Gwynt Glas Offshore Wind Farm

Environmental Impact Assessment

Scoping Report

Pursuant to Regulation 10 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and Regulation 13 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended)

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Glossary

TERM	DEFINITION
Agreement for Lease (AfL)	Agreement under which exclusive rights to develop a floating Offshore Wind Farm (OWF) in the defined area and serve an option to move into a Lease are awarded to the Applicant. A separate Transmission Agreement for Lease may also be awarded, conferring equivalent rights in relation to the export cable route and associated transmission infrastructure.
Applicant	The legal entity submitting all relevant consent applications the Development, namely Gwynt Glas OWF Limited.
Anchors	Seabed-embedded or seabed-seated devices that hold the mooring lines in place, preventing floating offshore infrastructure from drifting under environmental forces.
Array Scoping Boundary	The area being considered at scoping stage for location of the array.
Cable protection	Measures and materials used to protect Inter-Array and / or Offshore Export Cables from external hazards, as well as protecting cables at infrastructure crossing points.
Cumulative Effect Assessment (CEA)	The assessment of the combined effect of the Development in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor / resource.
Development	Gwynt Glas OWF, encompassing generation assets within the array and associated transmission assets.
Environmental Statement (ES)	A document reporting the findings of the Environmental Impact Assessment (EIA) and produced in accordance with the EIA Directive as transposed into UK law by the Town and Country Planning (EIA) Regulations 2017 and, where applicable, the Infrastructure Planning (EIA) Regulations 2017.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics.
Excursion Limit	The excursion limit is the maximum distance a floating substructure can drift from its intended position.
Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.

TERM	DEFINITION
Floating substructure (FSS)	A floating structure which provides buoyancy and, in conjunction with the Station Keeping System (SKS), supports a superstructure (e.g. wind turbine, offshore substation or similar), and maintains movement within acceptable limits.
Haul Road	The track along the Onshore Export Cable Corridor used by traffic to access different sections of the Onshore Export Cable route for construction.
Horizontal Directional Drilling (HDD)	HDD is a trenchless technique to bring the Offshore Export Cables ashore at the Landfall and can be used for crossings other obstacles such as roads, railways and watercourses onshore.
Inter-Array Cables	The subsea power cables which electrically connect the wind turbines to each other and to the Offshore Transmission Station(s).
Interconnector cables	Subsea cables which link Offshore Transmission Station(s).
Jointing Bays	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into buried ducts.
Landfall	The point on the coastline at which the Offshore Export Cables are brought onshore, connecting to the onshore cables at the Transition Joint Bay (TJB) above mean high water.
Landfall Zone	The generic term applied to the entire landfall area between Mean Low Water Spring and the TJBs inclusive of all construction works. This Zone encompasses portions of both the Offshore Scoping Boundary and Onshore Scoping Boundary and includes the landfall compounds and the intertidal working area.
Link Boxes	An underground metal box placed within a concrete pit where the metal sheaths between adjacent export cable sections are connected and earthed, installed with a ground level manhole to allow access to the link box for regular maintenance or fault-finding purposes.
Main Construction Compound	A larger facility compared to Temporary Construction Compounds, used for receiving and storing materials, as well as accommodating temporary site offices and associated infrastructure.
Mean High Water Springs (MHWS)	The highest level reached by the sea at high tide during mean high water spiring tide, which is determined by averaging throughout the year, the

TERM	DEFINITION
	heights of two successive high waters during a 24-hour period in each month when the range of the tide is at its greatest.
Midpoint Compensation Reactor(s)	A Midpoint Compensation Reactor is an electrical device installed along an export cable route to help manage the reactive power generated in long subsea transmission systems.
Mooring lines	Structural lines that secure the floating offshore wind (FLOW) turbine to seabed anchors.
National Grid interface point	A National Grid interface point, or Point of Connection, is the physical location where a user's system (generator or consumer) connects to the transmission or distribution network.
Offshore Development Area	The Offshore Development Area is the boundary within which all offshore infrastructure required for the Projects would be located including the Landfall Zone, offshore wind generation units, offshore substatiosn and offshore export cables.
Offshore Export Cables	The cables which would bring electricity from the Offshore Transmission Station(s) to the onshore TJB Pit.
Offshore Export Cable Corridor	The area within which the Offshore Export Cable would be installed.
Offshore Export Cable Scoping Boundary	The area being considered at scoping stage for location of the Offshore Export Cable Corridor.
Offshore Scoping Boundary	The area being considered at scoping stage for location of all offshore infrastructure required for the Development, which extends seaward of MHWS.
Offshore Transmission Station(s)	A fixed structure located within the array, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore Transmission Owner	A licensed entity responsible for owning, operating, and maintaining the offshore electricity transmission assets that connect offshore generation (such as wind farms) to the onshore electricity network, receiving regulated revenues for these services.
Onshore Development Area	The Onshore Development Area would be for the Environmental Statement (ES) and describes the area within which all onshore infrastructure required for the Development would be located including Landfall, Onshore Export Cable Corridor, accesses, temporary construction

TERM	DEFINITION
	compounds, Onshore Transmission Station(s) and onward connection cable route to the National Grid.
Onshore Export Cable Corridor	The area within which the onshore export cable would be installed
Onshore Export Cables	Onshore Export Cables take the electric from the TJB to the Onshore Transmission Station(s) and then onwards connection to the National Grid Interface.
Onshore Scoping Boundary	The area being considered at scoping stage for location of all onshore infrastructure required for the Development which extends landward of MHWS.
Onshore Transmission Station(s)	A fixed installation located on land, containing electrical equipment used to receive power exported from offshore infrastructure, transform it to an appropriate voltage, and transmit it onwards through the onshore electricity network.
Onshore Transmission Station(s) Zone	Parcel of land within the Onshore Scoping Boundary where the Onshore Transmission Station(s) infrastructure would be located.
Other Deepwater Offshore Wind innovative foundation designs	Other Deepwater Offshore Wind innovative foundation designs (here after referred to as innovative deepwater solutions) is an emerging and new turbine technology relying on innovative solutions which may include, inter alia, turbines where support structures are not solely buoyant, and where there are rigid support structures transferring loads to the seabed.
Other trenchless techniques	Other techniques (aside from HDD) for installation of ducts or cables where trenching may not be suitable, such as micro tunnelling or auger boring.
Scoping Opinion	The report adopted by the Planning Inspectorate on behalf of the Secretary of State (SoS) in relation to this Scoping Report provided by the Applicant.
Scoping Report	The report that is produced in order to request a Scoping Opinion from the SoS as well as Natural Resources Wales (NRW) in relation to Marine Licensing.
Scour protection	Material installed around subsea infrastructure to prevent the removal of seabed sediment by hydrodynamic forces.

TERM	DEFINITION
Station Keeping System	The system (including mooring lines and anchors) used to hold a wind turbine within its excursion limit and maintain the intended orientation of the wind turbine substructure.
Subsea Transmission Station(s)	A Subsea Transmission Station(s) is a seabed-mounted electrical installation that collects power from offshore wind turbines and steps up the voltage for efficient export to shore via high-voltage export cables. It performs the same core function as an offshore substation, but without the need for a surface platform.
Subsea Power Collector(s)	A Subsea Power Collector(s) is a seabed-mounted electrical hub used to collect, route and distribute power from multiple Inter-Array Cables within an offshore wind farm. It operates at array voltage and does not normally include voltage transformation, providing layout flexibility and efficient cable management.
Survey Areas	Defined offshore and onshore areas where surveys (e.g. geophysical, geotechnical, and ecological) are undertaken to inform site selection, design, consenting, construction, and operation of the Development.
Temporary Construction Compound	An area set aside to facilitate the construction of the Development.
Topic specific Study Area	This is an area which is defined for each EIA topic which is intended to cover the area within which an effect can be reasonably expected.
Transition Joint Bay	The TJB is an underground structure at the landfall that houses the joint between the Offshore Export Cables and the Onshore Export Cables.
Trenching	Open cut method for cable or duct installation.
Wind turbine	A wind turbine converts wind energy into electrical energy. The main components include rotor assembly (composed of three blades and a hub); nacelle (containing the generator, shaft and gearbox, power electronic converter and transformer); and a tower (containing lifting equipment and switchgear).
Worst-case scenario	A concept that ensures the EIA is based on assessing the realistic worst-case scenario where flexibility, or a range of options, is sought as part of a consent application.

Acronyms

TERM	DEFINITION
AA	Appropriate Assessment
AARA	Air-to-Air Refuelling Area
ABP	Associated British Port
ADBA	Archaeological Desk-Based Assessment
AEP	Annual Exceedance Probability
AEZ	Archaeological Exclusion Zone
AfL	Agreement for Lease
AHVs	Anchor Handling Vessels
AI	Artificial Intelligence
AIL(s)	Abnormal Indivisible Load(s)
AIP	Aeronautical Information Publication
AIS	Automatic Identification System
AL(s)	Action Level(s)
ALARP	As Low as Reasonably Practicable
ALC	Agricultural Land Classification
AMSL	Above Mean Sea Level
AONB	Area of Outstanding Natural Beauty
AQMA(s)	Air Quality Management Area(s)

TERM	DEFINITION
ASIDOHL	Assessment of the Significance of the Impact of Development on Historic Landscape
ATC	Air Traffic Control
ATS	Air Traffic Services
BDMPS	Biologically Defined Minimum Population Scales
BERR	Department for Business, Enterprise and Regulatory Reform
BGS	British Geological Survey
BMV	Best and Most Versatile
BNL(s)	Basic Noise Level(s)
BS	British Standard
BSI	British Standards Institute
BTO	British Trust for Ornithology
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CBRA	Cable Burial Risk Assessment
CCC	Carmarthenshire County Council
CCR	Climate Change Resilience
CCRA	Climate Change Risk Assessment
CEA	Cumulative Effects Assessment

TERM	DEFINITION
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CfD	Contracts for Difference
CGNS	Celtic and Greater North Seas
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute of Archaeologists
CIRIA	Construction Industry Research and Information Association
CIS	Celtic and Irish Seas
CMRA	Coal Mining Risk Assessment
CMS	Construction Method Statement
CO_2e	Carbon dioxide equivalent
CoCP	Code of Construction Practice
COLREGs	International Regulations for Preventing Collisions at Sea
COPD	Chronic obstructive pulmonary disease
CPA	Coast Protection Act
CPT	Cone Penetration Test
CRM	Collision Risk Model
CRTN	Calculation of Road Traffic Noise

TERM	DEFINITION
CSIP	Cable Specification and Installation Plan
CTA	Control Area
CTMP	Construction Traffic Management Plan
DARC	Deep Space Advanced Radar Capability
DAS	Digital Aerial Survey
dB	Decibel
dB(A)	A-weighted decibel
DBA	Desk-Based Assessment
DCO	Development Consent Order
DEA	Drag Embedment Anchors
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DGC	Defence Geographic Centre
DIO	Defence Infrastructure Organisation
DMAP	Designated Maritime Area Plan
DMRB	Design Manual for Roads and Bridges
DNV	Det Norske Veritas
DrWPA	Drinking Water Protected Area

TERM	DEFINITION
DSLP	Development Specification and Layout Plan
DTI	Department of Trade and Industry
DTM	Digital Terrain Model
DWT	Deadweight Tonnage
EATM	Environmental Assessment of Traffic and Movement
eDNA	Environmental DNA (Deoxyribonucleic acid)
EDFps	EDF power solutions UK and Ireland
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
EMODnet	European Marine Observation and Data Network
EMP	Ecological Management Plan
END	Environmental Noise Directive
EPP	Evidence Plan Process
EPS	European Protected Species
EPUK	Environmental Protection United Kingdom
EQS	Environmental Quality Standards
ERCoP	Emergency Response and Cooperation Plan
ERL	Effects Range-Low

TERM	DEFINITION
ERN	Evidence Review Note
ES	Environmental Statement
ESB	Electricity Supply Board
ESDAL	Electronic Service Delivery for Abnormal Loads
ETG(s)	Expert Topic Group(s)
EU	European Union
EUNIS	European Nature Information System
EUSeaMap	European Seabed Habitat Map
FCA	Flood Consequence Assessment
FIR	Flight Information Region
FL	Flight Level
FLCP	Fisheries Liaison Coexistence Plan
FLO	Fisheries Liaison Officer
FLOW	Floating Offshore Wind
FLOWERs	Floating Offshore Wind Environmental Response to Stressors
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FOU	Floating Offshore Unit
FSA	Formal Safety Assessment
FSS	Floating Substructure
GB	Great Britain

TERM	DEFINITION
GBP	Great British Pound
GCR	Geological Conservation Review
GCT	General Chemical Test
GHG	Greenhouse Gas
GI	Ground Investigation
GIS	Geographic Information System
GLoMEEP	Global Maritime Energy Efficiency Partnerships Project
GLVIA3	Guidelines for Landscape and Visual Impact Assessment: Third Edition
GN46	LANDMAP Guidance Note 46
GT	Gross Tonnage
GVA	Gross Value Added
GW	Gigawatt
GWDTE	Groundwater Dependent Terrestrial Ecosystems
GWP	Global Warming Potential
GWSW_chem	Chemical Dependent Surface Water Body Status
HAT	Highest Astronomical Tide
HAZID	Hazard Identification
HDD	Horizontal Directional Drilling
HER	Historic Environment Record
HGV(s)	Heavy Goods Vehicle(s)

TERM	DEFINITION
HIA	Health Impact Assessment
HMPE	High Modulus Polyethylene
HPG	Historic Parks and Gardens
HRA	Habitat Regulations Assessment
HSE	Health and Safety Executive
HSI	Habitat Suitability Index
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IALA	International Association of Lighthouse Authorities
IAQM	Institute of Air Quality Management
IAMMWG	Inter-Agency Marine Mammal Working Group
IBTS	International Bottom Trawl Survey
ICES	International Council for the Exploration of the Sea
IEMA	Institute of Environmental Management and Assessment
IFP(s)	Instrument Flight Procedure(s)
IHBC	Institute of Historic Building Conservation
IHLS	International Herring Larvae Surveys
IMO	International Maritime Organisation

TERM	DEFINITION
INNS	Invasive Non-Native Species
ISEP	Institute of Sustainability and Environmental Professionals
IUCN	International Union for Conservation of Nature
JCP	Joint Cetacean Protocol
JNAPC	Joint Nautical Archaeology Policy Committee
JNCC	Joint Nature Conservation Committee
KIS-ORCA	The Kingfisher Information Service – Offshore Renewable & Cable Awareness project
km	Kilometre
km2	Square Kilometres
kV	Kilovolts
LAQM. TG (22)	Local Air Quality Management Technical Guidance
LAT	Lowest Astronomical Tide
LCAs	Landscape Character Areas
LCT	Landing Craft Tank
LFA(s)	Low Flying Area(s)
LiDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
LMP	Landscape Management Plan
LNR	Local Nature Reserve
LOA	Length Overall

TERM	DEFINITION
LPA	Local Planning Authority
LR5	Leasing Round 5
LVIA	Landscape and Visual Impact Assessment
m	Metre
m/s	Metres per Second
MADS	Major Accidents and Disasters
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi-Agency Geographic Information for the Countryside
MAIB	Marine Accident Investigation Branch
MAL	Maritime Archaeology Ltd
MarESA	Marine Evidence-based Sensitivity Assessment
MarLIN	Marine Life Information Network
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multi-Beam Echo Sounder
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MDA	Managed Danger Area
MDS	Maximum Design Scenario

TERM	DEFINITION
MEDIN	Marine Environmental Data and Information Network
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
ML	Marine licence
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPCP	Marine Pollution and Contingency Plan
MRA	Mining Remediation Authority
MU	Management Unit
MW	Megawatt
NAPPA	Noise Action Planning Priority Areas
NATS	National Air Traffic Services
NBB	Net Benefit for Biodiversity
NBN	National Biodiversity Network
NCN4	National Cycle Network 4
NCR	National Cycle Route
NE	Natural England
NERC	Natural Environment and Rural Communities
NESO	National Energy System Operator

TERM	DEFINITION
NH3	Ammonia
NIEA	Northern Ireland Environment Agency
NLCA	National Landscape Character Areas
nm	Nautical Miles
NNR	National Nature Reserve
NO_2	Nitrogen Dioxide
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NRMM	Non-Road Mobile Machinery
NRR	Night Rotary Region
NRW	Natural Resources Wales
NSIP(s)	Nationally Significant Infrastructure Project(s)
NSTA	North Sea Transitional Authority
nT	Nanotesla
NVC	National Vegetation Classification
NVSR	Noise and Vibration sensitive receptors
O&M	Operation & Maintenance
ONS	Office for National Statistics
OREIs	Offshore Renewable Energy Installations
OS	Ordnance Survey

TERM	DEFINITION
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
OWEKH	Offshore Wind Evidence and Knowledge Hub
OWF	Offshore Wind Farm
OWIC	Offshore Wind Industry Council
PAD	Protocol for Archaeological Discoveries
PAHs	Polycyclic Hydrocarbons
PCBs	Polychlorinated biphenyls
PCC	Pembrokeshire County Council
PCNP	Pembrokeshire Coast National Park
PCSM	Preliminary Conceptual Site Model
PDA(s)	Project Development Area(s)
PDE	Project Design Envelope
PEA	Preliminary Ecological Appraisal
PEMP	Project Environmental Management Plan
PEXA	Practice and Exercise Areas
PLGR(s)	Pre-lay grapnel run(s)
PM	Particulate Matter
PPW	Planning Policy Wales
PRA	Preliminary Risk Assessment

TERM	DEFINITION
PRoW	Public Rights of Way
PSD	Particle Size Distribution
PSR(s)	Primary Surveillance Radar(s)
PV	Photovoltaic
PVA	Population Viability Analysis
QSR	Quality Status Report
Ramsar Convention	The Convention on Wetlands of International Importance especially as Waterfowl Habitat
RBMP	River Basin Management Plan
RCAHMW	Royal Commission on the Ancient and Historical Monuments of Wales
RCP	Representative Concentration Pathways
RHL	Registered Historic Landscapes
RHPG	Registered Historic Parks and Gardens
RIAA	Report to Inform the Appropriate Assessment
RIGS	Regionally Important Geodiversity Sites
RLoS	Radar Line of Sight
RNAS	Royal Naval Air Station
RNLI	Royal National Lifeboat Institution
RRH	Remote Radar Head
RSPB	Royal Society for the Protection of Birds

TERM	DEFINITION
RYA	Royal Yachting Association
SAC	Special Areas of Conservation
SAR	Search and Rescue
SCAs	Seascape Character Areas
SCANS	Small Cetaceans in European Atlantic Waters and the North Sea
SCOS	Special Committee on Seals
sCRM	Stochastic Collision Risk Model
SD	Standard Deviation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SEPLA	Suction Embedded Plate Anchor
SF6	Sulphur Hexafluoride
SI_Chem	Chemical Saline Intrusion
SI_abs	Quantitative Saline Intrusion
SIP	Site Integrity Plan
SKS	Station keeping System
SLA(s)	Special Landscape Area(s)
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMP	Seabird Monitoring Programme
SNCB(s)	Statutory Nature Conservation Body(ies)

TERM	DEFINITION
SoCG	Statements of Common Ground
SOLAS	International Convention for the Safety of Life at Sea
SoS	Secretary of State
SPA	Special Protection Area
SPI	Species of Principal Importance
S-P-R	Source-Pathway-Receptor
SPZ(s)	Source Protection Zone(s)
SSCs	Suspended Sediment Concentrations
SSR(s)	Secondary Surveillance Radar(s)
SSS	Side Scan Sonar
SSSI	Site of Special Scientific Interest
TAN	Technical Advice Note
TJB(s)	Transition Joint Bay(s)
TLP	Tension Leg Platform
TMZ	Transponder Mandatory Zone
TRA	Temporary Reserved Area
TSS	Traffic Separation Scheme
UK	United Kingdom
UK BAP	UK Biodiversity Action Plan
UKCP18	United Kingdom Climate Projections 2018

TERM	DEFINITION
UKHO	United Kingdom Hydrographic Office
UKRI	UK Research and Innovation
UXO	Unexploded Ordnance
VFR	Visual Flight Rules
VLA	Vertical Loaded Anchors
VMS	Vessel Monitoring System (not used in text but common in fisheries)
WB_abs	Quantitative Water Balance
WER	Water Environment Regulations

TERM	DEFINITION
WFD	Water Framework Directive
WHIASU	Wales Health Impact Assessment Support Unit
WHO	World Health Organisation
WNMP	Welsh National Marine Plan
WSI	Written Scheme of Investigation
WWBIC	West Wales Biodiversity Information Centre
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1 Introduction

1. This Environmental Impact Assessment (EIA) Scoping Report has been prepared for Gwynt Glas Offshore Wind Limited (hereafter the 'Applicant') in accordance with Regulation 10 of the Infrastructure Planning (EIA) Regulations 2017 (hereafter the 'EIA Regulations') and Regulation 13 of the Marine Works (EIA) Regulations 2007 (as amended) (hereafter the 'Marine EIA Regulations').

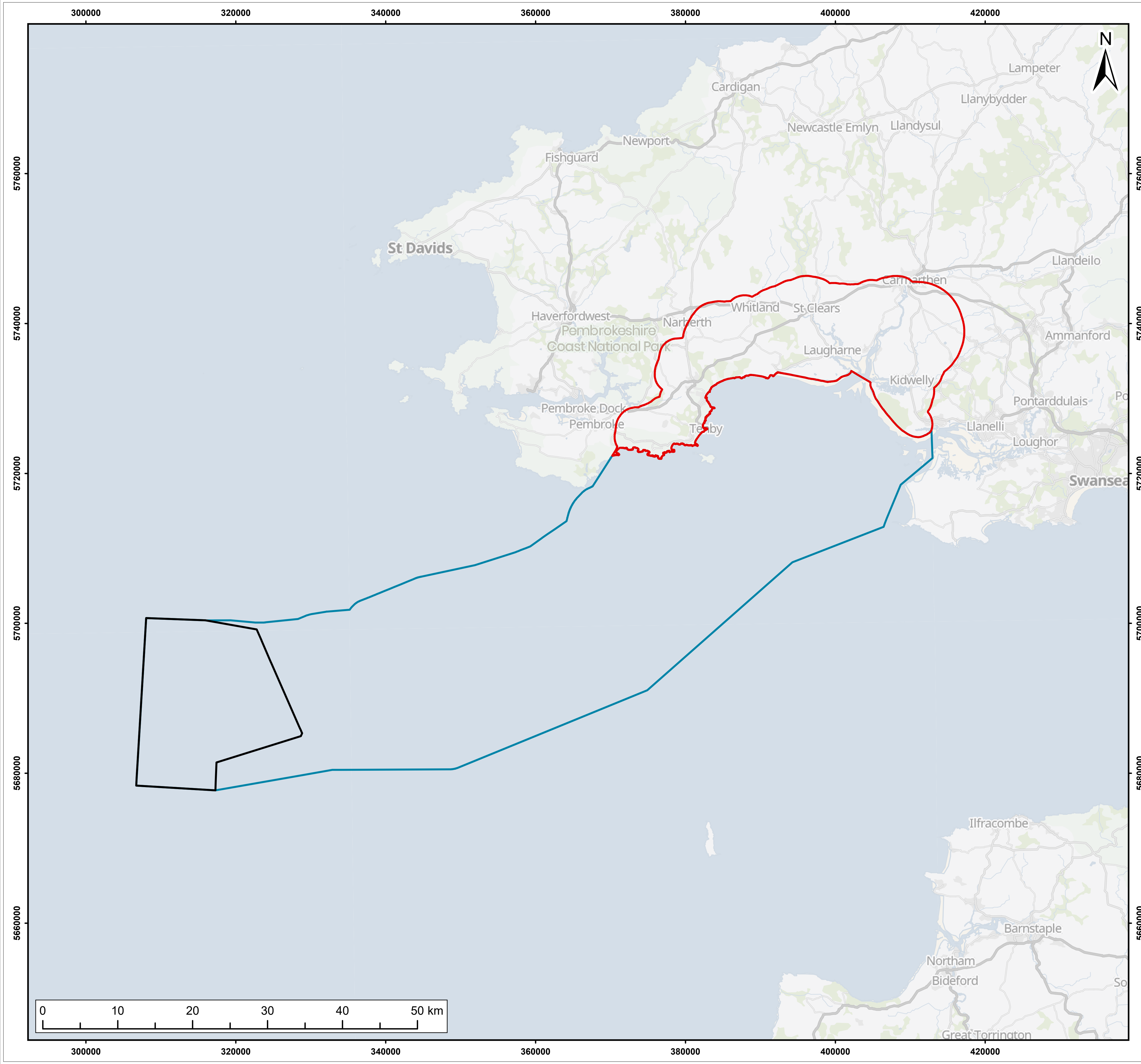
2. The proposed Gwynt Glas Offshore Wind Farm (hereafter the 'Development') would be located approximately 42 kilometres (km) off the southwest coast of Pembrokeshire in the Celtic Sea, with an anticipated capacity of up to 1.5 gigawatts (GW) (see **Figure 1.1.1**). The Array Scoping Boundary covers approximately 369 square kilometres (km^2). The Development would include offshore generating infrastructure and associated transmission assets. It is expected that the grid connection would be made at the proposed Llandyfaelog Substation in Carmarthenshire (to be built by National Grid), requiring the installation of underground export cables between the landfall and the grid connection point. Several landfall and onshore cable route options are currently under consideration, and a new Onshore Transmission Station(s) would be located near the proposed National Grid substation at Llandyfaelog. Further details on Development design are provided in **Section 1.5 Development Description**.

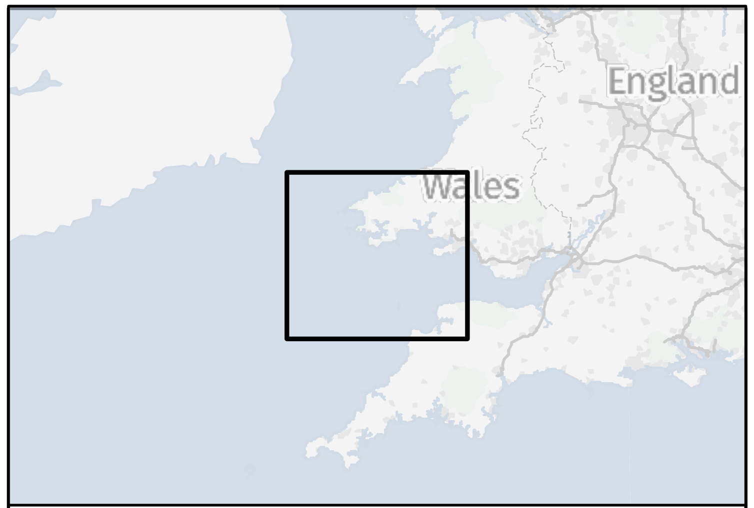
3. Throughout this Scoping Report, a distinction is made between the following 'Scoping Boundaries' (see **Figure 1.1.1**):
   - **Offshore Scoping Boundary, composed of**:
     - **Array Scoping Boundary**; and
     - **Offshore Export Cable Scoping Boundary**
   - **Onshore Scoping Boundary**.

4. The Scoping Boundaries are broad areas at this stage of the Development to allow for further analysis of environmental and engineering constraints, as well as engagement with stakeholders, to support assessment of options and inform the final routes to be chosen.

5. Topic-specific Study Areas are defined in the technical sections of this report, where they differ from these boundaries.

6. This Scoping Report forms the basis of a formal request for an EIA Scoping Opinion from the Planning Inspectorate and Natural Resources Wales (NRW).





Legend:

Array Scoping Boundary

Onshore Scoping Boundary

Offshore Export Cable Scoping Boundary

Source: © Haskoning UK Ltd, 2026
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Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Location of the Gwynt Glas Offshore Wind Farm

Figure: 1.1.1	Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0004

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	17/02/2026	MW	AS	A3	1:500,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

Haskoning
Enhancing Society Together

Gwynt GLAS

1.1 Development Background

7. The Crown Estate's Offshore Wind Leasing Round 5 (LR5) was launched in July 2021, to identify and award Project Development Areas (PDAs) in the Celtic Sea for floating offshore wind projects, following extensive stakeholder engagement and environmental assessments. LR5 focused on three PDAs, each capable of supporting up to 1.5GW of generating capacity at the point of connection to the electrical transmission network (noting that the installed capacity may be higher due to overplanting), with developers selected through a competitive tender designed to maximise environmental sustainability and socio-economic benefits. Under each PDA, the developer has the option to construct the offshore wind project in up to three 'phases', each phase with a generating capacity of a minimum of 300GW.

8. The Applicant secured PDA 1. Operating under a joint venture between EDF power solutions and Electricity Supply Board (ESB) with support from Pembrokeshire-based Development partner DP Energy (**Section 1.2 The Applicant**), the Applicant will aim to deliver the Development and contribute to the United Kingdom's (UK) net-zero ambitions and deliver economic benefits to South Wales and beyond.

9. The Applicant has included other deepwater and innovative solutions to the scoping envelope to allow the assessment and analysis of such concepts and their suitability for the Development. Innovative deepwater solutions is a fast-developing area and the Department for Energy Security and Net Zero (DESNZ) has included a definition to support such concepts in the Contracts for Difference (CfD) Allocation Round 8 that will run in the second half 2026 (DESNZ, 2026a and 2026b).

10. Ahead of the leasing process, The Crown Estate undertook a plan-level Habitats Regulations Assessment (HRA) covering all three PDAs[1] and associated test and demonstration projects, and a wide marine area that would cover potential cable corridor options. The HRA concluded that, with appropriate mitigation measures, the proposed developments would have no adverse effect on protected sites. This proactive approach provided developers with early clarity on environmental requirements, reducing uncertainty and helping accelerate project delivery. Following the award of Round 5 Agreements for Lease (AfL), the outputs of the plan-level HRA were subject to a formal Conformity Check process, which reviewed whether the shortlisted PDAs and associated high-level design assumptions remained within the scope and parameters assessed at plan-level. This post-award conformity process confirmed that the leasing outcomes were consistent with the plan-level HRA findings and that no new impact pathways or materially different effects arose beyond those previously assessed, thereby validating the conclusions of the plan-level HRA and confirming its continued applicability as a robust strategic basis for subsequent project-level HRAs.

1.1.1 Need for the Development

11. The Crown Estate's Offshore Wind LR5 represents a critical opportunity to establish floating offshore wind at scale in the Celtic Sea, unlocking up to 4.5GW of new renewable generation capacity in deeper waters, supporting the development of floating offshore wind and the UK's net zero and energy security ambitions. By enabling early commercial deployment of floating wind,

[1] The scope of the HRAs was limited to the PDAs; transmission infrastructure was excluded.

LR5 is intended to act as a springboard for a long-term offshore wind market, with the UK Government signalling the potential to unlock a further 12GW of capacity in the Celtic Sea in future leasing rounds (The Crown Estate, no date). This scale of development is expected to deliver substantial regional economic benefits, including significant investment in ports, manufacturing, fabrication, and marine services across South Wales and South-West England (The Crown Estate, no date).

12. The Development is a significant component of the UK's transition to a low-carbon energy system and its commitment to achieving net zero greenhouse gas emissions by 2050.

13. The UK Government's Clean Power 2030 Action Plan sets ambitious targets for the electricity system, including achieving around 43–50 GW of offshore wind capacity by 2030, alongside a broader aim for clean sources to supply at least 95% of Great Britain's electricity.

14. The Welsh Government is also committed to net zero by 2050, with renewable energy targets including the following:

- Generate 70% of Wales' electricity consumption from renewable sources by 2030 (Welsh Government, 2026).
- Achieve 1GW of renewable electricity and heat capacity in Wales under local ownership by 2030 (Welsh Government, 2022).
- Ensure that all new energy projects from 2020 onwards include at least an element of local ownership (Welsh Government, 2022).

15. The Development, with a planned capacity of up to 1.5GW, would contribute substantially to these objectives by providing clean, reliable energy, enhancing energy security, and reducing dependence on fossil fuels. Furthermore, the Development supports regional economic growth, job creation, and skills development. Its delivery is essential to meeting statutory climate targets, improving resilience in the face of rising energy demand, and enabling the UK to maintain global leadership in renewable energy innovation.

1.2 The Applicant

16. The Applicant is a joint venture between EDF Power Solutions UK and ESB, with DP Energy acting as an exclusive development partner.

1.2.1 EDF power solutions UK and Ireland

17. EDF power solutions UK and Ireland (EDFps) is a subsidiary of the EDF Group and one of the world's largest low carbon electricity companies. EDFps's investment and innovation reduces costs for consumers and bringing significant benefits for communities. With an operating portfolio of 50 renewable energy sites including battery, onshore and offshore wind (together totalling more than 2GW) EDFps are providing much needed affordable, low carbon electricity across the UK and Ireland. The EDFps portfolio in the UK and Ireland is expanding with almost 14GW of projects in planning and development, including wind, battery and solar photovoltaic (PV). EDFps and ESB have a strong track record collaborating on project delivery with the partnership delivering the 450 megawatts (MW) Neart na Gaoithe offshore wind project in Scotland in 2025.

18. For more information, please visit https://www.edf-powersolutions.uk/.

1.2.2 ESB

19. Established in 1927, ESB is Ireland's foremost energy company. It is a strong, diversified utility operating across the Irish and British electricity market: from generation, through transmission and distribution, supply, and related sectors including telecommunications and smart energy services. The ESB strategy of achieving zero carbon emissions by 2040, has seen a rapid diversification of the Company's generation portfolio - transitioning from fossil fuel reliant thermal generation to renewable generation and energy storage. The Company's renewable portfolio has a current capacity of more than 1.8GW, with significant projects - notably in the offshore sector in Ireland and Britain, in development stage. ESB has formed strong partnerships in project delivery, particularly in the offshore sector.

