded.	Maintain
North Sea glacial tunnel valley (Swallow Hole)	With respect to the North Sea glacial tunnel valley (Swallow Hole) within the Zone, means that— i. Its extent, component elements and integrity are maintained; ii. Its structure and functioning are unimpaired; and iii. Its surface remains sufficiently unobscured for the purposes of determining whether the conditions in paragraphs (i) and (ii) are satisfied. Any obscurement of that feature brought about entirely by natural processes is to be disregarded. Any alteration to that feature brought about entirely by natural processes is to be disregarded.	Maintain

SSSI

Humber Estuary - 2000480 SSSI - Grimsby Dock to Humber Mouth Subtidal (185)

The Humber Estuary SSSI is 108.66 km^2 and goes from Grimsby Dock to Humber Mouth Subtidal. The main habitat is Littoral Sediment. The current condition of the site has been classed as unfavourable – recovering condition with a section between Humberston and Louth Canal of favourable condition along the coast. Another favourable section off the coast which forms the Donna Nook National Nature Reserve (Natural England, 2010)

Subtidal invertebrate and sediment analysis showed that there are 5 predominant biotopes in the estuary. SS.SSa.IFiSa.NcirBat (*Nephtys cirrosa* and *Bathyporeia spp.* in infralittoral sand) and SS.SMu.SMuVS.AphTubi (*Aphelochaeta marioni* and *Tubificoides spp.* in variable salinity infralittoral mud) were sampled in the outer estuary. The biotopes with the richest biota were found in the outer estuary. The biotopes and species recorded were as expected for the area. Further biotopes are likely to be present in areas which were not sampled. The subtidal morphology of the Humber Estuary has been identified as displaying a cycle in the behaviour of the banks and channels with a period of approximately 14-years. These cyclic changes have been related to similar patterns observed in the siltation rates within the estuary, which are themselves modified in magnitude of change by long-term and seasonal changes in freshwater flow which adjust density gradients and lead to changes in the flow characteristics close to the bed. The extent of subtidal sandbanks changes with a surprising (and irregular) frequency due to the high energy nature of the system. River lamprey and sea lamprey are continuing to breed in spawning rivers. Sea lamprey and the estuary features have been judged as unfavourable recovering (at risk) as water quality parameters have failed within the last six year due to the dissolved oxygen sag in the Humber which can affect migration. Reduction of the DO Sag has been a priority of the Environment Agency through the recent review of consent work. Grey seal pup numbers have increased steadily since records began in 1981. They have almost doubled from the year

2000 when numbers were 618 to 2007 when numbers reached 1194. There are no barriers to breeding site and seals accessing new areas despite high level usage of site by visitors.

Saltfleetby – Theddlethorpe Dunes SSSI

Also designated as National Nature Reserve (NNR), this important reserve covers an area of 967.65 ha and contains tidal sand and mudflats, salt and freshwater marshes and sand dunes. The location of this site is illustrated below in Figure B-12. On the foreshore, accreting mud and silt flats and saltmarsh in the north give way to a narrower sandy beach at the southern end. The sand dunes are also much wider in the north and there is an extensive freshwater marsh between two dune ridges, which converge into a narrower ridge south of Churchill Lane at Theddlethorpe. The much older landward dunes developed on a storm beach and are thought to have formed in the 7th to 8th centuries. The second ridge on the northern half of the reserve, enclosing the freshwater marsh, developed in the mid-1800s following the diversion of the Great Eau. New dunes are now forming along the southern half of the reserve (Lincs Wildlife Trust, 2023).

Figure B-12: Map showing the location and boundary of Saltfleetby-Theddlethorpe Dunes NNR and SSSI. Taken from Natural England, (2011)

Annex I habitats

The marine route alignments were developed to avoid Annex I habitat as mapped by JNCC or features that could be potential Annex I reef habitat as identified through review of UKHO high resolution bathymetric data. However, areas of Annex I habitat have been identified within the study area.

1110 – Sandbanks which are slightly covered by sea water all the time

Areas of Annex I Sandbank outside of an SAC have been identified within the study area. These were classified by Intertek as a secondary constraint as certain installation activities might be restricted e.g., deposit of external cable protection on these features. Marine route alignment ENG F crosses a protected sandbank (Triton Knoll) which although it lies outside of an SAC, must be treated as if designated.

The classification for the habitat is "Sandbanks which are slightly covered by sea water all the time". They consist of sandy sediments that are permanently covered by shallow sea water, typically at depths of less than 20m below chart datum (but sometimes including channels or other areas greater than 20m deep). The habitat comprises distinct banks (i.e., elongated, rounded or irregular 'mound' shapes) which may arise from horizontal or sloping plains of sandy sediment. Where the areas of horizontal or sloping sandy habitat are closely associated with the banks, they are included within the Annex I type (JNCC, 2023c).

The diversity and types of community associated with this habitat are determined particularly by sediment type together with a variety of other physical, chemical and hydrographic factors. These include geographical location (influencing water temperature), the relative exposure of the coast (from wave-exposed open coasts to tide-swept coasts or sheltered inlets and estuaries), the topographical structure of the habitat, and differences in the depth, turbidity and salinity of the surrounding water. Within the UK's inshore waters Sandbanks which are slightly covered by sea water all the time can be categorised into four main sub-types:

- gravelly and clean sands.
- muddy sands.
- eelgrass Zostera marina beds.
- maerl beds (composed of free-living Corallinaceae).

The latter two sub-types are particularly distinctive and are of high conservation value because of the diversity of species they may support and their general scarcity in UK waters.

Shallow sandy sediments are typically colonised by a burrowing fauna of worms, crustaceans, bivalve molluscs and echinoderms. Mobile epifauna at the surface of the sandbank may include shrimps, gastropod molluscs, crabs and fish. Sandeels *Ammodytes spp*., an important food for birds, live in sandy sediments. Where coarse stable material, such as shells, stones or maerl is present on the sediment surface, species of foliose seaweeds, hydroids, bryozoans and ascidians may form distinctive communities. Shallow sandy sediments are often important nursery areas for fish, and feeding grounds for seabirds (especially puffins *Fratercula arctica*, guillemots *Uria aalge* and razorbills *Alca torda*) and sea-duck (e.g., common scoter *Melanitta nigra*).

1170 – Reefs - Marine, coastal and halophytic habitats

Areas of Annex I Reef outside of an SAC have also been identified as occurring within the study area. Biogenic reefs (mussel and *Sabellaria spinulosa*) are common in parts of the study area. These have been classified by Intertek as a secondary constraint as certain installation activities might be restricted e.g., deposit of external cable protection, on these features and project specific mitigation will need to be agreed if significant effects are identified.

Marine route alignment ENG D routes to the east of marine aggregate Area 106/3. Consultation with the marine aggregate industry for EGL 3 and EGL 4 identified that a previous aggregate extraction option area was relinquished in this location due to the high presence of *Sabellaria spinulosa* through the site. The marine route alignment would cross through this previous aggregate extraction site and therefore there is a high likelihood of encountering Sabellaria reef.

Reefs are rocky marine habitats or biological concretions that rise from the seabed. They are generally subtidal but may extend as an unbroken transition into the intertidal zone, where they are exposed to the air at low tide. Intertidal areas are only included within this Annex I type where they are connected to subtidal reefs. Reefs are very variable in form and in the communities that they support. Two main types of reef can be recognised: those where animal and plant communities develop on rock or stable boulders and cobbles, and those where structure is created by the animals themselves (biogenic reefs) (JNCC, 2023d).

Reefs occur widely around the UK coast and are found in both inshore and offshore waters. There is a far greater range and extent of rocky reefs than biogenic concretions. Only a few invertebrate species are able to develop biogenic reefs, and these have a restricted distribution and extent in the UK.

Priority Marine Features / Species of Conservation Importance

Priority Marine Features

Listed below in Table B-14 are the Priority Marine features (habitats and species) which intersect the marine route alignments. Information on these features are included in Section 6.3 and 6.4 of this document.

Table B-14: Priority Marine Features which intersect EGL 5 marine route alignments

Feature	Protected Site	Marine route alignments that intersect feature
North Sea glacial tunnel valleys	Holderness Offshore MCZ	ENG B

Feature	Protected Site	Marine route alignments that intersect feature
Ocean Quahog	Holderness Offshore MCZ	ENG A, ENG B, ENG C, ENG D, ENG E
	North East of Farnes HPMA	**0.5km away**
Sandeel	-	All marine route alignments intersect potential sandeel grounds see Figure 6-3 (Drawing C01494-EGL3-FISH-001)

Ocean Quahog Aggregations

Ocean quahog is found around all British and Irish coasts, as well as offshore. Benthic surveys have shown a reduction in North Sea distribution between 1902-1986. The same surveys also show a reduction in species abundance between 1972-1980 and 1990-1994. It is thought that UK waters are likely to be a sink of new recruits, with larval settlement events originating from Iceland separated by long periods without successful recruitment (Witbaard and Bergman, 2003). These recruits are thought to be carried down the east coast of the UK and into the mid and southern North Sea where the slower moving waters inside gyres allow settlement to occur. Temperature is also thought to play an important role in the successful recruitment of ocean quahog, with increasing temperatures attributed as the cause of low recruitment success in North Sea populations (Witbaard and Bergman, 2003). As the seas around the UK warm, it is expected that southerly populations of Ocean quahog may experience increased recruitment failure resulting in a range contraction. Recovery of the feature within a site is therefore likely to be reliant on an infrequent and unpredictable supply of recruits from elsewhere and highly dependent on wider environmental pressures, such as climate change.

As a burrowing species, extent and distribution of supporting habitats will be important in governing the extent and distribution of the species. ocean quahog has been found in a range of sediments, from coarse clean sand to muddy sand in a range of depths typically from 4 m to 482 m deep, but most commonly between 10 m to 280 m (Thorarinsdóttir and Einarsson, 1996; OSPAR, 2023; Tyler-Walters and Sabatini, 2017). Ocean quahog is thought to have a high sensitivity to physical loss of habitat (Tyler-Walters and Sabatini, 2017). It is therefore important to conserve the extent and distribution of supporting habitats to provide the best chance of any potential settlement for new recruits and to retain existing individuals (JNCC, 2018b).

Species of Conservation Importance

Marine Mammals

A number of marine mammals are present with the study area. The include cetaceans (whales, dolphins and porpoises), pinnipeds, and otters. The most frequently observed species are harbour porpoise, which is a protected feature of the Southern North Sea SAC, with common dolphin, bottlenose dolphin, white-beaked dolphin, short-beaked common dolphin recorded occasionally. Other cetacean species are rare visitors to the study area, except for minke whale which is noted as a protected feature of the Southern Trench MPA (Hammond et al., 2021).

Cetacean species are known to be sensitive to underwater noise. For marine route alignments which cross protected sites which have a marine mammal as a designated feature the option appraisal should consider that it may be to demonstrate that no adverse effects will occur taking place during the relevant period / season, and to check any planned and ongoing projects in the area to ensure the combined effects do not impact the species.

The grey seal and harbour (common) seal are both known to be present within the study area throughout the year. Grey seal is a designated feature of Humber Estuary SAC and the Berwickshire and North Northumberland Coast SAC. The harbour seal are a designated feature of The Wash and North Norfolk Coast SAC. The study area is used widely by grey seal and harbour seal and consideration may need to be made to the timing of project activities in order to try and avoid breeding and moulting season, particularly in coastal areas and at known haul-out sites.

River Lamprey – Annex II Species

The river lamprey *Lampetra fluviatilis* is found in coastal waters, estuaries and accessible rivers. The species is normally anadromous (i.e., spawning in freshwater but completing part of its life cycle in the sea), and pollution or artificial obstacles such as weirs or dams impede migration.

Sites that hold healthy populations of river lamprey have clear water and suitable areas of gravels, silt or sand for spawning. The Humber Estuary SAC includes river lamprey as a qualifying feature and is in proximity to the Theddlethorpe landfall and marine route alignment ENG Route C. The selected sites are generally extensive river systems, including important tributaries, which provide conservation of the range of habitat features required by the species. Marine sites that are considered important migration routes or feeding grounds for this species have also been selected, usually where they abut a freshwater site. Identification of suitable sites in some parts of the UK has been hampered by the absence of comparative population data, and by difficulties in identifying juvenile lampreys (JNCC, 2023e).