20. For more information, please visit https://esb.ie/.

1.2.3 DP Energy

21. DP Energy develops renewable energy projects across the world. Headquartered in Cork, Ireland, DP Energy has to date developed over 1GW of renewable energy projects which are built and operational. With over 30 years' experience in the global renewable energy sector, DP Energy is 100% committed to using the most sustainable and environmentally responsible methods in all of their energy developments. Operating in the UK since the 1990s to deliver onshore wind projects, DP Energy opened an office in Pembroke Dock in 2021 to focus the Celtic Sea floating wind opportunities, whilst progressing a UK and New Markets project pipeline.

1.3 Purpose of this Document

22. As the Development's offshore generating assets are located in Welsh waters and exceed 350MW of generating capacity it is classified as a Nationally Significant Infrastructure Project (NSIP). As such, a Development Consent Order (DCO) is required for its development under the Planning Act 2008. In order to support the DCO application, an EIA is required. Consent would be sought for the construction, operation, maintenance and decommissioning of the Development.

23. A Marine Licence (ML) would be required for those components of the Development that are located in the marine area and involve licensable marine activities. Marine licencing for the generation assets, including wind turbines, Inter-Array Cables and Offshore Transmission Station(s)) would be sought through a deemed ML granted as part of the DCO. In addition, marine licencing for the transmission infrastructure including export cables and associated works that are located in Welsh inshore waters up to Mean High Water Springs (MHWS), or which span both offshore and inshore waters, would be consented separately through the marine licensing regime administered by NRW. The Offshore Export Cable Scoping Boundary currently extends into English waters. Should the final cable route extend into English waters, the consent strategy would tailored to suit, with a ML for the transmission infrastructure beyond 12 nautical miles (nm) (spanning both English and Welsh waters) deemed within the DCO and a separate ML from NRW sought for the transmission infrastructure within 12nm.

24. The Onshore Export Cable and Onshore Transmission Station(s) would be consented as associated development under the DCO.

25. This document supports a request for a Scoping Opinion from the Planning Inspectorate for the Development in accordance with Regulation 10 of the EIA Regulations and from NRW in accordance with Regulation 13 of the Marine EIA Regulations. Both sets of EIA Regulations enable

an application to request a Scoping Opinion from the Secretary of State (SoS) and Welsh Ministers on the information to be included in an EIA. It considers all relevant legislation, policies and guidance applicable to both marine and terrestrial areas and does not attempt to separate the Development, the environment or the potential impacts into those areas covered by the different consenting regimes but considers the Development as a whole. This approach would be taken for all the assessments needed to support the applications and is consistent with other recent offshore wind DCO applications.

26. The DCO and associated ML applications would be supported by an Environmental Statement (ES) prepared in accordance with the EIA Regulations and the Marine EIA Regulations, as the Development falls under Schedule 2 and Schedule A1 of these regulations, respectively.

27. The applications would also be supported by a Marine Conservation Zone (MCZ) Assessment, an HRA, a Water Environment Regulations (WER) Assessment, and other assessments as may be required.

28. This Scoping Report outlines the receptors that would be considered during the EIA and the proposed approach to data gathering. It also provides information on the assessment methodology in order to characterise the baseline environment, assess potential impacts and develop mitigation measures. This would be refined during consultation with technical stakeholders throughout the assessment process.

29. The Scoping Report and resulting Scoping Opinions would play a key part in a proportionate and focused EIA. It is recognised that a number of issues cannot be scoped out until further information is known about the Development and the baseline environment. Any further refinement of the impacts scoped out would be justified and agreed with the relevant stakeholders as the EIA progresses beyond Scoping.

1.4 Policy and Legislative Context

30. This section summarises the regulatory and planning policy framework for the Development. It identifies the main climate change and renewable energy policies, as well as planning policy and environmental legislation in the UK and Wales.

1.4.1 Overarching Planning Policy and Legislation

31. This section outlines the primary UK-wide planning policy and legislative frameworks that guide the development, assessment, and consenting of offshore renewable energy projects.

32. Overarching planning policy and legislation of relevance to the Development are:

- The Planning Act (2008) (as amended);
- Marine Works (EIA) Regulations 2007;
- Infrastructure Planning (EIA) Regulations 2017;
- National Policy Statements (NPS);
    - Overarching NPS for Energy (NPS EN-1) (DESNZ, 2025a);
    - NPS for Renewable Energy Infrastructure (NPS EN-3) (DESNZ, 2025b), which covers nationally significant renewable energy infrastructure (including offshore generating stations in excess of 100MW;

  - NPS for Electricity Networks Infrastructure (NPS EN-5) (DESNZ, 2025c); and
- Planning and Infrastructure Act 2025 (for which secondary legislation and guidance is awaited but expected to be in force prior to DCO application).

1.4.1.1 Welsh Planning Policy and Legislation

33. This section lists the planning policies and legislative requirements specific to Wales that inform the approach to offshore wind development and associated assessments.

34. Key Welsh planning policy and legislation of relevance to the Development are:

- The Planning (Wales) Act 2015;
- Planning Policy Wales (PPW) (Welsh Government, 2024);
- South-West Wales Area Statement (NRW, 2019a) and Marine Area Statement (NRW, 2019b);
- The Well-being of Future Generations (Wales) Act 2015;
- Welsh National Marine Plan (WNMP) 2019 (Welsh Government, 2019);
- Future Wales: The National Plan 2040;
- The Infrastructure (Wales) Act 2024;
- Environment (Principles, Governance and Biodiversity Targets) Act; and
- The Historic Environment (Wales) Act 2016.

1.4.2 Climate Change and Renewable Energy Policy and Legislation

35. This section provides a list of the key policies and legislative drivers related to climate change mitigation and renewable energy targets that underpin the need for, and support of, offshore wind development.

36. Key climate change policy and renewable energy policy and legislation of relevance to the Development are:

- United Nations Framework Convention on Climate Change (Paris climate agreement);
- The UK Climate Change Act 2008;
- UK Climate Change Risk Assessment (CCRA) 3
- Climate Change Act 2008 (2050 Target Amendment) Order 2019;
- The UK Energy Act (2013);
- Net Zero Strategy: Build Back Greener 2021 (Presented to Parliament pursuant to Section 14 of the Climate Change Act 2008);
- British Energy Security Strategy (2022);
- Climate Adaptation Strategy for Wales (2024);
- Net Zero Wales Plan (2021); and
- Clean Power Action Plan (2030).

1.4.3 Environmental Legislation

37. This section identifies the relevant environmental legislation that governs the protection of ecological, marine, and coastal receptors and sets the requirements for environmental assessment.

38. Key international and UK environmental legislation of relevance to the Development is as follows:

- **International:**
  - The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention); and
  - The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).
- **UK:**
  - The Wildlife and Countryside Act (1981);
  - Countryside and Rights of Way Act (2000);
  - The Commons Act (2006);
  - Marine Coastal and Access Act (2009);
  - UK Marine Policy Statement (2020);
  - Marine Strategy Regulations (2010);
  - Conservation of Habitats and Species Regulations 2017 and Conservation of Offshore Marine Habitats and Species Regulations 2017 (together referred to as the 'Habitats Regulations');
  - The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2017;
  - The Environment (Wales) Act (2016);
  - Environmental Permitting (England and Wales) Regulations 2016; and
  - Environment (Principles, Governance and Biodiversity Targets) (Wales) Act 2026.

1.4.3.1 HRA

39. Under the Conservation of Habitats and Species Regulations 2017 and Conservation of Offshore Marine Habitats and Species Regulations 2017 , which transpose the requirements of the Habitats Directive into domestic law following European Union (EU) Exit, decision-makers must assess whether a plan or project could adversely affect the integrity or qualifying features of a National Site Network site (formerly Natura 2000), such as a Special Area of Conservation (SAC), Special Protection Area (SPA), or candidate SAC. This process is known as an HRA. Where a plan or project, either alone or in combination with other plans or projects, is likely to have a significant effect on a European site and is not directly connected with or necessary for its management, an Appropriate Assessment (AA) must be undertaken. In Wales, this duty applies to both offshore waters (up to 12nm) and onshore elements of the Development, it also extends to offshore areas beyond 12nm through the Conservation of Offshore Marine Habitats and Species Regulations 2017. It is carried out by the relevant competent authorities, including NRW for Welsh waters.

40. A HRA Screening Assessment has been carried out to identify whether any elements of the proposed Development have the potential to result in adverse effects (other than insignificantly) on the integrity or qualifying features of a National Site Network site (Gwynt Glas Offshore Wind Farm (OWF) Limited, 2026a). Where such effects are identified, the assessment would inform the need for further detailed assessment and / or the implementation of appropriate mitigation measures.

1.4.3.2 MCZ Assessment Screening

41. The Marine and Coastal Access Act 2009 (Section 126) provides the appropriate authority with powers to designate MCZs in England and Wales. MCZs are intended to protect a wide range of nationally important marine species, habitats, geological features and geomorphological interests, and may be designated in English and Welsh territorial waters as well as UK offshore waters. In Wales, the designation process is administered by the Welsh Ministers. Any proposed development must demonstrate that it would not hinder the achievement of the conservation objectives of designated MCZs.

42. A MCZ Screening Assessment has been carried out to identify whether any elements of the proposed Development have the potential to result in adverse effects (other than insignificantly) on the integrity of MCZs (Gwynt Glas OWF Limited, 2026b). Where such effects are identified, the assessment would inform the need for further detailed assessment and / or the implementation of appropriate mitigation measures.

1.4.4 Licencing

43. This section describes the licencing frameworks and consent regimes applicable to offshore windfarm construction and operation, including the bodies responsible for their administration.

1.4.4.1 European Protected Species (EPS) and Wildlife Licensing

44. The Development is located in Welsh territorial, Welsh and English offshore waters and Welsh land and therefore has the potential to interact with species afforded protection under the Conservation of Habitats and Species Regulations 2017, the Conservation of Offshore Marine Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981. EPS known to occur within or adjacent to the marine environment include harbour porpoise *Phocoena phocoena*, bottlenose dolphin *Tursiops truncatus*, and other cetaceans, all of which are strictly protected from deliberate capture, injury or disturbance. Certain seabird species may also be afforded protection under domestic wildlife legislation where relevant. EPS known to occur on land in South Wales includes bats, dormice, great crested newts, birds, reptiles and water voles. Badgers may also be present onshore protected under the Protection of Badgers Act 1992.

45. Should project activities, either alone or in-combination with other plans or projects, give rise to a risk of offence under the relevant legislation, the need for an EPS or Wildlife Licence would be considered. At this stage, the need for such licences cannot be ruled out and will be informed by the findings of baseline surveys, impact assessment, and the application of mitigation measures embedded in the project design. Where a licence is required, it would be sought from NRW as the relevant licensing authority in Wales or Natural England (NE) for any relevant activity within English Waters and would be informed by project-level assessment demonstrating that the statutory tests for licensing can be met.

1.5 Development Description

1.5.1 Design Envelope Approach

46. The Development description at this stage is necessarily indicative. This reflects the use of a Project Design Envelope (PDE) approach, under which the description submitted as part of the DCO and ML applications is based on realistic worst-case parameters for key elements of the Development rather than a finalised detailed design. The PDE defines the maximum extents and characteristics of the Development that could realistically be constructed, thereby enabling a robust assessment of potential environmental effects while retaining flexibility for subsequent design refinement.

47. The PDE approach is widely recognised and is an established method for assessing developments where detailed design is not fixed at the time of application. It has been formally recognised in the Overarching NPS for Energy (NPS EN-1) (DESNZ, 2025a) and the NPS for Renewable Energy Infrastructure (NPS EN-3) (DESNZ, 2025b) and has been used in all OWF DCO applications to date. The approach is also consistent with the Planning Inspectorate's Advice Note Nine: Rochdale Envelope (The Planning Inspectorate, 2025a), which states that: "The 'Rochdale Envelope' is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been resolved at the time when the application is submitted."

48. Case law further confirms this approach as recognised practice, including Rochdale MBC ex parte C Tew (1999), which established the Design Envelope principle. When suitably applied, this approach allows a comprehensive assessment of likely environmental effects and helps to avoid the need for protracted re-submission procedures at a later stage, while still providing sufficient certainty to decision-makers, statutory consultees and the public.

49. Within this context, the Development description would evolve over time and be refined through the EIA process. Certain key design elements, including wind turbine model, capacity and substructure type, are inherently linked to procurement timing, supply-chain availability and evolving market conditions, and therefore cannot be fixed at the application stage without constraining deliverability. Flexibility to respond to economic circumstances and technological advances is essential if the Development is to proceed and be successful. Accordingly, flexibility within defined and assessed limits would be built into the design basis for the DCO and ML applications through the application of the PDE approach.

50. The PDE is intended to identify the key design parameters for the Development, such as wind turbine size range, cable length, platform or substructure types and mooring types, and to define a realistic worst-case scenario that initially informs this Scoping Report. The subsequent sections, therefore, set out a series of options and / or parameters for which worst-case values are identified. This ensures that the maximum realistic environmental effects are robustly evaluated, while retaining sufficient flexibility to accommodate further refinement during detailed design, including improvements or technological advancements that cannot be predicted at the time of application.

51. The use of a PDE does introduce a degree of complexity into the EIA process, as is common to many large-scale developments. The EIA Regulations require an ES to provide a description of the location, design and size of the scheme sufficient to enable likely significant environmental effects to be assessed and informed responses to be made. A balance therefore needs to be struck between defining the Development in enough detail to predict impacts, while retaining sufficient

flexibility to allow successful delivery under changing conditions, such as the adoption of the latest available technology at the time of construction. The Applicant recognises the desire for certainty and would ensure that flexibility within the PDE is restricted to only those areas where it is required, with the intention that the PDE would be progressively refined over the life of the EIA through close collaboration between the engineering and EIA teams.

1.5.2 Development Phasing

52. The Development may be constructed in up to three distinct Phases or 'Projects', with each Phase comprising its own set of offshore and onshore transmission infrastructure. This phased approach provides flexibility in delivery and allows each phase to operate as a functionally separate package of generation and transmission assets. The arrangement has been intentionally designed so that, following commissioning, the transmission assets associated with each Phase could be transferred independently through the Offshore Transmission Owner regime. Further detail on phasing would be provided in the EIA with Development scenarios defined and reflected in each technical assessment.

1.5.3 Development Infrastructure Overview

1.5.3.1 Offshore

53. The Offshore Scoping Boundary lies in the Celtic Sea and the Array Scoping Boundary is approximately 42km from shore at its closest point (Pembrokeshire, South Wales). The Development's array could comprise of:

- Wind turbines (**Section 1.5.3.1.1**);
- Floating substructures (FSS) and/or innovative deepwater solutions (**Section 1.5.3.1.1**);
- Station keeping systems (SKS) for FSSs (**Section 1.5.3.1.2**);
- Scour protection for subsea infrastructure (**Section 1.5.3.1.3**);
- Cables, including Inter-Array Cables, Interconnector Cables and Offshore Export Cables, and associated cable protection (**Section 1.5.3.1.4**);
- Offshore Transmission Station(s) (**Section 1.5.3.1.5**);
- Midpoint Compensation Reactor(s), if required (**Section 1.5.3.1.8**);
- Subsea Transmission Station(s), if required (**Section 1.5.3.1.7**); and
- Subsea Power Collector(s), if required (**Section 1.5.3.1.5**).

54. The Array Scoping Boundary and Offshore Export Cable Scoping Boundary are collectively referred to as the 'Offshore Scoping Boundary'. The Offshore Scoping Boundary is shown on **Figure 1.1.1**. Key site parameters for the Offshore Scoping Boundary are presented in **Table 1.5.1**.

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Table 1.5.1 Offshore Scoping Boundary Key Parameters

PARAMETER / UNIT	VALUE
Distance from shore (Pembrokeshire) (km)	42
Area (km^2)	369
Water depth (m below Lowest Astronomical Tide (LAT))	0 - 84
Operational period (years)	40

55. Options for transferring electricity from the OWF to the onshore grid are currently being evaluated, including both High Voltage Alternating Current (HVAC) and High Voltage Direct Current (HVDC) solutions. The preferred approach would be selected following assessment of the potential impacts of each option, alongside consideration of technical efficiency and cost effectiveness.

56. The principal components of the Development are illustrated in **Plate 1.5.1**, with components common to both HVAC and HVDC systems identified.

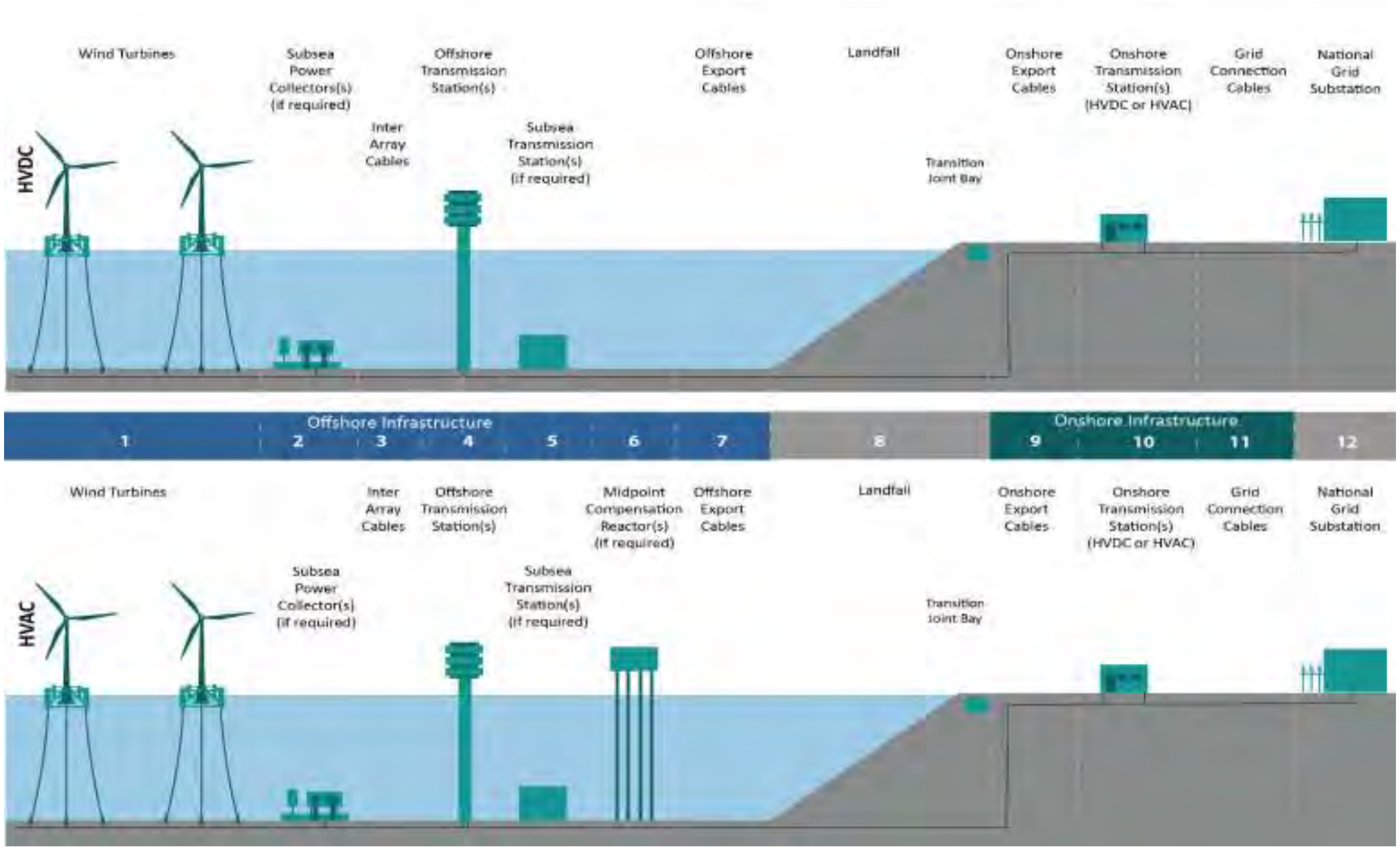


Plate 1.5.1 Key Infrastructure Components for HVDC and HVAC

1.5.3.1.1 Wind Turbines

57. The wind turbines convert wind energy into electrical energy. Each wind turbine is a complex system composed of a number of components. The main components are:

- Rotor assembly, composed of three blades and a hub;
- Nacelle, containing the generator, shaft and gearbox (if applicable), power electronic converter and transformer; and
- Tower containing lifting equipment and, if applicable, the switchgear.

58. The wind turbine parameters reflect both today's technology and what the Applicant considers could be achievable by the time of construction. The final wind turbine model(s) that would be used for the Development would be selected post-consent.

59. The EIA would be undertaken using wind turbine parameters that ensure the worst case is assessed for each receptor.

60. The key features of a typical floating turbine are illustrated on **Plate 1.5.2** and the wind turbine design envelope for the Development is outlined in **Table 1.5.2.**

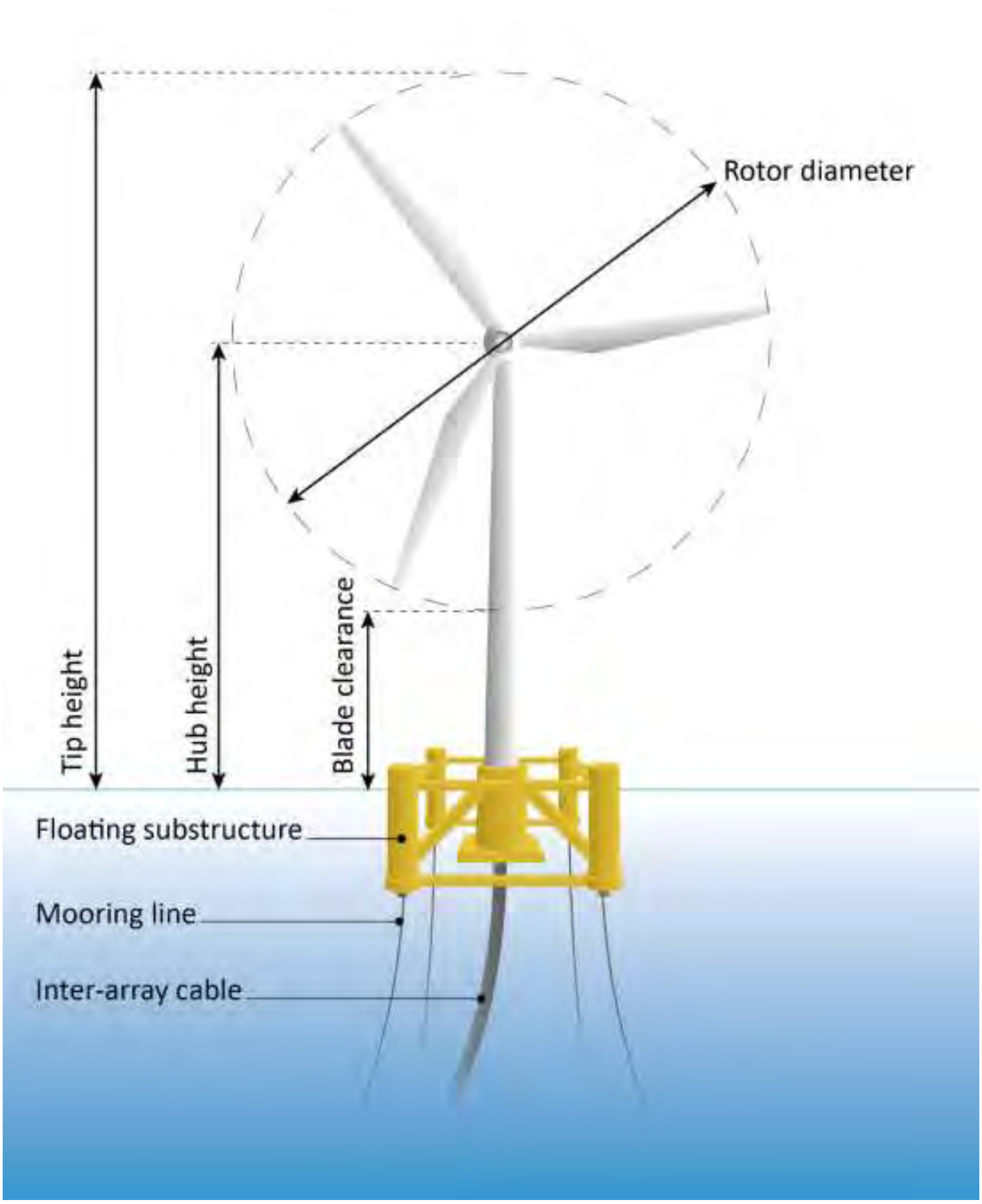


Plate 1.5.2 Floating Offshore Wind Turbine Schematic

Table 1.5.2 Wind Turbine Design Envelope

PARAMETER	MINIMUM	MAXIMUM
Wind turbine capacity (MW)[1]	14	25
Number of wind turbines[2]	66	118
Maximum wind turbine rotor diameter (metre (m))	330	
Maximum rotor swept area (km^2)	0.086	
Minimum blade tip clearance above MHWS ("air gap")[3]	22	
Maximum blade tip height (m) above Highest Astronomical Tide (HAT)	220	310
Minimum wind turbine spacing (m)	1,320	

[1] The minimum wind turbine generator capacity corresponds to the maximum number of wind turbines and vice versa.

[2] Maximum number of wind turbines allows for 10% for overplanting.

[3] As per Marine Guidance Note (MGN) 654 (Maritime and Coastguard Agency (MCA), 2021a). The minimum air gap for the Development would be informed by technical studies and would be defined in the ES.

Wind Turbine Substructures

61. The final selection of the wind turbine substructure would depend on factors including but not limited to seabed conditions, water depth, wave, wind and tidal conditions, health and safety, economics, advances in technology and procurement approach. As site conditions vary across the Development site, it is possible that more than one substructure type is used.

62. The ES would consider different substructures and associated worst case scenario (i.e. those resulting in the worst case environmental impacts).

63. FSSs require an appropriate SKS, comprising of mooring lines and anchors to secure the FSSs to the seabed, providing stability and maintaining the FSS in its excursion limit. SKS options are detailed in **Section 1.5.3.1.2**. **Table 1.5.3** outlines each structure under consideration, noting that the Development could utilise innovative deepwater solutions.

64. Innovative deepwater solutions would be considered in-line with the evolution of technologies. The chosen technology may include, inter alia, turbines where support structures are not solely buoyant, and where there are rigid support structures transferring loads to the seabed. These are also defined in **Table 1.5.3** for completeness.

Table 1.5.3 Substructure Options being considered for the Development

TYPE OF SUBSTRUCTURE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Tension Leg Platform (TLP)	A TLP is a highly buoyant semi-submerged structure, which maintains its position and stability through the opposite forces of excess buoyancy in the FSS and the highly tensioned, near vertical mooring lines anchored to the seabed. It is anticipated that wind turbine integration on a TLP would take place at an assembly port. There are some FSS concepts that may not offer sufficient stability for an integrated Floating Offshore Unit (FOU) transportation to the windfarm site.	

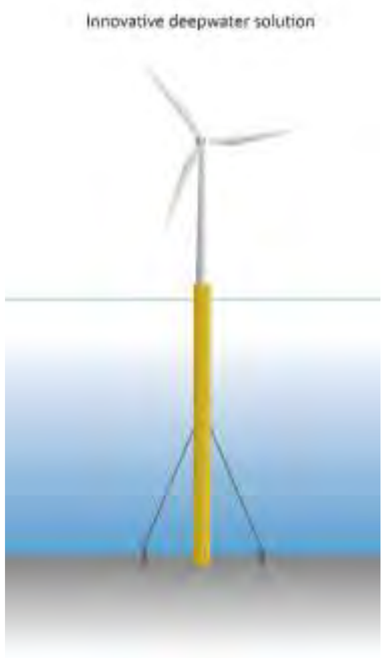
TYPE OF SUBSTRUCTURE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Semi-submersible platform	Semi-submersible platforms are buoyancy-stabilised structures which float partly below the water surface and maintain position via a SKS. These platforms usually consist of three or more columns connected via bracings or pontoons with heave plates (large, flat plates attached to the bottom of the platform's columns or pontoon to help resist vertical movement by waves), however designs may vary. Semi-submersible platform designs can use a wide range of SKS. Wind turbine integration is likely to take place at an assembly port. Subsequent transfer to and installation at the windfarm site would likely uses tugs and anchor handling vessels (AHVs).	

TYPE OF SUBSTRUCTURE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Barge	Barges are wide, flat platforms that sit low in the water. Its large surface area helps spread out buoyancy, which keeps the structure stable while supporting the wind turbine. Generally, barge substructures comprise of a single hull, but variations of barge FSSs exist such as twin hulled barge concepts. Barges tend to be more susceptible to wave loading than other technology types due to the wide, flat surface at the waterline and their relatively shallow draft. Like semi-submersible technology, barges can use a variety of SKS technology and can be assembled at a port, with subsequent transfer to and installation at the windfarm site typically uses tugs and AHVs.	

TYPE OF SUBSTRUCTURE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Buoy (modified spar-buoy)	This form of FSS is currently less developed in the market. These FSSs are a modified form of a traditional spar[2] but have a much shallower draught and much larger area in the water than their traditional spar counterparts. They behave like semi-submersibles during transport and installation activities, operations, and wind turbine integration but they achieve stability, via a low centre of gravity and high centre of buoyancy, over a wider footprint than a traditional spar. Unlike spars which typically require large draughts (both at the assembly port and in operation), buoys tend to have draughts comparable to semi-submersibles, which improves port access and removes other challenges associated with deep draughts. In addition, it also allows for wind turbine integration at an assembly port and the transport of a fully integrated FOU to the windfarm site.	

[2] Typically a cylindrical shaped FSS with a large draft, incorporating ballast in the lower end.

TYPE OF SUBSTRUCTURE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Semi-spar platform	This is a subset of traditional spar form of FSS also known as a hybrid spar. They are typically split into two structures, one highly buoyant structure supporting the wind turbine, and another structure / mass suspended below the support structure which acts to lower the centre of gravity. Coupled together they act like a traditional spar. Semi-spars offer the advantages of traditional spars in terms of stability and reduced water plane area. They also include the benefits of other FSS options like wind turbine integration at the assembly port and integrated transport and installation operations. However, the use of a counterweight does provide challenges and complications regarding installation, tow to shore maintenance activities and decommissioning, as lowering and raising the suspended structure / mass is a difficult marine operation to undertake.	

TYPE OF SUBSTRUCTURE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Innovative deepwater solutions	The Development has the potential to utilise innovative deepwater solutions, including next generation technologies adapted for increased water depths, reflecting the continuing evolution of modern foundation design. These are defined, as per DESNZ (2025d), as turbines that, in normal operation are mounted on foundations supported by any combination of buoyancy, support-structure transferring loads to seabed through a rigid structure within water column, and/or slender tensile members/moorings. These support structures may include small, shallow penetration monopiles, small jacket or lattice towers or small gravity base structures. An example noted by ORE Catapult (2025) is a hybrid fixed and floating concept which utilise lattice-like structures which extend to and are fixed to the seabed, further supported by mooring lines. The substructure is attached to the seabed as in fixed offshore wind yet, similarly to Floating Offshore Wind (FLOW), stability is provided through mooring lines or tendons.	

1.5.3.1.2 Station Keeping System

65. To maintain the position of a FSS, it is necessary to connect the FSS to the seabed via a SKS. The SKS generally comprises several mooring lines and anchors, which also provide stability to the wind turbine with various degrees of influence based on the system deployed. The mooring line and anchor design envelopes are outlined in **Table 1.5.4** and **Table 1.5.5** respectively.

66. There are several types of mooring configuration and anchoring solutions which are available for FSSs, with different installation techniques.

67. In addition to the mooring lines and anchors there are several ancillary elements not described in detail here, which are deployed as part of the SKS. These include, but may not be limited to:

- Buoyancy components;
- Clump weights;
- Shackles and connectors; and
- Tensioners.

68. The design of the SKS depends on the site characteristics and the technology being used. It is possible that different mooring and anchor solutions may be used across the Development. This would be dependent on the site characteristics (i.e. water depths and metocean conditions) and determined during the design development.

Mooring Lines

69. Mooring lines are connected to the FSS at various points or a single point (depending on the mooring system and / or the FSS concept).

70. Mooring lines for FSSs can be made of several different materials in various forms, for example:

- Steel chain;
- Synthetic mooring ropes (e.g. Polyester, Nylon and High Modulus Polyethylene (HMPE)[3]); or
- Sheathed spiral strand steel wire rope (a steel-based rope with an outer sheath made of a polymer coating for corrosion protection).

71. Mooring tendons for TLP type substructures could be made of:

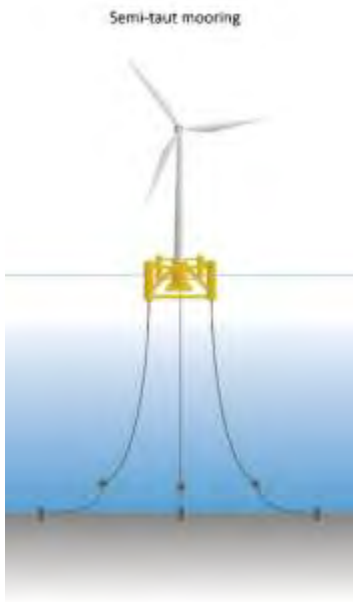
- High strength steel pipes;
- Sheathed spiral strand steel wire rope; or
- Synthetic fibres.

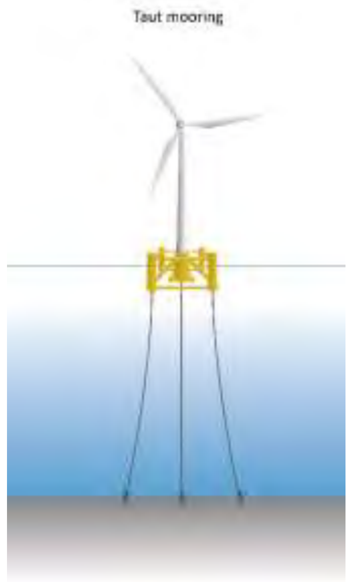
72. The mooring types in the PDE are described in **Table 1.5.4**.

[3] HMPE is a very strong, lightweight fibre which offers exceptional strength-to-weight ratio, low elongation and high resistance to chemicals and ultraviolet.

Table 1.5.4 Mooring Line options being considered for the Development

TYPE OF MOORING LINE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Catenary mooring	This configuration uses free hanging chain, whereby the weight of the chain creates a curved (catenary) shape through the water column between the FSS and the anchor. This type of mooring generally has a larger seabed footprint compared to other mooring solutions as long, heavy chains or ropes lie on the seabed in a curved (catenary) shape, requiring significant horizontal space. Generally, the weight of the chain resists excursions and provides stability, with minimal vertical tension. The length of each catenary chain is typically six to eight times the water depth. This system works well in water depths up to 300m.	

TYPE OF MOORING LINE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Semi-taut mooring	This configuration uses chain at the top and bottom of the mooring line, and rope in the mid-section forming a combination of a taut and catenary system. Buoyancy modules are used to lift the rope off the seabed and prevent damage to these sections, however, there remains some seabed contact with this mooring option (less so than catenary moorings). The mooring lines have some tension, which reduces horizontal spread within the water column compared to catenary. The semi-taut solution, being a mix of taut and catenary systems, mean the anchors suitable for catenary systems can be used.	

TYPE OF MOORING LINE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Taut mooring	This configuration uses lines which are tensioned between the substructure and anchors until taut. The tension and flexibility in the lines are used to provide stability and controls movement in the water column (excursions). As the mooring is taut, the mooring line does not make contact with the seabed. Mooring lines run steeply from the substructure to the seabed, occupying less horizontal space within the water column. In this configuration the load on the anchor is both vertical and horizontal, therefore pile or suction anchors are most likely to be used. It typically has a shorter length of mooring line than a catenary system. This system works well in a wide range of water depths.	

TYPE OF MOORING LINE	DESCRIPTION	DIAGRAM AND DIMENSIONS
Tension-leg mooring	This type of system is used by TLP. Due to the vertical loading and high tension on these systems, tendons with low strain and high strength are used, which can be synthetic ropes or steel tubular pipes for example. The seabed footprint is very small, and the mooring lines are almost entirely vertical with very little horizontal movement in the water column. This type of SKS requires deeper anchor penetration into the seabed which can result in larger localised seabed disturbance.	

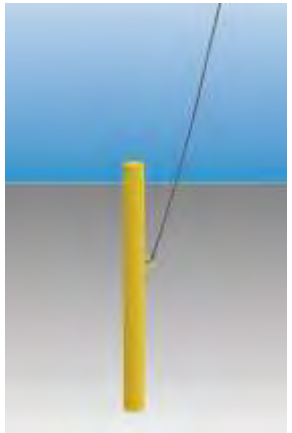
Anchors

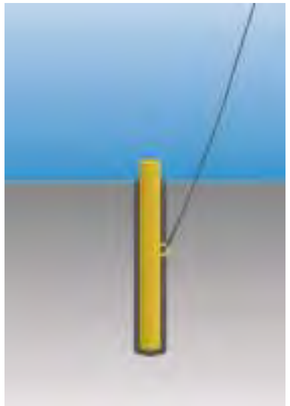
73. The anchor is the connection point between the mooring system and the seabed that stops the wind turbine moving out of position. Anchor selection depends on a combination of factors including seabed conditions, loading, FSS behaviour and installation constraints. The types of anchors being considered for the Development are broadly grouped into the following types:

- Piled anchors, including, but not limited to:
  - Driven piles;
  - Anchor piles installed by Drive-Drill-Drive method;
  - Drilled and grouted anchor piles;
  - Subsea micropiles; and
  - Groutless self-drilling rock anchor.
- Suction anchors, including, but not limited to:
  - Suction anchor piles; and
  - Suction embedded plate anchor (SEPLA).
- Embedded Plate Anchors, including:
  - Vertical loaded anchors (VLA);
  - Drag embedment anchors (DEA);
  - Flexibly embedded plate anchor; and
  - SEPLA.
- Javelin anchors;
- Gravity anchors; and
- Friction anchors.

74. A brief description and illustration of several of the main anchor types detailed above is provided in **Table 1.5.5**.

Table 1.5.5 Anchoring Options being considered for the Development

TYPE OF ANCHOR	DESCRIPTION	DIAGRAM
Piled anchors		
Driven piles	Driven piles are steel tubes typically used for anchoring in hard or challenging soil conditions. The pile is typically driven to the required penetration depth using an impact or vibratory hammer. These types of anchors can be used to support both vertical and horizontal loads.	

TYPE OF ANCHOR	DESCRIPTION	DIAGRAM
Drilled and grouted anchor piles	Drilled and grouted piles are similar to driven piles and are also typically used in hard soil conditions. However, these anchors (piles) are installed by drilling a hole into the seabed to a target depth and then grouting in-situ to seal the connection between the pile and the surrounding ground.	
Suction anchors		
Suction anchor piles	In suitable soil types (typically clays / sands) it may be possible to use suction piles (also known as suction caissons suction buckets, suction cans). As with the driven pile, these anchors are good for both horizontal and vertical load resistance.	

TYPE OF ANCHOR	DESCRIPTION	DIAGRAM
SELPA	A suction caisson (follower) is lowered to the seabed and pumped to create suction, embedding the plate anchor at depth. The follower is then retrieved, leaving the plate in place for high holding capacity.	
Embedded Plate anchors		
DEA	DEA work by being dragged across the seabed, embedding themselves to the required depth. They are best suited for use with catenary and semi-taut mooring systems due to the fact that they support horizontal loading. They work well in sediments which contain a significant proportion of clay and when they are fully submerged in the seabed.	

TYPE OF ANCHOR	DESCRIPTION	DIAGRAM
VLA	VLAs are similar to DEAs in that they are installed by dragging the anchor across the seabed. However, these anchors are capable of bearing both vertical and horizontal loads.	
Gravity Anchors		
Gravity anchors	Installed by lowering heavy concrete or steel blocks onto the seabed. They rely on their mass and friction with the seabed to resist loads. No penetration is required, making them suitable for shallow waters and firm soils.	

1.5.3.1.3 Scour Protection

75. Where the seabed sediment is soft enough to be mobilised, sediment transport can lead to scour around infrastructure installed on, or in, the seabed (e.g., anchors). The depth and area of scour is dependent on the shape of the infrastructure installed, the characteristics of the seabed sediment and metocean (e.g. waves and currents) conditions.

76. Scour created around infrastructure can, in turn, lead to additional fatigue, wear and tear to the installed infrastructure. In the worst case, it can lead to failures and need for complex corrective maintenance. The use of scour protection, both in terms of volume and material, is an important consideration for projects. Commonly used scour protection types and those which are under consideration for the Development include (but are not limited to):

- Concrete mattresses;
- Graded rock placement / rock bags / rock nets;
- Grout bags;
- Eco-based products (e.g. reef cubes); and
- Artificial frond mats.

1.5.3.1.4 Cables

Inter-Array Cables

77. Inter-Array Cables are armoured cables containing electrical and fibre optic cores, which link the wind turbines to each other and other offshore infrastructure within the array and include (for FSSs) dynamic Inter-Array Cables and static Inter-Array Cable sections. It is typical for wind turbines to be connected together via strings or loops of Inter-Array Cables, dependent on the electrical design selected.

78. The maximum length of the Inter-Array Cables for the Development is estimated to be 300km. The location and final length of the Inter-Array Cables would be determined post-consent, subject to the final layout of the wind turbines.

79. Currently, the typical voltage rating of an Inter-Array Cable is 66 kilovolts (kV), however, due to the increasing wind turbine capacity, the supply chain is developing Inter-Array Cables with a voltage rating of up to 132kV. These higher voltage Inter-Array Cables are therefore also being considered at this stage.

80. For FSSs, due to the nature (and movement) of the structure, both static Inter-Array Cable (on the seabed) and dynamic Inter-Array Cable (moving in the water column) are required, joined together by a connector to form one continuous cable. The dynamic Inter-Array Cable section is designed to accommodate the movement of the FSS.

81. Dynamic Inter-Array Cable sections can be deployed in various configurations, depending on a number of factors such as water depth and on-site conditions. These configurations may include:

- Free hanging;
- Lazy “S” wave; and
- Steep wave.

82. The lazy “S” wave configuration is most commonly associated with floating offshore wind farms, however further detailed design is required to define the most suitable configuration for the Development (if FSS are chosen).

83. Dynamic cable configurations require a number of auxiliary cable items, designed to help reduce fatigue and protect the cable, such as:

- Buoyancy modules;
- Bend stiffeners;
- Bend restrictors;
- Abrasion protection at the touchdown point; and
- Connectors (joining the dynamic Inter-Array Cable to the static Inter-Array Cable).

84. At the point where the dynamic cable comes into contact with the seabed, the touchdown point, it essentially transitions to being a laid static cable, usually via a connector. Cable protection may be applied to the static Inter-Array Cable. In addition, clump weights / ballast and tethering anchors may be used to hold the cable in position.

85. Should the static section of the Inter-Array Cables require burying or protection this would be subject to further studies and a Cable Burial Risk Assessment (CBRA) post-consent, particularly for the portion of cable that comes into contact with the seabed after the touchdown point.

86. Prior to any installation on the seabed, it is likely that seabed preparation activities would be required. These are detailed further in **Section 1.5.4**.

Offshore Export Cables

87. Electricity from the Offshore Transmission Station(s) would be transmitted via one or two subsea export cables to shore (per phase). Each cable comprises a circuit with three cores. The total number of Offshore Export Cables would be determined at a later date during detailed design. Offshore Export Cables (220kV AC or 275kV) are likely to run from the Offshore Transmission Station(s) to a Transition Joint Bay (TJB) at the landfall. The TJB connects the Offshore Export Cables and Onshore Export Cables. Each Offshore Export Cable would be installed in a separate trench and protected in line with good industry practice, including relevant Det Norske Veritas (DNV), Construction Industry Research and Information Association (CIRIA) and International Cable Protection Committee guidance, and in accordance with the policy principles set out in NPS EN-3 (DESNZ, 2025b).

88. Cables would be buried wherever practicable to protect them from damage from activities such as fishing, anchoring and seabed mobility, and to reduce long-term maintenance risks. Local seabed conditions, including hard ground, boulder fields, steep gradients or high-energy environments, may prevent burial or the achieving of the target depth along parts of the route. Where burial is not possible or cannot be maintained, appropriate alternative protection measures would be implemented in accordance with recognised good industry practice.

89. It is likely that the Offshore Export Cables would have to cross a number of other cables and / or pipelines. Formal agreements with regards to existing cable crossings would be sought by the Applicant and the existing owners / operators, with the installation techniques and crossing design discussed and agreed to ensure integrity of the existing infrastructure and any new cables associated with the Development.

90. It is envisaged there would be no separate cables for fibre optics. Fibre optics would be integrated with the Offshore Export Cables.

91. The Offshore Export Cables would be installed in separate installation campaigns as the installation vessel can only install one cable at a time.

92. The export cables could be either HVAC or HVDC. If HVAC is chosen for the Development, there could be up to six HVAC cables. For HVDC there could be up to three cables. Either technology option would be assessed in the EIA as the final technology decision could be made post-consent.

Cable Burial and Protection

93. Cables may be surface laid or buried. A detailed CBRA would be undertaken post-consent, which would evaluate the likelihood and consequences of cable damage arising from external hazards and seabed conditions. The purpose of the CBRA is not simply to justify burial, but to determine the most appropriate protection strategy for each section of cable. The CBRA would determine, where burial is possible, the target burial depth and methods to be used for cable installation. The burial methods that may be used for the cables include:

- Jet trenching;
- Mechanical trenching;
- Cable ploughing; and
- Mass flow excavator.

94. The burial depths may vary and would be dependent on risk and ground conditions. The maximum width of seabed affected by installation and volume of material to be deployed for cable protection, would be presented in the Development ES.

95. Where it is not possible to achieve the required burial depth, either due to seabed conditions or crossing of third-party pipes or cables, then further external cable protection may be required. The type of cable protection selected would be dependent on various factors, for example seabed and sediment conditions, the physical processes present, and health and safety considerations associated with installation, maintenance and decommissioning. Cable protection may include (but would not be limited to):

- Concrete mattresses;
- Rock placement;
- Rock bags;
- Eco-based products (e.g. reef cubes); and
- Rock nets.

1.5.3.1.5 Subsea Power Collector(s)

96. A Subsea Power Collector(s) is a seabed-mounted electrical hub used to collect and distribute power. It functions as an underwater node that receives medium-voltage power from groups of wind turbines and routes it onwards, typically towards a Subsea Transmission Station(s) or directly into export infrastructure via dedicated subsea cables. The unit contains electrical equipment such as switchgear and protection systems within a sealed, pressure-resistant enclosure. Subsea Power Collector(s) may be used in the Development. This is a developing technology.

1.5.3.1.6 Offshore Transmission Station(s)

97. The cables from wind turbines would be brought to an Offshore Transmission Station(s), located appropriately to optimise the Inter-Array Cable and Offshore Export Cable lengths. Up to three Offshore Transmission Station(s) may be required to reflect the Development phasing. At the Offshore Transmission Station(s), the generated power would be transformed to an appropriate transmission voltage. For HVAC solutions, this would involve stepping up the Inter-Array Cable voltage to a higher export voltage. Alternatively, for an HVDC solution, the Offshore Transmission Station(s) may include converter infrastructure to convert the generated AC power to DC at an appropriate voltage level for export. The final voltage and configuration would be determined through detailed design studies.

98. The Offshore Transmission Station(s) would typically include components including but not limited to transformers, batteries, generators, switchgear, fire systems, and modular facilities for operational and maintenance activities.

99. The Offshore Transmission Station(s) would comprise a topside platform installed on a fixed foundation. The location of the Offshore Transmission Station(s) would be confirmed during the detailed design process. Foundation options for the Offshore Transmission Station(s) are as follows:

- Monopile;
- Jacket with pin piles;
- Tripod;
- Suction bucket (jacket); and
- Gravity based structures.

1.5.3.1.7 Subsea Transmission Station(s)

100. A Subsea Transmission Station(s) is an electrical substation installed on the seabed to collect, transform, and transmit power generated by offshore wind turbines. Subsea substations provide an alternative to traditional surface platforms by housing transformers and switchgear in a sealed underwater structure. Electricity from the array is routed to the subsea substation, where it is stepped up to a higher voltage and then exported to shore via subsea cables. Subsea Transmission Station(s) may be used in the Development. This is a developing technology.

1.5.3.1.8 Midpoint Compensation Reactor(s)

101. A Midpoint Compensation Reactor(s) is an electrical device installed along an export cable route to help manage the reactive power generated in long subsea transmission systems. It is typically located part-way between the offshore electrical infrastructure and the onshore grid connection point. By providing inductive compensation, the reactor helps stabilise voltage levels, improves power quality, and enables efficient transmission over long distances. Installing a Midpoint Compensation Reactor(s) can reduce electrical losses, support system reliability, and ensure that the export cable operates within its designed electrical limits, particularly for far-from-shore or deep-water floating wind developments. Midpoint Compensation Reactor(s) may be needed for the Development. If midpoint compensation is needed the structure(s) would be fixed to the seabed with the compensation reactor housed on a platform above sea level.

1.5.3.2 Onshore

102. The Onshore Scoping Boundary for the purposes of EIA Scoping, is located in the Pembrokeshire and Carmarthenshire area of South Wales. It has been shaped by the potential location of the onshore grid connection point at the proposed Llandyfaelog substation, informed by site selection work undertaken to date for the Development, and the selected based on the location of potential landfalls, which have been influenced by the location of PDA1 offshore.

103. The Onshore Scoping Boundary includes a wide area of search in which all the onshore infrastructure for the Development would be located. The Onshore Scoping Boundary extends landward from MHWS, and encompasses the Landfall, the Onshore Export Cable Corridor, the Onshore Transmission Station(s) and the grid connection cable corridor to the National Grid Substation. The Onshore Scoping Boundary would be refined to the Onshore Development Area as the EIA progresses and the Landfall location, the Onshore Export Cable Corridor, the Onshore Transmission Station(s) location and the grid connection cable corridor are identified. Each

location would be selected to avoid key constraints, such as residential areas and designated and protected sites, where possible. Further detail on how the Onshore Scoping Boundary has been defined is provided in **Section 1.6 Site Selection**.

104. The Onshore Scoping Boundary is shown on **Figure 1.1.1**.

1.5.3.2.1 Landfall

105. National Grid Electricity Transmission has provided information that the location for the onshore grid connection point for the Development would likely be at the proposed substation, near Llandyfaelog, south of Carmarthen (National Energy System Operator (NESO), 2024). Based on site selection undertaken to date, the Scoping Report encompasses a broad Onshore Scoping Boundary within which all the onshore infrastructure would be located, including the Landfall, Onshore Export Cable Corridor, Onshore Transmission Station(s) and grid connection cable corridor.

106. The Offshore Export Cables would be connected to the Onshore Export Cables in the TJBs, which would be constructed prior to the installation of the Offshore Export Cables nearshore. Once the onshore and offshore cables are installed, the joint is completed and the TJB would be covered and the land above reinstated. There would be up to six TJBs for a HVAC technology and three TJBs for a HVDC technology solution as shown in **Table 1.5.6.**

107. Trenchless solutions, open trench surface lay and a combination of shallow water cable installation using a shallow draft vessel or jack up barge with trenchless solutions are currently being considered for landfall.

108. Trenchless solutions include horizontal directional drilling (HDD) which involves drilling pilot holes between the entry (onshore) and the exit (offshore) points. These are then enlarged by a larger cutting tool passing through the holes. Cable ducts are then placed through the channels created. There would be one trenchless solution per cable. The number of export circuits required for the Development is dependent on the technology which would be used i.e. HVDC or HVAC, as shown in **Table 1.5.7.**

109. Open trench surface lay involves cable excavation by backhoe excavator with trenches typically 1-2m wide by 1-2m deep. This option is suitable for a great range of soil types when compared to trenchless techniques such as HDD, apart from rock.

110. A third option of shore end cable lay using a combination of HDD and shallow draft vessel may be adopted due to the extensive length of very shallow water on the approach to the potential Landfall location. The submarine cable lay from the OWF to the 8m contour would be by normal cable laying vessel, then a shallow draft cable laying vessel or barge would be used to lay the cable in the shallow water to the shore. In favourable weather and tidal conditions, the shallow draft vessel would be capable of beaching in the shallow water at low tide closer to the shore at a suitable distance from which the cable can be pulled ashore through a cable trench or pre-installed ducts.

1.5.3.2.2 Onshore Export Cables

111. The Onshore Export Cable would connect the Landfall to the Onshore Transmission Station(s) and would be installed underground.

112. The working width for the Onshore Export Cable Corridor in the Onshore Scoping Boundary, to accommodate the HVDC or HVAC export cables for the Development, would be approximately 250m wide (to encompass up to three phases). This width would accommodate secondary temporary construction compounds, but main temporary construction compounds may exceed this width where necessary along the Onshore Export Cable Corridor. The standard working width accounts for the required construction footprint, including cable trenches, jointing bays, haul roads, spoil storage, drainage etc. The requirement for main temporary construction compounds along the Onshore Export Cable Corridor to host parking, welfare and storage facilities, would be confirmed during the project design process in terms of exact size and location. For the purpose of scoping, main temporary construction compounds are expected approximately every 10km along the Onshore Export Cable Corridor with secondary temporary construction compounds every 5km. There may also be a requirement for additional construction access points outside of the 250m wide Onshore Export Cable Corridor. The Onshore Export Cables would generally be installed in trenches which are then backfilled. There would be a maximum of six trenches required for a HVAC technology development and three trenches required for a HVDC technology development. Should the Development be constructed in Phases, two trenches would be required for each Phase of a HVAC technology and one trench for each Phase of a HVDC technology. The total construction width for all trenches to accommodate the Development Phasing would not exceed 250m. Ducts may be installed at the start of Phase 1 for all Phases or may be installed at the beginning of each Phase.

113. There would be a need for onshore trenchless crossing techniques, such as HDD or other trenchless installation methods, in some locations to avoid specific features, such as rivers. Where alternative methods such as HDD are used, the Onshore Export Cable Corridor would be widened to facilitate the work however would not exceed 250m in total width.

114. Jointing bays would be used to pull the cables into ducts and / or to join cable lengths to each other. Link boxes are used for earthing cables and would be installed inside a protective concrete chamber. The jointing bays are subsurface structures, whilst link boxes would require access (for inspections) from the surface during operation and therefore would be located at or above ground level. At the jointing locations there would be one link box per circuit. The frequency of jointing bays and link boxes would be approximately every 0.5 to 1km. The key indicative construction parameters for the Onshore Export Cables known at this stage are set out in **Table 1.5.6.**

Table 1.5.6 Key Indicative Parameters for Onshore Export Cables

PARAMETER	HVAC	HVDC
Landfall		
Maximum number of TJBs	6	6
Approximate TJB excavation area (per TJB)	30m x 6m	25m x 5m
Approximate TJB construction area	100m x 50m	100m x 50m
Approximate Landfall HDD compound (if required)	50m x 30m	250m x 150m
Onshore		
Maximum number of Onshore Export Cable Corridors	3	3
Maximum number of Onshore Export Cable trenches	6	3
Maximum Onshore Export Cable Corridor construction width (m)	250 (which could encompass up to three phases)	250 (which could encompass up to three phases)
Approximate Onshore Export Cable route length (km)	Up to 60	Up to 60
Jointing bay interval	Every 500m to 1000m	Every 500m to 1000m
Proposed cable installation method	Trenching and HDD or other trenchless solutions	Trenching and HDD or other trenchless solutions
Number of main temporary cable construction compounds	Approximately one every 10km. Total number dependant on total Onshore Export Cable Corridor length	Approximately one every 10km. Total number dependant on total Onshore Export Cable Corridor length
Main temporary cable construction compound dimensions	100m x 50m	100m x 50m
Number of secondary temporary cable construction compounds	Approximately one every 5km. Total number dependant on total Onshore Export Cable Corridor length	Approximately one every 5km. Total number dependant on total Onshore Export Cable Corridor length

PARAMETER	HVAC	HVDC
Secondary temporary cable construction compound dimensions	Within the 250m width of the Onshore Export Cable Corridor	Within the 250m width of the Onshore Export Cable Corridor

1.5.3.2.3 Onshore Transmission Station(s)

115. The Development's Onshore Transmission Station(s) would be either Air Insulated Switchgear or a Gas Insulated Switchgear design, to connect the Development to the national grid. The Onshore Transmission Station(s) would be located close to the onshore grid connection point, currently expected to be at the proposed Llandyfaelog Substation. The Onshore Transmission Station(s) would contain the necessary electrical and auxiliary equipment and components for transforming the power from the windfarm to 400kV to meet the UK Grid Code for connection to the national grid. The maximum design scenario would be set out in the pre-application consultation stage / ES (e.g. maximum height, footprint, number and type of buildings). The key indicative construction parameters for the Onshore Transmission Station(s) known at this stage are set out in **Table 1.5.7**. The need, location and extent of landscaping would be identified and agreed with relevant stakeholders during the Development's design process.

Table 1.5.7 Key Indicative Construction Parameters for the Onshore Transmission Station(s)

PARAMETER	HVAC	HVDC
Maximum number of Onshore Transmission Station(s)	Up to three (one per Phase)	Up to three (one per Phase)
Maximum Onshore Transmission Station(s) footprint	386m x 285m (total area would accommodate up to three transmission stations)	180m x 160m (total area would accommodate up to three transmission stations)
Maximum number of Temporary Construction Compounds per Onshore Transmission Station	1 (total of up to three if the Development is constructed in Phases)	1 (total of up to three if the Development is constructed in Phases)
Maximum Onshore Transmission Station(s) Compound footprint in total	120m x 100m (would accommodate up to three Temporary Construction Compounds if the Development is constructed in Phases)	120m x 100m (would accommodate up to three Temporary Construction Compounds if the Development is constructed in Phases)
Maximum building height in Onshore Transmission Station(s) (m)	20	30

PARAMETER	HVAC	HVDC
Maximum external equipment height (m)	50	50

1.5.4 Pre-construction

1.5.4.1 Offshore

116. Pre-construction works are activities undertaken prior to formal commencement of construction. Additional MLs or other permissions may be needed for pre-construction activities. For the Development, pre-construction activities include:

- Geophysical, geotechnical and visual surveys, which are typically carried out to provide information on the presence of unexploded ordnance (UXO), archaeological features, bedform and mapping of boulders, bathymetry, topography and subsurface layers.
- Benthic survey e.g. drop-down video and grab sampling to provide context on the habitat types present in the Development site. In addition, Particle Size Analysis data from grab samples would be used to inform the baseline for herring spawning and sandeel habitat suitability.
- Should UXO be present, they would be avoided through micro-siting, relocation (if allowed as an option), or disposed of in-situ. UXO clearance would not be considered in detail in the ES, however an indicative assessment of potential impacts would be included for relevant receptors (e.g. benthic ecology, fish and shellfish ecology, and marine mammals). Should UXO clearance be required, separate ML application(s) would be submitted to cover the specific needs.
- Before cable-laying operations commence, the route must be free from obstructions such as discarded fishing gear, anchors or abandoned cables, wires and ropes that may be identified as part of the pre-construction surveys. A survey vessel will be used to undertake a pre-lay grapnel run (PLGR) to clear such identified debris.
- Seabed preparation, including sand wave and boulder clearance. This is particularly important for cable laying works where sand wave and boulder clearance may be needed to provide a flat seabed free from obstructions and mobile sediments. These seabed preparations also assist with minimising damage to cables and maintaining the required cable burial depths.

117. Pre-construction activities would be considered, as appropriate, in the technical chapters of the Development ES under construction stage impacts.

1.5.4.2 Onshore

118. Onshore pre-commencement works would not take place until after the grant of consent and would be assessed as part of the construction assessment. The main pre-commencement activities onshore would consist of:

- Ground investigation (GI) and pre-construction surveys;
- Road / junction modifications and any new junctions off existing highways if required;

- Pre-construction utilities diversions;
- Site clearance; and
- Environmental mitigation i.e. ecological fencing.

1.5.5 Construction

119. The indicative high-level construction milestones over an anticipated maximum duration of six years takes into account potential Development Phasing. The indicative construction programme is provided in **Section 1.5.8**.

120. Construction of infrastructure in the marine area would typically be performed on a 24-hour basis depending on suitable construction weather windows.

121. Wind turbines, FSS, substations and electrical infrastructure would be fabricated offsite, marshalled, assembled and stored at a suitable port facility / facilities and transported to site as required. Fabrication contracts have not been placed, and the Applicant would run competitive tendering processes to identify the most suitable contractors to deliver the required elements of the Development. Fabrication could take place in the UK, in Europe or elsewhere dependent upon the location of the chosen contractor.

122. The port facilities required for construction (and operations and maintenance) are unknown at this stage and agreements with ports are typically finalised post DCO consent. It is noted that for the pre-application consultation stage / ES, the offshore impact assessments would consider vessel movements to and from port, based on a realistic worst case scenario port location, as well as consideration of onshore traffic movements.

123. Construction of substructures utilising innovative deepwater solutions, including those which transfer loads to the seabed, are evolving but would be in keeping with established construction methods.

1.5.6 Operation and Maintenance (O&M)

1.5.6.1 Offshore

124. O&M activities can be split into three main categories:

- Scheduled maintenance;
- Unscheduled maintenance; and
- Emergency / special maintenance (in the event of major equipment breakdown and repairs).

125. The O&M strategy would be finalised based on the location of a suitable port / harbour, which is yet to be defined. The suitable port / harbour selected would need to provide sufficient access to vessels with the capabilities to complete any required O&M activities. The overall O&M strategy would also reflect the technical specification once known, including wind turbine type, electrical transmission design and final project layout. Whether O&M activities can be undertaken at sea or if towing to port is required would also influence the port location chosen.

126. At this stage, the high-level offshore O&M activities would include (but not be limited to) the following:

- Wide ranging inspections of foundations, transition pieces, blades, safety equipment, Offshore Transmission Station(s) equipment, Substructure, anchors, moorings, SKS element etc.;
- System performance assessments and fault-finding;
- Replacement of lubricants, oils, filters, etc.;
- Painting and coating of turbines, etc.;
- Replacement of wind turbine parts including bearings, gearboxes, generators, nacelles, transformers and blades;
- Minor repair and replacements including access ladders, corrosion protection system (including anodes and protective coatings), secondary steel, boat landings, cable penetrations and ducting, aids to navigation;
- Removal of marine growth and guano;
- Reburial or other remedial actions of Offshore Export Cables;
- Repair or replacement of Offshore Export Cables; and
- Replenishment of rock protection as additional cable and scour protection.

1.5.6.2 Onshore

127. At this stage, the high-level onshore O&M activities would include but not be limited to the following:

- Planned maintenance at the Onshore Transmission Station(s);
- Routine access and maintenance at link boxes along the Onshore Export Cable Corridor;
- Unplanned / unscheduled emergency operations associated with the Onshore Export Cable Corridor and/or Onshore Transmission Station(s); and
- Planned inspections / maintenance and periodic testing of the Onshore Export Cable.

1.5.7 Decommissioning

128. The duration of the lease with The Crown Estate is 60 years. However, the operational lifetime of the Development is 40 years.

129. At the end of the operational lifetime of the Development, the decommissioning sequence would be undertaken in reverse of the construction sequence.

130. Decommissioning of OWF components shall be undertaken following permanent shutdown in compliance with all applicable health, safety, environmental, and regulatory requirements. All electrical and mechanical systems shall be safely isolated, de-energized, and secured prior to dismantling works. Turbines, Offshore Transmission Station(s), mooring lines, and Inter-Array Cables shall be disconnected using approved marine vessels and lifting procedures, then transported to shore for recycling or disposal at licensed facilities. Structural components such as turbine towers and nacelles shall be dismantled in a controlled manner, with steel and composite materials segregated for reuse or recycling where practicable. Anchors, foundations, or other subsea infrastructure that cannot be removed without causing significant seabed disturbance or environmental harm shall remain in situ, subject to environmental assessment and regulatory

approval. Where infrastructure is retained, it shall be made safe and environmentally neutral to prevent future hazards. Export and Inter-Array Cables shall be recovered where practical; where removal would result in major seabed disruption, cables shall be buried or rendered inert to ensure long-term stability. All wastes, including hazardous materials, shall be handled by licensed contractors, segregated, and disposed of at approved facilities with full traceability. Upon completion, the site and seabed shall be left in a safe condition, and close-out documentation shall be provided to the relevant authorities. These measures would be assessed as part of the ES.

131. Decommissioning of the Onshore and Offshore Transmission Station(s) shall be carried out following permanent shutdown in compliance with all applicable health, safety, environmental, and regulatory requirements. All electrical systems shall be safely isolated, de-energized, and grounded prior to dismantling works. Electrical, mechanical, and structural equipment, including transformers, switchgear, and control systems, shall be removed in a controlled manner. Hazardous materials such as oils, SF_6 gas, and batteries shall be recovered, treated, and disposed of by licensed contractors. All wastes shall be segregated, recycled where practicable, and disposed of at approved facilities with full traceability. Upon completion, the site or seabed shall be left in a safe condition and close-out documentation shall be provided to the relevant authorities.

132. A decommissioning plan expanding on the processes above would be prepared during detailed design and developed and refined during the Development's lifetime and as decommissioning approaches. To reflect future best practice and new technologies, the approach and methodologies of the decommissioning activities would be compliant with the relevant legislation, guidance and policy requirements at the time of decommissioning.

1.5.8 Indicative Programme

133. The total duration of development construction is anticipated to extend over a period of up to six years (2034 – 2039 inclusive), subject to confirmation of the final grid connection date, ongoing supply-chain engagement, and the outcomes of further pre-consent site surveys.

134. The Development could be delivered on a phased basis, each construction phase is anticipated to span approximately three to four years, with overlapping periods of activity. Further detail on phasing would be provided in the ES with development scenarios defined and reflected in each technical assessment.

1.6 Site Selection

1.6.1 Site Selection Process Overview and Current Status

135. The overall aim of the site selection process is to understand the relevant constraints (environmental, socio-economic, engineering and commercial) to ensure that the final Development design is robust and deliverable. The site selection process also aims to minimise impacts on the environment from the final Development design.

136. The offshore PDA was defined as part of the LR5 process (The Crown Estate, 2024a) which was informed by a plan-level environmental assessment and involved extensive spatial analysis and stakeholder engagement to identify areas with lower environmental, socio-economic, engineering and commercial constraints and suitable proximity to existing grid or planned

infrastructure. The approach aimed to de-risk development and accelerate delivery while aligning with UK decarbonisation goals under the Clean Power 2030 Action Plan.

137. Three PDAs were defined, as follows:

- PDA 1 (off Pembrokeshire);
- PDA 2 (central Celtic Sea, between Wales and Cornwall); and
- PDA 3 (near North Devon / Cornwall).

138. Following the defining of the PDAs as part of the LR5 process, DESNZ requested NESO (formerly NG ESO[4]) carry out an exercise to recommend how to connect Celtic Sea offshore windfarms to the onshore network.

139. Under the Holistic Network Design Follow Up Exercise undertaken by the NESO, each PDA was allocated a connection to the onshore electricity network. PDA 1 was allocated a connection using HVAC technology to Carmarthenshire, PDA 2 would connect via HVDC to the potential new South Wales Connection Node and PDA 3, using HVAC would connect into North Devon (NESO, 2024).

140. National Grid Electricity Transmission (NGET) has indicated that the location for the onshore grid connection point for the Development is likely to be at the proposed new substation at Llandyfaelog, located in Carmarthenshire, Wales.