Sea Lamprey – Annex II Species

The sea lamprey *Petromyzon marinus* is a primitive, jawless fish resembling an eel. It is the largest of the lampreys found in the UK. It occurs in estuaries and easily accessible rivers, and is an anadromous species. Like the other species of lamprey, sea lampreys need clean gravel for spawning, and marginal silt or sand for the burrowing juvenile ammocoetes. Sea lampreys have a preference for warm waters in which to spawn. Features such as weirs and dams, as well as polluted sections of river, may impede migration to spawning grounds. In comparison to the river lamprey, sea lampreys seem to be relatively poor at ascending obstacles to migration, and are frequently restricted to the lower reaches of rivers. The Humber Estuary SAC includes sea lamprey as a qualifying feature (JNCC, 2023f) and is in proximity to the Theddlethorpe landfall and marine route alignment ENG Route C.

Priority Coastal Habitats

The priority coastal habitat 'Coastal Sand Dunes' is present at both the Theddlethorpe and Anderby Creek landfalls.

Other designations (NNR, Local Nature Reserve (LNR), WHS, AONB etc.)

Table B-15 identifies other designations identified at the proposed landfalls.

Table B-15: Other designations at the proposed landfalls

Site name	Description / designated features	Landfall Name	Relevant marine route alignments
Saltfleetby – Theddlethorpe Dunes (NNR) (now part of the Lincolnshire Coronation Coast NNR)	• Nature reserve designated for a variety of biological, social and economic features. • Beach to intertidal, mudflat to saltmarsh • Dunes with Sea buckthorn and other scrubs • Fixed dunes with herbaceous vegetation (grey dunes) • Humid dune slacks and fen community • Nationally scarce plants • Shifting dunes (stand, embryonic to mobile dunes)	Theddlethorpe	ENG C

Fish Spawning and Nursery Grounds

Using Information taken from the Cefas fisheries sensitivities maps (Coull et al., 1998; Ellis et al., 2012), the following species have spawning and/or nursery grounds which may intersect the marine route alignments:

- Anglerfish (nursery)
- Blue Whiting (nursery)
- Cod (spawning & nursery)
- Common Skate (spawning & nursery)
- European Hake (nursery)
- Haddock (nursery)
- Herring (spawning & nursery)
- Lemon Sole (spawning & nursery)
- Ling (nursery)
- Mackerel (spawning)
- Horse mackerel (nursery)
- Nephrops (spawning & nursery)
- Plaice (spawning & nursery)
- Sandeel (spawning & nursery)
- Sole (spawning & nursery)
- Spotted Ray (spawning & nursery)
- Sprat (spawning & nursery)
- Spurdog (nursery)
- Thornback Ray (spawning & nursery)
- Tope Shark (nursery)
- Whiting (spawning & nursery)

Consultation on spatial management measures for industrial sandeel fishing in English waters was concluded on 29 May 2023. The decision made by the UK government was to prohibit the fishing of sandeel within English Waters ICES Area 4 (North Sea) from 26th March 2024.

Appendix 2. Relevant Data – Socio-Economic Environment

Bathing Waters

Table C-1 presents the bathing waters in proximity to the Landfalls.

Table C-1: Bathing waters in proximity to Landfalls

Bathing Water Name	Area	Year of Designation	Status 2024	Landfall name	Distance from bathing water
Mablethorpe Town	Lincolnshire	1988	Excellent	Theddlethorpe	2.9 km
Huttoft and Marsh Yard (previously Moggs Eye)	Lincolnshire	1988	Excellent	Anderby Creek	2.3 km
Anderby	Lincolnshire	1988	Excellent	Anderby Creek	0.76 km

Infrastructure

Cables

There are various telecommunications and power cables that cross the marine route alignments. Table C-2 provides a list of all cable crossings as identified by Intertek.

Table C-2: Cable crossings

Type	Status	Asset Name
Power	Proposed	Aminth Interconnector
Power	Proposed	Atlantic Super Connection
Power	Active	Blyth Demo Phase 1
Power	Proposed	Cambois Connection Export Cables
Power	Proposed	Continental Link
Power	Active	Dudgeon Export A
Power	Active	Dudgeon Export B
Power	Active	Dudgeon Inter Array
Power	Proposed	Eastern Green Link 1
Power	Proposed	Eastern Green Link 2
Power	Proposed	Eastern Green Link 3
Power	Proposed	Eastern Green Link 4
Power	Active	Humber Gateway Export Cable
Power	Active	Inner Dowsing Export Cable
Power	Active	Lincs Export Cable
Power	Active	Lynn Export Cable
Power	Proposed	Ossian Export Cables (x3 assumed)
Power	Active	Race Bank Export Cable
Power	Active	Sheringham Shoal Export Cable
Power	Under construction	Sofia Export Cable
Power	Active	Teesside Export Cable

Type	Status	Asset Name
Power	Active	Triton Knoll Export Cable
Power	Active	Triton Knoll Interarrays
Power	Active	Westernmost Rough Export Cable
Power	Active	Hornsea 1 Centre Export Cable
Power	Active	Hornsea 1 East Export Cable
Power	Active	Hornsea 1 West Export Cable
Power	Active	Hornsea 2 South Export Cable
Power	Active	Viking Link
Power	Active	North Sea Link
Power	Proposed	Hornsea 3 Export Cables
Power	Under construction	Dogger Bank A Export Cable
Power	Under construction	Dogger Bank B Export Cable
Power	Under construction	Dogger Bank Export Cable
Power	Proposed	Hornsea 4 Export Cable
Telecom	Inactive	Stratos
Telecom	Active	Havhingsten 2.1
Telecom	Active	Havhingsten S2
Telecom	Active	Pangea North
Telecom	Inactive	Tata North Europe
Telecom	Inactive	UK-Denmark 4
Telecom	Inactive	UK-Germany 6
Telecom	Active	NO UK
Telecom	Inactive	CANTAT 3

Oil & Gas

There is significant oil and gas infrastructure off the east coast of Scotland and the North East of England. Table C-3 provides a list of all pipeline crossings as identified by Intertek.

Table C-3: Oil & gas pipeline crossings

Fluid	Status	Name
Gas/Chemical	Active	Amythyst to Easington
Gas	Active	Breagh
Gas	Active	Cleeton Cp to Dimlington
Gas	Not in use	Easington to Rough 47/3b
Oil	Active	Ekofisk 2/4j to Teesside
CCS	Agreement/Option for Lease	Endurance CO2 Storage Facility and Pipelines
Gas	Active	Everest to Teesside (Cats Trunkline)
Gas	Active	Helvellyn Pipeline
Mixed Hydrocarbons	Active	Juliet to Pickerill A Gas Pipeline
Mixed Hydrocarbons	Active	Langeled Pipeline
Gas	Active	Loggs Pp to Theddlethorpe Gas Line
Gas	Active	Loggs Pp to Theddlethorpe Meoh Line
Chemical (methanol)	Active	Mercury to Neptune
Gas	Active	Ravenspurn North Export Line
Gas	Active	Rose Pipeline

Fluid	Status	Name
Gas	Abandoned	Rough 47/3b Import/Export
Gas	Active	Theddlethorpe to Murdoch Md
Gas	Active	Theddlethorpe to Murdoch Md Meoh Line
Chemical (methanol)	Active	Viking Ar to Theddlethorpe Gas Line
Gas	Active	Viking Ar to Theddlethorpe Moeh Line
Chemical (methanol)	Active	Whittle to Cleeton
Condensate	Active	York Methanol Pipeline
Chemical (methanol)	Active	York Production Pipeline

Table C-4 lists the licensed oil and gas blocks which the marine route alignments cross.

Table C-4: Licensed oil & gas blocks which the marine route alignments cross

Marine route alignment	License block number
ENG Route A	47/9, 47/9c, 42/28d, 42/28a, 42/27
ENG Route B	42/28d, 42/28a, 42/27
ENG Route C	47/8c, 47/8b, 47/3h, 47/3b, 47/3f, 42/28d, 42/28a, 42/27
ENG Route D	47/9b, 47/9c, 42/28d, 42/28a, 42/27,
ENG Route E	47/9b, 47/9c, 42/28d, 42/28a, 42/27,
ENG Route F	47/5a, 42/30a, 42/29a, 42/28b
Offshore Route	42/7b,42/1b
SCOT Route A	N/A
SCOT Route B	N/A
SCOT Route C	N/A

Offshore Windfarms

Existing and Planned OWFs

Table C-5 shows the distances between the marine route alignment and the offshore wind farms within the Study Area. It should be noted that many of the projects still in a planning stage have not decided on export cable routes so there will be potential interactions with this. Where crossings of export cable routes are known these are listed in Table C-2 above.

Table C-5: Offshore Windfarms within study area and their distances to the marine route alignments

Name	Developer	Status	Project background	Distance to marine route alignments
Blyth	EDF Renewables	Inactive/Decommissioned		>20 km from all marine route alignments
Blyth Demo Phase 1	EDF Renewables	Operational		>20 km from all marine route alignments
Blyth Demonstration Phases 2&3	EDF Renewables	Consented		>20 km from all marine route alignments
Humber Gateway	Humber Wind Limited, operator RWE Renewables and Greencoat UK Wind Plc	Operational	Fully operational 2015.	ENG Routes A, B, C: 16.9 km

Name	Developer	Status	Project background	Distance to marine route alignments
				ENG Routes D, E, F: >20 km
Triton Knoll	Triton Knoll Offshore Wind Farm Ltd, owner J-POWER/Electric Power Development Co.,LTD, Kansai Electric Power Co., Inc	Operational	Fully operational 2022.	ENG Routes A, B, C: 8.9 km ENG Routes D, E: 7.3 km ENG Route F: 2.3 km
Race Bank	Ørsted Power (UK) Ltd, Macquarie Capital Group Limited & Spring Infrastructure Capital Co., Ltd	Operational	Fully operational 2018.	ENG Routes A, B, C, E: >20 km ENG Route D: 13.2 km ENG Route F: 0.6 km
Sheringham Shoal	Scira Offshore Energy Ltd, owners Equitix Limited Owner The Renewables Infrastructure Group Limited (TRIG), Equinor ASA (previously Statoil ASA), Green Investment Group (GIG)	Operational	Fully operational 2012.	ENG Routes A, B, C, D, E: >20 km ENG Route F: 18.3 km
Lincs	RES (Renewable Energy Systems Ltd) owners Ørsted Power (UK) Ltd & Green Investment Group (GIG)	Operational	Fully operational 2010.	ENG Routes A, B, D, E: 7.4 km ENG Route C: 19.1 km ENG Route F: 1.9 km
Inner Dowsing	GLID Wind Farms Topco Ltd owners BlackRock Investment Management (UK) Limited & Green Investment Group (GIG)	Operational	Fully operational 2009.	ENG Routes A, B, D, E, F: 9.1 km ENG Route C, Offshore Route, SCOT Routes A, B, C: >20 km
Lynn	GLID Wind Farms Topco Ltd owners BlackRock Investment Management (UK) Limited & Green Investment Group (GIG)	Operational	Fully operational 2009.	ENG Routes A, B, D, E: 15.6 km ENG Route C, Offshore Route, SCOT Routes A, B, C: >20 km ENG Route F: 14.1 km
Dudgeon	Equinor ASA (previously Statoil ASA)	Operational	Fully operational 2017.	>20 km from all marine route alignments
Hornsea 1 (Centre)	HORNSEA 1 LIMITED (formerly Heron Wind Limited), Owner Global Infrastructure Partners LLP, Ørsted A/S (formerly DONG Energy AS)	Operational	Fully operational 2019.	>20 km from all marine route alignments
Hornsea Project 2 – Phase 2 (Soundmark)	Breesea Limited, owner Ørsted (UK) Limited	Construction	.	>20 km from all marine route alignments
Hornsea Project 2 – Phase 3 (Sonningmay)	Breesea Limited, owner Ørsted (UK) Limited	Construction		>20 km from all marine route alignments