141. Site selection work has progressed based on a grid connection point at Llandyfaelog to define a potential Onshore Transmission Station(s) Zone and an Onshore Export Cable Corridor. This has been used to define the Onshore and Offshore Scoping Boundaries for the Scoping Report.

1.6.2 Landfall

142. For the purposes of scoping, individual Landfall options have not been identified. The potential Landfall location would be located within the Scoping Boundary as shown on **Figure 1.1.1**. As Offshore and Onshore Export Cables can only connect via viable Landfall sites, initially environmental constraints were mapped out, and broad zones were identified where viable Landfall sites would be located in order to minimise, as far as possible, impacts on environmental receptors. These broad zones, which are encapsulated within the Onshore and Offshore Scoping Boundary, were identified based on the following:

- Avoidance of areas with substantial infrastructure or urban land use e.g. areas of housing, coastal defences, military defence, tourism sites, other energy infrastructure; and
- Avoidance of areas with substantial sea cliffs.

1.6.2.1 Identification of Short List Options

143. As the EIA process progresses, these broad zones would be narrowed down to specific Landfall location options following additional technical and environmental reviews of the broad Landfall options. Consideration of the following principles would be made in conjunction with environmental and engineering assessments conducted for the potential Landfall options:

- Coastal erosion concerns;

[4] NG ESO was rebranded and expanded into the NESO in October 2024

- Requirement for cable / pipeline crossings;
- Flood zones and space constraints for HDD works and / or surface lay;
- Prescence of other infrastructure, or possible infrastructure, such as roads or industry; and
- Engineering and construction constraints including shallow access or steep cliffs.

144. Further details of these principles would be outlined within the ES.

1.6.3 Array Scoping Boundary

145. The Array Scoping Boundary, designated as PDA1, defines the area within which wind turbines, Inter-Array Cables, and potentially other associated platforms may be installed. Water depths across the Array Scoping Boundary range from approximately 66m to 84m below LAT.

1.6.4 Offshore Export Cable Scoping Boundary

1.6.4.1 Defining the Offshore Export Cable Scoping Boundary

146. The Offshore Export Cable Scoping Boundary has been defined to encompass all potential landfall options in accordance with the landfall criteria outlined in **Section 1.6.2**. Offshore Export Cable Route(s) have not been identified at this stage, as such the boundary extends approximately 60km along the South Wales coast, from MHWS seaward, and connects offshore to the northern and southern extents of the Array Scoping Boundary, located approximately 42km offshore within the Celtic Sea.

1.6.4.2 Identification of Long List Options

147. To further refine this area, the following design principles would be applied to identify potential Offshore Export Cable Corridors to connect the Landfall options to the Array Scoping Boundary:

- Connect to viable landfall locations;
- Minimise cable length where possible;
- Minimise number of crossings of existing Offshore Export Cables, power cables, telecoms cables and pipelines, where crossing is required, cables and pipelines to be crossed at approximately 90°°;
- Maintain required separation distances with other offshore cables and pipelines;
- Maintain sufficient space for Offshore Export Cable installation (including anchor spread of installation vessels whilst maintaining an appropriate safety buffer with existing subsea cables and pipelines);
- Minimise interference with established navigation routes and maintain safe navigational access;
- Avoid or minimise disruption to key fishing grounds;
- Avoid other offshore wind development sites;
- Avoid designated sites as far as possible;
- Avoid habitat features in designated sites as far as possible, where sites cannot be avoided;

- Avoid known historic wrecks as far as possible; and
- Minimise sterilisation of aggregate dredging areas and other lease areas.

148. Following consideration of these principles in conjunction with environmental and engineering assessments conducted for the potential Offshore Export Cable Corridor options, potential variations for the Offshore Export Cable Corridor routes would be taken forward for further assessment.

1.6.4.3 Identification of Short List Options

149. Following further review of engineering and environmental considerations for the remaining long list routes, a number of Offshore Export Cable Corridor options would be removed from further consideration for reasons such as engineering and environmental constraints which would result in up to three Offshore Export Cable Corridor(s) to reflect the potential for Development Phasing, for the purposes of the EIA.

1.6.5 Onshore Scoping Boundary

1.6.5.1 Defining the Onshore Scoping Boundary

150. Onshore Export Cable Route(s) have not been identified at this stage. The Onshore Scoping Boundary has been defined by connecting the Onshore Transmission Station(s) Zone (see Section 1.6.6) to the Array Scoping Boundary and encompassing the potential Landfall areas.

1.6.5.2 Identification of Long List Options

151. To further refine this area, the following design principles would be applied to identify potential Onshore Export Cable Corridors to connect the Landfall options to the Onshore Transmission Station(s) Zone:

- Cable corridors should be kept as straight and as short as practicable – avoiding tight bends;
- Avoid residential titles (including whole gardens) where possible by applying a 250m buffer around residential properties;
- Avoid areas identified in local plans for housing development where possible;
- Avoid direct significant impacts to internationally and nationally designated areas (e.g. SACs, SPAs, Sites of Special Scientific Interest (SSSIs), etc.) where possible;
- Avoid direct significant impacts to mature woodland and historic woodland;
- Minimise the number of crossings;
- Minimise the number of crossings of assets (e.g. utilities);
- Minimise the number of road and rail crossings;
- Minimise the number of hedgerow crossings; and
- Minimise the number of watercourse crossings.

152. Following consideration of these principles in conjunction with environmental and engineering assessments conducted for the potential Onshore Export Cable Corridor options, potential

variations for the Onshore Export Cable Corridor routes would be taken forward for further assessment.

1.6.5.3 Identification of Short List Options

153. Following further review of engineering and environmental considerations for the remaining long list routes, a number of Onshore Export Cable Corridor options would be removed from further consideration for reasons such as engineering and environmental constraints which would result in a singular Onshore Export Cable Corridor for the purposes of the EIA.

1.6.6 Onshore Transmission Station(s)

1.6.6.1 Defining the Onshore Transmission Station(s) Area of Search

154. The Onshore Transmission Station(s) area of search was defined using an initial 4km radius from the known location of the proposed Llandyfaelog National Grid Substation.

155. A 4km radius was set to minimise the length of the connection between the Onshore Transmission Station(s) and onshore grid connection point. Minimising this distance would mitigate transmission losses and minimise adverse effects on economic efficiency. The 4km radius was then refined to follow the estuary outline and position the whole Onshore Transmission Station(s) Zone east of the River Towy to reduce the need for a river crossing between the Onshore Transmission Station(s) and the grid connection.

1.6.6.2 Identification of Long List Options

156. Within the Onshore Transmission Station(s) Zone, locations for the placement of the Onshore Transmission Station(s) would be identified subject to the following constraints:

- Avoid residential properties (including whole gardens) where possible with a 250m buffer around residential properties;
- Avoid housing land allocations identified in adopted local plans where possible;
- Avoid direct impacts to internationally and nationally designated areas (e.g. SACs, SPAs, SSSIs etc.) where possible;
- Avoid mature woodland and historic woodland; and
- Preference was given to locating infrastructure in Flood Zone 1.

157. Following consideration of these principles in conjunction with environmental and engineering assessments, a potential long list of options for the location of the Onshore Transmission Station(s) would be identified post scoping stage of the EIA process and taken forward for further assessment.

1.6.6.3 Identification of Short List Options

158. Following additional studies, including site visits undertaken from publicly accessible land to consider the potential landscape impacts, engineering site visits and other potential developments in the area, a preferred location for the Onshore Transmission Station(s) would be identified for the EIA.

1.7 Consultation

1.7.1 Approach to Consultation

159. The Applicant will undertake ongoing and targeted dialogue and engagement with stakeholders, regulators, landowners and communities that may be affected by the Development. This commitment to open, honest, transparent, and meaningful communication and engagement will make it as easy as possible for all to have a strong voice in helping shape the Development. The engagement will continue throughout the EIA process to the submission of the DCO and ML applications.

160. The Planning and Infrastructure Act 2025 would amend the requirements around statutory consultation once the relevant provisions come into force. The Applicant is keeping the requirements under review and any consultation undertaken would comply with the relevant statutory provisions in force at the time the consultation is carried out.

161. Consultation with technical regulators and stakeholders is being facilitated through an Evidence Plan Process (EPP) (further information is provided in **Section 1.7.4**). The EPP is an integral tool to the structure and delivery of the EIA and other assessments during the pre-application stage as well as setting the basis for Statements of Common Ground (SoCG) with relevant stakeholders.

162. The EPP is now common practice in almost all NSIPs which brings the regulators and key technical stakeholders to the table, thereby establishing relationships and giving opportunities for technical stakeholders to be involved in a shared technical discussion. Its aim is to establish agreement on the key aspects (data gathering, impact assessment and mitigation measures) prior to the DCO and ML application submissions.

163. In summary, the EPP is an effective mechanism for technical stakeholder engagement which provides:

- A platform to debate advice on technical topics between multiple agencies;
- Greater certainty on the amount and range of evidence that should be collated to inform assessments;
- Opportunities for issues to be addressed and agreed early in the pre-application process so robust and streamlined decisions can be taken; and
- Opportunities to explore options to avoid, reduce and mitigate impacts before they become constrained by project design.

164. An approach to community consultation including opportunities for communities to feed into the Development and how community views would be considered and incorporated into the development or design of the Development, would be outlined. Further information on the approach to community consultation and engagement is discussed in **Section 1.7.2**.

165. All pre-application consultation would be recorded. A report would provide details of consultation undertaken, any relevant responses received, and the account taken of any such responses. The primary purpose of the report is to provide details of the consultation carried out.

166. The DCO and ML application process and both sets of EIA Regulations require public and stakeholder consultation to ensure projects consider the environment and communities. They share similarities, such as engaging the public, statutory bodies, and stakeholders at key stages

and allowing comments on environmental assessments. The Development's approach to consultation would ensure requirements of both approaches are met.

1.7.1.1 Welsh Language Requirements

167. While applicants are not directly subject to Welsh language legislation, both the DCO and marine licensing processes in Wales are administered by public bodies with statutory Welsh language duties under the Welsh Language Act 1993 and the Welsh Language (Wales) Measure 2011. Therefore, applicants are expected to provide bilingual public-facing consultation materials and statutory notices to support compliance with those requirements in practice. This means that key non-technical application documents, statutory notices, and consultation materials are normally provided in both English and Welsh, ensuring equal treatment of both languages (Welsh Government, 2025a). The Planning Inspectorate's Welsh Language Scheme and Welsh Government policy reinforce that bilingual communication is essential throughout the process, from pre-application consultation to examination and decision stages. Therefore, the Applicant would provide bi-lingual materials throughout the DCO and ML application process, where required.

1.7.2 Community and Public Engagement

168. Consultation with stakeholders and local communities is a key part of the planning and consenting processes. The Applicant is actively seeking input, with all comments and opinions provided carefully considered and used to help shape the Development.

169. Public events (in person, virtual or hybrid) would be held to introduce and update people on the progress of the Development. The events would also allow the Development team to respond to any queries and questions the public may have. All materials produced for public consultation events would be made available in both English and Welsh, ensuring accessibility and inclusivity in line with Welsh language legislation and best practice for engagement in Wales. Members of the public would be able to respond to consultations or ask questions through the medium of Welsh or English.

170. Pre-application consultation would be the main opportunity for communities and members of the public to review the plans, provide comments, submit feedback, and to shape the development of the Development design prior to submission of the DCO and ML applications. All communities and members of the wider public would have the opportunity to be asked about the Development.

171. The Applicant would ensure that communities and wider public stakeholders who are most affected by the proposals are engaged as the Development progresses and would have the opportunity to comment on the proposals at key decision-making points.

172. Pre-application consultation would incorporate an initial consultation to introduce the Development followed by at least one consultation stage. The Applicant would work with local authorities to find the best way to engage and consult communities. Engagement at different stages of the Development ensures that consultation is thorough and timed to allow the Applicant to effectively gather and incorporate opinions and feedback into Development design and the DCO and ML applications.

173. The Development would engage with communities and their representatives, finding the best mechanisms to consult with those affected by or interested in the Development. All consultation materials would consider:

- How to minimise the use of technical language and jargon in materials;
- Different formats for sharing project information;
- Electronic / hard copies / in-person in various locations; and
- Consideration of the design and format of application documents to ensure accessibility (for example braille, requirement for translations) and where consultation materials are made available.

174. The location and timings of in-person events are being explored, and it is expected that this would include:

- Community consultation events which would act as the focal point of consultation for both the informal consultation and formal consultation phases. Events would be held virtually and throughout the consultation area.
- Meetings with local representatives of communities of interest.
- Information cascade through adverts and articles in the print press, project specific website, newsletters and direct mail.

175. The Applicant would offer a range of ways for the public to contact the project team, and share their views based on the most appropriate mechanisms for the community.

176. This approach to consultation, using various consultation methodologies, reflects the Applicant's commitment to meaningful engagement and to capture the views of local communities from individuals, community groups and those harder to reach groups.

1.7.3 Pre-scoping Consultation

177. The Applicant has proactively initiated engagement with several stakeholders from an early stage in the Development. **Table 1.7.1** provides an overview of stakeholder consultation undertaken up to June 2026. The Applicant would build from this initial consultation to ensure that all stakeholders are effectively engaged as the EIA process progresses.

Table 1.7.1 Meetings Held with Stakeholders (at time of writing)

MEETING AND DATE HELD	ATTENDEES	SUBJECT
Introduction to Gwynt Glas (7th October 2025)	- The Applicant - Cabinet Secretary for the Economy, Energy and Planning, Welsh Government	An introduction to the Development to Welsh Government
Introduction to Gwynt Glas (24th November 2025)	- The Applicant - Swansea Council Chief Exec	An introduction to the Development to Swansea Council

MEETING AND DATE HELD	ATTENDEES	SUBJECT
Introduction to Gwynt Glas (24th November 2025)	The Applicant Neath Port Talbot Council Director of Environment and Regeneration	An introduction to the Development to Neath Port Talbot Council
Introduction to Gwynt Glas (27th November 2025)	The Applicant NRW	An introduction to the Development team to NRW.
Introduction to Gwynt Glas (27th November 2025)	The Applicant First Minister of Wales	An introduction to the Development to Welsh Government
Introduction to Gwynt Glas (1st December 2025)	The Applicant NRW Joint Nature Conservation Committee (JNCC)	An introduction to the project team to NRW and JNCC.
Community Council Webinars (21**st** and 22**nd** May and 3**rd** June 2026)	Community Councils within the Onshore Scoping Boundary	An introduction to the Development and Scoping

178. The Development is located predominantly in Welsh waters, however, a small section of the Offshore Scoping Boundary extends into English waters. Due to the overlap with English waters and the proximity to Irish waters, cross-border impacts also need to be considered. Consultation with the respective Governments and other relevant stakeholders would be undertaken as required and where applicable.

1.7.4 Technical Consultation

179. Consultation is an important part of the EIA and HRA processes and consultation with technical consultees would be crucial to the development of the assessments. This consultation would initially include discussions on the detailed methodologies for data collection and undertaking the impact assessments, as well as any key points raised in the Scoping Opinion.

180. As additional data and project information, including mitigation measures, develop further discussions would take place and it may be appropriate to scope impacts out at this stage. This will be based on, for example, site-specific survey information, and only where there is documented agreement with relevant regulators and stakeholders. Agreement logs would be developed with attendees for review and signoff. It is hoped these would ultimately be able to form the basis for the SoCG, which would be submitted as part of the DCO and ML applications.

181. As part of the EPP, Expert Topic Groups (ETGs) would be established where it is relevant for multiple agencies or stakeholders to collectively engage in topic specific technical discussions. **Table 1.7.2** provides an overview of the likely stakeholders that would be engaged throughout the EIA and the broad environmental topic areas to be discussed. Based on other NSIPs, the EPP is very beneficial, enabling early engagement and discussion over evidence needs between

applicants and relevant stakeholders. The EPP helps to identify and address evidence gaps and issues faced by projects in the pre-application stage.

Table 1.7.2 Consultation Groups Proposed for the Development

CONSULTATION	PURPOSE OF TOPICS INCLUDED	STAKEHOLDERS

ETGs	ETGs could be established relating to the following topics:
	- Seabed
	  o Marine Geology, Oceanography and Physical Processes including Water Quality (including marine water and sediment quality)
	  o Benthic and intertidal ecology
	  o Fish and shellfish ecology
	- Marine mammal ecology and underwater noise
	- Offshore ornithology
	- Terrestrial ecology (including onshore ornithology)
	- Seascape, Landscape and Visual Impact Assessment (SLVIA) and Landscape and Visual Impact Assessment (LVIA)
	- Traffic and transport, onshore noise and air quality
	- Water resource and flood risk (including land use and geology where relevant)
	- Historic environment (onshore and offshore)
	- Socio-economics, Human Health and Tourism
	Where there is sufficient overlap in technical expertise, topics may be combined to provide efficiency for all parties.
		- NRW Advisory
		- Welsh Government's Marine and Fisheries Division
		- JNCC
		- Centre for Environment, Fisheries and Aquaculture Science (Cefas)
		- Royal Commission on Ancient and Historic Monuments, Wales
		- Cadw
		- Carmarthenshire County Council (CCC)
		- Royal Society for the Protection of Birds (RSPB)
		- The Wildlife Trust of South and West Wales
		- Pembrokeshire County Council (PCC)
		- Pembrokeshire Coast National Park (PCNP) Authority
		- Swansea City & County Council
		- Inshore Fisheries and Conservation Authority (Cornwall / Devon and Severn)
		- Whale and Dolphin Conservation

CONSULTATION	PURPOSE OF TOPICS INCLUDED	STAKEHOLDERS
		- CCC Lead Local Flood Authority (LLFA) and PCC LLFA - Environment Agency - NE (Devon, Cornwall and Isles of Scilly) - Landmark Trust - Dŵr Cymru Welsh Water - NRW Flood Risk Management Team - Public Health Wales
Fisheries	This topic typically sits outside the framework of the EPP. Fisheries consultation would be undertaken at an early stage in the EIA process to identify and manage potential effects on commercial and recreational fishing activities throughout construction, operation, and decommissioning. This typically involves engagement with fisheries stakeholders such as fishing industry representatives, fisheries management organisations, and individual operators, supported by a fisheries impact assessment. The process considers issues including temporary exclusion during works, changes to access or navigation, interactions with fishing gear, and potential displacement effects, with appropriate mitigation and co-existence measures developed where required.	- UK fisheries - Foreign fisheries

CONSULTATION	PURPOSE OF TOPICS INCLUDED	STAKEHOLDERS
Aviation and radar	This topic typically sits outside the framework of the EPP. Consultation with aviation stakeholders would be undertaken to ensure that potential effects on aviation safety, air traffic management, and defence or meteorological radar systems are identified and appropriately managed. This typically involves engagement with relevant stakeholders, such as the Civil Aviation Authority (CAA), National Air Traffic Services (NATS), the MOD, and relevant aerodrome operators, supported by an aviation and radar impact assessment. The process considers issues such as wind turbine height and lighting, radar interference, and effects on flight procedures, with mitigation measures developed where necessary in line with relevant CAA, NATS, and MOD guidance.	- CAA - Ministry of Defence (MoD) - Defence Infrastructure Organisation (DIO) - NATS En Route
Shipping and navigation	This topic typically sits outside the framework of the EPP. Consultation with shipping and navigation stakeholders would be undertaken to identify and manage potential impacts on maritime safety and vessel operations. It typically includes engagement with maritime stakeholders and the preparation of a Navigation Risk Assessment (NRA) to assess changes to navigational risk arising from offshore infrastructure. Hazard Identification (HAZID) workshops are commonly used to systematically identify hazards and agree appropriate mitigation measures, with the assessment approach guided by relevant MCA guidance, including applicable MGN(s).	- MCA - Trinity House - Royal Yachting Association (RYA) - Cymru Wales - Chamber of Shipping - Port authorities - Shipping companies

1.8 EIA Methodology

1.8.1 Proportionate Approach to EIA

182. A proportionate EIA is critical for OWF development because it ensures that environmental considerations are addressed effectively without imposing unnecessary burdens on developers, regulators or stakeholders. Proportionality means focusing effort and resources on the most significant environmental effects rather than producing unnecessarily lengthy or repetitive documentation that cover all possible effects.

183. This principle was first articulated in Institute of Sustainability and Environmental Professionals (ISEP's)[5] (2025) Delivering Proportionate EIA strategy and reaffirmed through initiatives like the Offshore Wind Evidence and Knowledge Hub (OWEKH), which promotes standardised scoping and evidence sharing to streamline assessments while maintaining environmental integrity. OWEKH has cross-governmental support from all UK administrations.

184. UK legislation also supports this approach. The Energy Act 2023 introduced the Offshore Wind Environmental Improvement Package, enabling tailored HRA and strategic compensatory measures to accelerate consenting while safeguarding marine ecosystems.

185. Additionally, statutory requirements under the EIA Regulations 2017 and guidance from bodies such as Cefas emphasise that EIAs should be proportionate, targeted, and based on robust baseline data to comply with the Habitats and Birds Directives. This approach reduces delays, improves clarity, and ensures that environmental protection remains central to the UK's offshore wind expansion goals.

186. The Applicant has taken a proportionate approach to EIA in producing this Scoping Report by taking the following measures:

- Keeping introductory chapters brief by listing relevant legislation and policies, but not including text from these documents;
- Cross referencing between chapters to reduce replicating text;
- Providing embedded and additional mitigation in one place (see **Table 1.8.2**) to reduce replicating the same text in multiple chapters;
- Following OWEKH Evidence Review Notes (ERNs) where they are available for specific topics; and
- Reviewing other offshore wind EIA documents and DCO applications to incorporate relevant findings.

1.8.2 Characterisation of the Baseline Environment

187. Characterisation (description) of the baseline environment would be undertaken to determine the baseline conditions in the areas that could potentially be affected by the Development. This would require the following steps:

[5] ISEP was rebranded in July 2025 from IEMA (Institute of Environmental Management & Assessment)

- Define study areas for each receptor based on the zone of influence (ZoI) and relevant characteristics of the receptor (e.g. mobility / range);
- Review available information;
- Review likely or potential impacts that might be expected to arise from the Development;
- Determine if the available data are adequate to make an assessment with sufficient confidence;
- If further data are required, ensure that data collection is targeted and directed at answering the key questions and filling important data gaps; and
- Review information gathered to ensure the environment can be characterised in sufficient detail.

188. Existing data from research, government and industry, would be used alongside data collected by The Crown Estate and the Applicant specifically for the Development. The proposed data and information sources are outlined in the baseline environment subsections in **Chapters 2, 3** and **4**.

189. Consideration would also be given to how the environment would change over the lifetime of the Development if it didn't go ahead. This would take account of wider issues such as climate change and biodiversity loss (in line with Schedule 4 of the EIA Regulations).

190. The approach to establishing a robust baseline is summarised under each topic in this Scoping Report (see **Chapters 2** to **4**), and the Applicant would seek to agree this via consultation e.g. from the views expressed in the Scoping Opinion.

1.8.3 Assessment of Impacts

191. The EIA team would make balanced assessments with the input of EIA and technical specialists. A combination of existing and new data, following guidance and the application of experience and expert judgement would be used. In order to provide a consistent framework and system of common tools and terms, where appropriate, a matrix approach would be used to frame and present the judgements made (see **Table 1.8.1** for an example). For each EIA topic the latest guidance or best practice would be used and, therefore, definitions of sensitivity and magnitude of impact would be tailored to each receptor. The impact assessment would consider the potential for, and significance of, impacts during the construction, operation and decommissioning of the Development.

192. The assessment of impacts would use a source-pathway-receptor (S-P-R) model (**Plate 1.8.1**), whereby the source is the initiator event, the pathway is the link between the source and the receptor impacted by the effect, and the receptor is the receiving entity. An example of this type of conceptual model is provided by cable installation which disturbs sediment on the seabed (source). This sediment is then transported by tidal currents until it settles back to the seabed (pathway). The deposited sediment could change the composition and elevation of the seabed (receptor). All three elements; source, pathway and receptor, need to be present for an impact to take place.

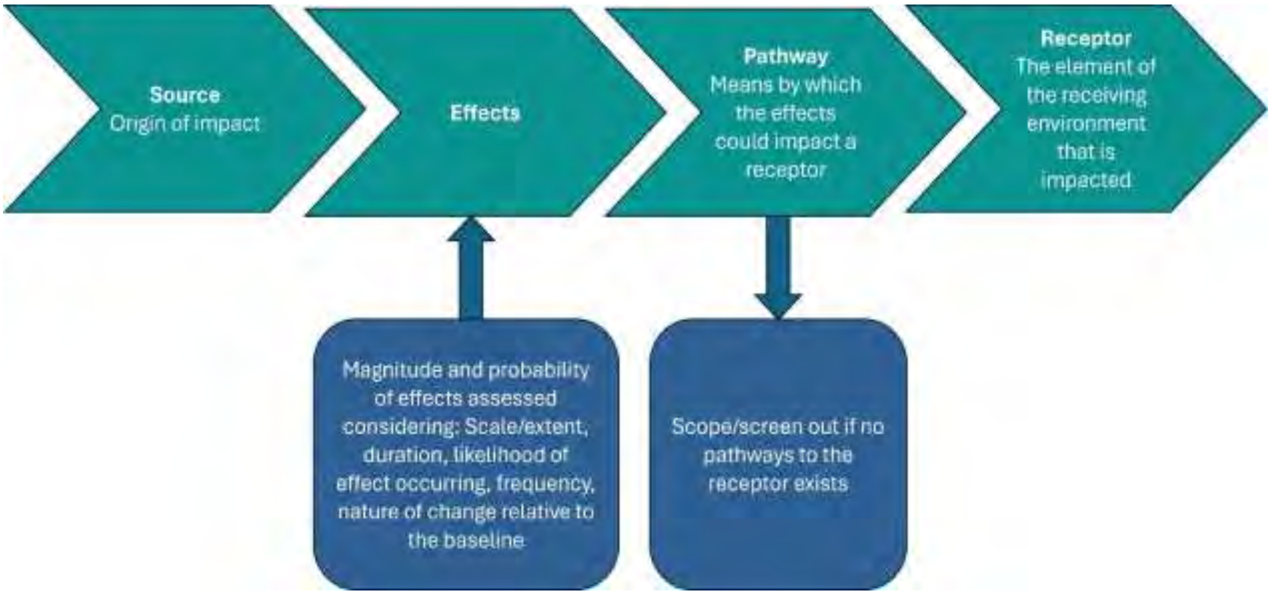


Plate 1.8.1 S-P-R Model

1.8.3.1 Determining Receptor Sensitivity and Value

193. The ability of a receptor to adapt to change, tolerate and / or recover from potential impacts would be key in assessing its sensitivity to the impact under consideration. For ecological receptors, tolerance could relate to short-term changes in the physical environment. For human receptors tolerance could relate to displacement effects and impacts on economics or safety. It also follows that the times required for recovery would be a key consideration in determining receptor sensitivity.

194. Receptor value considers whether, for example, the receptor is rare, has protected or threatened status, importance at local, regional, national or international scale, and in the case of biological receptors whether the receptor performs a key role in the ecosystem function.

195. The overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance and recoverability as well as applying professional judgement and / or past experience. Expert judgement is particularly important when determining the sensitivity of receptors. For instance, an Annex II species (under the Habitats Directive) could have high value, but if it was highly tolerant of an effect or had high recoverability its sensitivity should reflect the ecology of the species rather than default to the protected status alone.

1.8.3.2 Predicting the magnitude of impacts

196. In order to predict the significance of an impact it is fundamental to establish the magnitude and probability of the impact occurring through a consideration of:

- Scale or spatial extent (small scale to large scale; most of the population or a few individuals);
- Duration (short-term to long-term, permanent);
- Frequency; and

- Nature of change relative to the baseline.

1.8.4 Evaluation of Significance

197. After establishing the receptor sensitivity and magnitude of effect, the impact significance would be predicted by using quantitative or qualitative criteria. Where possible a matrix such as the one presented in **Table 1.8.1** would be used in the assessment.

198. For the purpose of the EIA, major and moderate adverse impacts are deemed to be significant and, as such, may require mitigation. Whilst minor impacts are not significant in their own right, these may contribute to significant impacts cumulatively or through interaction.

Table 1.8.1 Example of the Significance of an Impact Resulting from Each Combination of Receptor Sensitivity and the Magnitude of the Effect upon it

		NEGATIVE MAGNITUDE				BENEFICIAL MAGNITUDE			
		HIGH	MEDIUM	LOW	NEGLIGIBLE	NEGLIGIBLE	LOW	MEDIUM	HIGH
SENSITIVITY	HIGH	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	MEDIUM	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	LOW	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	NEGLIGIBLE	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

1.8.5 Embedded and Additional Mitigation, Impact Significance and Residual Impact

199. The EIA Regulations require a description of the measures envisaged to avoid, prevent, reduce or (where possible) offset any significant adverse effects on the environment. Mitigation is categorised into two types - embedded or additional.

200. Embedded mitigation incorporated into the Development's design that would limit potential effects on the environment, is defined as "*mitigation measures that have been incorporated into a project's description and form an inherent part of the project's design*" (ISEP, 2024).

201. Different embedded mitigation measures may be applicable for different environmental topics. In the EIA, impacts would be assessed with embedded mitigation in place. Where impacts are deemed 'significant' in EIA terms then additional mitigation would be required. Impacts may then be reassessed and the post-mitigation or 'residual impact' identified. If the impact does not require additional mitigation (or none is possible) the residual impact would remain the same.

202. Embedded mitigation measures would be developed as site-specific information becomes available and the Development's design is refined during the EIA. Additional mitigation measures would evolve as the Development's design is refined, the EIA progresses, and / or in response to consultation.

203. The following embedded mitigation hierarchy would be followed to prioritise the avoidance of effects:

- Mitigation by site selection;

- Mitigation by avoidance;
- Mitigation by restoration of land; and
- Good practice construction measures to reduce perceptual change.

204. Where possible, embedded mitigation would be incorporated into the Development's design at an early stage (often using experience from operational projects). Embedded mitigation can include:

- The design elements aimed at reducing impacts;
- Commitment to specific best practice;
- Commitment to pre-construction surveys; and
- Commitment to consultation.

205. The embedded mitigation measures and best practice measures which may be relevant to the Development are presented in **Table 1.8.2.** This list is not exhaustive and would be refined for and finalised in the ES as more design information is known.

206. In some circumstances it may be necessary to detail monitoring requirements as part of the additional mitigation measures identified. Monitoring may be needed to confirm an assumption that an assessment relies on (e.g. continue to monitor baseline conditions) and / or to confirm effectiveness of mitigation measures. Monitoring should be proportionate and directly relevant to the findings of the impact assessment and / or relate to uncertainties in the assessment, i.e. it should not be monitoring for the sake of monitoring.

Table 1.8.2 Examples of Embedded Mitigation Measures Proposed for the Development

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Offshore		
Cable routeing	Consideration of cable routeing to avoid sensitive habitats (e.g. potential fish spawning grounds).	- Fish and Shellfish Ecology
Micro-siting	Spatial mitigation, such as micro-siting anchors or cable protection to avoid sensitive sediment types or known nursery / spawning areas where practicable.	- Fish and Shellfish Ecology - Benthic Ecology
Seabed preparation	Where seabed preparation is required (e.g. seabed levelling, or sand wave levelling) using methods and equipment that have been designed to minimise potential for sediment suspension and dispersal.	- Marine Geology, Oceanography and Physical Processes, and Water Quality
Application of suitable installation methodology	Application of installation techniques using methods and equipment to minimise sediment suspension.	- Marine Geology, Oceanography and Physical Processes, and Water Quality - Fish and Shellfish Ecology - Benthic Ecology
Construction Method Statement (CMS)	Preparation of CMS post consent, setting out detailed wind turbine, substructure and cable installation methods and techniques (based on final Development design).	- Marine Geology, Oceanography and Physical Processes - Water Quality - Fish and Shellfish Ecology - Benthic Ecology

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
		Shipping and Navigation Commercial Fisheries
Minimum target burial depth	Offshore cables would be buried to a minimum target burial depth of 0.5m where possible (recognised industry good practice). A detailed CBRA would also be required to confirm the extent to which cable burial can be achieved and undertaken in accordance with industry-standard guidance, including the Carbon Trust CBRA Guidance (Carbon Trust, 2015). Where it is not possible to achieve cable burial, additional cable protection (rock placement, concrete mattressing or grout bags) may be required to reduce snagging risk. Where the CBRA deems burial is not feasible, suitable use and monitoring of cable protection would be employed. Any cable protection would seek not to reduce the depth of surrounding waters by more than 5%.	Marine Geology, Oceanography and Physical Processes, and Water Quality Fish and Shellfish Ecology Benthic Ecology Commercial Fisheries Shipping and Navigation
Timing construction activities	Temporal mitigation, where feasible, to avoid peak spawning or migration periods for key species (e.g. demersal spawners, diadromous fish).	Fish and Shellfish Ecology Marine Mammals
Outline Project Environmental Management Plan (PEMP)	Implementation of an Outline PEMP to reduce any risks associated with accidental spills and leaks during all stages of the Development.	Marine Geology, Oceanography and Physical Processes Water Quality Population and Human Health Climate Change Resilience (CCR)

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Draft Marine Mammal Mitigation Protocol (MMMP)	A MMMP would be produced to reduce the risk of permanent threshold injury in marine mammals from underwater noise. A draft MMMP would be provided with the DCO and ML applications. The final MMMP would be developed in the pre-construction period based on best available information, methodologies, industry best practice, latest scientific understanding, current guidance and detailed project design. The MMMP would be developed in consultation with the relevant stakeholders.	- Marine Mammals - Fish and Shellfish Ecology
Site Integrity Plan (SIP)	A SIP would be produced for the Bristol Channel Approaches and the West Wales Marine SACs (subject to the production of the overarching SIP production by The Crown Estate). The SIP would set out measures to avoid significant disturbance to harbour porpoise which would lead to an adverse effect on integrity in relation to the SAC conservation objectives. An Outline SIP would be provided with the submitted DCO and ML application. The final SIP would be developed in the pre-construction period as per the MMMP. The SIP would be developed in consultation with the relevant stakeholders. The Crown Estate stated that it would develop an overarching SIP for the Bristol Channel Approaches SAC to take account of all Round 5 developments as part of the mitigation set out in the Plan level HRA.	- Marine Mammals
Fisheries Liaison Coexistence Plan (FLCP)	A FLCP would be drawn up. It would set out ongoing fisheries liaison procedures, embedded mitigation, and additional measures where residual impacts on commercial fisheries are identified.	- Commercial Fisheries - Shipping and Navigation - Population and Human Health
Adherence to best practice guidance	Adherence to best practice guidance with regards to fisheries liaison and procedures in the event of interactions between the Development and fishing activities (e.g., Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW), 2025).	- Commercial Fisheries

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
	Adherence to best practice guidance with regards to damage or loss of fishing gear that is attributable to the Development (e.g., FLOWW, 2025).	Commercial Fisheries
Boulder removal	Where boulder removal is required during site preparation, the location of large boulders that are relocated and may pose a snagging risk for fishing gear, would be disclosed to the fishing industry within a timely manner and in an accessible format.	Commercial Fisheries
Development Specification and Layout Plan (DSLP)	Development of and adherence to a DSLP. The DSLP would confirm layout and relevant design parameters.	Commercial Fisheries Shipping and Navigation Aviation and Radar
	To support fisheries engagement, spatial information on final layout, final cable routes and any surface protection measures would be clearly communicated to fishers via established channels, including The Kingfisher Information Service – Offshore Renewable & Cable Awareness project (KIS-ORCA), fisheries liaison officers (FLO), and Notices to Mariners, and through the measures in the FLCP. This ensures that commercial fishers are informed in advance of installation, have access to up-to-date spatial data, and can plan operations accordingly to minimise risk and disruption.	
	The layout of the wind turbines in the Array, would be finalised in discussion with the MCA in order to ensure the specific wind turbine layout is compatible with potential search and rescue (SAR) activity.	
Layout orientation	Layout of infrastructure to include at least one line of orientation.	Shipping and Navigation
Minimum blade tip height (air gap)	Minimum blade clearance of 22m above HAT.	Shipping and Navigation Offshore Ornithology

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Aids to Navigation	Aids to navigation (marking and lighting) could be deployed in accordance with the latest relevant available standard industry guidance and as advised by Trinty House, MCA and CAA and MoD as appropriate. This would include a buoyed construction area around the Array Scoping Boundary to be agreed in consultation with Trinity House.	- Shipping and Navigation - Commercial Fisheries
Lighting and marking	Lighting and marking failures appropriately reported / rectified as soon as possible and interim hazard warnings put in place as required.	- Shipping and Navigation - Commercial Fisheries
Compliance with relevant regulations	Compliance with regulatory expectations on moorings for floating wind and marine devices published by MCA and the Health and Safety Executive (HSE) (HSE and MCA, 2017).	- Shipping and Navigation - Commercial Fisheries
	Compliance with MCA and MGN 654 (MCA, 2021) and its annexes where applicable (including consideration of a SAR checklist, an Emergency Response and Cooperation Plan (ERCoP) and Under Keel Clearance. Consideration would also be given to MGN 654 SAR Annex 5 (MCA, 2024).	- Shipping and Navigation - Commercial Fisheries
	Compliance of all project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	- Shipping and Navigation - Commercial Fisheries
Safety Zones	Applications would be made, where appropriate, for Safety Zones (e.g. 500m) for construction and major maintenance works, and for pre commissioning works (e.g. 50m).	- Shipping and Navigation - Commercial Fisheries
Marine co-ordination	Marine co-ordination of project vessels from a marine control centre.	- Shipping and Navigation

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Guard vessels	Use of guard vessels, where appropriate, to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, to mitigate any impact which poses a risk to surface navigation during construction, maintenance and decommissioning stages.	Shipping and Navigation Commercial Fisheries
Appropriate marking	Appropriate marking of the Development on admiralty and aeronautical charts. This would include provision of the positions and heights of structures to the UK Hydrographic Office (UKHO), CAA, MoD and Defence Geographic Centre (DGC).	Shipping and Navigation Commercial Fisheries Aviation and Radar
FLO	Appointment of a FLO to facilitate engagement with the commercial fishing industry. Ongoing liaison with fishing fleets would be maintained during construction, maintenance and decommissioning operations via an appointed FLO.	Shipping and Navigation Commercial Fisheries
Advance warning and notifications	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances would be given via Notices to Mariners and Kingfisher Bulletins.	Shipping and Navigation Commercial Fisheries
	Notification of damage or decay to cables to the MCA, Trinity House, Kingfisher and UKHO within 24 hours of discovery.	Shipping and Navigation Commercial Fisheries
Cable Specification and Installation Plan (CSIP)	CSIP to confirm planned cable routeing, burial and any additional protection and would set out methods for post-installation cable monitoring. The CSIP is likely to be supported by a CBRA, which would outline how external cable protection should be used and / or minimised if cable burial is not achieved.	Shipping and Navigation Commercial Fisheries Marine Geology, Oceanography and Physical Processes Water Quality

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
		- Fish and Shellfish Ecology - Benthic Ecology
Outline Vessel Management Plan	An Outline Vessel Management Plan would confirm the types and numbers of vessels that would be engaged on the Development and consider vessel coordination including indicative transit route planning.	- Shipping and Navigation - Commercial Fisheries - Accidents and disasters
Navigational Safety Plan	A Navigational Safety Plan would describe measures put in place by the Development related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Development activity to other sea users (e.g., via Notice to Mariners).	- Shipping and Navigation - Commercial Fisheries - Accidents and disasters
ERCoP	The ERCoP would be prepared in line with MCA guidance and confirms what measures the Offshore Development has in place to support any emergency response.	- Shipping and Navigation - Commercial Fisheries - Aviation and Radar - Accidents and disasters
Lighting and Marking Plan / Aids to Navigation Management Plan	Development and adherence to a Lighting and Marking Plan and Aids to Navigation Management Plan. The Lighting and Marking Plan would confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting.	- Shipping and Navigation - Commercial Fisheries - Aviation and Radar

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Aviation lighting and marking	Appropriate marking of the Development on aeronautical charts. This would include provision of the positions and heights of structures to CAA, MOD, and Defence Geographics Centre.	Aviation and Radar
	Aviation lighting and marking, as described in the Lighting and Marking Plan, would be installed in accordance with Article 223 of the UK Air Navigation Order 2016 which sets out the mandatory requirements to be followed for lighting of offshore wind turbines.	Aviation and Radar
	Failures of the lighting and marking of the Development would be appropriately reported and rectified as soon as practicable. Interim hazard warnings would be put in place as required. For any outage expected to be 12 hours or longer, a Notice to Aviation would be issued.	Aviation and Radar
Archaeological Exclusion Zones (AEZs)	AEZs would be implemented to protect any known and identified marine archaeological receptors of high archaeological interest.	Offshore Archaeology and Cultural Heritage
Avoidance of wrecks	Avoidance of known wrecks or identified heritage sites through final wind turbine layout and routeing and application of standard mitigation measures.	Offshore Archaeology and Cultural Heritage

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Onshore		
Outline Landscape Management Plan (LMP)	The Outline LMP would set out the outline landscape mitigation for the onshore transmission infrastructure in respect of onshore landscape receptors. The Outline LMP would set out an outline of the measures that are proposed to avoid or mitigate landscape impacts during the pre-construction, construction and operation stages of the onshore transmission infrastructure, as identified through the EIA. The Outline LMP would form the basis for a final LMP, which would be prepared and submitted to the Local Planning Authority (LPA) for approval prior to construction and would set out committed mitigation that has been identified as a result of the assessment at the Onshore Transmission Station(s). It also sets out how planting would be established and maintained.	- Terrestrial Ecology - LVIA - Tourism and Recreation
Design and Access Statement	The Design and Access Statement would set out the design principles that would be applied to the detail design of the Projects. This would ensure that a sense of place is considered and integrated throughout the design process and adverse environmental effects are mitigated where possible whilst respecting Landscape Character.	- LVIA - Tourism and Recreation
Outline Ecological Management Plan (EMP)	The Outline EMP includes but is not limited to pre-construction, construction, and post-construction measures relating to habitats, hedgerows and protected or notable species where relevant. The Outline EMP would include details of any long-term mitigation and management measures relevant to terrestrial ecology and ornithology and nature conservation. The Outline EMP would be developed in consultation with the relevant stakeholders.	- Terrestrial Ecology

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
Onshore Transmission Station(s) Design Principles Document (Design Guide)	A Design Principles Document (or 'Design Guide') would be prepared to set out the approach to the design of the Onshore Transmission Station(s), in accordance with the design guidance contained in Overarching NPS for Energy (NPS EN-1 (DESNZ, 2025a)), the NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2025b) and the NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2025c).	- LVIA
Outline Code of Construction Practice (CoCP)	The Outline CoCP outlines the control measures and standards that would be implemented to control the impacts on the environment. Appendices may include the following, subject to amendment and refinement as the EIA progresses: - Outline Surface Water Drainage Plan; - Outline Drainage Strategy; - Outline Public Rights of Way (PRoW) Management Plan; - Outline Soil Management Plan; - Outline Site Waste Management Plan; - Crossing Method Statement; - Drilling Fluid Breakout Management Plan; - Outline Pollution Prevention Plan; - Outline Lighting Plan; and - Outline Materials Management Plan.	- All onshore and overarching topics

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
An Adaptive O&M Strategy	Including regular and periodic inspections and maintenance. This ensures that climate related deterioration can be identified and rectified earlier and allows maintenance frequency to change if climate impacts accelerate wear over time.	- CCR
Outline Written Scheme of Investigation (WSI)	The information obtained from the desk-based assessment (DBA) and certain non-intrusive and intrusive evaluation stages would inform the EIA process and beyond, and mitigation would be embedded in the design and siting of the onshore infrastructure areas (both temporary and permanent) in order to, as far as possible, avoid impacts to known historic assets. Where impacts upon known historic assets are unavoidable, a series of mitigation measures would be put in place to reduce the scale of the impact. These would be secured through the submission of an Outline WSI with the DCO application. The Outline WSI would take account of the Research Framework for the Archaeology of Wales 2016.	- Onshore Archaeology and Cultural Heritage
Outline Construction Traffic Management Plan (CTMP)	An Outline CTMP would be submitted alongside the DCO application. The Outline CTMP would contain details of measures to control, monitor and enforce Heavy Goods Vehicle (HGV) movements and provide details of the mechanisms for managing design of accesses and highway works. The Outline CTMP would also include ‘Travel Plan’ measures to manage the number of employee vehicle trips if this is assessed as significant in EIA terms.	- Traffic and Transport - Noise and Vibration - Population and Human Health - Tourism and Recreation
Access strategy	An access strategy would be developed that seeks to reduce the impact of HGV traffic on the most sensitive communities and to minimise travelling via narrow or constrained sections of the local highway network. The access strategy would be facilitated by:	- Traffic and Transport - Population and Human Health

MITIGATION MEASURE	DESCRIPTION	RELEVANT TOPIC
	- The selective and localised construction of a temporary haul road where required to support construction activities and reduce reliance on the public highway, rather than the provision of a continuous haul road along the full length of the Onshore Export Cable route; - The use of clearly defined construction access points, located and designed to minimise effects on local communities, highway safety and network operation; - The creation of vehicle crossovers; and - Controls on vehicle routeing in the Outline CTMP.	
Trenchless Crossings	To avoid disruption to transport users whilst the Development's onshore export cables are installed under main road and rail infrastructure, trenchless crossing techniques would be used at the key locations where required and viable.	- All onshore topics
Hydrogeological Risk Assessments	Where the Development crosses watercourses connected to sites of particular sensitivity (e.g. SSSI or groundwater Source Protection Zones (SPZs)) a hydrogeological risk assessment would be undertaken to inform the site specific crossing method statement.	- Terrestrial Ecology - Geology and Land Quality - Flood Risk and Hydrology

1.8.6 Confidence

207. Once an assessment of a potential impact has been made, a level of confidence is assigned to the assessment to assist in the understanding of the judgement. This is based on a simple scale of high-medium-low, where high confidence assessments are made on the basis of robust evidence, with lower confidence assessment being based, for example, on extrapolation and / or use of proxies.

1.8.7 Inter-relationships

208. The impact assessment would consider the inter-relationship of impacts on individual receptors. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. When considering the potential for impacts to inter-relate it is assumed that any residual effect determined as having no impact would not result in a significant inter-relationship when combined with other effects on receptors. However, where a series of negligible or greater residual impacts are identified, they would be considered further.

1.8.8 Cumulative and Transboundary Impacts

209. Cumulative Effect Assessment (CEA) forms part of the EIA process. The Planning Inspectorate's Advice Note Nine (The Planning Inspectorate, 2025a) and Seventeen (The Planning Inspectorate, 2025b) provide guidance on plans and projects that should be considered in the CEA including:

- Projects that are under construction;
- Permitted applications not yet implemented;
- Submitted applications not yet determined;
- Projects on the Planning Inspectorate's Programme of Projects;
- Developments identified in relevant development plans, (and emerging development plans, with weight being given as they move close to adoption) recognising that information on any relevant proposals is likely to be limited; and
- Sites identified in other policy documents as their development is reasonably likely to come forward.

210. Only projects which are reasonably well defined and sufficiently advanced to provide information on which to base a meaningful and robust assessment would be included in the CEA. Projects which are sufficiently implemented during the site characterisation for the Development would be considered as part of the baseline for the EIA. Where possible, the Applicant would use as-built project parameter information (if available) as opposed to consented parameters to reduce over-precaution (inaccuracies) in the CEA.

1.8.9 Declaration of Use of Artificial Intelligence

211. This Scoping Report has, in limited instances, been prepared with the assistance of artificial intelligence (AI) tools for the following tasks:

- Rewriting text for clarity or tone, and/or restructuring;
- Providing background on projects;

- Providing background on OWF technologies;
- Explaining engineering methods (reviewed and approved by the Applicant's engineering team); and
- Comparing standards or guidance.

212. AI tools were used solely through company-approved platforms (including Microsoft Copilot) during the period January to June 2026 and are in line with the Applicant's AI Policy.

213. All AI outputs have been critically reviewed, verified against primary sources, and aligned with Development-specific requirements, ensuring no confidential information is entered.

2 Offshore

2.1 Marine Geology, Oceanography and Physical Processes including Water Quality

214. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Marine Geology, Oceanography and Physical Processes including Water Quality.

215. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Marine Geology, Oceanography and Physical Processes including Water Quality receptors in the Development's ES.

216. The Marine Geology, Oceanography and Physical Processes, including Water Quality assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description**;
- **Section 2.2 Benthic Habitat;**
- **Section 2.3 Fish and Shellfish Ecology;**
- **Section 2.6 Commercial Fisheries;** and
- **Section 2.10 Offshore Archaeology and Cultural Heritage**

The following questions are posed to consultees to help them frame and focus their response to the Marine Geology, Oceanography and Physical Processes including Water Quality, scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Marine Geology, Oceanography and Physical Processes, including Water Quality Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?
- Do you agree with the proposed approach to assessment?

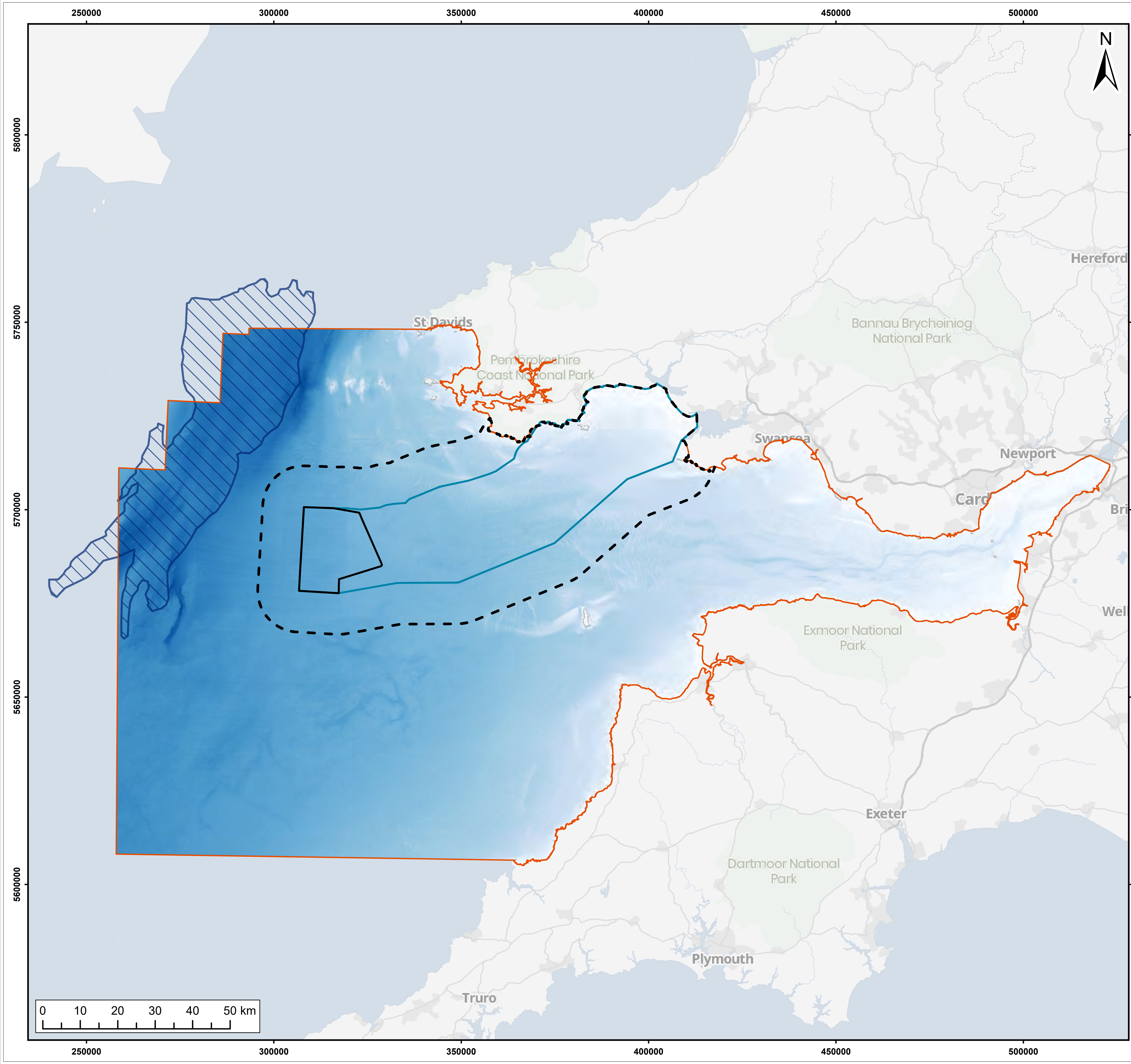
2.1.1 Study Area

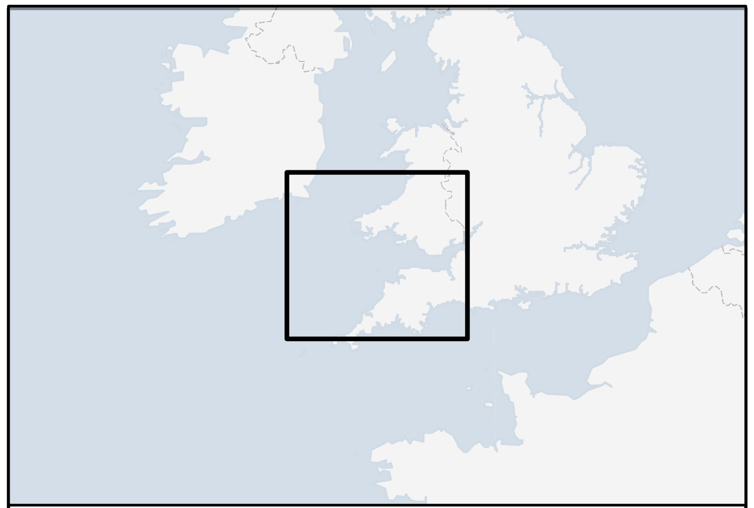
217. The existing baseline is described considering both the near-field (within the footprint of the Offshore Scoping Boundary) and far-field (beyond the Offshore Scoping Boundary and across the

wider regional seabed and coastline) environment, which together comprise the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area (**Figure 2.1.1)**.

218. The Marine Geology, Oceanography and Physical Processes, including Water Quality Study Area includes the north-eastern portion of the Celtic Sea, including part of St George's Channel and the north-western Bristol Channel, extending towards the Welsh coastline into Carmarthen Bay, Pembrokeshire (**Figure 2.1.1**).

219. The tidal excursion (the distance travelled by a water particle on a single tide) is approximately 7km in a north-west to south-east direction within the Array Scoping Boundary, increasing to a maximum of 15km within the Offshore Export Cable Scoping Boundary in an east-west direction, and 5km to 6km in a north-east to south-west direction within Carmarthen Bay (ABPmer, 2018). Therefore, a precautionary 15km is applied to the entire Offshore Scoping Boundary to encompass all potential direct and indirect effects. This distance is also in line with the maximum tidal excursion used in the Screening Criteria provided in the MCZ Principles of The Crown Estate's MCZ Assessment for Celtic Sea FLOW Plan (NIRAS, 2023) (see the **Gwynt Glas OWF Marine Conservation Zone Screening Assessment** submitted alongside this Scoping Report).





Legend:

Array Scoping Boundary

Offshore Export Cable Scoping Boundary

Marine Geology, Oceanography and Physical Processes Study Area

Zone of Influence

Celtic Deep

EMODNET Bathymetry

(Mean Sea Level)

0m

-143m

Source: © Haskoning UK Ltd, 2026, EMODnet Bathymetry Consortium (2020): EMODnet Digital Bathymetry (DTM).
Base map: Contains OS data © Crown Copyright and database right 2026. Contains data from OS Zoomstack

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Bathymetry within the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area

Figure:	2.1.1	Drawing No:	PC6850-HAS-ZZ-ZZ-DR-GS-0006		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	20/02/2026	MW	AS	A3	1:1,000,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

Haskoning
Enhancing Society Together

GwyntGLAS

2.1.2 Baseline Environment

2.1.2.1 Bathymetry

220. The Celtic Sea occupies a broad, triangular section of the north-eastern Atlantic Ocean, situated to the west of the British Isles. It stretches from Ireland's south-west coast down to the north-west coast of France, spanning roughly 472,000km^2 (Water Worlds, no date). It is generally shallow, with average depths around 114m (Water Worlds, no date). The Marine Geology, Oceanography and Physical Processes including Water Quality Study Area reaches depths of greater than 120m below LAT, in an area known as the Celtic Deep (**Figure 2.1.1**), to the west of the Offshore Scoping Boundary. Bathymetry shallows closer to the coastline of South Wales and the Bristol Channel, with maximum depths in the Bristol Channel of 50 to 60m near the entrance and approximately 20 to 30m near Lavernock Point (Pye and Blott, 2009).

221. The maximum water depth within the Offshore Scoping Boundary reaches approximately 84m below LAT in the Array Scoping Boundary, gradually shallowing toward the coast, where depths in the nearshore of Carmarthen Bay are 0m below LAT (EMODnet, 2024).

2.1.2.2 Geomorphology

222. The geomorphology of the South Wales coastline is shaped by resistant rock formations, creating prominent headlands and stretches of cliffed shoreline with intertidal platforms. Between these features lie bays bordered by sandy beaches, dune systems, and back-barrier marshes (Evans, 1995a, b). The northern and eastern sections of Carmarthen Bay, east of Pendine, are lined with extensive sandy barrier systems and former back-barrier marshes, much of which have now been reclaimed. At the heart of the bay lies a large estuarine network, the Three Rivers system, formed by the Taf, Tywi, and Gwendraeth rivers (**Figure 2.1.1**). From Pendine to Angle, near the entrance to Milford Haven, the coastline is predominantly cliffed, interspersed with small pocket beaches backed by dune systems.

2.1.2.3 Tidal Currents

223. Tides within the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area are semi-diurnal and predominantly rectilinear (the tide alternates between a flood (flowing towards the land) and ebb (flowing towards the sea)) in a straight or nearly straight line, reversing in direction approximately 180° every six hours. Modelled spring peak flows increase from 0.26 to 0.50 metres per second (m/s) in the south-west of the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area, increasing to 1.01 to 1.25m/s in the central Study Area adjacent to Bristol Channel, before gradually decreasing to 0.11 to 0.25m/s within Carmarthen Bay (ABPmer, 2018). The maximum spring peak flows in the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area are located within the Bristol Channel, with speeds up to 4.41m/s (ABPmer, 2018).

224. Spring peak flows within the Offshore Scoping Boundary are approximately 0.51 to 0.75m/s (ABPmer, 2018). These speeds gradually increase towards the coast to a maximum of 1 to 1.25m/s, before decreasing within Carmarthen Bay closer to the coastline to approximately 0.11 to 0.25m/s (ABPmer, 2018).

225. Tidal current flows across the Offshore Scoping Boundary travel from the east or north-east on a flood tide, and to the west or south-west on an ebb tide.

2.1.2.4 Waves

226. The Celtic Sea has a long, unobstructed fetch to the south-west, resulting in exposure to Atlantic-generated swell as well as locally produced waves driven by south-westerly winds. Consequently, wave activity within the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area is predominantly influenced by conditions originating from the west to south-west.

227. The most frequent waves across the Offshore Scoping Boundary approach from the west, and the most frequent waves within Carmarthen Bay approach from the south-west (**Plate 2.1.1**; ABPmer, 2018). ABPmer (2018) describe annual mean significant wave heights of 2.00 to 2.25m within the Array Scoping Boundary. Wave heights decrease gradually across the Offshore Export Cable Scoping Boundary, to less than 1.2 to 1.5m closer to the Carmarthenshire coastline.

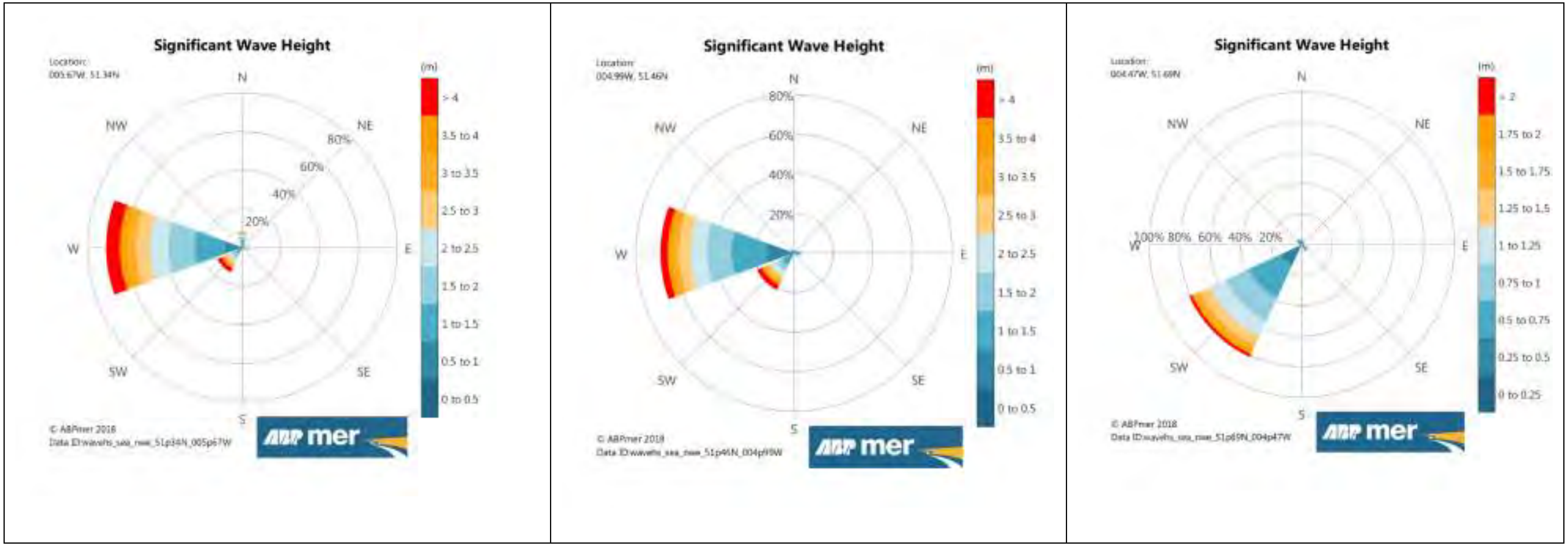


Plate 2.1.1 Significant wave height direction across the Array Scoping Boundary (left), along the Export Cable Scoping Boundary (middle) and close to the nearshore area of the Offshore Scoping Boundary (right) (ABPmer, 2018)

2.1.2.5 Bedload Sediment and Transport

228. The data shows the seabed across the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area is composed primarily of sand, which transitions to mud in the Celtic Deep, whilst the sediment in St George's Channel is composed of sandy gravel (BGS, no date).

229. The seabed of the Offshore Scoping Boundary is predominantly sand, whilst the seabed between the Array Scoping Boundary and the coastline in Carmarthen Bay is mixed, composed of sand, slightly gravelly sand, patches of muddy sand and muddy sand and gravel. Carmarthen Bay is predominantly sand. This will be confirmed through site-specific survey data to be undertaken along the Offshore Export Cable Scoping Boundary (**Table 2.1.1**) in 2027.

230. Sediment transport in the area is driven by a combination of wave action and currents. Residual circulation reflects the influence of tidal forces, wind-driven drift, the Coriolis effect, and density variations caused by salinity, temperature, and sediment load. This system exhibits considerable short- to medium-term variability and a complex spatial structure. Overall, the prevailing pattern is an easterly residual depth-averaged flow along the coast from Carmarthen Bay to Nash Point, and a net westerly depth-averaged flow across the central Bristol Channel (Hamilton, 1973; Heathershaw & Hammond, 1980; Uncles, 1982; Collins & Ferentinos, 1984).

2.1.2.6 Suspended Sediment Concentrations (SSCs)

231. Cefas (2016) mapped the spatial distribution of average annual SSCs across the UK continental shelf between 1998 and 2015.

232. Large areas of the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area are characterised by SSCs of 0-5 milligrams per litre (mg/l), increasing to higher concentrations in the Bristol Channel of 65-76mg/l. The data shows that the waters within the Offshore Scoping Boundary are characterised by concentrations of lower than 1.4mg/l. SSCs gradually increase towards the Pembrokeshire coastline, reaching 15 to 20mg/l within Carmarthen Bay (Cefas, 2016).

2.1.2.7 Frontal Systems and Stratification

233. The majority of the Marine Geology, Oceanography and Physical Processes including Water Quality Study Area exhibits a marked seasonal cycle in its water-column structure, transitioning between fully mixed winter conditions and strongly stratified summer conditions, characteristic of much of the north-west European shelf. Shallower waters closer to the Pembrokeshire coastline are vertically well mixed throughout the year (Tappin *et al*., 2007).

234. The Array Scoping Boundary is located in a region that becomes thermally stratified in the summer, whereas the Offshore Export Cable Scoping Boundary is located in mixed waters (Tappin *et al.,* 2007). These areas are separated by tidal mixing fronts, which vary in time and space (Tappin *et al.,* 2007).

2.1.2.8 Sediment and Water Quality

235. The OSPAR Maritime Area encompasses the North-East Atlantic and its adjacent seas. Recognising the importance of clean, healthy and productive seas, OSPAR has committed to systematic periodic assessments of climate change and ocean acidification and the state of the marine

environment. OSPAR has divided its Maritime Area into five regions, and the Offshore Scoping Boundary is located within: Region III, the Celtic Seas. The assessments conducted across each Region underpin OSPAR's Quality Status Report (QSR), the last of which was published in 2023 (OSPAR Commission, 2023). In summary, for Region III, the QSR reports decreases in releases of hazardous substances such as Polychlorinated biphenyls (PCBs), Polyaromatic Hydrocarbons (PAHs) and organochlorides alongside decreases in discharges of produced water and oil-based drilling fluids from the oil and gas industry. Chemicals discharged by the oil and gas industry have also reduced and a gradual reduction of the input and availability of excess nutrients has been recorded. For Region III, metals in sediments are often above the Effects Range-Low (ERL) thresholds but are trending downwards. Mercury, however, continues to be of concern. With respect to PAHs and PCBs, concentrations in sediment are stable or decreasing.

236. Sediment samples taken to support the EIA for the Erebus Offshore Wind Farm, which is located immediately adjacent to the northern boundary of the Array Scoping Boundary are noted here. Within this area, targeted stations at approximately 1km spacing were sampled for metals and PAHs at 107 stations. Heavy metal analysis included Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn) (Blue Gem Wind, 2022). Of the contaminants for which analysis was undertaken, only As levels were found to be above Cefas Action Level (ALs) 1 over sections of the Erebus Array area. It was noted that higher concentrations of contaminants were generally located in Erebus' export cable corridor within Milford Haven rather than in the array location. Elevated levels of As are common in offshore areas where geological sources are noted (i.e. are not associated with anthropogenic inputs).

237. The Array Scoping Boundary is located within an area of the now closed Milford Haven Industrial Sea disposal site (reference LU040). Characterisation information is not available for the site given it was closed in 1984 but historical use records indicate the site was used for the disposal of sewage sludge. The Applicant sought disposal site records from Cefas in December 2025, however, Cefas confirmed that no such records exist for the site. Therefore, site-specific sampling will be used to characterise the Array Scoping Boundary.