Name	Developer	Status	Project background	Distance to marine route alignments
Westermost Rough	Ørsted (UK) Limited	Operational	Fully operational 2015.	>20 km from all marine route alignments
Dogger Bank A	Dogger Bank Wind Farms, owners Equinor ASA (previously Statoil ASA) and SSE Renewables, ENI	Construction	Generated electricity for the first time in October 2023	>20 km from all marine route alignments
Dogger Bank B	Dogger Bank Wind Farms, owners Equinor ASA (previously Statoil ASA) and SSE Renewables, ENI	Construction	Expected to be fully operational in 2025.	>20 km from all marine route alignments
Hornsea Project Three (HOW03) -	Ørsted (UK) Limited	Government Support on Offer	Potentially operational 2025.	>20 km from all marine route alignments
Hornsea Project Four (HOW04)	Ørsted (UK) Limited	Planning		ENG Route A, B, C, D, E, Offshore Route, SCOT Routes A, B, C: >20 km
				ENG Route F: 14.2 km
Dogger Bank C	Dogger Bank Wind Farms, owners Equinor ASA (previously Statoil ASA) and SSE Renewables, ENI	Construction	Expected to be fully operational in 2027.	>20 km from all marine route alignments
Sofia	Sofia Offshore Wind Farm Limited, owner RWE Renewables	Construction	Expected to be fully operational in 2026.	>20 km from all marine route alignments
Sheringham Shoal Extension	Equinor ASA (previously Statoil ASA), Green Investment Group (GIG), Equitix Limited, The Renewables Infrastructure Group Limited (TRIG),	Planning		ENG Routes A, B, C, D, E, Offshore Route, SCOT Routes A, B, C: >20 km
				ENG Route F: 10.8 km
Dudgeon Extension	Equinor ASA (previously Statoil ASA), owners Masdar, China Resources (Holdings) Company Limited	Consent Application submitted		ENG Route A, B, C, D, E, Offshore Route, SCOT Routes A, B, C: >20 km
				ENG Route F: 7.8 km
Teesside	EDF Renewables	Operational	Fully operational in 2014	>20 km from all marine route alignments
R4 Project 3 (Outer Dowsing)	Outer Dowsing Offshore Wind owner GTR4 Limited JV with Corio Generation and Total Energies	Pre-planning Application		ENG Route A, C, D, E, Offshore Route, SCOT Routes A, B, C: >20 km
				ENG Route B: 16.1 km
				ENG Route F: 3.7 km
R4 Project 1 (Dogger Bank Southwest)	RWE	Pre-planning Application		>20 km from all marine route alignments
R4 Project 2 (Dogger Bank Southeast)	RWE	Pre-planning Application		>20 km from all marine route alignments

Restricted Areas

Dredging, spoil and dumping grounds

Table C-6 shows the dredging, spoil and dumping grounds that intersect or are in proximity to the marine route alignments.

Table C-6: Disposal sites within proximity of marine route alignments

Site Name and ID	Status	Cable Route	Distance from Cable Route	Length of cable intersecting site
Hornsea Disposal Site Area 2A, HU209	Closed	ENG Routes A, C, D, E	12.3 km	N/A
		ENG Route B	3.6 km	
		ENG Route F	N/A	2.1 km
		Offshore Route, SCOT Routes A, B, C	>20 km	N/A
Hornsea Disposal Area 1, HU205	Open	ENG Routes A, C, D, E	15.7 km	N/A
		ENG Route B	5.2 km	
		ENG Route F	1.7 km	
		Offshore Route, SCOT Routes A, B, C	>20 km	
Spurn Head, HU100	Closed	ENG Routes A, B, C	N/A	8.5 km
		ENG Routes D, E	N/A	4.0 km
		ENG Route F, Offshore Route, SCOT Routes A, B, C	>20 km	N/A
Triton Knoll, HU204	Closed	ENG Routes A, B, C	8.9 km	N/A
		ENG Routes D, E	7.3 km	
		ENG Route F	3.1	
		Offshore Route, SCOT Routes A, B, C	>20 km	
West of Inner Drowsing Bank, HU200	Not for waste disposal	ENG Routes A, B	3.1 km	N/A
		ENG Route C	11.8 km	
		ENG Route D, E	1.8 km	
		ENG Route F	1.1 km	
		Offshore Route, SCOT Routes A, B, C	>20 km	
Sheringham Shoal Drillings, HU123	Closed	ENG Routes A, B, D, E	7.5 km	N/A
		ENG Route C	19.2 km	
		ENG Route F	1.9 km	
		Offshore Route, SCOT Routes A, B, C	>20 km	
Race Bank OWF, HU126	Open	ENG Routes A, B, C, D, E, Offshore Route, SCOT Routes A, B, C	>20 km	N/A
		ENG Route F	0.3 km	
North West Zone Area 107, HU149	Closed	ENG Routes A, B, E	14.4 km	N/A
		ENG Route C, Offshore Route, SCOT Routes A, B, C	>20 km	
		ENG Route D	11.6 km	
		ENG Route F	3.2 km	
Dudgeon, HU145	Closed	ENG Routes A, B, C, D, E, Offshore Route, SCOT Routes A, B, C	>20 km	N/A
		ENG Route F	2.5 km	
Wash Bank, HU114	Closed	ENG Route A, B	10.5 km	N/A

Site Name and ID	Status	Cable Route	Distance from Cable Route	Length of cable intersecting site
		ENG Route C	14.7 km	
		ENG Route D	1.9 km	
		ENG Route E	4.3 km	
		ENG Route F	9.5 km	
		Offshore Route, SCOT Routes A, B, C	>20 km	
Conoco Pipeline Trench, HU201	Closed	ENG Routes A, B, C	18.1 km	N/A
		ENG Routes D, E, F, Offshore Route, SCOT Routes A, B, C	>20 km	
New Sand Hole, HU070	Closed	ENG Routes A, B, C	14.5 km	N/A
		ENG Routes D, E	16.6 km	
		ENG Route F, Offshore Route, SCOT Routes A, B, C	>20 km	
Babbage, HU203	Closed	ENG Routes A, C, D, E, Offshore Route, SCOT Routes A, B, C	>20 km	N/A
		ENG Route B	16.7 km	
		ENG Route F	13.3 km	

PEXA

There are numerous military exercise (PEXA) areas within the study area, these are listed below in Table C-7.

Table C-7: Military areas within the study area

Name	Category	Information
D613D	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 10000 feet; Maximum Flight Level: 66000 feet
D207: HOLBEACH	Firing danger area, small arms firing range, surface danger area, range	Authority: DIO SD TRG; Maximum Altitude: 23000 0; Activity: B,F,DUO
D307: DONNA NOOK	Surface danger area, firing danger area	Authority: DIO SD TRG; Maximum Altitude: 20000 0; Activity: F,B
D323F	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 25000 feet; Maximum Flight Level: 66000 feet
D323C	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D323D	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
X5309: ROWLSTON	Firing danger area, small arms firing range, surface danger area	Authority: ARMY DEPT; Activity: F
D323B	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D323E	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 25000 feet; Maximum Flight Level: 66000 feet
D323A	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 5000 feet; Maximum Flight Level: 66000 feet
D323G	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 25000 feet; Maximum Flight Level: 66000 feet

Name	Category	Information
D412: STAXTON	Surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 10000 0; Activity: AAF
D513B: DRURIDGE BAY	Surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 23000 0; Activity: F
D513: DRURIDGE BAY	Surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 10000 0; Activity: F
D513A: DRURIDGE BAY	Surface danger area, firing danger area	Authority: HQ Air; Maximum Altitude: 23000 0; Activity: F
D613D	AIAA - Areas of Intense Aerial Activity	Authority: HQ Air; Minimum Flight Level: 10000 feet; Maximum Flight Level: 66000 feet

Commercial Fisheries

Brown & May Marine Ltd were commissioned to undertake a fishing activity report for EGL3 and EGL 4 (Document ref EGL 3 & 4_Basline_Fisheries_Report_20230111_Final). The report was broken down into three sections, the Scottish landfall, mid-section and English landfall. A summary of the relevant sections (mid-section and Landfall) report from EGL 3 is provided below. The EGL 5 marine route alignments parallel EGL 3 and therefore the information is relevant.

Overview of fishing activity EGL 3 Mid-Section of Study Area

The mid-section route area included ICES rectangles 41E9, 41F0, 41F1, 40E9, 40F0, 40F1, 39E9, 39F0, 39F1, 38E9, 38F0, and 38F1

Intensity

Most of the fishing activity within the study area is carried out by UK vessels, with comparatively few non-UK vessels recorded in the area. The highest concentrations of sightings are in proximity to the coast and within the UK's 12NM limit. The marine route alignments are not located in this area. In relation to the study area, UK fishing vessels are lower with greater distance from the coast.

The surveillance sightings data broadly corresponds with the spatial patterns of fishing activity from the available AIS data for all European fishing vessels.

Larger vessel intensity:

- The value of demersal trawling activity by larger vessels appears to be most intense in close proximity to the coast and north-east of the study area.
- The majority of vessel activity is removed from the marine route alignments.
- Bottom otter trawling and otter twin trawling follow the same pattern as demersal trawling.
- Potting activity is most intense in the south of the study area, with some activity occurring nearby to the cable routes.

Type

The vessels operating in the study area are mostly potters/whelkers, drift netters and trawlers. The main fishing methods in the region of the marine route alignments is demersal trawls targeting nephrops. In the south of the study area, pots and traps catching edible crabs and lobsters are the main fishing method.

Value

The highest landing values are recorded in the south-west of the study area. In comparison, the east and north of the study area have much lower landing values.

Danish and Dutch landing values:

- The majority of Danish vessels were recorded in the east of the study area, where no marine route alignments cross.
- Most of the Danish vessels within the study area are bottom otter trawls.
- The highest value of landings from Dutch vessels are located in the south of the study area.
- Although Dutch vessels were recorded in low amounts, the marine route alignments do traverse this area.
- Most of the Dutch vessels are demersal and midwater trawls.

Overview of fishing activity EGL 3 Southern (English) Landfalls

The Southern (English) landfalls area included ICES rectangles 36E9, 36F0, 36F1, 35E9, 35F0, 35F1, 34E9, 34F0, and 34F1

Intensity

The highest concentrations of fishing activity within the study area is carried out by UK vessels, in proximity to the coast and within the UK's 12NM limit. Some French vessels are sighted just outside the 12NM limit. Both UK and French vessel intensity is close by to sections of the marine route alignments.

Activity is shown by UK, Dutch, Danish and Belgian vessels in the east of the study area, removed from the marine route alignments. The surveillance sightings data broadly corresponds with the spatial patterns of fishing activity from the available AIS data for all European fishing vessels. However, the AIS data does show high vessel activity in ICES 35F0, 36F0 and 36F1 – this is related to a construction project in 2021 that used fishing vessels as guard vessels. It can be concluded this is not representative of normal patterns of fishing activity across that section of the study area.

Larger vessel activity:

- The value of potting activity by larger vessels appears to be highest in the centre of the study area, where marine route alignments are located.
- Both demersal trawling and otter trawling vessels are located in the north-eastern sector of the study area.
- The majority of beam trawling activity is removed from the marine route alignments.

Type

The vessels operating in the study area are mostly potters/whelkers and scallop dredgers. A small concentration of trawling vessels are located in the north-east of the study area, away from the marine route alignments. Pots and traps catching lobsters and edible crabs tend to be the predominant fishing method where the marine route alignments are located.

Value

The highest landing values are recorded to the east of Grimsby, in close proximity to the marine route alignments.

Danish, Dutch, and Belgian landing values:

- The majority Belgian vessels were recorded in the east of the study area, away from the marine route alignments.
- Similar spatial pattern from the Dutch vessels.
- The majority of landings according to value are from bam trawls for both Belgian and Dutch vessels.
- Whereas the highest Danish landings in terms of value are located in the north of the study area, avoiding the marine route alignments.