238. In terms of water quality data for the Offshore Scoping Boundary, site-specific surveys undertaken prior to the ES will be analysed in the EIA. Given the area is dynamic with a varied wave and tidal regime, it is anticipated that water quality offshore would meet Environmental Quality Standards (EQS).

239. The Offshore Export Cable Scoping Boundary passes through the Pembrokeshire South coastal water body (GB611008590003). Water quality data is collected to inform the classification status of this water body out to 1 nautical mile (nm). Information available on DataMapWales (Welsh Government, 2026) indicates this water body is at high status for chemical parameters.

2.1.3 Data Sources

240. Data sources and information available to inform the EIA section would include:

- DataMapWales (Welsh Government, 2026);
- APBmer UK Atlas of Marine Renewable Energy (APBmer, 2018);
- UKHO tidal diamonds and historical charts;
- UK Climate Projections 2018 (UKCP18) (Met Office, 2018);
- British Geological Society (BGS) 1:250,000 seabed sediment, Quaternary geology and bedrock geology mapping (BGS, no date);
- Offshore Oil and Gas Strategic Environment Assessment (SEA) 8 Overall Report and associated specialist reports (Department of Energy and Climate Change (DECC), 2009);
- Admiralty Charts and UKHO bathymetry data;
- Projects including Erebus FLOW (Blue Gem Wind, 2022), and Llŷr 1 OWF ES (Llyr Floating Wind Ltd., 2024);
- Swansea and Carmarthen Bay Coastal Engineering Group Shoreline Management Plan 2 (Swansea and Carmarthen Bay Coastal Engineering Group, 2012);
- Environment Agency’s Flood and Coastal Erosion Risk Management Research programme investigating future cliff erosion related to sea-level rise; and
- WFD information for water bodies (Welsh Government, 2026)

241. In addition to the data and information presented above, **Table 2.1.1** describes the surveys that have been undertaken to date, and those that will be undertaken in 2027 by the Applicant to support the assessment. Survey methodologies will be agreed in advance with stakeholders where possible.

Table 2.1.1 Site-Specific Survey Data

DATASET	DESCRIPTION	SPATIAL COVERAGE	SURVEY TIMINGS
The Crown Estate Surveys for Round 5	Geophysical (multibeam echosounder, side scan sonar & sub bottom profiling) survey	Array Scoping Boundary	01/06/2024 to 15/07/2024
	Geotechnical (Cone Penetration Testing (CPT), vibrocore and borehole) surveys	Array Scoping Boundary	05/08/2024 to 09/09/2024
Site-specific benthic data	Benthic (drop-down camera, grab sampling (macrobenthic, Particle Size Distribution (PSD), contaminants)	Array Scoping Boundary	2025
Gwynt Glas Surveys	Geophysical (multibeam echosounder, side scan sonar & sub bottom profiling) survey	Offshore Export Cable Scoping Boundary	To be completed in 2027

DATASET	DESCRIPTION	SPATIAL COVERAGE	SURVEY TIMINGS
	Geotechnical (CPT, vibrocore and borehole) surveys	Offshore Export Cable Scoping Boundary	To be completed in 2027
	Benthic (drop-down camera, grab sampling (macrobenthic, PSD, contaminants)	Offshore Export Cable Scoping Boundary	To be completed in 2027

2.1.4 Approach to Impact Assessment

242. The assessment for Marine Geology, Oceanography and Physical Processes, including Water Quality would be undertaken in accordance with following standards and guidance:

- Guidance on Best Practice for Marine and Coastal Physical Processes Baseline Survey and Monitoring Requirements to Inform EIA of Major Development Projects (NRW, 2025a).
- Offshore Wind Farms: Guidance Note for EIA in respect of Food and Environmental Protection Act and Coast Protection Act (CPA) requirements: Version 2 (Cefas, 2004).
- Review of Cabling Techniques and Environmental Effects applicable to the OWF Industry (Department for Business, Enterprise and Regulatory Reform (BERR) 2008).
- Coastal Process Modelling for OWF EIA (Lambkin *et al*., 2009).
- General advice on assessing potential impacts of and mitigation for human activities on MCZ features, using existing regulation and legislation (JNCC and NE, 2011).
- Guidelines for Data Acquisition to support Marine Environmental Assessments of Offshore Renewable Energy Projects (Cefas, 2011).
- Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards: Phase I: Expectations for pre-application baseline data for designated nature conservation and landscape receptors to support offshore wind applications (Natural England, 2022a).
- Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards: Phase III: Expectations for data analysis and presentation at examination for offshore wind applications (Natural England, 2022b).
- Review of Cable Installation, Protection, Mitigation and Habitat Recoverability. The Crown Estate (RPS, 2019).

243. A detailed approach to the impact assessment for Marine Geology, Oceanography and Physical Processes including Water Quality is presented in **Section 2.1.4.1** and **2.1.4.2**.

2.1.4.1 Marine Geology, Oceanography and Physical Processes

244. The assessment of effects on Marine Geology, Oceanography and Physical Processes including Water Quality would be based on a S-P-R model, which is outlined in **Section 1.8 EIA Methodology**. This approach identifies the origin (source) of a potential impact, the changes that occur because of the impact and how they may affect a particular receptor (pathway), with the receptor being the element that is affected by the impact. In the context of Marine Geology,

Oceanography and Physical Processes including Water Quality, the pathway to impact is often represented by a sequence of inter linked changes that collectively lead to an effect. S-P-R models are conceptual in their basis; however, they are underpinned by an evidence base that integrates theoretical (e.g. expert judgment), empirical (e.g. observational) and numerical (numerical modelling) approaches.

245. An example of a S-P-R model, in the context of Marine Geology, Oceanography and Physical Processes including Water Quality, is where cable installation disturbs the seabed and sediment becomes suspended (the source), this leads to a change in SSCs in the water column relative to the baseline, and as this sediment is redeposited, seabed levels (and potential seabed sediment composition) change. The spatial extent (defined as the Zo)) of this impact is determined by the tidal regime and how far the suspended sediment can travel before being redeposited (tidal excursion, based on tidal ellipses). The receptors are any features that are sensitive to changes in SSCs, seabed level and sediment composition, that are present within the ZoI for this impact. As detailed in Paragraph 219, the ZoI for the Development is a precautionary 15km from the Offshore Scoping Boundary.

246. Changes to Marine Geology, Oceanography and Physical Processes including Water Quality may also act as pathways for impacts on receptors assessed in other EIA topics. Following the S-P-R approach, the assessment would be undertaken in two stages. First, predicted changes arising from the project would be described and a ZoI defined to identify relevant receptors. Where these changes affect Marine Geology, Oceanography and Physical Processes including Water Quality receptors directly, their significance would be determined based on impact magnitude and receptor sensitivity, using the criteria in **Section 1.8 EIA Methodology**. Where these changes could influence other receptors, the degree of change would be characterised in this section, with significance assessed in the relevant topic sections.

247. To support the impact assessment for Marine Geology, Oceanography and Physical Processes including Water Quality, a numerical modelling study is planned. The following is proposed:

- Sediment dispersion modelling to quantify the potential impacts of anchor and cable installation (including seabed preparation activities). It would also provide the transport and fate of any material released into the water column as part of the installation works.
- Modelling of impacts on the tidal regime during the O&M stage.
- Modelling of impacts on the wave regime during the O&M stage.

248. This study would be undertaken using the MIKE software developed by DHI (www.dhigroup.com), which contains a suite of coastal and environmental modelling modules of global standard. Modelling would be validated using relevant available data sources.

249. The results of this numerical modelling would be used to support the impact assessments within the below topics:

- **Section 2.2 Benthic Habitat**;
- **Section 2.3 Fish and Shellfish Ecology**;
- **Section 2.4 Marine Mammals and Marine Turtles**;
- **Section 2.9 Infrastructure and Other Users**; and
- **Section 2.10 Offshore Archaeology and Cultural Heritage.**

250. The results of the numerical modelling would also support the Report to Inform Appropriate Assessment (RIAA).

251. To develop a strong understanding of how the Development may interact with naturally stratified ocean conditions, the EIA would firstly provide a detailed description of the baseline stratification, including its timing, intensity, and depth structure utilising data from the Copernicus Marine Environment Monitoring Service[6]. Establishing this baseline is essential, as wind turbines operating in seasonally stratified waters can modify the vertical density structure through turbulence generated by turbine-induced mixing. This effect has been observed around turbine foundations, where wake-enhanced turbulence reduces vertical gradients in temperature and salinity, contributing to a more homogeneous water column. Ongoing research programmes, including the FLOW Environmental Response to Stressors (FLOWERs) and Enabling Sustainable Wind Energy Expansion in Seasonally Stratified Seas projects led collaboratively by Plymouth University and The Crown Estate (The Crown Estate, 2025; UK Research and Innovation (UKRI) / Natural Environment and Rural Communities (NERC), 2026), are being utilised to improve understanding of how offshore development may influence stratified seas, local mixing processes, and associated environmental responses.

252. For the initial impact assessment, a simplified analytical method would be applied to estimate the potential influence of turbine-driven mixing on the existing stratification and estimate the time required for the turbine to fully mix the water column and compare this to the time required for water to travel through the Array Scoping Boundary under the prevailing hydrodynamic regime.

2.1.4.2 Water and Sediment Quality

253. With respect to the assessment regarding the potential release of sediment contaminants on water quality, there is no specific guidance available. Sediment quality guidelines used by the OSPAR Commission and the Marine Management Organisation (MMO) would therefore be used. With respect to OSPAR values, these are presented in QSRs. These assessments use Background Assessment Concentrations and the US Environmental Protection Agency's ERL to determine levels of contamination and trends over time.

254. With respect to the MMO sediment quality guidelines, these are used to undertake the assessment regarding suitability of sediment for sea disposal and are known as Cefas ALs. These ALs are used as part of a 'weight of evidence' approach to decision making on the disposal of dredged material. Although the majority of the material assessed against these standards arises from a specific activity, i.e. dredging and disposal activities, they are also considered suitable for undertaking an initial risk assessment with respect to determining risks to marine waters from other marine activities, as part of EIA and associated WFD compliance assessments.

255. Due to the presence and movements of Development related vessels/equipment there is the potential for spills and leaks which could result in changes to water and sediment quality. All vessels involved would be required to comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78. Pollution controls would be set out within the Marine Pollution Contingency Plan, which is included as part of the final contained within the final PEMP. The plan would be produced and implemented to cover the construction and the O&M stages of the Development. This would set out all procedures and measures to be followed

[6] Atlantic- European North West Shelf- Ocean Physics Reanalysis

to minimise the accidental spill risk. An Outline PEMP would be provided as part of the DCO and ML Application and would be further developed in consultation with key stakeholders for approval post-consent. As a result, it is proposed that these effects do not require further consideration in the EIA.

2.1.4.3 Receptors

256. With respect to the assessment of impacts related to Marine Geology, Oceanography and Physical Processes including Water Quality, the principal receptors are coastal or marine features with an inherent oceanographic, geological or geomorphological value or function which may be affected by the Development. These may include:

- Seabed morphological features (e.g. sandbanks, sandwaves, channels, paleochannels / valleys);
- Coastal morphology features (e.g. beaches, estuaries, spits, adjacent coastline);
- Geodiversity (e.g. geomorphological / geological features and / or sedimentary deposits);
- Water column structure and features; and
- Water and sediment quality.

257. The receptors proposed for inclusion in the assessment are within the 15km ZoI and are listed in **Table 2.1.2**. The impact assessment would incorporate a combination of the sensitivity of the receptor, its value (if applicable) and the magnitude of the change to determine a significance of effect.

Table 2.1.2 Marine Geology, Oceanography and Physical Processes including Water Quality Receptors

RECEPTOR	DESCRIPTION	CLOSEST DISTANCE TO THE ARRAY SCOPING BOUNDARY (KM)	CLOSEST DISTANCE TO THE EXPORT CABLE SCOPING BOUNDARY (KM)
Limestone Coast of South West Wales / Arfordir Calchfaen De Orllewin Cymru SAC	Vegetated sea cliffs of the Atlantic and Baltic Coasts, Fixed coastal dunes with herbaceous vegetation	41	0
North West of Lundy MCZ	Subtidal coarse sediment	32	0
South-West Approaches to Bristol Channel MCZ	Subtidal coarse sediment and Subtidal sand	37	28
Pembrokeshire Marine SAC	Estuaries, Large shallow inlets and bays, Reefs	30	0

RECEPTOR	DESCRIPTION	CLOSEST DISTANCE TO THE ARRAY SCOPING BOUNDARY (KM)	CLOSEST DISTANCE TO THE EXPORT CABLE SCOPING BOUNDARY (KM)
Carmarthen Bay and Estuaries SAC	Sandbanks which are slightly covered by sea water all the time, Estuaries Mudflats and sandflats not covered by seawater at low tide, Large shallow inlets and bays, Salicornia and other annuals colonising mud and sand, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	62	0
Pembrokeshire South Water Body	Water Quality	34	0

2.1.5 Potential Impacts

2.1.5.1 Potential Impacts During the Construction Stage

2.1.5.1.1 Impacts on Waves and Tidal Currents

258. Whilst there is potential for the physical presence of construction plant and offshore infrastructure to impact upon the wave and tidal current regimes, these impacts would increase incrementally as the Development is constructed, with the greatest potential impacts resulting from the completed Development. These impacts are therefore considered under **Section 2.1.5.2.1** for the O&M stage and are therefore **scoped out** from further consideration in relation to the construction stage and decommissioning stage.

2.1.5.1.2 Impacts on Sediment Transport Processes and Morphological Change of the Seabed

259. Construction of the Development infrastructure would not change the shallow geology of the site other than in the case of localised effects associated with the installation of infrastructure on the seabed. Due to the localised nature of these effects, it is not anticipated that such changes would give rise to significant impacts on seabed features. However, further consideration would be given to the potential effects on the form and function of bedload sediment transport processes, including the potential for sand wave clearance, boulder clearance and rock dumping for scour protection. Hence, these potential impacts would be assessed as part of the EIA and are therefore **scoped in** for the construction stage.

2.1.5.1.3 Impacts on Sediment Transport Processes and Morphological Change at the Coast

260. There is the potential for changes in coastal sediment transport processes and morphological change at the coast associated with construction activities at the landfall (e.g. cable installation). Hence, these potential impacts would be assessed as part of the EIA and are therefore **scoped in** for the construction stage.

2.1.5.1.4 Impacts on SSCs and Transport

261. Potential impacts during construction include temporary disturbance of the seabed due to the installation activities for the Development (including seabed preparation and, if buried, ploughing / trenching, and Offshore Export Cable burial) which release sediment into the water column resulting in increased SSCs and changes to seabed levels. These potential impacts would be assessed as part of the EIA and are therefore **scoped in** for the construction stage.

2.1.5.1.5 Impacts on Contaminant Concentrations due to Changes in SCCs

262. Disturbance of seabed sediments could give rise to increases in chemical contaminants within the water column if bound to bed sediment particles. Site-specific information will be collected to determine both particle size (muddier sediments are at higher risk of containing contaminants) and chemical contaminant concentrations. This data would be assessed as part of the EIA and therefore this potential impact is **scoped in** for the construction stage.

2.1.5.1.6 Indentations on the Seabed due to Installation Vessels

263. There is potential for certain vessels used during installation of the Development to directly impact the seabed. This applies for those vessels that utilise jack-up legs or anchors to hold station and to provide stability for a working platform, or for vessels that breach during low tide. Where vessel infrastructure has been placed on the seabed and then removed, there is potential for an indentation to remain, proportional to the dimensions and drag (if any) of the object. This potential impact is therefore **scoped in** for the construction stage.

2.1.5.1.7 Impacts on Water Column Stratification Influencing Nutrient Fluxes and Primary Production

264. The main potential effect on stratification is changes to near-field mixing due to wake effects associated with the Development and the potential for destabilising local water column stratification (i.e. those restricted to the area inside and immediately outside the Array). It is acknowledged that this impact begins in construction and continues through decommissioning, however, to avoid duplicating assessments, the full extent of this impact would be assessed in the O&M stage section, with a clear acknowledgment that they span the duration of the Development's lifetime.

2.1.5.2 Potential Impacts During the O&M Stage

2.1.5.2.1 Impacts on Waves and Tidal Currents

265. Potential effects during operation could occur due to the physical presence of infrastructure (i.e. SKS and/or innovative deepwater solutions, scour protection and any cable protection on the seabed), which may result in localised changes to waves and tidal currents due to physical blockage effects. These changes could potentially affect the sediment transport regime and/or seabed morphology and are therefore **scoped in** for the O&M stage.

2.1.5.2.2 Impacts on Sediment Transport Processes and Morphological Change of the Seabed

266. Previous studies have been undertaken to assess the effects of fixed wind turbine foundations on bedload sediment transport and morphological change, for example the generic industry modelling undertaken for the Department of Trade and Industry (DTI) (ABPmer, 2003) and work undertaken at the Scroby Sands OWF (Cefas, 2006). These studies have concluded that minimal

impacts can be expected on prevailing bedload sediment transport conditions, both within wind farm sites as well as further afield, provided that the foundations are adequately spaced (which would vary depending on the details of the foundations and wind farm layout). Although the majority of research to date has focused on fixed-bottom turbines with larger and more intrusive seabed footprints, this evidence base remains highly valuable for informing assessments of offshore wind farms with either FSSs and associated SKSs, and/or innovative deepwater solutions. The fixed-foundation research provides a conservative, worst-case basis for assessing potential impacts on bedload sediment transport and seabed morphological change. While floating turbines, and innovative deepwater technology are anticipated to exert smaller direct seabed obstructions, they still involve structures that can locally modify near-bed flow and generate seabed scour. Therefore, impacts are expected to remain localised to the immediate surroundings of seabed infrastructure, similar in nature, though smaller in magnitude, to those observed around larger fixed turbine foundations. Scour at each structure on the seabed would be assessed as part of the EIA using well-established empirical methods based on existing literature (Whitehouse, 1998; Whitehouse *et al.*, 2010; Den Boon *et al*., 2004; van der Tempel *et al.*, 2004; DNV, 2004), monitoring from the Round One offshore wind farms (Cefas, 2006; ABPmer, 2008; HR Wallingford, 2008) and engineering judgement. This approach ensures that, despite limited floating-specific data, the assessment remains precautionary, evidence-based, and aligned with industry best practice.

267. Should cables be buried, there would be no impact on bedload sediments and sediment transport. However, it is possible that cable protection would be required at locations where the seabed is characterised by harder geology which prevents or restricts cable burial. The impacts that cable protection may have, primarily relate to the potential for interruption of sediment transport and the footprint presented on the seabed. These impacts would be assessed as part of the EIA and are therefore also **scoped in** for the O&M stage.

2.1.5.2.3 Impacts on Sediment Transport Processes and Morphological Change at the Coast

268. If a trenched solution is adopted for Offshore Export Cable installation at the landfall, impacts on coastal sediment transport processes and morphology may occur if the Offshore Export Cable is not buried to a sufficient depth to ensure it remains buried over the duration of the operational period. Furthermore, if cable protection is required at the landfall, this could potentially interrupt sediment transport pathways. The impacts can be mitigated by adopting a trenchless solution such as HDD. This is being considered in the design process but technical feasibility cannot be confirmed at the scoping stage. Therefore, impacts on sediment transport processes and morphological change at the coast during the operational phase have been **scoped in** for further assessment.

2.1.5.2.4 Impacts on SSCs and Seabed Morphology due to Resuspended Sediment

269. There is potential for small volumes of sediments to be re-suspended during the O&M stage by several methods:

- Due to scouring of infrastructure installed on the seabed by tidal currents;
- Due to maintenance activities such as unplanned cable repair or from disturbance caused by jack up vessel legs and work vessel anchors. The volume of sediment resuspended is likely to be much lower than during construction.

- Depending on the substructure adopted, the seabed in the vicinity of FSSs may be swept by the catenary action of the mooring lines. If there is sediment present on the seabed in these areas (rather than exposed bedrock) then this would be entrained into suspension in the water column.

270. Therefore, this impact is **scoped in** for the O&M stage.

2.1.5.2.5 Impacts on Contaminant Concentrations due to Changes in SSCs

271. The volumes of material to potentially be disturbed during the O&M stage are such that significant contamination release and associated effects on water quality are not predicted. This impact is therefore **scoped out** for the O&M stage.

2.1.5.2.6 Indentations on the Seabed due to O&M Vessels

272. As outlined above, there is potential for certain vessels used during the O&M stage to directly impact the seabed. This applies for those vessels that utilise jack-up legs or several anchors to hold station and to provide stability for a working platform. This impact is therefore **scoped in** during operation.

2.1.5.2.7 Impacts on Water Column Stratification Influencing Nutrient Fluxes and Primary Production

273. The main potential effect on stratification is changes to near-field mixing due to wake effects associated with the Development and the potential for destabilising local water column stratification (i.e. those restricted to the area inside and immediately outside the Array).

274. As outlined in **Section 2.1.2.7**, the Array Scoping Boundary is located in waters that are seasonally stratified in the summer and are well-mixed during the winter months. When the water column is well mixed, any enhancement in mixing due to the presence of substructures would result in no change in the vertical distribution of nutrients.

275. As a thermocline develops in spring and the water becomes stratified, there is potential for turbulence around substructures to enhance mixing and increase nutrient availability (a proxy for primary productivity) within surface waters (>20m depth). Therefore, potential effects on water column stratification and primary productivity are **scoped in** during operation.

2.1.5.3 Potential Impacts During the Decommissioning Stage

276. It is anticipated that the decommissioning impacts would be similar in nature to those of construction (**Section 2.1.5.1**), although the magnitude of effect is likely to be lower. Impacts on waves and tides, and water stratification would not be assessed for the decommissioning stage as the main impact manifests during the O&M stage of the Development and they are therefore **scoped out** of the EIA during the decommissioning stage.

277. The removal of offshore infrastructure has the potential to affect bedload sediment transport and SSCs, therefore, it is proposed to be **scoped in** to the EIA.

2.1.5.4 Potential Inter-relationship Impacts

278. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship

between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.1.5.5 Potential Cumulative Impacts

279. There may be potential for cumulative impacts to occur on Marine Geology, Oceanography and Physical Processes including Water Quality as a result of other activities. Therefore, cumulative impacts on these receptors are proposed to be **scoped in** to the EIA.

280. Offshore wind projects and other activities relevant to the assessment of cumulative impacts on Marine Geology, Oceanography and Physical Processes including Water Quality would be identified through a screening exercise. The potential impacts considered in the cumulative assessment as part of EIA would be in line with those described for the Development-alone assessment, though it is possible that some would be screened out on the basis that the impacts are highly localised (i.e. they occur only within the footprint of the Development) or where management measures in place for the Development and other projects would reduce the risk of impacts occurring.

281. The cumulative assessment would be based on a ZoI which would define the extent of which effects of the Development are expected based on local hydro-geological conditions. The ZoI would be defined as part of the EIA and would consider other projects (including other offshore wind farms nearby, aggregate extraction and dredging, subsea cables and oil and gas activity) and marine users. These would be identified and assessed in accordance with the guidance and methodologies set out in **Section 1.8 EIA Methodology**. The assessment would be dependent on the availability and accessibility of information for other developments, but potential cumulative impacts could include impacts to the tidal, wave or sedimentary regime and water column structure.

2.1.5.6 Potential Transboundary Impacts

282. The Development is approximately 36km from the UK Exclusive Economic Zone (EEZ) territorial boundary between the UK and Ireland. Given that the likely Marine Geology, Oceanography and Physical Processes including Water Quality impacts would be restricted to a ZoI extending approximately 15km from the Offshore Scoping Boundary, there would be no pathway for transboundary impacts. It is therefore proposed to **scope out** transboundary effects on Marine Geology, Oceanography and Physical Processes including Water Quality.

2.1.5.7 Summary of Potential Impacts

283. **Table 2.1.3** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.1.3 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Marine Geology, Oceanography and Physical Processes including Water Quality Assessment

POTENTIAL IMPACT	CONSTRUCTION	OPERATION AND MAINTENANCE	DECOMMISSIONING
Impacts on waves and tidal currents	x	✓	x

POTENTIAL IMPACT	CONSTRUCTION	OPERATION AND MAINTENANCE	DECOMMISSIONING
Impacts on sediment transport processes and morphological change of the seabed	✓	✓	✓
Impacts on sediment transport processes and morphological change at the coastline	✓	✓	✓
Impacts on SSCs and seabed morphology due to resuspended sediment	✓	✓	✓
Impacts on contaminant concentrations due to changes in SSCs	✓	x	✓
Impacts on water column stratification influencing nutrient fluxes and primary production	x	✓	x
Indentations on the seabed due to installation, O&M and decommissioning vessels	✓	✓	✓
Inter-relationship Impacts	✓	✓	✓
Cumulative impacts	✓	✓	✓
Transboundary impacts	x	x	x

2.1.6 Potential Mitigation Measures

284. Embedded mitigation measures relating to Marine Geology, Oceanography and Physical Processes including Water Quality impacts are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

285. Requirements for any additional mitigation measures would be determined through the EIA.

286. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders. These would be fed iteratively into the design and assessment process. All proposed mitigation measures would comply with regulatory requirements and good practice.

2.2 Benthic Habitat

287. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Benthic Habitat.

288. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Benthic Habitat receptors in the Development's ES.

289. The Benthic Habitat assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description**;
- **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**; and
- **Section 2.3 Fish and Shellfish Ecology**.

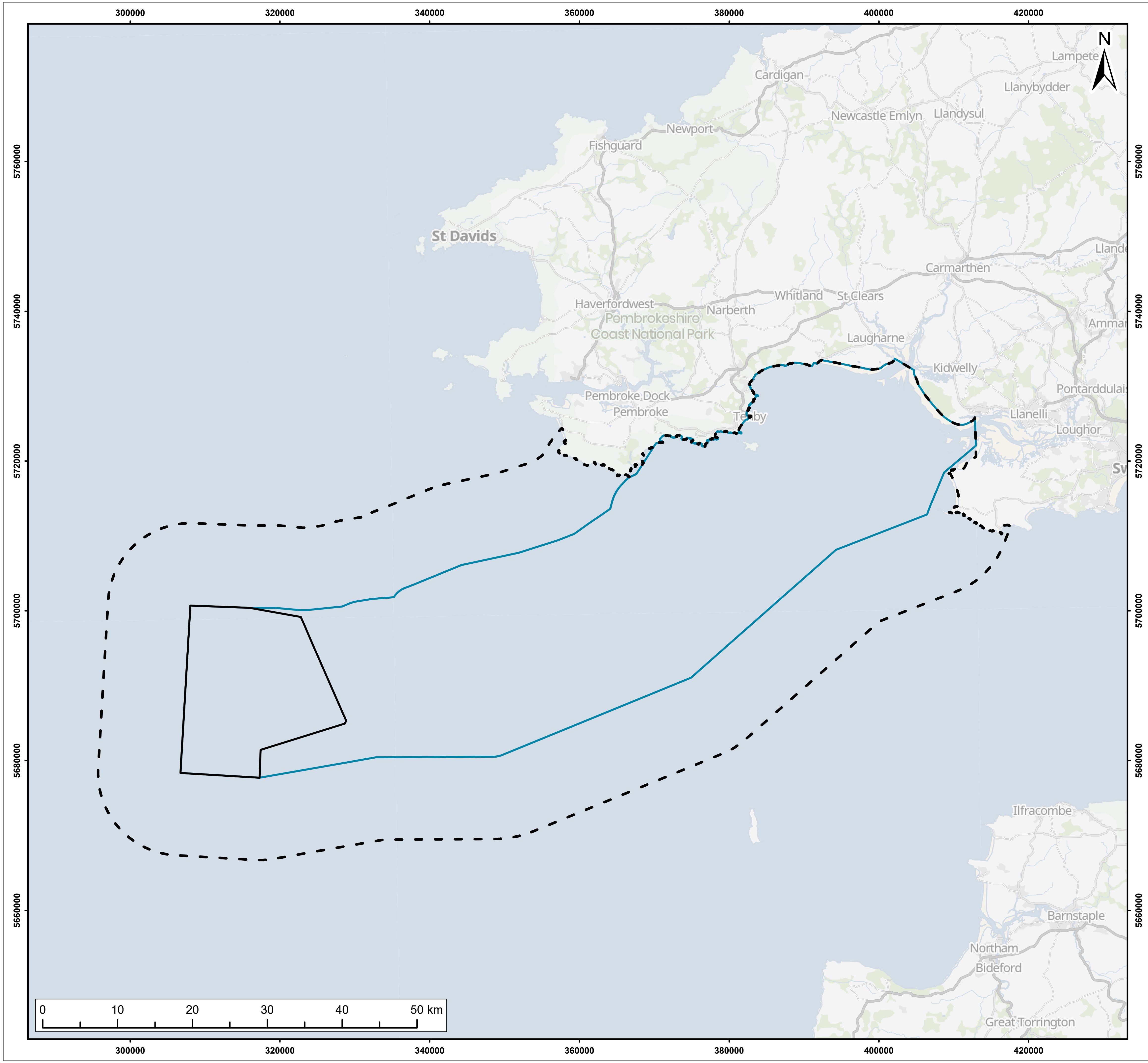
The following questions are posed to consultees to help them frame and focus their response to the Benthic Habitat scoping exercise which will in turn inform the Scoping Opinion:

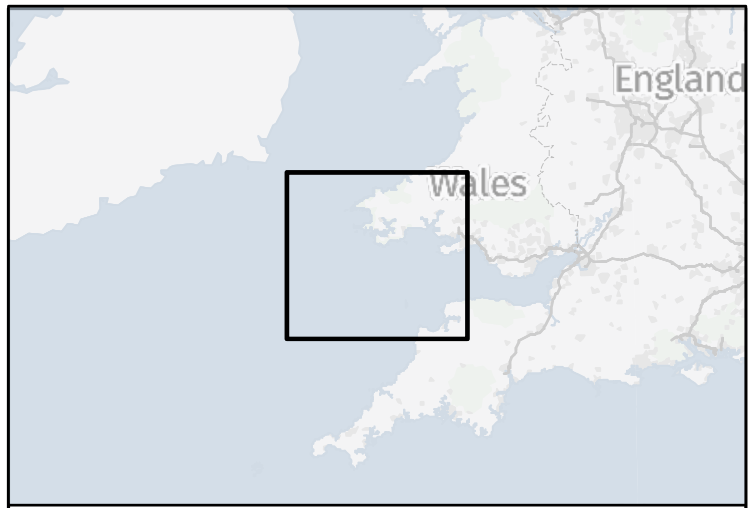
- Do you agree with the proposed Benthic Habitat Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?
- Do you agree with the proposed approach to assessment?

2.2.1 Study Area

290. The Benthic Habitat Study Area is informed by the ZoI defined in **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**, and includes the Offshore Scoping Boundary with a buffer of 15km (see **Figure 2.2.1**).

291. The extent of the Benthic Habitat Study Area (**Figure 2.2.1**) provided a regional context on benthic and intertidal habitats and also covers potential effects outside of the offshore infrastructure for the Development. The Benthic Habitat Study Area encompasses water depths of 0 to 80m.





Legend:

- Array Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Benthic Habitat Study Area

Source: © Haskoning UK Ltd, 2026
Base map: Contains OS data © Crown Copyright and database right 2026. Contains data from OS Zoomstack

Project:	Gwynt Glas Offshore Wind Farm Scoping Report
Title:	Benthic Habitat Study Area
Figure: 2.2.1	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0090

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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2.2.2 Baseline Environment

2.2.2.1 Intertidal Zone

292. The intertidal zone is the area of the shoreline between the highest and lowest extent of the tides. The intertidal zone within the Benthic Habitat Study Area predominantly comprises of exposed, sandy shores. Available data from European Seabed Habitat Map (EUSeaMap) (EMODnet Seabed Habitats, 2023) and DataMapWales lists the following biotopes and features of the coastline as the following:

- Polychaetes in littoral fine sand (MA5241);
  - Polychaetes and *Angulus tenuis* in Atlantic littoral fine sand (MA52412);
- *Eurydice pulchra* in littoral mobile sand (MA52332);
- Reef / Rocky intertidal reef;
- Submerged or partially submerged sea caves; and
- Intertidal caves.

293. An intertidal benthic walkover survey will be undertaken prior to ES submission to record habitat types present at the proposed landfall location to characterise the ecological interest in the intertidal zone.