Restricted Fishing Areas and Relevant Byelaws

Inshore Fisheries Conservation Authority

The study area includes several Inshore Fisheries Conservation Authority (IFCA) areas which have various byelaws. The byelaws may restrict areas of seabed from certain types of fishing, restrict the catching of certain species or ensuring that species of a minimum size are caught. The marine route alignments cross through the Eastern IFCA and lay offshore of the North Eastern IFCA.

The Eastern IFCA currently has 22 Byelaws which are available to view at: http://www.eastern-ifca.gov.uk/byelaws/. Of particular relevance are the following:

- Marine Protected Areas Byelaw 2018 – prohibits fishing within an area at the Horseshoe Point landfall to protect sea grass beds.
- Byelaw 12: Inshore trawling restriction – restricts certain fishing types along the Lincolnshire coastline off Anderby Creek and Theddlethorpe landfalls.

The North Eastern IFCA currently has 21 Byelaws which are available to view at: https://www.ne-ifca.gov.uk/byelaws. The North Eastern IFCA currently has 21 Byelaws which are available to view at: https://www.ne-ifca.gov.uk/byelaws. The marine route alignments avoid the majority of North Eastern IFCA waters, but marine route Alignments ENG Route A.1 and Eng Route A.2 cross the following byelaw areas:

- Trawling: Prohibition: Exceptions Byelaw III 2003
- Humber Estuary Fishing Byelaw XXIX

- Crustacea Conservation Byelaw XXVIII

MMO

As well as the regional IFCA's the Marine Management Organisation (MMO) also have Byelaws. They have nine Byelaws in total, of which one is within the study area. All byelaws can be viewed at https://www.gov.uk/guidance/marine-conservation-byelaws. The objective of the Inner Dowsing, Race Bank and North Ridge Special Area of Conservation (Specified Areas) Prohibited Fishing Gears Byelaw 2022 is to protect marine habitats which are designated features of the Inner Dowsing, Race Bank and North Ridge SAC; specifically sandbanks which are slightly covered by sea water all the time and *Sabellaria spinulosa* reefs.

Relevant Marine Plan

North East Offshore Marine Plan

The relevant policies for cables in the North East Offshore Marine Plan (HM Government, 2021) are summarised in Table C-10. A summary of the key policies that have been referred to when completing the option appraisal are also detailed in Table C-10, noting that this is not an exhaustive list.

Table C-8: North East Offshore Marine Plan policies

Policy Code	Policy Text
NE-CAB-1	Preference should be given to proposals for cable installation where the method of installation is burial. Where burial is not achievable, decisions should take account of protection measures for the cable that may be proposed by the applicant. Where burial or protection measures are not appropriate, proposals should state the case for proceeding without those measures.
NE-CAB-2	Proposals demonstrating compatibility with existing landfall sites and incorporating measures to enable development of future landfall opportunities should be supported. Where this is not possible proposals will, in order of preference: a) avoid b) minimise c) mitigate significant adverse impacts on new and existing landfall sites, d) if it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.
NE-CAB-3	Where seeking to locate close to existing sub-sea cables, proposals should demonstrate compatibility with ongoing function, maintenance and decommissioning activities of the cable.
NE-CO-1	Proposals that optimise the use of space and incorporate opportunities for co-existence and co-operation with existing activities will be supported. Proposals that may have significant adverse impacts on, or displace, existing activities must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.
NE-PS-1	In line with the National Policy Statement for Ports, sustainable port and harbour development should be supported. Only proposals demonstrating compatibility with current port and harbour activities will be supported. Proposals within statutory harbour authority areas or their approaches that determinentally affect safety of navigation, or the compliance of statutory harbour authorities with the Open Port Duty or the Port Marine Safety Code will not be authorised unless there are exceptional circumstances. Proposals that may have a significant adverse impact upon future opportunity for sustainable expansion of port and harbour activities, must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.
NE-MPA-1	Proposals that support the objectives of marine protected areas and the ecological coherence of the marine protected area network will be supported. Proposals that have adverse impacts on the objectives of marine protected areas must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate adverse impacts, will due regard given to statutory advice on an ecologically coherent network.

East Inshore and Offshore Marine plans

The relevant policies for cables in the East Inshore and Offshore Marine plan (HM Government, 2014) are summarised in Table C-11. A summary of the key policies that have been referred to when completing the option appraisal are also detailed in Table C-11, noting that this is not an exhaustive list.

Table C-9: East Offshore Marine Plan policies

Policy Code	Policy Text
CAB-1	Preference should be given to proposals for cable installation where the method of installation is burial. Where burial is not achievable, decisions should take account of protection measures for the cable that may be proposed by the applicant.
BIO-1	Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas (marine, terrestrial).
MPA-1	Any impacts on the overall Marine Protected Area network must be taken account of in strategic level measures and assessments, with due regard given to any current agreed advice121 on an ecologically coherent network.
GOV-2	Opportunities for co-existence should be maximised wherever possible.
GOV-3	Proposals should demonstrate in order of preference: a) that they will avoid displacement of other existing or authorised (but yet to be implemented) activities153 b) how, if there are adverse impacts resulting in displacement by the proposal, they will minimise them c) how, if the adverse impacts resulting in displacement by the proposal, cannot be minimised, they will be mitigated against or d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts of displacement
PS1	Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance should not be authorised in International Maritime Organization designated routes.
PS3	Proposals should demonstrate, in order of preference: a) that they will not interfere with current activity and future opportunity for expansion of ports and harbours, b) how, if the proposal may interfere with current activity and future opportunities for expansion, they will minimise this c) how, if the interference cannot be minimised, it will be mitigated d) the case for proceeding if it is not possible to minimise or mitigate the interference

Major Projects

A review of projects in England has been undertaken. Projects in this section may have a bearing on the cable landfall or offshore cable route. This considers:

- Cable landfall selection and de-selection and reasons behind these decisions on other projects.
- Stakeholder comments that may have a bearing on the proposed landfalls or offshore routes within 12NM.
- Seabed leases and how they interact.
- Decisions made on projects by the Marine Management Organisation (MMO) and any conditions that were placed on them which may be pertinent to the project.

It is recognised that since the development of the marine route alignments prior to June 2024 major developments in the region have provided further details on their individual schemes e.g., cable routes have been published or refined. The changes do not materially alter the conclusions of the assessment, although they would be used in future to refine the selected preferred marine route alignment e.g., to optimise infrastructure crossing locations. The sections below provide the most recent publicly available information as of March 2025.

Hornsea Project One and Two

Hornsea One became fully operational in 2019 and Hornsea Two slightly later in 2022. Both wind farms landfall at Horseshoe Point on the Lincolnshire coast on the edge of the Humber. Following stakeholder engagement with the Humber Port Authority the cable route was routed around the southern edge of the TSS to avoid interactions with vessel traffic (see Figure C-1 below). (Ørsted, 2021). Proposing marine route alignments through the TSS is likely to pose a consenting risk to the project.

During their investigations 13 landfall sites had been identified, of these two were immediately ruled out following site visits. One, Donna Nook was ruled out due the high level of sensitivities in the area and it was in the centre of military exercise area. The other

Cleethorpes was ruled out high level of local infrastructure such as fixed caravans which was not picked up during the desk study. Two other landfalls at Killingholme and Immingham were ruled as the jurisdictions for these sites were within the Humber Estuary Port Authority and the reluctancy of the harbour master to grant permission to have the cable within the estuary.

The chosen landfall of Horseshoe point, had challenging conditions and a longer cable corridor. But despite this it was chosen due to the fact there was no need for a land crossing of the Humber estuary for it to meet the grid connection at Killingholme which made it the preferred route.

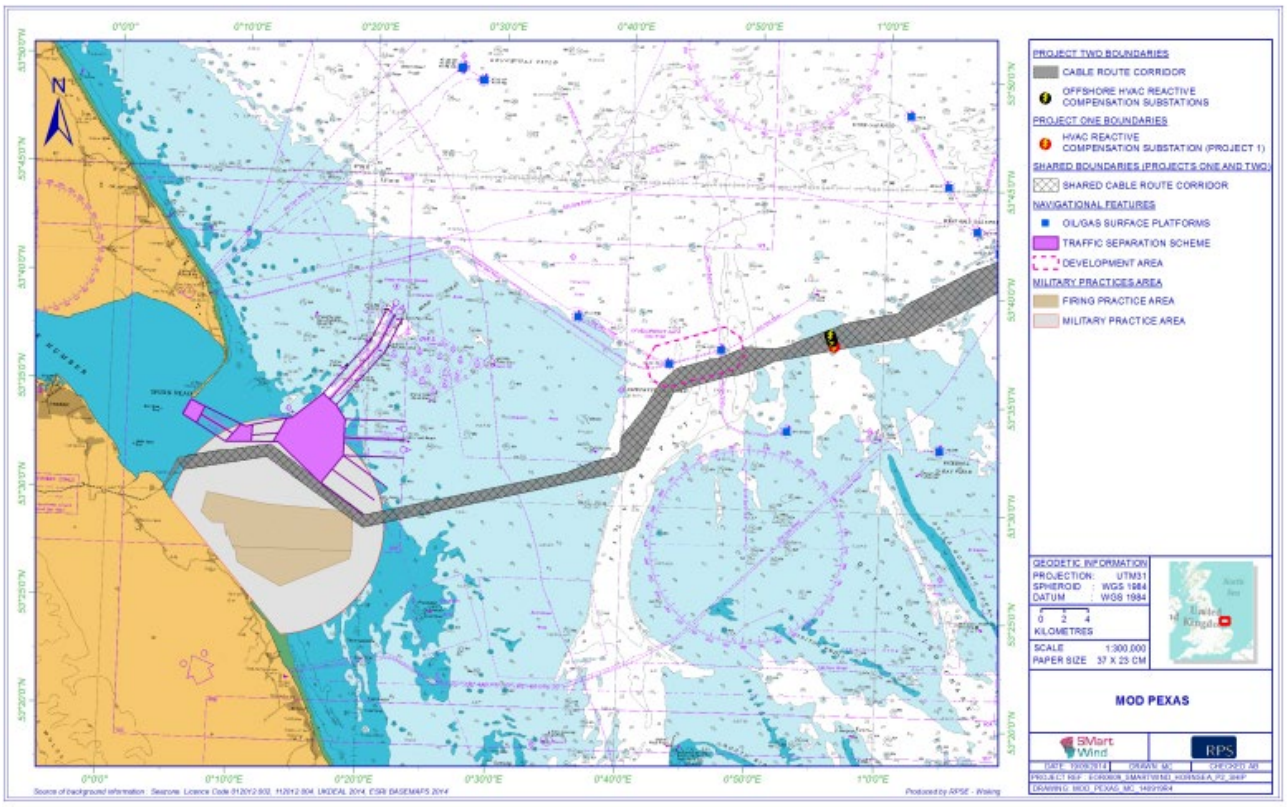


Figure C-1: Map illustrating the location of Hornsea two offshore wind farm export cables. Taken from Hornsea Offshore Windfarm Project Two, Environmental Statement Volume 5 – Offshore Annexes, Annex 5.7.1 Subzone 2 and Offshore Cable Route Navigational Risk Assessment, January 2015

Inner Dowsing and Lynn Wind Farm

Though these projects were originally planned as separate projects as round 1 wind farms but they were merged as one when they were constructed. They began fully operational in 2009. The site is only 5 km off the east coast of England near Skegness in Lincolnshire.

Dogger Bank A, Dogger Bank B and Dogger Bank C

Dogger Bank wind farms A, B and C are being built over three phases. They are situated in the Round 3 zone. Since there conception names have varied, this has been linked to which landfall convertor station they will link into either Creyke Beck, East Yorkshire or Teesside. Once all three site are developed they will create the worlds largest offshore wind farm.

Construction on Dogger Bank A in Spring 2022, with turbines generating electricity in October 2023 for the first time. Sofia OWF (previously Dogger Bank Teesside B) is expected to generate power in 2025 with commercial operations occurring in 2026; it makes landfall in Redcar, Teesside and joins the National Grid connection at an existing substation at Lackenby, Teesside. Dogger Bank C (previously known as Dogger Bank Teesside A) is expected to be commercially operational in 2027 and will mark the completion of works of the Dogger Bank wind farms (SSE Renewables, 2025).