2.2.2.2 Subtidal Zone

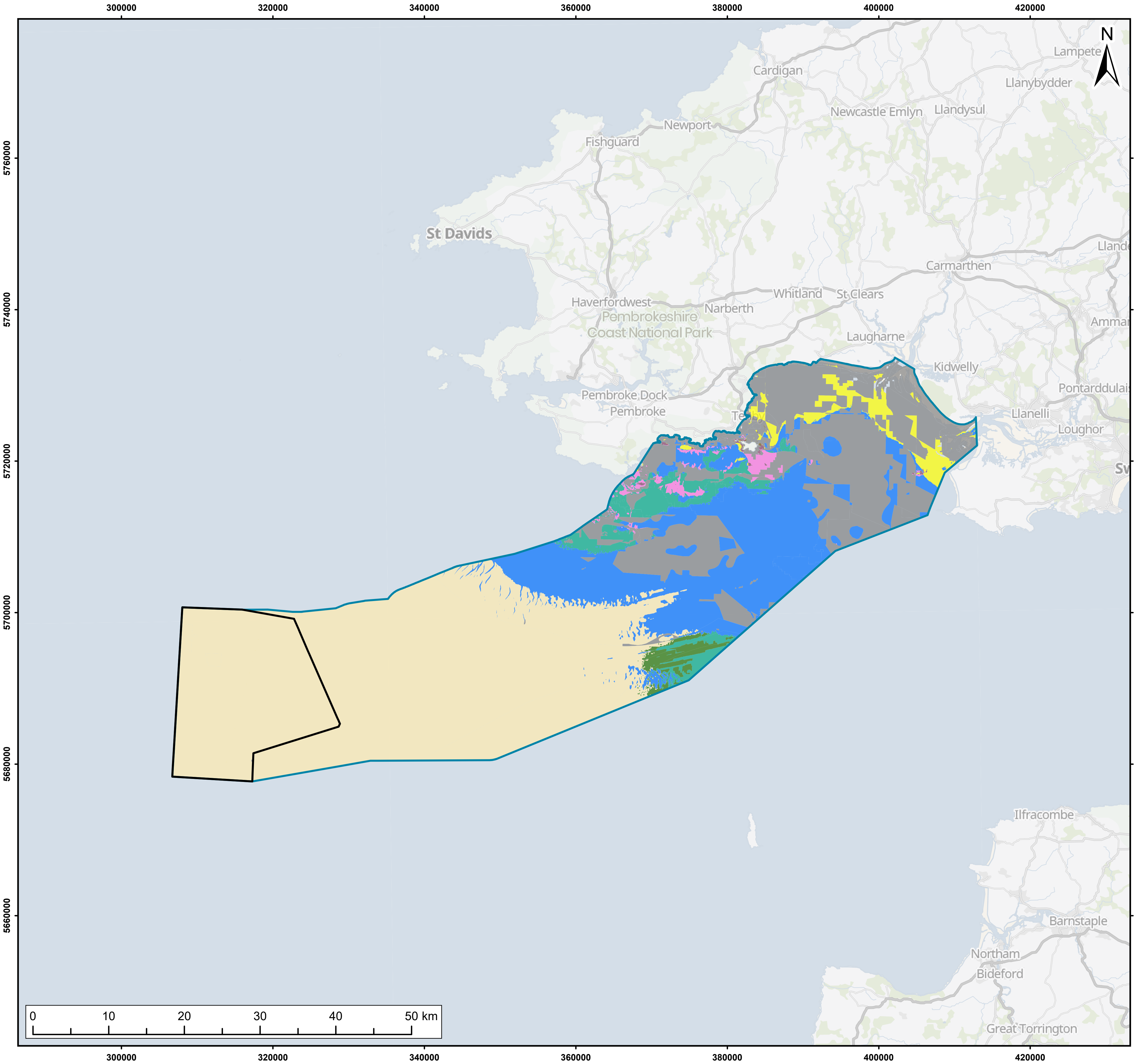
294. The subtidal zone is the area of the seabed and water column that remains permanently submerged, extending from the lowest extent of the tides seaward. The data provided in the EUSeaMap have been used to determine the European Nature Information System (EUNIS) habitat types within the Offshore Scoping Boundary, as shown on **Figure 2.2.2**. For characterisation purposes, this information will be supplemented with survey data from the benthic characterisation survey, and any other available data to inform the EIA.

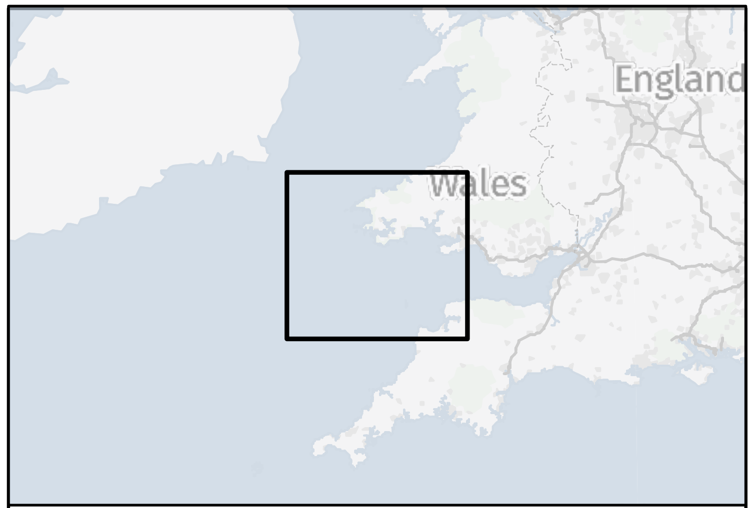
295. The seabed within the Array Scoping Boundary is predominantly comprised of Atlantic offshore circalittoral sand (MD52), with one area of Atlantic offshore circalittoral rock (MD12) in the south-east extent of the Array Scoping Boundary with an area of approximately 0.07km^2.

296. The seabed within the Offshore Export Cable Scoping boundary is comprised of:

- Atlantic offshore circalittoral sand (MD52);
- Atlantic offshore circalittoral coarse sediment (MD32);
- Atlantic offshore circalittoral rock (MD12);
- Atlantic circalittoral sand (MC52);
- Atlantic circalittoral coarse sediment (MC32);
- Atlantic circalittoral rock (MC12);
- Atlantic infralittoral rock (MB12);
- Atlantic infralittoral sand (MB52); and
- Atlantic infralittoral mud (MB62).

297. The Benthic Habitats closer to the nearshore areas of the Offshore Scoping Boundary are characterised by large shallow inlets and bays with areas of subtidal reef. The most predominant biotope is Atlantic infralittoral sand (MB52).





Legend:

- Array Scoping Boundary
- Offshore Export Cable Scoping Boundary

EUNIS Habitats

- Null
- Circalittoral coarse sediment
- Circalittoral fine sand
- High energy circalittoral rock
- High energy infralittoral rock
- Infralittoral coarse sediment
- Infralittoral fine sand
- Infralittoral sandy mud
- Moderate energy infralittoral rock
- Offshore circalittoral coarse sediment
- Offshore circalittoral sand

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Base map: Contains OS data © Crown Copyright and database right 2026. Contains data from OS Zoomstack

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: EUNIS Benthic Habitat Mapping (EUNIS, 2022)

Figure: 2.2.2	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0092				
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2.2.2.3 Designated Sites and Protected Species

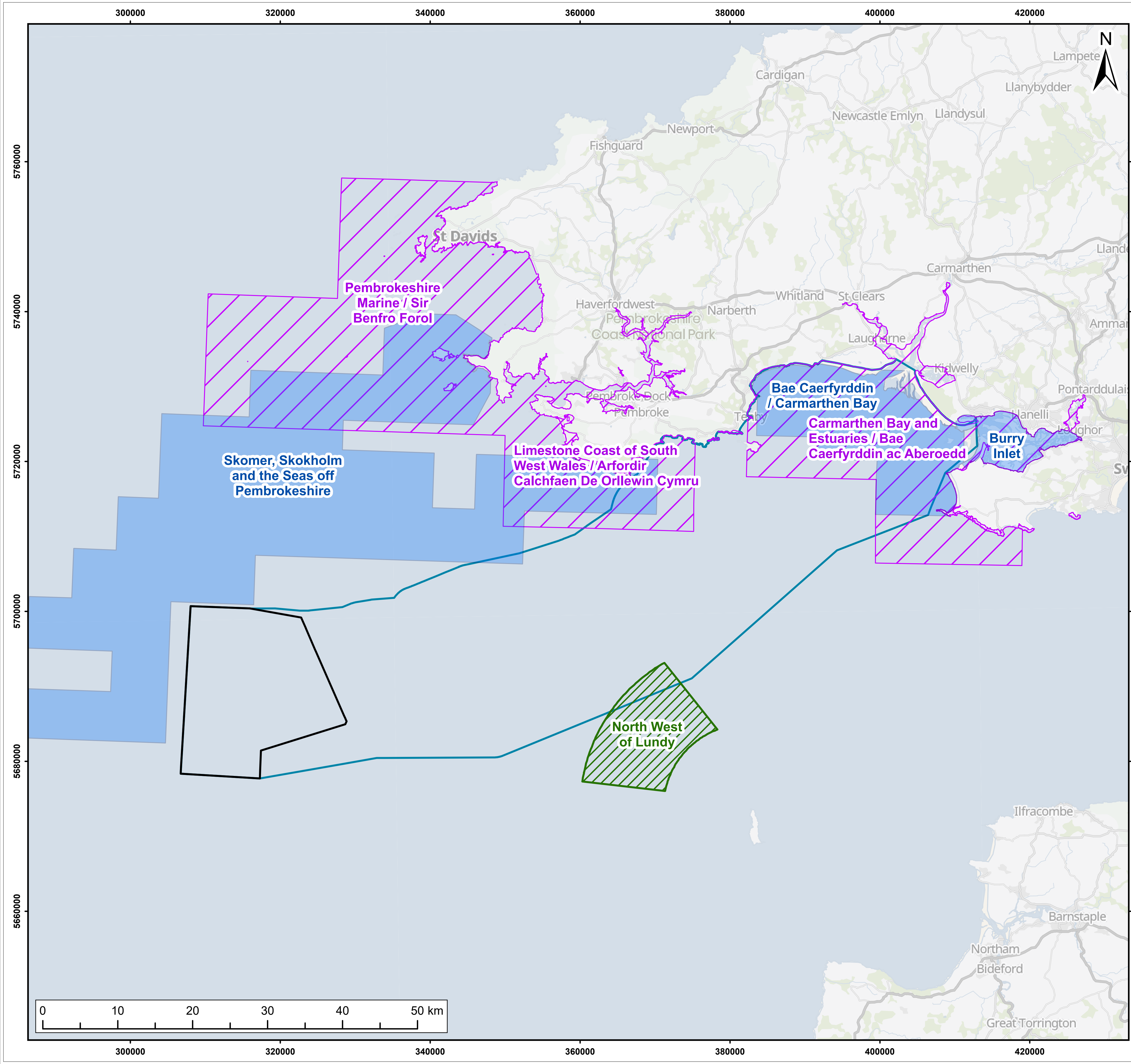
298. There are several designated sites that overlap with the Offshore Scoping Boundary (**Figure 2.2.3**). **Table 2.2.1** provides details of the designated sites and their associated features.

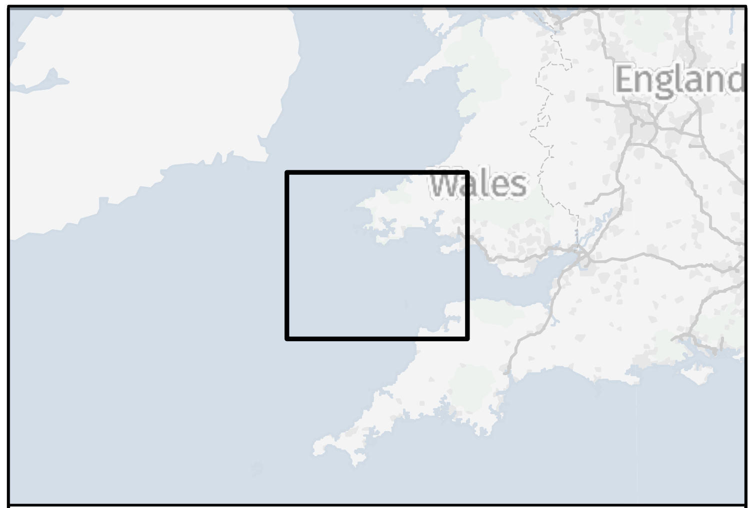
Table 2.2.1 Designated Sites for Benthic Features within the Offshore Scoping Boundary

DESIGNATED SITE	DESIGNATING FEATURES
Pembrokeshire Marine / Sir Benfro Forol SAC	Annex I habitats that are a primary reason for selection of this site: - Estuaries - Large shallow inlets and bays - Reefs Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: - Sandbanks which are slightly covered by sea water all the time - Mudflats and sandflats not covered by seawater at low tide - Coastal lagoons - Atlantic salt meadows *Glauco-Puccinellietalia maritimae* - Submerged or partially submerged sea caves
Limestone Coast of South West Wales / Arfordir Calchfaen de Orllewin Cymru SAC	Annex I habitats that are a primary reason for selection of this site: - Vegetated sea cliffs of the Atlantic and Baltic Coasts - "Fixed coastal dunes with herbaceous vegetation ("grey dunes")" Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: - European dry heaths - Semi-natural dry grasslands and scrubland facies on calcareous substrates *Festuco-Brometalia* (important orchid sites) - Caves not open to the public - Submerged or partially submerged sea caves
Camarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd SAC	Annex I habitats that are a primary reason for selection of this site: - Sandbanks which are slightly covered by sea water all the time - Estuaries - Mudflats and sandflats not covered by seawater at low tide - Large shallow inlets and bays - Salicornia and other annuals colonizing mud and sand - Atlantic salt meadows *Glauco-Puccinellietalia maritimae*

DESIGNATED SITE	DESIGNATING FEATURES
North West of Lundy MCZ	- Subtidal coarse sediment
Ardal Gwarchodaeth Arbennig Bae Caerfyrddin / Camarthen Bay SPA	- 3a: Supporting habitat - 3b: Food availability
Ardal Gwarchodaeth Arbennig Cilfach Tywyn / Burry Inlet SPA	- 3a: Supporting habitat - 3b: Food availability
Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA	- Supporting habitat for all five features of the SPA

299. The Offshore Scoping Boundary also contains several UK Biodiversity Action Plan (UK BAP) habitats, which, whilst not afforded a protected status, are valuable ecological receptors. These habitats are predicted to comprise of Intertidal Mudflats, Peat and Clay Exposures with Piddocks, Intertidal and Subtidal Reef, Subtidal Sands and Gravels, and Tide-swept Channels.





Legend:

- Array Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Special Area of Conservation (SAC)
- Marine Conservation Zone (MCZ)
- Special Protection Area (SPA)

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Designated Sites Scoped in for Assessment

Figure: 2.2.3	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0093				
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2.2.2.4 Marine Invasive Non-Native Species

300. Information on marine Invasive Non-Native Species (INNS) is available from DataMapWales. There are a number of marine INNS recorded within the Offshore Scoping Boundary. Marine INNS in Wales have been categorised into high risk, medium risk and low/unknown risk (Welsh Government, 2018). The following species have been identified (**Table 2.2.2**).

Table 2.2.2 Marine INNS Recorded within the Offshore Scoping Boundary

RISK CATEGORY	SPECIES	RECORDED LOCATION
High	American slipper limpet *Crepidula fornicata*	Giltar Point Penally Beach Porth Tywyn / Burry Port Rhossili Bay Inner Head
Medium	Japanese wireweed *Sargassum muticum*	Freshwater East Beach Manorbier bay Lydstep Haven Giltar point Monkstone Beach Gilman Point Porth Tywyn / Burry Port Inner Head
	Leathery seasquirt *Styela clava*	Offshore Export Cable Scoping Boundary

301. Notable species listed under low / unknown risk are soft shelled clam *Mya arenaria* and Darwin's barnacle *Austrominius modestus* as they have been recorded across the nearshore area of the Offshore Scoping Boundary.

2.2.2.5 Receptors

302. The principal receptors that would be assessed in the EIA are habitats and associated species listed as designating features in **Table 2.2.1** and UK BAP habitats noted in **Section 2.2.2.3**.

2.2.3 Data Sources

303. **Table 2.2.3** outlines existing data that have been used to inform this section and would also be used to inform the EIA.

Table 2.2.3 Data Sources Used to Inform the Benthic Habitat Assessment

DATASET	SPATIAL COVERAGE
DataMapWales	Broadscale data with regional coverage.
NRW Marine Development	Broadscale data with regional coverage.
Marine Life Information Network (MarLIN)	Broadscale data not specific to the Offshore Scoping Boundary.
National Biodiversity Network (NBN) Atlas Wales	Broadscale data with regional coverage.
European Marine Observation and Data Network (EMODnet) Seabed Habitats Map Viewer	Predictive maps are available for the full Offshore Scoping Boundary.
Marine INNS **Priority Monitoring and Surveillance List for Wales**	Welsh territorial waters.

304. In addition to the data in **Table 2.2.3**, **Table 2.2.4** describes the surveys that have been undertaken to date, and those that will be undertaken in 2027 by the Applicant to support the assessment. Survey methodologies will be agreed in advance with stakeholders where possible.

Table 2.2.4 Site-Specific Survey Data

DATASET	DESCRIPTION	SPATIAL COVERAGE	SURVEY TIMINGS
The Crown Estate Surveys for Round 5	Geophysical (multibeam echosounder, side scan sonar & sub bottom profiling) survey	Array Scoping Boundary	01/06/2024 – 15/07/2024
Site specific surveys	Benthic (drop-down camera, grab sampling (macrobenthic, PSD, contaminants)	Array Scoping Boundary	September 2025
Gwynt Glas surveys	Intertidal benthic walkover	Landfall Zone	2027
	Grab sampling, drop-down video and Environmental DNA (eDNA)	Offshore Export Cable Scoping Boundary.	2027

305. Other data and information available to inform the EIA includes:

- Llŷr FLOW Project: Scoping Report (Llŷr Floating Wind Ltd, 2022);

- Llŷr FLOW Project: ES (Llŷr Floating Wind Ltd, 2024);
- Erebus EIA Scoping Report (Blue Gem Wind Ltd, 2019);
- Erebus EIA (Blue Gem Wind Ltd, 2020).

2.2.4 Approach to Impact Assessment

306. The assessment of potential impacts on Benthic Habitats would be cross-referenced, where relevant, to the assessments for **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality** and **Section 2.3 Fish and Shellfish Ecology**. It would take account of NRW's Benthic habitat assessment guidance for marine developments and activities (NRW, 2025b) and the guidelines set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance Guidelines for Ecological Impact Assessment in the UK and Ireland v1.2: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2024).

307. The impact assessment would consider the following:

- Magnitude / extent: the size or amount of impact, e.g. area of seabed directly or indirectly impacted;
- Sensitivity of receptors;
- Duration: time for recovery (may vary with receptor sensitivity) and duration of activity causing an impact; and
- Timing and frequency.

308. Sensitivity of features would be based on the MarLIN Marine Evidence-based Sensitivity Assessment (MarESA) (Tyler-Walters *et al.* 2018) where available. The framework determines sensitivity based on resistance (tolerance) and resilience (recoverability), which are defined as:

- Resistance: the likelihood of damage (termed intolerance or resistance) due to a pressure; and
- Resilience: the rate of (or time taken for) recovery (termed recoverability, or resilience) once the pressure has abated or been removed.

2.2.5 Potential Impacts

2.2.5.1 Potential Impacts During the Construction Stage

309. Potential impacts during the construction stage of the Development could arise from disturbance of the seabed during the installation of FSSs and their SKSs (i.e., anchors and moorings), innovative deepwater solutions, Inter-Array Cables and associated cable protection and pre-construction works (including any seabed preparation, boulder clearance and UXO investigation / clearance - note clearance would be subject to a separate ML but is considered here for completeness), and the use of vessels for any associated activities.

310. It is acknowledged that the impacts associated with permanent habitat loss, introduction of hard substrate and potential effects of heating and electromagnetic fields (EMF) from cables begin in construction and continue through decommissioning, however, to avoid duplicating assessments, the full extent of these impacts would be assessed in the O&M stage section, with a clear acknowledgment that they span the duration of the Development's lifetime.

2.2.5.1.1 Temporary Physical Disturbance

311. There is potential for temporary physical disturbance of the seabed during construction activities such as the installation of anchors, substructures, Offshore Export Cables, seabed preparation, sandwave levelling and vessels that beach during low tide. These activities could temporarily disturb Benthic Habitats and their associated species. Areas affected by installation activities would be relatively small scale in relation to the wider environment, however this would depend on the installation methods and spatial footprint of the works. Therefore, this impact is proposed to be **scoped in** to the EIA.

2.2.5.1.2 Increased SSCs and Sediment Deposition

312. The installation of offshore infrastructure may cause an increase of SSC and sediment deposition in the water column. Increased SSCs have the potential to reduce light availability which in turn can affect phytoplankton biomass by changing the rate of photosynthesis. Such concentrations have the potential to affect the benthos through blockage of filter feeders and / or smothering sessile species once the sediment settles out of the water column and is deposited on the seabed. This impact is proposed to be **scoped in** to the EIA.

2.2.5.1.3 Remobilisation of Contaminated Sediments

313. Sediment disturbance could lead to the remobilisation of contaminated sediments (if present) that could be harmful to benthic communities. **Chapter 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality** provides local and regional context for sediment and water quality within the Offshore Scoping Boundary and it is anticipated that water quality offshore would meet EQS. Levels of sediment contamination will be determined through the benthic characterisation surveys and assessed against the Cefas ALs. As this data is not yet available, this impact is proposed to be **scoped in** to the EIA.

2.2.5.1.4 Pollution Events Resulting from the Accidental Release of Pollutants

314. Effects could also occur if there is an accidental release of pollutants into the water from construction vessels. The risk of pollutant release would be managed by the production of a PEMP for the Development which would include details on marine pollution and associated contingency plans within the Marine Pollution and Contingency Plan (MPCP). Chemicals to be used during the construction stage would be suitable for use in the marine environment and would be used in accordance with guidelines approved by the HSE and NRW (NRW, the Northern Ireland Environment Agency (NIEA), the Scottish Environment Protection Agency (SEPA) and the Oil Care Campaign, 2022) (Guidance for Pollution Prevention). All vessels and the carriage and use of chemicals must comply with the MARPOL 73/78. Best practice measures for the storage, use and disposal of lubricant and chemicals would be undertaken throughout the construction stage.

315. As a result of these embedded mitigation measures and the commitments that would be secured in the PEMP and MPCP, it is considered that the risk of a spill occurring is low and with the appropriate management measures in place, should a spill occur, the risk to the marine environment is effectively mitigated. The PEMP would be consulted on with the relevant stakeholders prior to the start of construction. Therefore, it is considered that no significant effect would occur and as a result of these mitigation measures, it is proposed that this impact is **scoped out** of the EIA.

2.2.5.1.5 Introduction of Marine INNS

316. Construction vessel traffic may result in the introduction of INNS to the area.

317. The potential risk of spreading or introducing INNS would be mitigated by employing biosecurity measures in accordance with the following relevant regulations and guidance:

- MARPOL sets out appropriate vessel maintenance;
- The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 (as amended), which set out a 'polluter pays principle' where the operators who cause a risk of significant damage or cause significant damage to land, water or biodiversity would have the responsibility to prevent damage occurring, or if the damage does occur would have the duty to reinstate the environment to the original condition; and
- The International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management Convention 2004), which provide global regulations to control the transfer of potentially invasive species.

318. These commitments would be secured in the PEMP via a condition in the ML(s). The PEMP would be consulted on with the relevant stakeholders prior to the start of construction.

319. With the appropriate mitigations in place through commitments secured in the PEMP, it is not anticipated that INNS would have a significant impact. Therefore, it is proposed that with this embedded mitigation, introduction of marine INNS from vessel traffic during the construction stage is **scoped out** of the EIA.

320. The colonisation of introduced substrate by marine INNS is considered under the O&M stage.

2.2.5.1.6 Disturbance from Noise and Vibration

321. The effects of noise and vibration on benthic receptors have been **scoped out** of further assessment as there is currently limited evidence to suggest that noise and vibration from the offshore activities presented in **Section 1.5 Development Description** would have a significant effect on benthic receptors. This is in line with the assessment carried out for Llŷr FLOW Project: ES (Llŷr Floating Wind Ltd, 2024).

2.2.5.2 Potential Impacts During the O&M Stage

322. Potential impacts during O&M would typically result from the physical presence of infrastructure on the seabed which would result in permanent habitat loss. Maintenance activities also have the potential to result in temporary impacts, similar to those occurring during construction, but smaller in extent and therefore of a lower magnitude. Impacts may also arise as a result of the operation of Offshore Export Cables by creating EMF and generating heat.

2.2.5.2.1 Permanent Habitat Loss

323. Permanent habitat loss would occur in the footprint of all anchors associated with infrastructure located on the seabed, innovative deepwater solutions and any required scour protection or cable protection for export cables. There may also be some loss over time from scour around structures present on the seabed. During operation, disturbance on the seabed may occur during movement and drag of mooring lines and dynamic Inter-Array Cables in response to physical conditions.

324. Data from the benthic characterisation surveys would be used to assess the extent of habitat loss in the Offshore Scoping Boundary and identify the habitat type and species that would be affected. Therefore, it is proposed that permanent habitat loss is **scoped in** to the EIA.

2.2.5.2.2 Temporary Physical Disturbance

325. There is potential for temporary physical disturbance during the O&M stage from jack-up vessels and the repair / replacement of subsea cables. The effects from planned maintenance should be temporary, localised and smaller in scale than during construction. However, it is proposed that this impact is **scoped** in to the EIA for further consideration.

2.2.5.2.3 Increased SSCs and Sediment Deposition

326. It is anticipated that the effects from increased SSCs and sediment deposition from O&M activities such as Offshore Export Cable repairs would be small scale and temporary, and less than during construction.

327. There is also the possibility for the movement of mooring lines and dynamic Inter-Array Cables to move sediment into suspension in the water column. The potential impacts related to the suspension of sediments during the O&M stage have been **scoped in** to the EIA.

2.2.5.2.4 Remobilisation of Contaminated Sediments

328. Sediment disturbance as a result of O&M activities could lead to the remobilisation of contaminants (if present) that could be harmful to Benthic Habitats and species. Levels of sediment contamination would be determined through the benthic characterisation surveys and assessed against the Cefas ALs. As this data is not yet available, this impact is proposed to be **scoped in** to the EIA.

2.2.5.2.5 Pollution Events Resulting from the Accidental Release of Pollutants

329. As described in **Section 2.2.5.1.4**, the embedded mitigation measures and the PEMP would be utilised to reduce spillage risk and establish appropriate management measures. Therefore, it is proposed that this impact is **scoped out** of EIA.

2.2.5.2.6 Interactions of EMFs

330. Subsea cables produce EMFs that may interfere with the behaviour of benthic species. The effects of EMF on benthic receptors have been **scoped in** for further assessment as, at this stage in the Development design, the potential for significant effects on benthic species cannot be ruled out.

331. The effects of EMF on fish and shellfish have been considered further in **Section 2.3 Fish and Shellfish Ecology.**

2.2.5.2.7 Introduction of Marine INNS

332. The potential impacts from the introduction of marine INNS are as set out for construction but are considered to be lower, due to fewer vessels required during O&M. Embedded mitigation measures related to biosecurity in the marine environment described in **Section 2.2.5.1.5** would also cover the Development's operation stage. Therefore, it is proposed that this impact is **scoped out** of the EIA.

2.2.5.2.8 Colonisation of Introduced Substrate

333. The Development infrastructure is expected to be colonised by a range of species leading to a localised increase in biodiversity. The presence of infrastructure would also provide habitat for mobile species, representing a change from the baseline ecology. It is therefore proposed that this impact should be **scoped in** to the EIA for further consideration.

2.2.5.2.9 Disturbance from Noise and Vibration

334. As previously discussed in **Section 2.2.5.1.6**, any underwater noise and vibration impacts during the operation stage are unlikely to cause significant effects on benthic receptors and therefore are proposed to be **scoped out** of the EIA**.**

2.2.5.2.10 Sediment Heating from Subsea Cables

335. Subsea cables and other infrastructure, including Subsea Power Collectors and subsea substations, generate minor resistive heat during electricity transmission. The magnitude and spatial extent of any seabed heating is dependent on cable specification, load, burial depth, and the thermal conductivity of surrounding sediments (Emeana *et al.*, 2016). Evidence from modelling and post-consent monitoring at UK offshore wind projects (including Erebus Offshore Wind Farm; White Cross Offshore Windfarm and Llŷr FLOW Project) demonstrates that temperature increases at the cable sediment interface are small (typically up to a few degrees Celsius), highly localised, and attenuate to background levels within metres of the cable. No measurable behavioural or ecological effects on benthic species have been identified.

336. Heat loss represents an inherent inefficiency in subsea power transmission and is minimised through embedded design measures, including conductor sizing, armouring, cable burial depth and optimisation of transmission efficiency. Thermal emissions from buried subsea cables are highly localised and dissipate rapidly into surrounding sediments and the overlying water column. This behaviour is consistent with OSPAR's (2009) assessment, which identifies thermal radiation from submarine power cables as a spatially limited, low-magnitude effect with very limited ecological relevance for benthic receptors.

337. Given the very small magnitude of predicted temperature elevations, rapid dissipation, and consistent findings of non-significant effects in comparable offshore EIAs, operational heat effects are considered negligible for benthic receptors. There is no credible pathway for population-level consequences, as such heat impacts from cables is therefore **scoped out** of further assessment within the EIA.

2.2.5.3 Potential Impacts During the Decommissioning Stage

338. The potential impacts during decommissioning are expected to be the same as those for construction stage, but of a smaller scale.

2.2.5.4 Potential Inter-relationship Impacts

339. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.2.5.5 Potential Cumulative Impacts

340. There is potential for cumulative effects on Benthic Habitats to arise in combination with other plans or projects during construction, operation and decommissioning of the Development. The CEA would follow the standard approach outlined in **Section 1.8 EIA Methodology**.

341. Offshore wind projects and other activities that may have an effect on Benthic Habitats would be identified through a screening exercise. The potential impacts considered in the CEA would be in line with those described for the Development-alone assessment, though it is possible that some would be screened out on the basis that the impacts are highly localised (i.e. they occur only within the Development site) or where management measures are in place. Cumulative impacts are therefore **scoped in** to the EIA.

2.2.5.6 Potential Transboundary Impacts

342. The Development is approximately 36km from the UK EEZ territorial boundary between the UK and Ireland. Given that the impacts on Benthic Habitats would be restricted to a ZoI extending 15km from the Offshore Scoping Boundary, there would be no pathway for transboundary impacts. It is therefore proposed to **scope out** transboundary effects on Benthic Habitats.

2.2.5.7 Summary of Potential Impacts

343. **Table 2.2.5** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.2.5 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Benthic Habitat Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Temporary physical disturbance	✓	✓	✓
Permanent habitat loss	x	✓	x
Increased SCCs and sediment deposition	✓	✓	✓
Remobilisation of contaminated sediments	✓	✓	✓
Pollution events resulting from the accidental release of pollutants	x	x	x
Introduction of marine INNS	x	x	x
Colonisation of introduced substrate	x	✓	x
Disturbance from noise and vibration	x	x	x
Interactions of EMFs	x	✓	x
Sediment heating from subsea cables	x	x	x

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Inter-relationship Impacts	✓	✓	✓
Cumulative Impacts	✓	✓	✓
Transboundary Impacts	x	x	x

2.2.6 Potential Mitigation Measures

344. Embedded mitigation measures relating to Benthic Habitat are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

345. Requirements for any additional mitigation measures would be determined through the EIA.

346. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All of the proposed mitigation measures would comply with regulatory requirements and good practice.

2.3 Fish and Shellfish Ecology

347. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Fish and Shellfish Ecology.

348. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Fish and Shellfish Ecology receptors in the Development's ES.

349. The Fish and Shellfish Ecology assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description**;
- **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**;
- **Section 2.2 Benthic Habitat**;
- **Section 2.4 Marine Mammals and Marine Turtles**;
- **Section 2.5 Offshore Ornithology**; and
- **Section 2.6 Commercial Fisheries**.

The following questions are posed to consultees to help them frame and focus their response to the Fish and Shellfish Ecology scoping exercise which will in turn inform the Scoping Opinion:

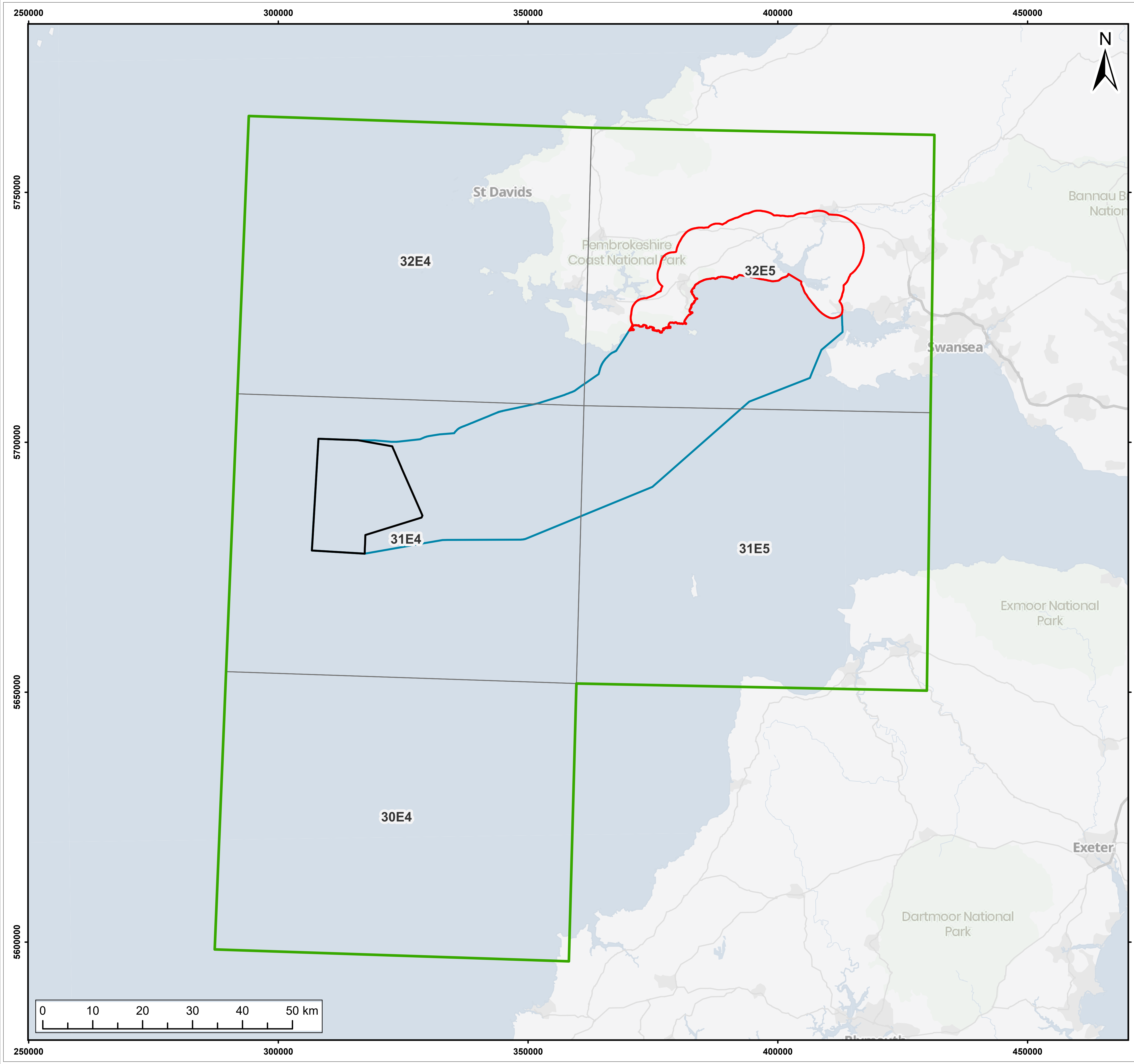
- Do you agree with the proposed Fish and Shellfish Ecology Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?
- Do you agree with the proposed approach to assessment?