The export cable routes for these projects were available from The Crown Estate and formed part of the baseline data set compiled by Intertek when developing the marine route alignments.

Dogger Bank South

The Dogger Bank South offshore wind farm projects are planned to be located approximately 100km off the northeast coast of England, in the North Sea. It will compromise of two offshore wind farms sites known as Dogger Bank Southwest and Dogger Bank Southeast, each hosting 100 turbines with a proposed capacity of up to 1.5GW. RWE own both projects, which are currently in the development phases. The PIER was submitted in spring 2023 and statutory consultation was held in June/July 2023.

A Development Consent Order application, accompanied by an Environmental Statement, was submitted 12th June 2024 and accepted by the Planning Inspectorate in July 2024. Following Stakeholder feedback, designs for the wind farm were changed reducing the footprint of the two proposed onshore converter stations. Formal Requests for Change were submitted on 10th January 2025 and accepted by the Examining Authority on 21st January 2025. The six-month Development Consent Order examination period started on 14th January 2025, following the conclusion of the Preliminary Meeting (previously started and adjourned on 22nd October 2024) (RWE, 2025).

The export cable routes for these projects were available from The Crown Estate and formed part of the baseline data set compiled by Intertek when developing the marine route alignments.

Hornsea Three Wind Farm

The Hornsea Three project will be located in the North Sea approximately 120 km off the Norfolk Coast. It was granted consent in December 2020 and is due to be operational by 2025. It has it grid connection at the Norwich Main Substation. Originally it was looking at landfall sites between Kings Lynn and Great Yarmouth, following a refinement process the coastline at Weybourne was chosen for the landfall. Concerns raised during the consultation process in relation to the export cable corridor was it is potential impact of Cromer Chalk Reef in the MCZ (Ørsted, 2023a)

Construction is still in the early stages for this project. Permanent ground works commenced for the onshore converter station Link 1 in January 2024 and in March 2024 for Link 2, with four HDD ducts successfully installed for both links (works completed January 2024) (Ørsted, 2025).

As part of its compensation plan Hornsea Three have established four artificial nesting structures to encourage the population growth of the Eastern Atlantic Kittiwake. This compensation is for potential collision impacts of breeding black-legged kittiwakes that are known to be near the Flamborough and Filey Coast SPA (Ørsted, 2020).

The export cable routes for these projects were available from The Crown Estate and formed part of the baseline data set compiled by Intertek when developing the marine route alignments.

Hornsea 4 Wind Farm

The Hornsea Four Windfarm will be located in the Southern North Sea and will connect to the National Grid at Creyke Beck. As with Hornsea Three they have put in place a number of compensation measure to compensate for potential impacts on specific seabird species due to its construction. They created a targeted consultation which suggested compensation measures of Offshore Nesting, Onshore nesting, Bycatch, predator eradication and Fish habitat management (Ørsted, 2021a).

Following the consultation but prior to obtaining consent, the fish habitat enhancement is being pursued 'without prejudice' resilience measures for the black legged kittiwake, northern gannet, common guillemot and razor bill, this is in the form of the planting of seagrass meadows. The planned seagrass meadows look to be planted in the Humber Estuary (Ørsted, 2021b). The first stage of this planting is on a 9.8 acre pilot area. Should Hornsea Four secure consent they will fund a further 74 acres, over the next seven years in partnership with the Yorkshire and Lincolnshire Wildlife Trusts in a project called Wilder Humber. The Humber Seagrass Restoration will focus on Spurn Point and would be a resilience measure for the offshore wind farm, providing potential new and improved nursery habitat for prey species that seabirds, specifically kittiwake, guillemot and razorbill, depend on.

Additionally, Ørsted are planting 3 hectares of salt marsh and planning to release 500,000 native oysters. The reintroduction of these native species will help to restore the estuary's ecosystem (Ørsted, 2022)

Consultation with Lincolnshire wildlife Trust identified Horseshoe Point as one of the target areas for seagrass planting.

The export cable routes for these projects were available from The Crown Estate and formed part of the baseline data set compiled by Intertek when developing the marine route alignments.

Dogger Bank D, also known as Gatroben

Dogger Bank D is the potential fourth phase of the Dogger Bank Offshore Wind Farms. It is at an early planning stage, with the Scoping Report submitted to the Planning Inspectorate in June 2024 (Dogger Bank D, 2025). In February 2024, it was confirmed that Dogger Bank D will connect into Birkhill Wood. Birkhill Wood is a proposed 400kV substation in East Riding, Yorkshire and is being developed by National Grid Electricity Transmission (Dogger Bank D, 2025). The proposed export cables route to a coastal location at Withow Gap, just south of Bridlington (see Figure C-2).

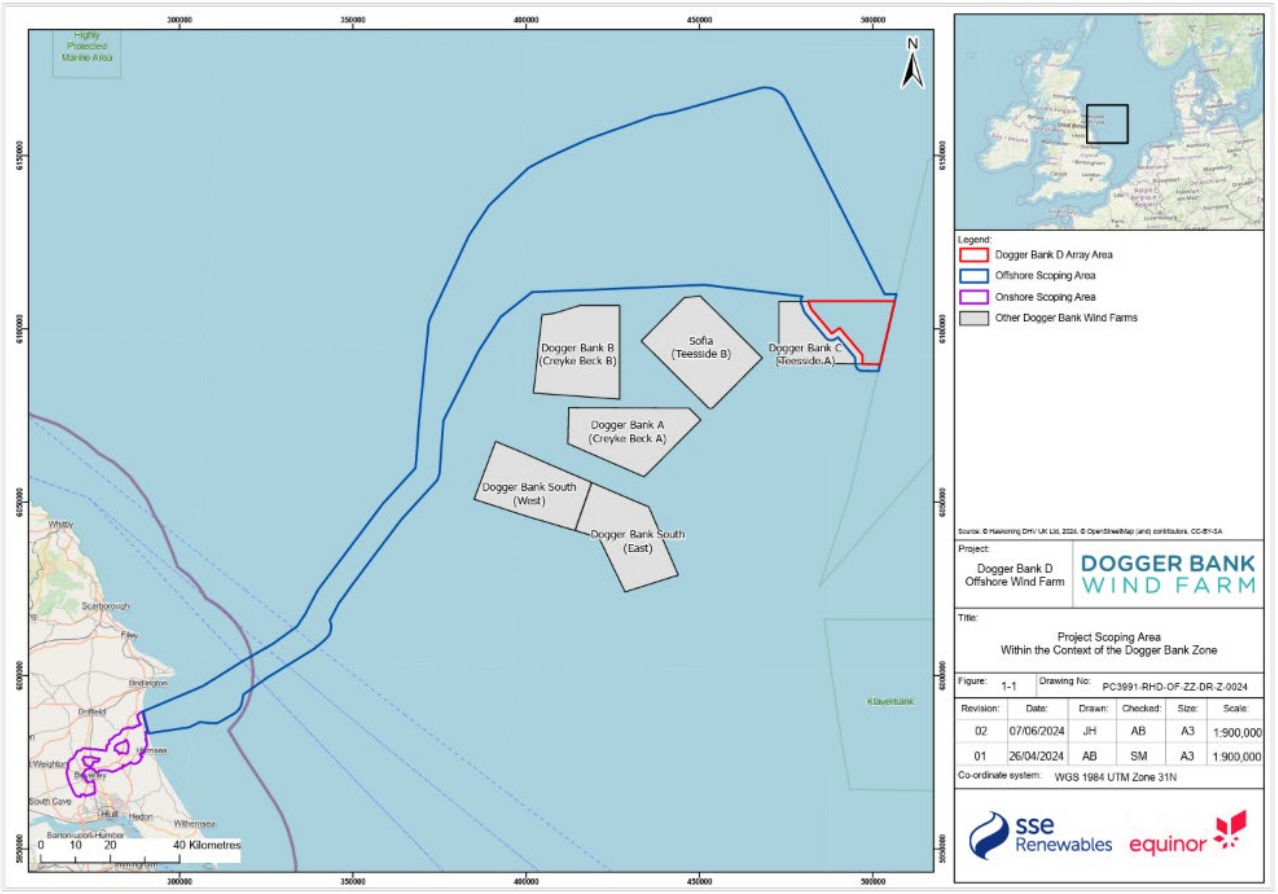


Figure C-2 Dogger Bank D proposed export cables route to a coastal location at Withow Gap, just south of Bridlington. Taken from Dogger Bank D, 2025.

Outer Dowsing

Outer Dowsing Offshore Wind farm is a DCO project and is currently progressing through DCO Examination. The Development Consent Order was submitted in March 2024 (Outer Dowsing, 2024) and was accepted by the Planning Inspectorate on 16th April 2024 (Outer Dowsing, 2024a). Figure C-3 below figure shows the draft Order Limits for the Scheme. It is sited off the coast of Lincolnshire with the landfall for the offshore transmission infrastructure at Anderby Creek as illustrated in Figure C-4.

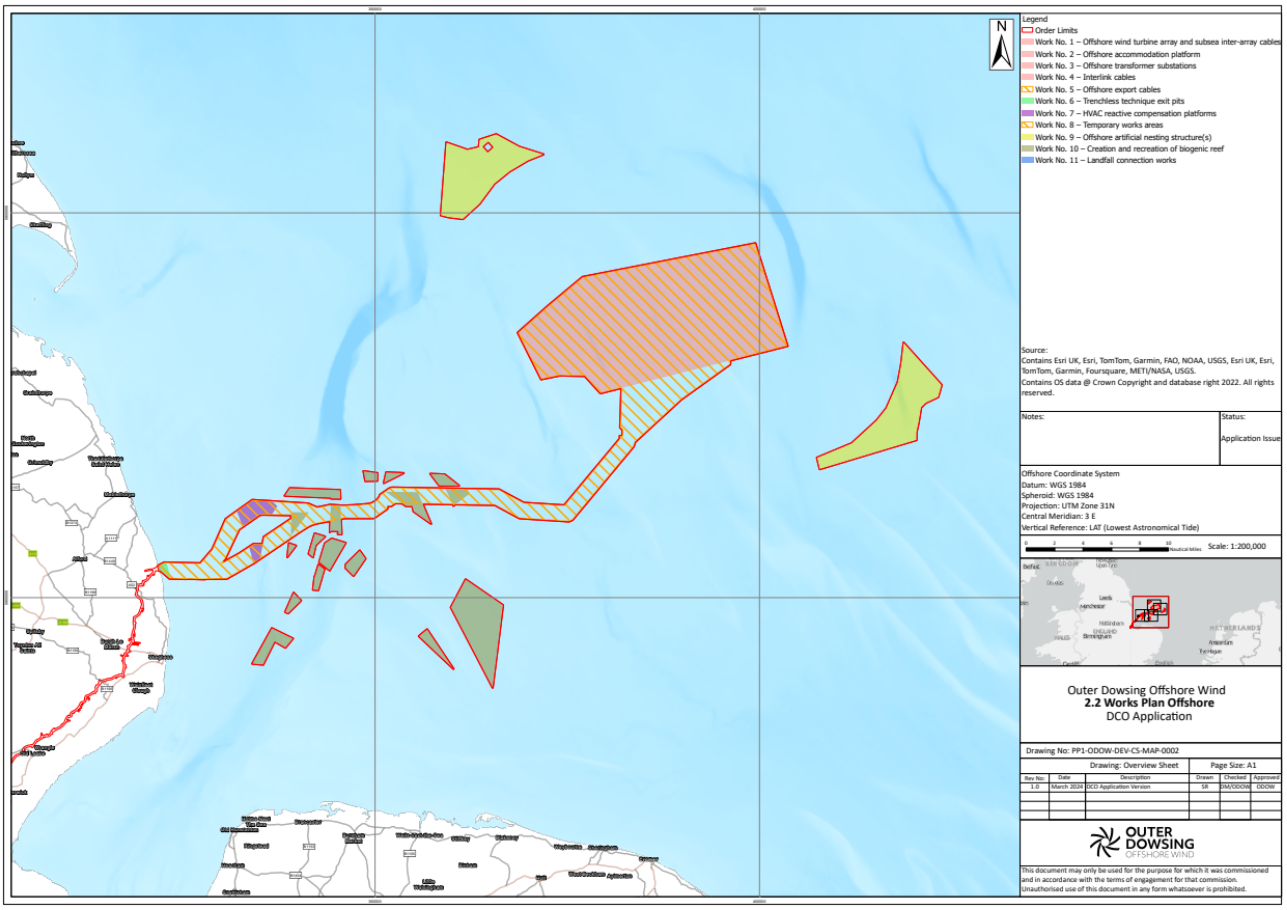


Figure C-3: Map illustrating the Order Limits for Outer Dowsing Offshore Wind Farm. Taken from Outer Dowsing,(2024)

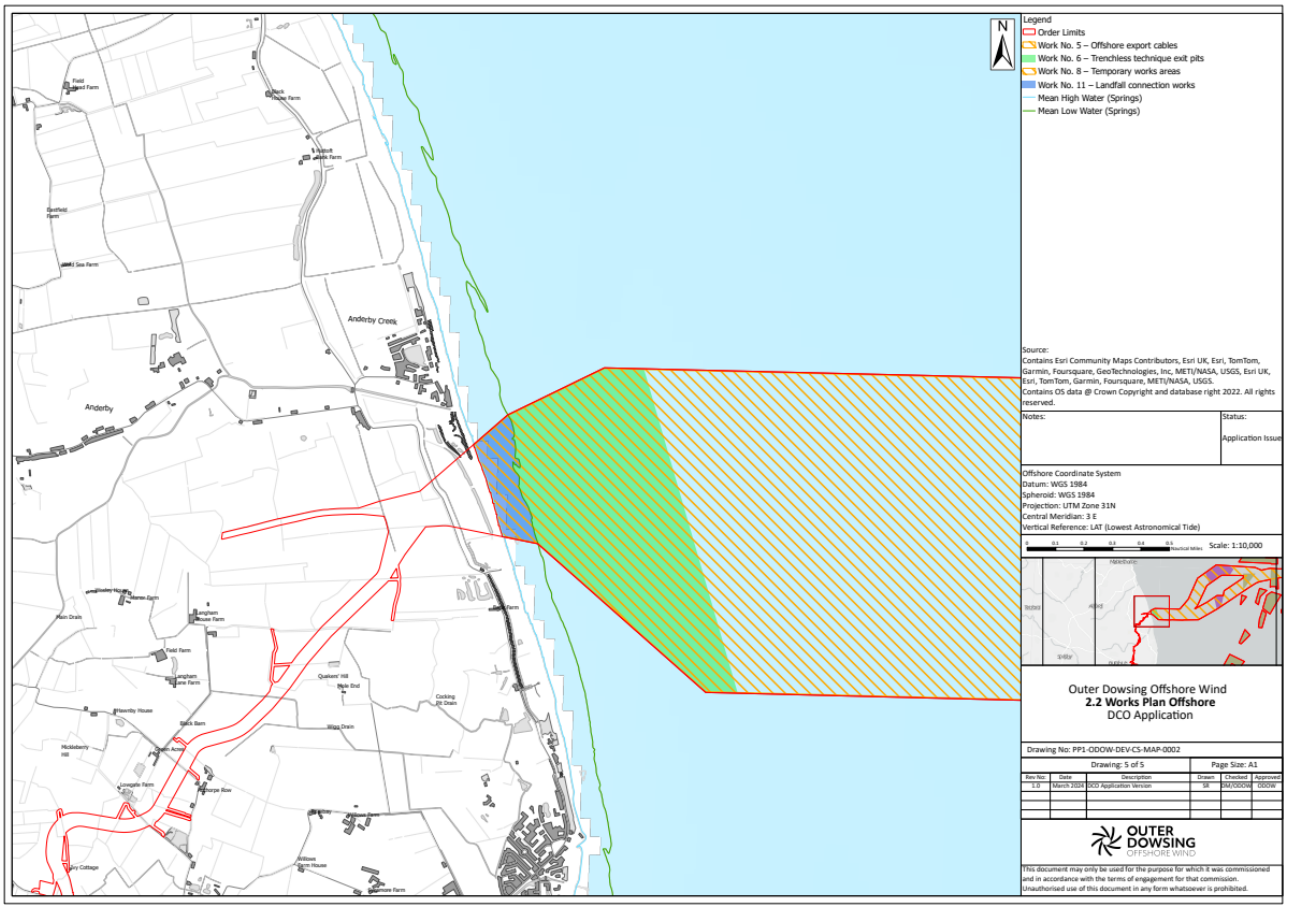


Figure C-4: Map illustrating the Order Limits for Outer Dowsing Offshore Wind Farm Landfall. Taken from Outer Dowsing,(2024)

Morven Floating Offshore Wind – Transmission System

Morven Offshore Wind Limited (MvOWL), a joint venture between bp and EnBW Energie Baden-Württemberg AG, is developing the Morven Offshore Wind Project; an offshore wind farm within Plan Option area E1 identified in the Scottish Government's Sectoral Marine Plan for Offshore Wind. The Morven Offshore Wind Farm is part of the Pathway to 2030 Holistic Network Design, in which National Grid aim to improve connections between offshore wind farms and their transmission networks. In July 2022 it was proposed that Morven Offshore Wind Farm would connect to the National Grid substation at Hawthorn Pit (see Figure C-5). In March 2024, The Beyond 2030 Report from National Grid ESO recommended a second grid connection point in the Branxton area, Southeast Scotland (RPS, 2025). The project is currently progressing with both grid connection options.

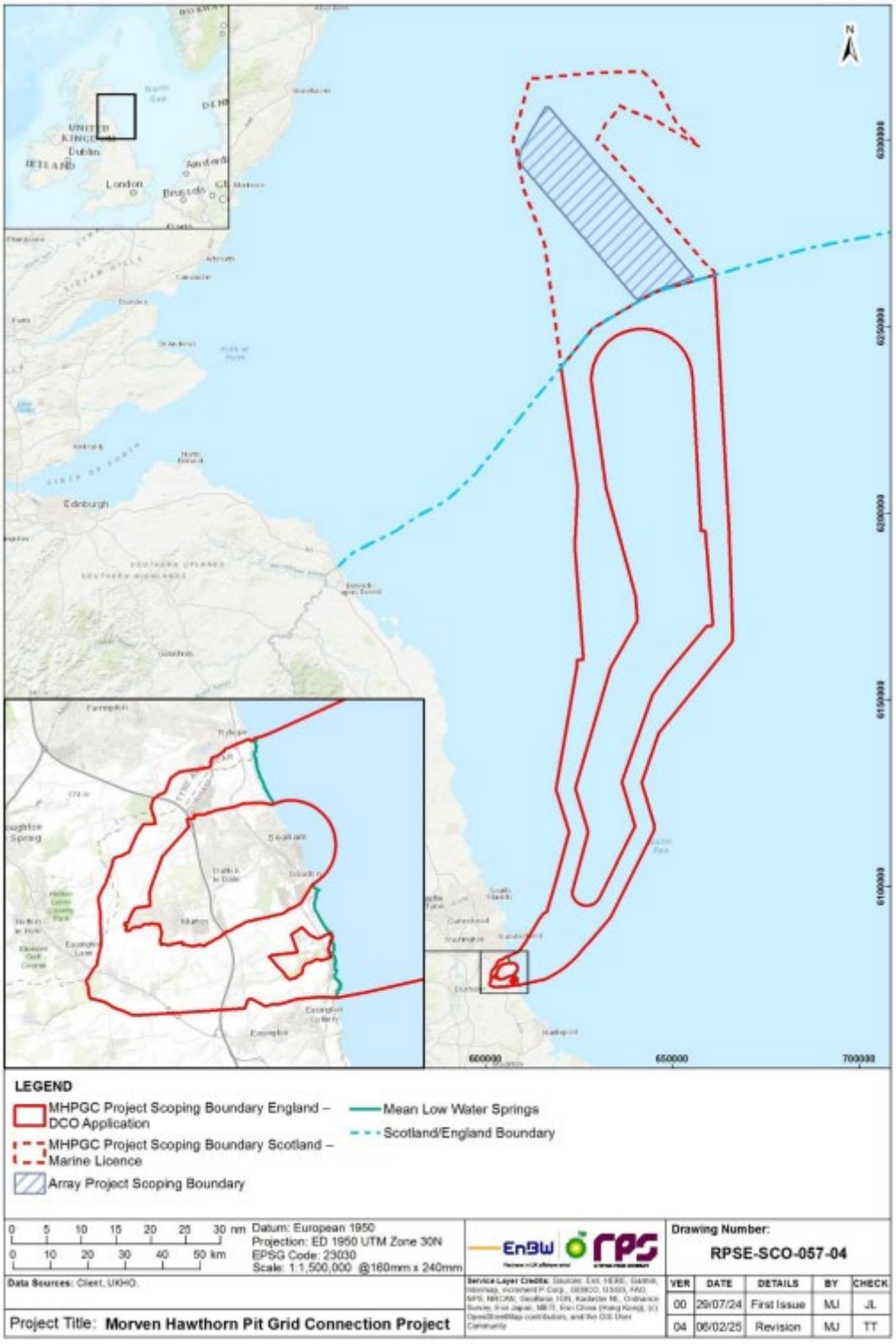


Figure C-5: Location of the Morven Export Cable Scoping Boundary. Taken from RPS (2025)

Carbon Capture and Offshore Wind Farm co-location

CCUS involves the capture of carbon dioxide (CO_2) emissions from industrial processes such as burning fossil fuels in power generation and then transporting it from where it was produced, via ship or in a pipeline, and stored deep underground in geological formations. In October 2021 the Government committed to deploy CCUS in a minimum of two industrial clusters by the mid-2020s, and four by 2030 at the latest (UK Parliament, 2021). In March 2023, The Crown Estate launched the first developer engagement for CCUS in collaboration with Crown Estate Scotland, conducting a survey to establish market requirements for seabed and subsurface carbon store development (The Crown Estate, 2023).

In order for the United Kingdom to meets it environmental targets the development of offshore wind farms and Carbon capture storage (CCS) sites are key. However, a recent case has brought to a head the issue of colocation. BP's Endurance CCS project and Ørsted's Hornsea Four project were both granted preliminary licenses more than 10 years ago for land in the North Sea for their projects which overlap by 110 sq. km. At the time this was not deemed to be a problem, however now it is realised that it is. The issue is that currently boats are required to monitor any potential carbon leaks from the CCS sites which is not easy to do within a turbine array and the potential of boats colliding with turbines fixed to the sea floor is an unwanted risk. Suggestions of spacing the turbine array further out and losing some of its potential capacity has not been a popular option to Ørsted who say it would reduce its overall capacity by 2.5% making it a less economically viable option. For BP the suggestion of using ocean bottom nodes to monitor the seabed instead of using boats at three to four times the cost is not popular (Reuters, 2023).

Currently both companies are working towards some sort of compromise which means they will be able to co-locate. This will not be the only time this issue will occur, there is also potential issues with the proposed Marram Offshore Wind Farm project and Acorn Carbon project in Scotland. However, to their advantage Shell is acting as one of the developers on both sites. To try and prevent such issues arising going forward the Crown Estate has set up a forum bringing together the North Sea Transition Authority, Carbon Capture and Storage Association, RenewableUK, OWIC, Crown Estate Scotland and the government (The Crown Estate, 2023a).

The Offshore Wind Carbon Capture Storage Colocation Forum commissioned two research projects, Project Colocate and Project Anemone, to demonstrate the best approach to colocation of offshore wind and CCS facilities. Project Colocate, delivered by the University of Aberdeen and funded by the Crown Estate, is investigating seabed viability for colocation of offshore wind and CCS in the East Irish Sea and Central North Sea. Project Anemone is investigating the mutual benefits of co-location offshore wind and CCS, with the aim of providing guidance of how these activities can run alongside one another (The Crown Estate, 2024)

Viking CCUS

There is one CCUS site off the east coast of Lincolnshire – Viking CCS project led by Harbour Energy. This project includes local industrial operators Humber Zero (Phillips 66's Humber Oil Refinery and VPI Immingham's gas-fired combined heat and power plant) EP UK Investment's gas-fired power plant and Prax's Lindsey Oil Refinery are working together with Harbour and plan to utilise our V Net Zero project to transport and store their captured CO_2 emissions. The project, if sanctioned, would progress towards first capture and storage from 2027 (Viking CCS, 2023). Figure C-6 below is from the Viking CCS project website which provides a schematic of the development and shows the location of the landfall just south of Theddlethorpe St Helen. The project will use the existing pipelines at Theddlethorpe with only new terrestrial pipelines required.

Figure C-6: Schematic of the Viking Link CCS development. Taken from Viking CCS, (2053)

Endurance

bp, Eni, Equinor, National Grid, Shell and Total have formed the Northern Endurance Partnership (NEP) to develop the offshore infrastructure to transport and store millions of tonnes of carbon dioxide (CO_2) emissions safely in the UK North Sea with the location shown in Figure C-7 (BP, 2023).

With bp as operator, the infrastructure will serve the proposed Net Zero Teesside (NZT) and Zero Carbon Humber (ZCH) projects that aim to establish decarbonized industrial clusters in Teesside and Humberside (see Figure C-8). Both aim to start up in 2026, with realistic pathways to achieve net zero as early as 2030 through a combination of carbon capture, hydrogen and fuel switching.

This is part of the £4.7 billion Industrial Strategy Challenge Fund set up by the government to address the biggest industrial and societal challenges using UK-based research and development.

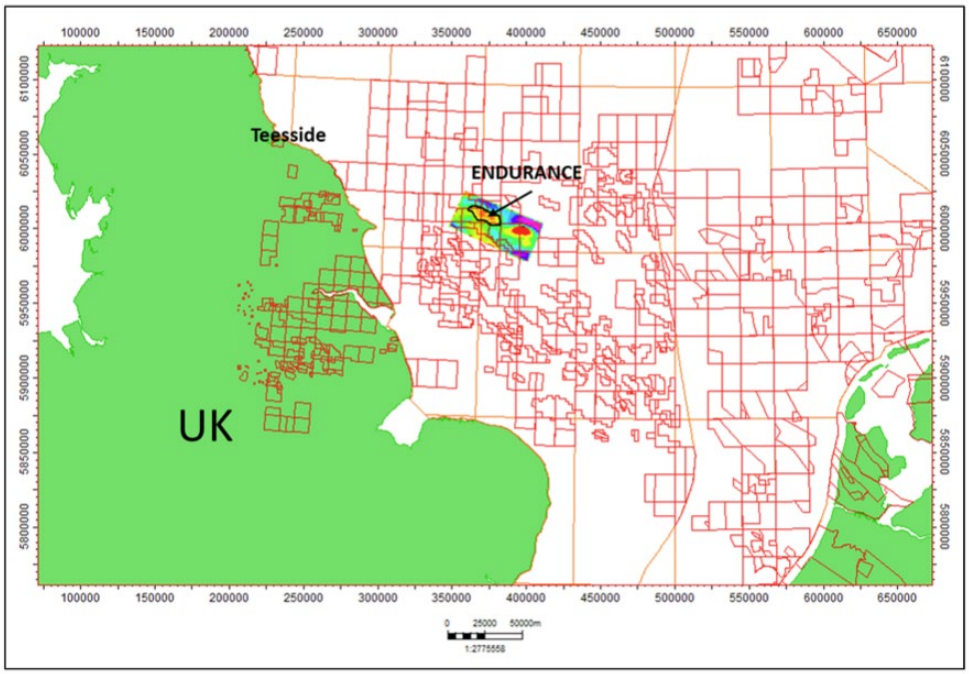


Figure C-7: Map illustrating the location of Endurance. Taken from Gov UK (2022)

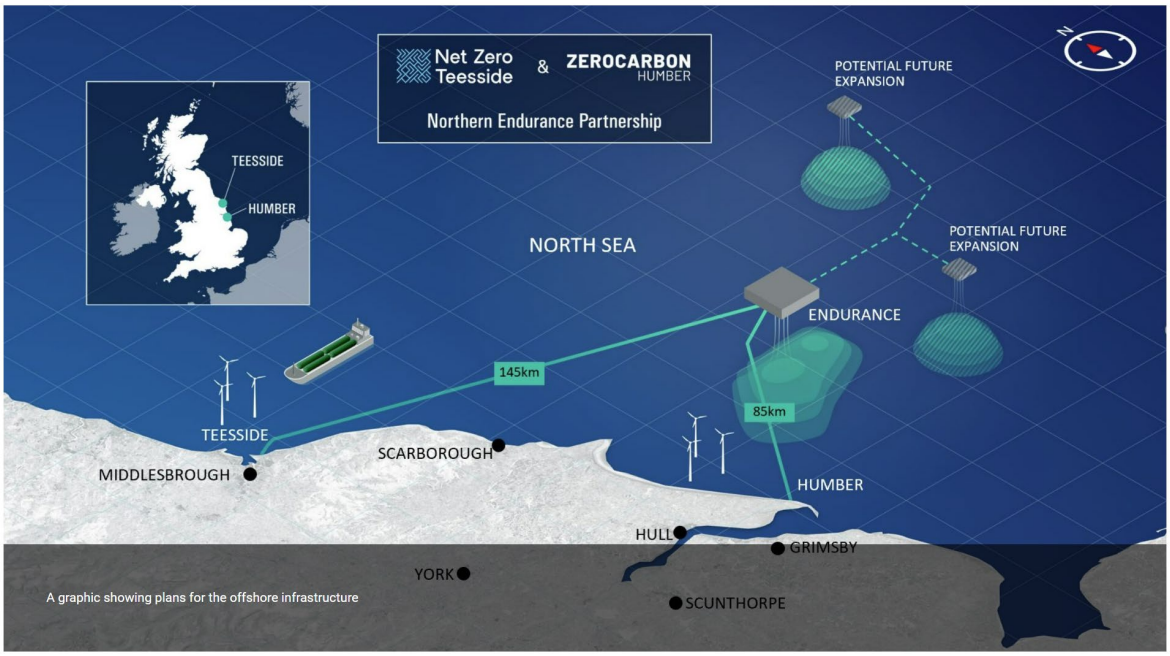


Figure C-8: Diagram showing the offshore infrastructure at Teeside and Humber.Taken from BP, (2023)

Humber Habitat Compensation and Mitigation Plan (HHCMP)

Various projects in the Humber estuary have occurred which has required compensation and mitigation plans. These include EGL3 the building of a new Port at Immingham Harbour and South Humber Gateway Development where existing habitats have been developed for commercial projects.

The compensation package for the new port focusses on the areas at Chowder Ness where the aim was to create 10.ha of mudflat and 0.8ha of saltmarsh and Welwick where the plan was to create between 15-38 ha of intertidal mudflat, 12-28 ha of saltmarsh and 4-10 ha of grassland. In all a total of 66 ha of farmland converted into a new inter-tidal habitat to compensate for the 22 ha of land lost to the new ports construction.

The compensation package for the South Humber Gateway development looked at developing four 20ha blocks of core wetland habitat surrounds by 150 m wetland habitat buffers which would be situated near key intertidal feeding grounds (localplan lincs, 2023). These plans were developed by North Lincolnshire Council, North East Lincolnshire Council, Natural England, Environment Agency, RSPB, Lincolnshire Wildlife Trust and Humber Nature partnership.

Saltfleet to Gibraltar Point Strategy (Lincshore Scheme)

The Environment Agency operates a flood management scheme along the Lincolnshire coast from Mablethorpe to Skegness. Beach management is undertaken on an annual basis starting April / May each year. A trailing suction hopper dredger is used to replenish sand on the beaches. Machinery and equipment is delivered to the beach at Huttoft using a direct access route to the beach at Moggs Eye. The nourishment in carried out in combination with a routine maintenance programme for the hard sea defences (Environment Agency, 2025)

Geological Waste Disposal Facility

RWM is in early-stage discussions with Lincolnshire County Council to see if they are interested in forming or joining a local Working Group as part of a national project to find a location for a Geological Disposal Facility (GDF) (Gov UK 2021). In the discussions with Lincolnshire County Council the former Theddlethorpe gas terminal has been identified as a possible site of interest. The project is in a very early stage with no publicly available information on locations or project boundaries.

Appendix References

BP (2023) New collaboration to develop offshore CCUS infrastructure Available at: https://www.bp.com/en/global/corporate/news-and-insights/reimagining-energy/northern-endurance-partnership-to-develop-offshore-ccus-infrastructure.html [Accessed February 2025]

Coull, K.A., Johnstone, R. and Rogers, S.I. (1998). Fisheries Sensitivity Maps in British Waters. Available at: https://www.cefas.co.uk/media/o0fgfobd/sensi_maps.pdf [Accessed February 2025]

DEFRA (2023) Highly Protected Marine Areas: North East of Farnes Deep. Available at: https://www.gov.uk/government/publications/highly-protected-marine-areas-north-east-of-farnes-deep [Accessed February 2025]

Dogger Bank D (2025) Dogger Bank D - Consultation. Available at: https://doggerbankd.com/news/scoping-report-submitted-for-proposed-dogger-bank-d-wind-farm/ [Accessed February 2025]

Dogger Bank D (2025). Introducing dogger bank D windfarm Available at: https://doggerbankd.com/ [Accessed February 2025]

Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. (2012). Spawning and nursery grounds of selected fish species in UK waters. Available at: https://www.cefas.co.uk/publications/techrep/techrep147.pdf [Accessed February 2025]

Environment Agency (2025) Saltfleet to Gibraltar Point Startegy Enhancing the Lincolnshire Coast. Available at: https://consult.environment-agency.gov.uk/lincolnshire-and-northamptonshire/sgp-lbm/ [Accessed February 2025]

Gov UK (2021) RWM Looking at GDF in Lincolnshire. Available at: https://www.gov.uk/government/news/rwm-in-early-discussions-with-lincolnshire-county-council-about-gdf [Accessed February 2025]

Gov UK (2022) Endurance Storage Development Plan Key Knowledge Document. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1079825/NS051-SS-REP-000-00010-Storage_Development_Plan.pdf [Accessed February 2025]

Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Börjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M., Scheidat, M. and Teilmann, J., 2021. Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Wageningen Marine Research.

HM Government, (2014) East Inshore and Offshore Marine plan. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312496/east-plan.pdf [Accessed February 2025]

JNCC (2013) Swallow Sand Marine Conservation Zone Site Summary Document. Available at: https://data.jncc.gov.uk/data/e708f8ce-60f7-4933-9bd0-aa7181c116f5/SwallowSand-SiteSummaryDocument.pdf [Accessed February 2025]

JNCC (2014) Quantifying usage of the marine environment by terns Sterna sp. around their breeding colony SPAs. Available at: Quantifying usage of the marine environment by terns Sterna sp. around their breeding colony SPAs (jncc.gov.uk) [Accessed February 2025]

JNCC (2015a) Humber Estuary SAC – Standard form: Available at: UK0030170.pdf (jncc.gov.uk) [Accessed February 2025]

JNCC (2016) JNCC Report No: 574 An assessment of the numbers and distributions of wintering red-throated diver, little gull and common scoter in the Greater Wash. Available at: An assessment of the numbers and distributions of wintering red-throated diver, little gull and common scoter in the Greater Wash (jncc.gov.uk) [Accessed February 2025]

JNCC (2017) Swallow Sand MCZ. Available at: https://jncc.gov.uk/our-work/swallow-sand-mpa/ [Accessed February 2025]

JNCC (2018) Greater Wash SPA. Available at: Greater Wash SPA | JNCC - Adviser to Government on Nature Conservation [Accessed February 2025]

JNCC (2018a) Conservation objectives for Swallow Sand Marine Conservation Zone. Available at:https://data.jncc.gov.uk/data/2cfe24e5-b3c4-4670-b085-e6766c0930b8/SwallowSand-2-ConservationObjectives-v1.0.pdf [Accessed February 2025]

JNCC, (2019) Harbour Porpoise (*Phocoena phocoena*) Special Area of Conservation: Southern North Sea Conservation Objectives and Advice on Operations . Available at: Southern North Sea MPA: Conservation Objectives And Advice On Operations (jncc.gov.uk) [Accessed February 2025]

JNCC (2019b) Holderness Offshore MCZ Feature Map. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805478/holderness-offshore-mcz-feature-map.pdf [Accessed February 2025]

JNCC (2020) Holderness Offshore MPA. Available at: Holderness Offshore MPA | JNCC - Adviser to Government on Nature Conservation [Accessed February 2025]

JNCC (2023) North East of Farnes Deep MPA and HPMA . Available at: https://jncc.gov.uk/our-work/north-east-of-farnes-deep-mpa-and-hpma/ [Accessed February 2025]

JNCC (2023a) Conservation Advice for North East of Farnes Deep Highly Protected Marine Area. Available at: https://data.jncc.gov.uk/data/5c5def7f-e1a0-4a7f-8078-a0ff3050a4fb/north-east-of-farnes-deep-hpma-conservation-advice-v1-0.pdf [Accessed February 2025]

JNCC (2023b) Southern North Sea MPA. Available at: https://jncc.gov.uk/our-work/southern-north-sea-mpa/#:~:text=The%20Southern%20North%20Sea%20SAC%20lies%20along%20the%20east%20coast,of%20harbour%20porpoise%20Phocoena%20phocoena. [Accessed February 2025]

JNCC (2023c). 1110 Sandbanks which are slightly covered by sea water all the time Available at: https://sac.jncc.gov.uk/habitat/H1110/ [Accessed February 2025]

JNCC (2023d), 1170 Reefs. Available at: https://sac.jncc.gov.uk/habitat/H1170/ [Accessed February 2025]

JNCC (2023e) River Lamprey *Lampetra fluviatilis. Available at: https://sac.jncc.gov.uk/species/S1099/* [Accessed February 2025]

JNCC (2023f) Sea lamprey *Petromyzon marinus* Available at: https://sac.jncc.gov.uk/species/S1095/ [Accessed February 2025]

Lincs Wildlife trust, (2023) Saltfleetby - Theddlethorpe Dunes. Available at: https://www.lincstrust.org.uk/nature-reserves/saltfleetby-theddlethorpe-dunes#:~:text=The%20total%20area%20within%20the,freshwater%20marshes%20and%20sand%20dunes [Accessed February 2025]

localplan lincs (2023) The South Humber Gateway Mitigation Strategy. Available at: https://localplan.northlincs.gov.uk/evidence/shb_mitigation_report.pdf [Accessed February 2025]

Natural England (2010). Humber Estuary - 2000480 SSSI - Grimsby Dock to Humber Mouth Subtidal (185). Available at: Unit detail (naturalengland.org.uk) [Accessed February 2025]

Natural England (2011) Saltfleetby - Theddlethorpe Dunes National Nature Reserve (NE152). Available at: https://publications.naturalengland.org.uk/publication/38015 [Accessed February 2025]

Natural England (2012) Humber Estuary EMS. Available at: https://publications.naturalengland.org.uk/publication/3060748 [Accessed February 2025]Natural England (2012a) Inner Dowsing, Race Bank and North Ridge cSAC (UK0030370A) – Map. Available at: http://publications.naturalengland.org.uk/publication/3288484 [Accessed February 2025]

Natural England (2014) Citation for Special Area of Conservation (SAC) Humber Estuary. Available at: http://publications.naturalengland.org.uk/publication/5009545743040512 [Accessed February 2025]

Natural England (2018) Humber Estuary SAC - Advice on Seasonality. Available at: Designated Sites View (naturalengland.org.uk) [Accessed February 2025]

Natural England (2019) European Site Conservation Objectives for Saltfleetby–Theddlethorpe Dunes and Gibraltar Point Special Area of Conservation Site code: UK0030270. Available at: http://publications.naturalengland.org.uk/publication/5300556352454656 [Accessed February 2025]

Natural England (2019a) European Site Conservation Objectives for Humber Estuary Special Protection Area Site Code: UK9006111. Available at: http://publications.naturalengland.org.uk/publication/5382184353398784 [Accessed February 2025]

Natural England, (2023) Inner Dowsing, Race Bank and North Ridge SAC - Supplementary Advice. Available at: https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK0030370&SiteName=inner+dowsing&SiteNameDisplay=Inner+Dowsing%2c+Race+Bank+and+North+Ridge+SAC&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality= [Accessed February 2025]

Ørsted (2020) Hornsea Project Three Offshore Wind Farm Response to the Secretary of Appendix 2: State's Minded to Approve Letter Kittiwake Compensation Plan. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-003246-HOW03-30Sep_Appendix%202%20Kittiwake%20Compensation%20Plan%20(06543754_A).pdf [Accessed February 2025]

Ørsted (2021) Horsea 1 Wind Farm. Available at: https://orsted.co.uk/energy-solutions/offshore-wind/our-wind-farms/hornsea1 [Accessed February 2025]

Ørsted (2021a) Hornsea Four Targeted consultation - Non-statutory consultation on potential Compensation Measures for seabirds, relating to the Hornsea Project Four Offshore Wind Farm, 05 August – 06 September 2021. Available at: https://orstedcdn.azureedge.net/-/media/www/docs/corp/uk/hornsea-project-four/compensation-measures-consultation/leaflet/hornsea-4-targeted-consultation-leaflet-aug-21.ashx?rev=0574e348dfe24948b88678049cde68cc&hash=CA7E09B4909102EFEFB13AF3A8B3E3CB [Accessed February 2025]

Ørsted (2021b) Hornsea Project Four: Derogation Information Volume B2, Annex 8.6: Compensation measures for FFC SPA: Fish Habitat Enhancement: Roadmap. Available at: Test (planninginspectorate.gov.uk) [Accessed February 2025]

Ørsted (2022) Restoring biodiversity around the Humber Estaury Available at: https://orsted.com/en/sustainability/nature/net-positive-biodiversity-impact/north-east-lincolnshire-biodiversity-restoration [Accessed February 2025]

Ørsted (2023a) Hornsea Project Three Offshore Wind Farm Environmental Statement: Volume 4, Annex 4.2 – Selection and Refinement of the Offshore ECR and HVAC Booster Station . Available at: https://orstedcdn.azureedge.net/-/media/www/docs/corp/uk/hornsea-project-three/application-documents/environmental-statement/how036442volume-4--42--selection-and-refinement-of-the-offshore-ecr-and-hvac-booster-station.ashx?la=en&hash=B91F71C319C44ACD2A6A2C0CF6F33EA9E866ECEA&hash=B91F71C319C44ACD2A6A2C0CF6F33EA9E866ECEA&rev=cd91c048c7904171abd7d831b29dcd7b [Accessed February 2025]

Ørsted (2025) Construction updates, Hornsea 3 Offshore Wind Farm. Available at: https://hornseaproject3.co.uk/construction-updates [Accessed February 2025]

OSPAR (2023) The OSPAR Commission List of Threatened and/or Declining Species & Habitats: Ocean quahog. Available at: Ocean Quahog | OSPAR Commission [Accessed February 2025].

Outer Dowsing (2023). Outer Dowsing Offshore Wind - Scoping Report. Available at: https://www.outerdowsing.com/document-library/ [Accessed February 2025]

Outer Dowsing (2024) Outer dowsing offshore wind submits development consent order application for 1.5 GW project (21/03/24). Available at: https://www.outerdowsing.com/news/outer-dowsing-offshore-wind-submits-development-consent-order-application-for-1-5-gw-project-19-03-24/ [Accessed February 2025]

Outer Dowsing (2024a) Outer Dowsing Offshore Wind Development Consent Order application accepted. Available at: https://www.outerdowsing.com/news/outer-dowsing-offshore-wind-application-accepted/ [Accessed February 2025]

PINNS (2022) Hornsea Project Four: Environmental Statement (ES) PINS Document Reference: A4.3.1 APFP Regulation: 5(2)(a) Volume A4, Annex 3.1: Selection and Refinement of the Cable Landfall. Available at: EN010098-000726-A4.3.1 ES Volume A4 Annex 3.1 Selection and Refinement of the Cable Landfall.pdf (planninginspectorate.gov.uk) [Accessed February 2025]

Ramsar (2007) Information Sheet on Ramsar Wetlands (RIS) – Humber Estuary. Available at https://rsis.ramsar.org/RISapp/files/RISrep/GB663RIS.pdf [Accessed February 2025]

Ramsar (2007a) map. Available at: https://rsis.ramsar.org/RISapp/files/1227/pictures/GB663_map1602.pdf [Accessed February 2025]

Reuters (2023) Two energy giants, two green projects: one double-booking in North Sea. Available at: https://www.reuters.com/business/energy/two-energy-giants-two-green-projects-one-double-booking-north-sea-2023-01-24/#:~:text=LONDON%2C%20Jan%2024%20(Reuters),the%20country%20meet%20renewable%20goals.

RPS (2025). Morven Hawthorn Pit Grid Connect Project - Environmental Impact Assessment Scoping Report. Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0210005-000004-Morven%20Hawthorn%20Pit%20Grid%20Connection%20Project%20Scoping%20Report.pdf [Accessed February 2025]

RWE (2025) *Welcome to DBS Offshore Wind*, *DBS Offshore Wind*. Available at: https://doggerbanksouth.co.uk/ [Accessed February 2025]

SSE Renewables (2025) Dogger Bank Offshore Wind Farm | SSE Renewables. Available at: https://www.sserenewables.com/offshore-wind/projects/dogger-bank/ [Accessed February 2025]

The Crown Estate (TCE) (2023) Carbon Capture, Usage and Storage. Available at: Carbon Capture, Usage and Storage | Carbon Capture, Usage and Storage (thecrownestate.co.uk) [Accessed February2025]

The Crown Estate, (2023a) Offshore wind and CCUS co-location. Available at: Offshore wind and CCUS co-location | Offshore wind and CCUS co-location (thecrownestate.co.uk) [Accessed February 2025]

The Crown Estate (2024) Offshore wind and carbon capture and Storage Colocation Forum Commissions Vital Research. Available at: https://www.thecrownestate.co.uk/news/offshore-wind-and-ccs-colocation-forum-commissions-vital-research-to-support [Accessed February 2025]

Thórarinsdóttir, G.G. and Einarsson, S.T. (1996) 'Distribution, abundance, population structure and meat yield of the Ocean Quahog, *arctica islandica*, in Icelandic Waters', *Journal of the Marine Biological Association of the United Kingdom*, 76(4), pp. 1107–1114. doi:10.1017/s0025315400040996.

Tyler-Walters, H. & Sabatini, M. 2017. Arctica islandica Icelandic cyprine. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [online]. Plymouth: Marine Biological Association of the United Kingdom. DOI https://dx.doi.org/10.17031/marlinsp.1519.2

UK Parliament, (2021) Climate Change Update - Statement made on 19 October 2021. Available at: Written statements - Written questions, answers and statements - UK Parliament [Accessed February 2025]

Viking CCS, (2023) Viking CCS. Available at: Viking CCS Project | Harbour Energy | Harbour Energy [Accessed February 2025]

Witbaard, R. and Bergman, M.J.N. (2003) 'The distribution and population structure of the bivalve arctica islandica L. in the North Sea: What possible factors are involved?', *Journal of Sea Research*, 50(1), pp. 11–25. doi:10.1016/s1385-1101(03)00039-x.

Wood, D., McIlwaine, P., Albrecht, J. & Downie, A. 2020. CEND0618 Survey Report: North East of Farnes Deep MCZ and Farnes East MCZ, JNCC/Cefas Partnership Report Series No. 22. JNCC, Peterborough. ISSN 2051-6711.

collaborative
environmental
advisers

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United

Registered in England and Wales
No. 4031152
nationalgrid.com