2.3.1 Study Area

350. The extent of the Fish and Shellfish Ecology Study Area has been defined to provide appropriate regional context and to encompass all potential effects occurring within or beyond the Development.

351. The Development is located within the International Council for the Exploration of the Sea (ICES) statistical rectangles 30E4; 31E4; 31E5; 32E4 and 32E5 (ICES, 1977). The Fish and Shellfish Ecology Study Area covers a total of 612.95km^2. Accordingly, the Fish and Shellfish Ecology Study Area includes these ICES rectangles in full, as ICES statistical rectangles provide the standard spatial

framework for the collection and reporting of fisheries-related datasets (e.g. species distribution, spawning and nursery grounds, and survey data). The species recorded in these rectangles are representative of those of commercial and ecological importance to the Celtic Sea region and therefore provide the appropriate spatial context for the assessment. The Fish and Shellfish Ecology Study Area is shown on **Figure 2.3.1**.



Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles

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Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Fish and Shellfish Ecology Study Area

Figure: 2.3.1	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0057				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	20/03/2026	MW	GLD	A3	1:750,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

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2.3.2 Baseline Environment

352. An initial desk-based review of existing literature and data sources was undertaken to support this scoping exercise and the baseline environment of Fish and Shellfish Ecology.

2.3.2.1 Spawning and Nursery Grounds

353. The Celtic Sea supports a diverse range of ecologically and commercially important fish and shellfish species. A review of available datasets (Coull *et al*. 1998, Ellis *et al*. 2012, Cefas, 1999) has been undertaken to describe the use of the Fish and Shellfish Ecology Study Area in relation to key life stages. This includes the identification of recognised spawning grounds, nursery habitats for juveniles and intensity.

354. The Fish and Shellfish Ecology Study Area supports a range of pelagic and demersal fish species, elasmobranch, and shellfish species characteristic of the Celtic Sea. **Table 2.3.1** identifies the known spawning and nursery grounds for these species and confirms whether these grounds overlap with the Fish and Shellfish Ecology Study Area. Where available, the relative intensity of spawning and nursery activity is also presented. **Figure 2.3.2**a to **Figure 2.3.2e** illustrate the spatial extent and relative intensity of spawning grounds within and surrounding the Fish and Shellfish Ecology Study Area. **Figure 2.3.3a** to **Figure 2.3.3e** illustrate the corresponding nursery grounds.

Table 2.3.1 Spawning and nursery grounds for species overlapping with the Fish and Shellfish Ecology Study Area; fish hearing groups and the conservation importance.

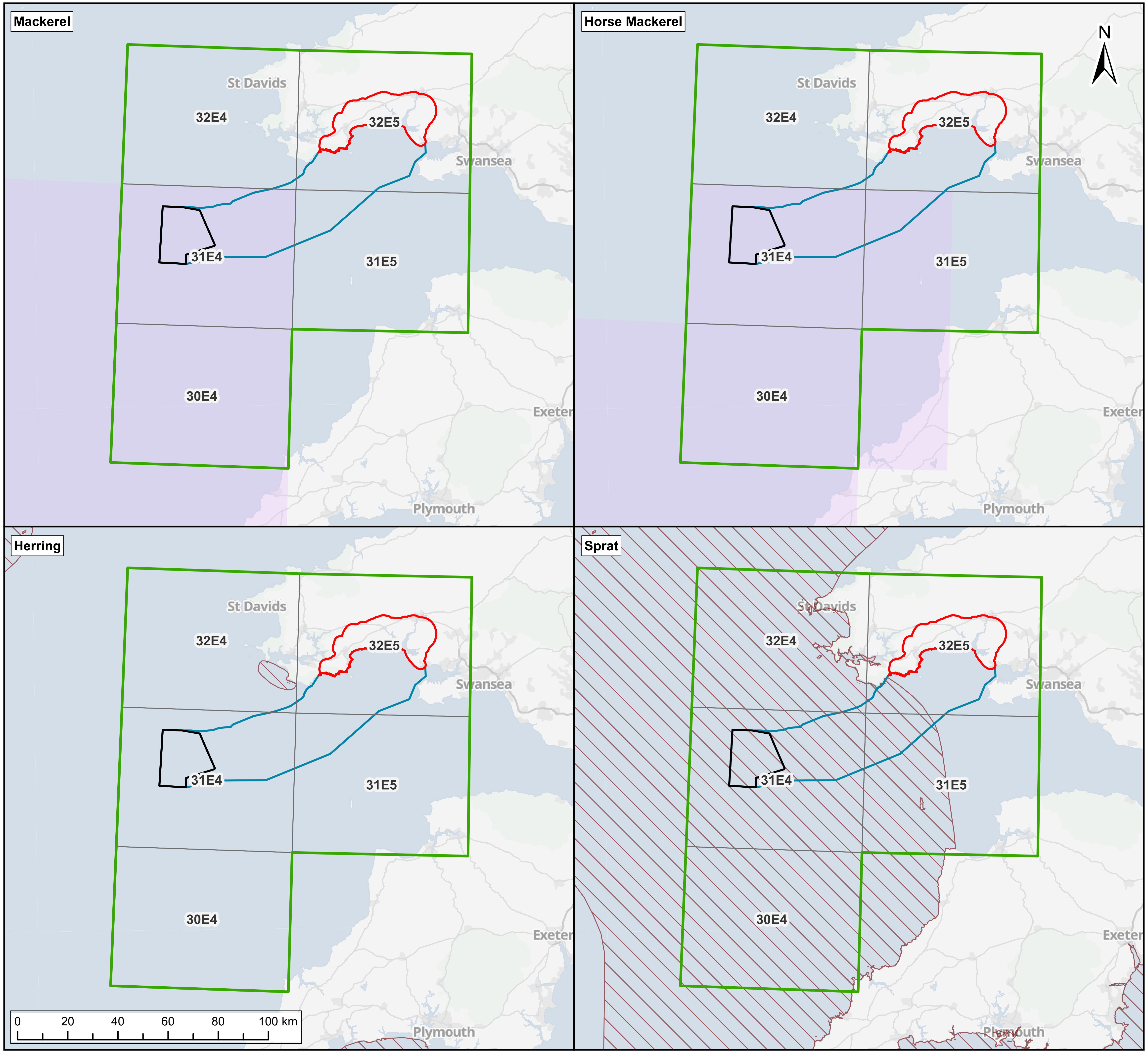
SPECIES	HEARING GROUP	AREAS OVERLAPPING WITH THE FISH AND SHELLFISH ECOLOGY STUDY AREA		CONSERVATION IMPORTANCE
		SPAWNING	NURSERY	
Pelagic Fish				
Mackerel *Scomber scombrus*	Group 1: Fish with no swim bladder or other gas chamber.	Yes (low intensity)	Yes (low intensity)	Listed by UK BAP Priority[7] and Species of Principal Importance (SPI) (Wales)[8].
Horse Mackerel *Trachurus trachurus*	Group 1: Fish with no swim bladder or other gas chamber.	Yes (low intensity)	No	Listed by UK BAP Priority and SPI (Wales).
Herring *Clupea harengus*	Group 3: Fish in which hearing involves a swim bladder or other gas volume.	Yes (undetermined intensity[9])	Yes (low intensity)	Listed by UK BAP Priority, SPI (Wales) and International Union for Conservation of Nature (IUCN) Red List.

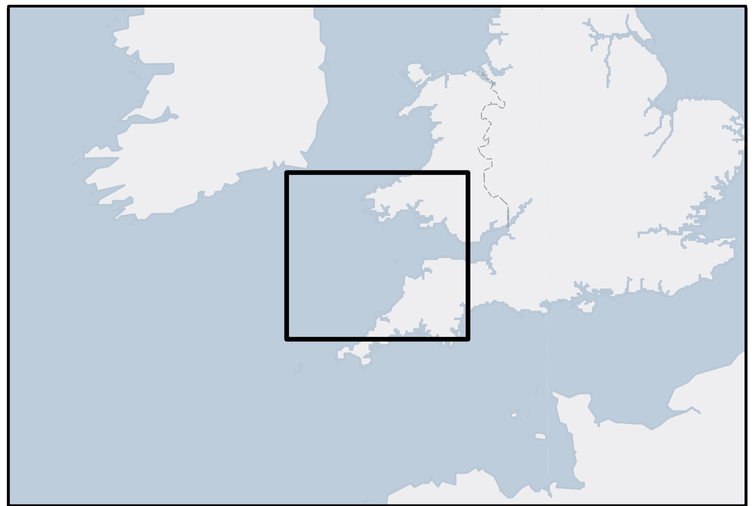
[7] Devolution and new national requirements shifted UK BAP work to country level, and the UK BAP was replaced by the UK Post-2010 Biodiversity Framework and later the UK Biodiversity Framework and National Biodiversity Strategy. The UK priority species list is still used to inform statutory priority species lists across the UK.
[8] SPI refers to the list of habitats and species that the Welsh Ministers are required to publish under Section 42 of the NERC Act 2006, now carried forward under Section 7 of the Environment (Wales) Act 2016. These species are recognised as being of principal importance for the purpose of maintaining and enhancing biodiversity in Wales.
[9] Indicates spawning and nursery intensity not stated by Coull *et al.*, (1998), Ellis *et al.*, (2012) and Cefas (1999)

SPECIES	HEARING GROUP	AREAS OVERLAPPING WITH THE FISH AND SHELLFISH ECOLOGY STUDY AREA		CONSERVATION IMPORTANCE
		SPAWNING	NURSERY	
Sprat *Sprattus sprattus*	Group 3: Fish in which hearing involves a swim bladder or other gas volume.	Yes (undetermined intensity[9])	No	No conservations listed.
Demersal Fish				
Whiting *Micromesistius poutassou*	Group 3: Fish in which hearing involves a swim bladder or other gas volume.	Yes (low intensity)	Yes (low intensity)	Listed by SPI (Wales)
European sea bass *Dicentrarchus labrax*	Group 2: Fish with a swim bladder that is not used in hearing.	No	Yes (undetermined intensity)	Listed by IUCN Red List.
Anglerfish *Lophius piscatorius*	Group 1: Fish with no swim bladder or other gas chamber.	No	Yes (low intensity)	Listed by UK BAP Priority and SPI (Wales).
European Hake *Merluccius merluccius*	Group 3: Fish in which hearing involves a swim bladder or other gas volume.	Yes (low intensity)	Yes (low intensity)	Listed by UK BAP Priority and SPI (Wales).
Sandeel sp. *Ammodytes spp.*	Group 1: Fish with no swim bladder or other gas chamber.	Yes (high and low intensity)	Yes (low intensity)	Listed by UK BAP Priority and SPI (Wales).

SPECIES	HEARING GROUP	AREAS OVERLAPPING WITH THE FISH AND SHELLFISH ECOLOGY STUDY AREA		CONSERVATION IMPORTANCE
		SPAWNING	NURSERY	
Cod *Gadus morhua*	Group 3: Fish in which hearing involves a swim bladder or other gas volume.	Yes (high and low intensity)	No	SPI (Wales), OSPAR Annex V and IUCN Red List.
Plaice *Pleuronectes platessa*	Group 1: Fish with no swim bladder or other gas chamber.	Yes (high and low intensity)	Yes (low intensity)	Listed by UK BAP Priority and SPI (Wales).
Lemon Sole *Microstomus kitt*	Group 1: Fish with no swim bladder or other gas chamber.	Yes (undetermined intensity[9])	Yes (undetermined intensity[9])	Listed by UK BAP Priority and SPI (Wales).
Sole *Solea solea*	Group 1: Fish with no swim bladder or other gas chamber.	Yes (high and low intensity)	Yes (high and low intensity)	Listed by UK BAP Priority and SPI (Wales).
Ling *Molva molva*	Group 3: Fish in which hearing involves a swim bladder or other gas volume.	Yes (low intensity)	No	Listed by UK BAP Priority and SPI (Wales).
Elasmobranch				
Tope Shark *Galeorhinus galeus*	Group 1: Fish with no swim bladder or other gas chamber.	No	Yes (low intensity)	Listed by UK BAP Priority and SPI (Wales) and IUCN Red List.

SPECIES	HEARING GROUP	AREAS OVERLAPPING WITH THE FISH AND SHELLFISH ECOLOGY STUDY AREA		CONSERVATION IMPORTANCE
		SPAWNING	NURSERY	
Spotted Ray *Raja montagui*	Group 1: Fish with no swim bladder or other gas chamber	No	Yes (low intensity)	OSPAR Annex V and IUCN Red List.
Thornback Ray *Raja clavata*	Group 1: Fish with no swim bladder or other gas chamber	No	Yes (low intensity)	Listed by UK BAP Priority and SPI (Wales) OSPAR ANNEX V and IUCN Red List.
Spurdog *Squalus acanthias*	Group 1: Fish with no swim bladder or other gas chamber	No	No	Listed by UK BAP Priority and SPI (Wales) OSPAR ANNEX V and IUCN Red List.
Shellfish				
Nephrops *Nephrops norvegicus*	Not applicable (invertebrate)	Yes (undetermined intensity[9])	Yes (undetermined intensity[9])	No conservations listed.





Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Spawning Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Spawning Grounds Overlapping
the Fish and Shellfish Ecology Study Area

Figure: 2.3.2a	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0059				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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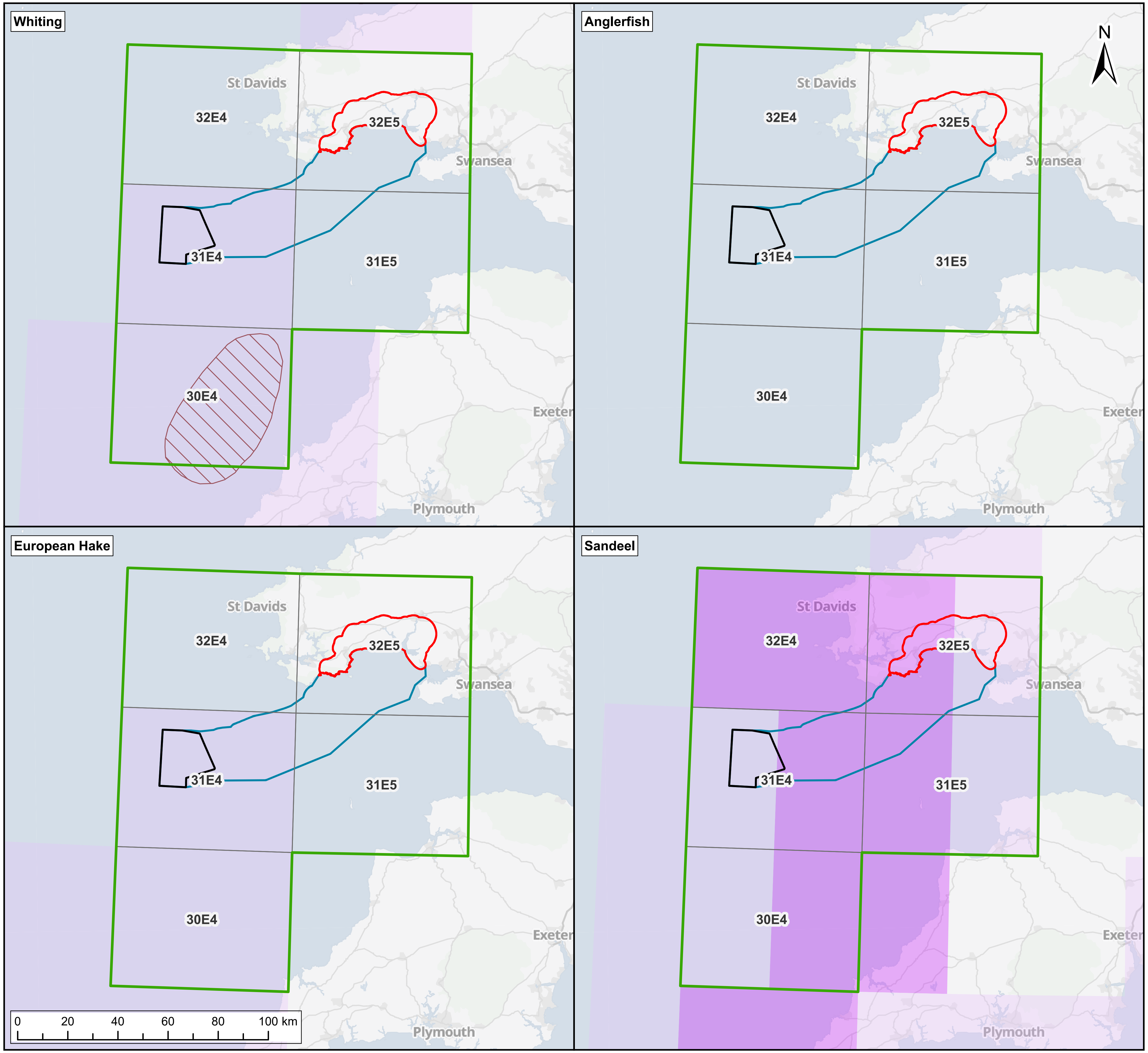

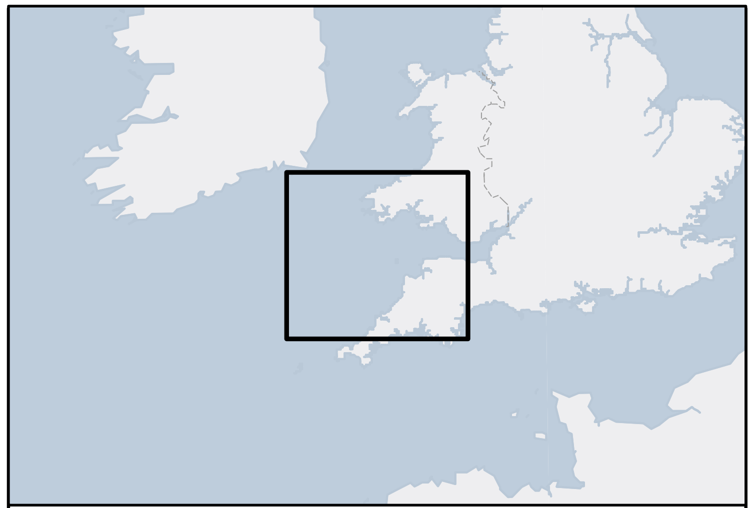

Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Spawning Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

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Project: Gwynt Glas Offshore Wind Farm Scoping Report					
Title: Spawning Grounds Overlapping the Fish and Shellfish Ecology Study Area					
Figure: 2.3.2b	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0060				
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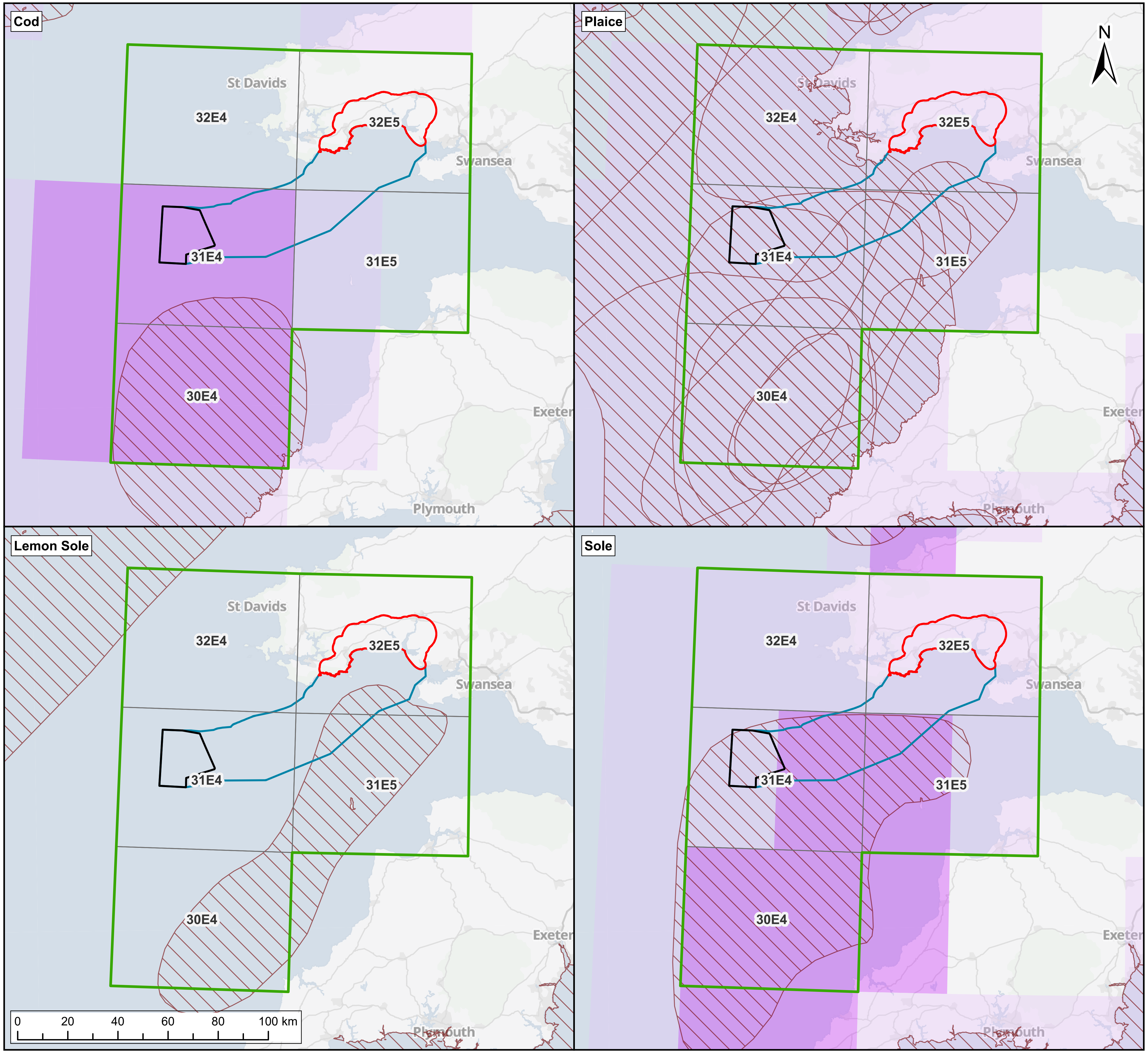

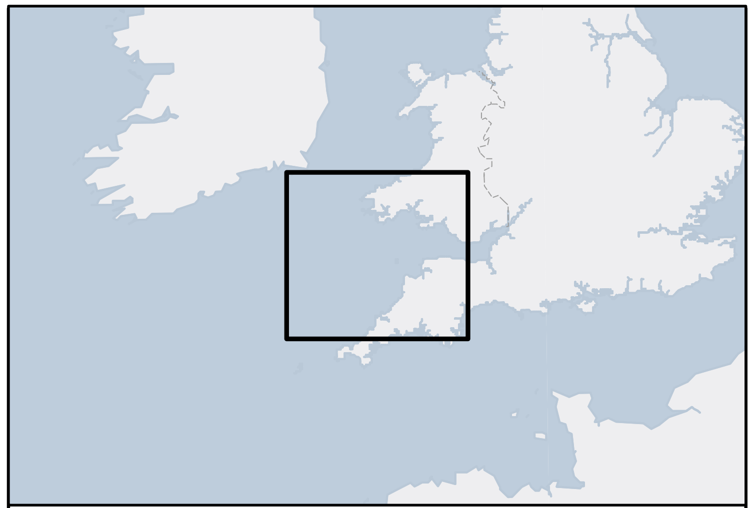

Legend:

- Array Scoping Boundary
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- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Spawning Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

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Project:	Gwynt Glas Offshore Wind Farm Scoping Report				
Title:	Spawning Grounds Overlapping the Fish and Shellfish Ecology Study Area				
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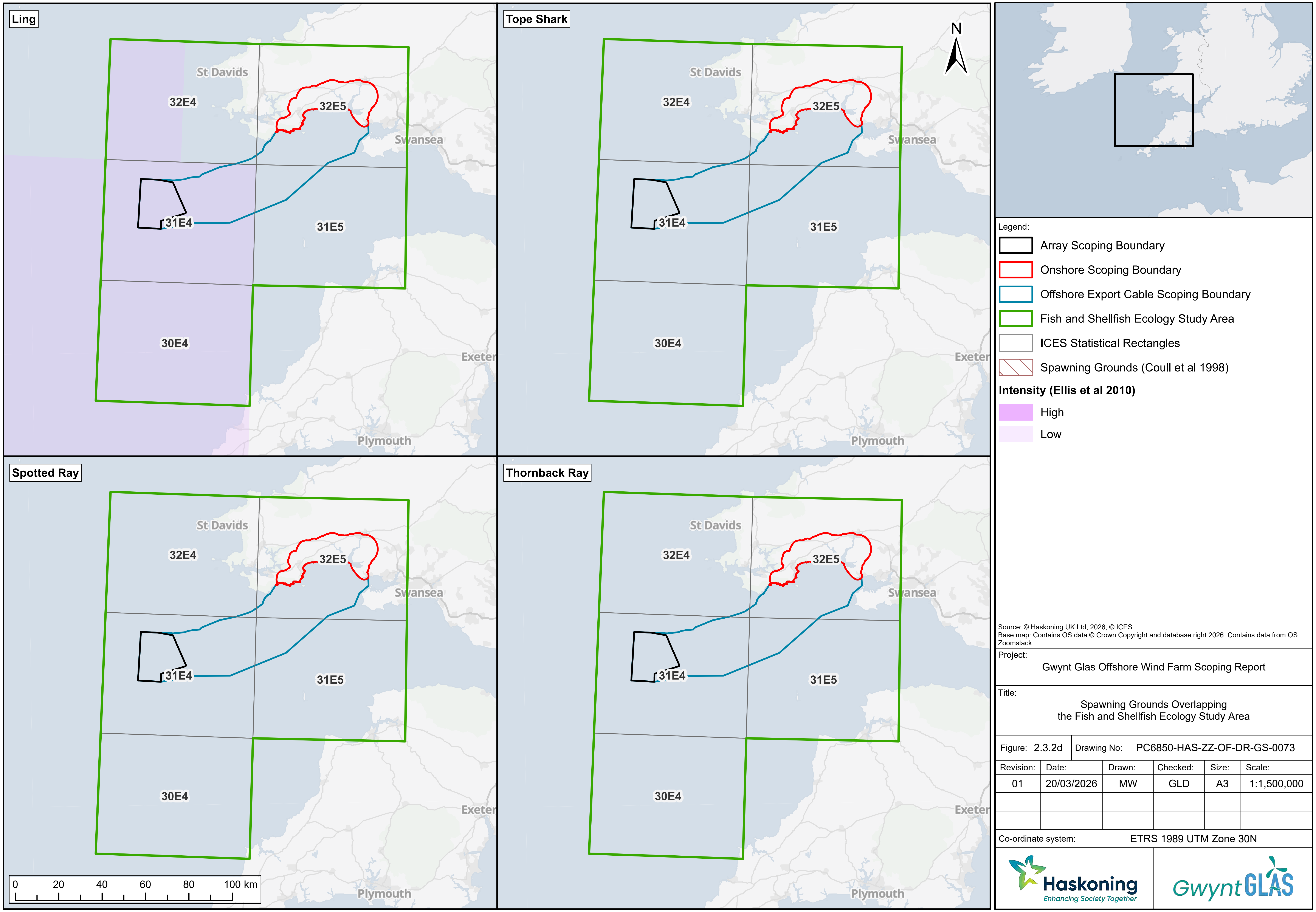

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Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Spawning Grounds Overlapping the Fish and Shellfish Ecology Study Area

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Co-ordinate system: ETRS 1989 UTM Zone 30N

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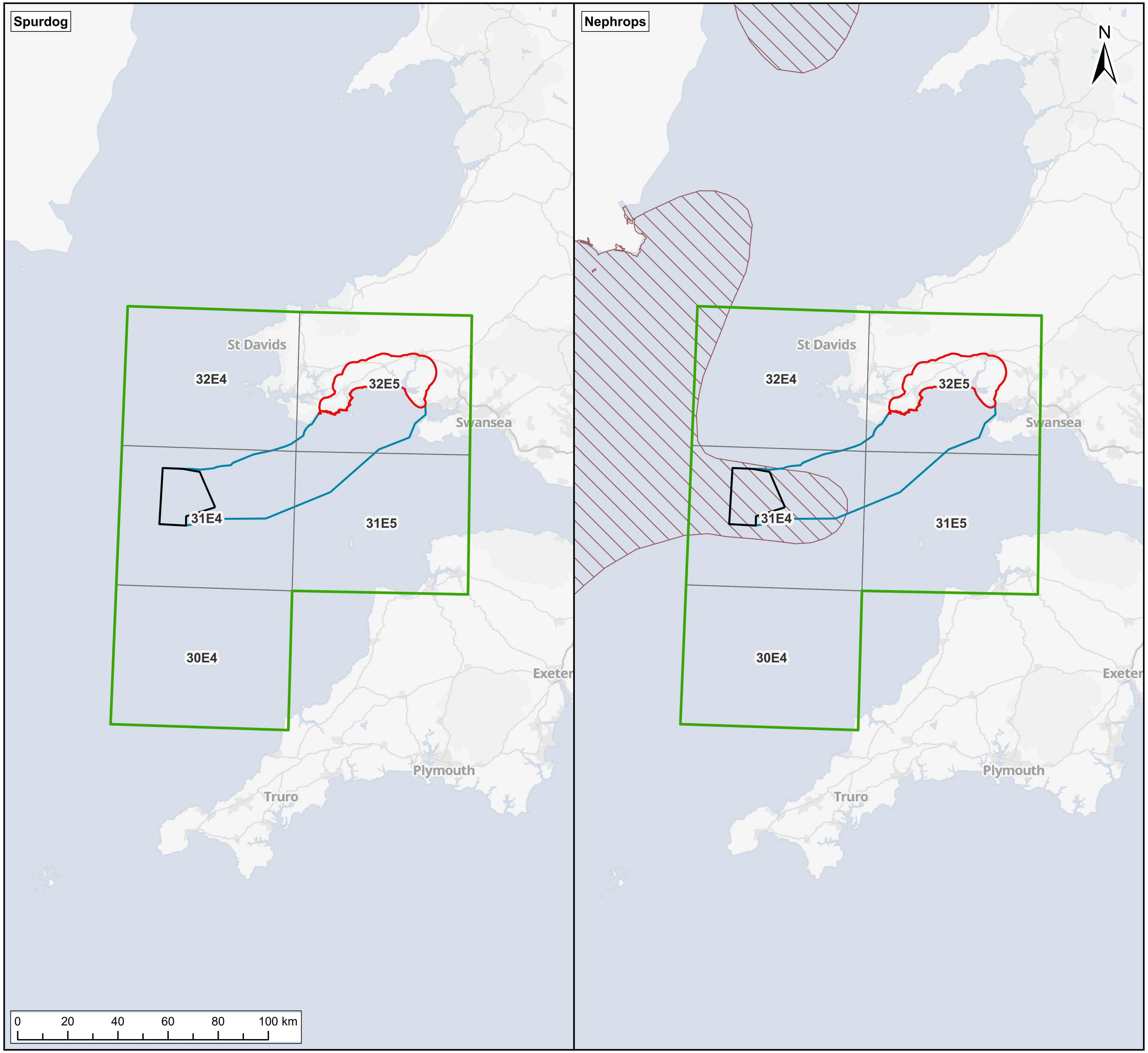

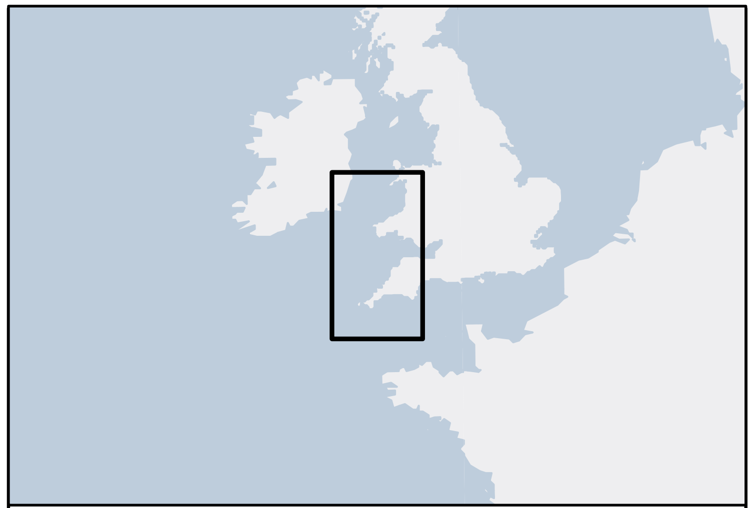

Legend:

- Array Scoping Boundary
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- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Spawning Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Spawning Grounds Overlapping the Fish and Shellfish Ecology Study Area

Figure: 2.3.2e	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0074				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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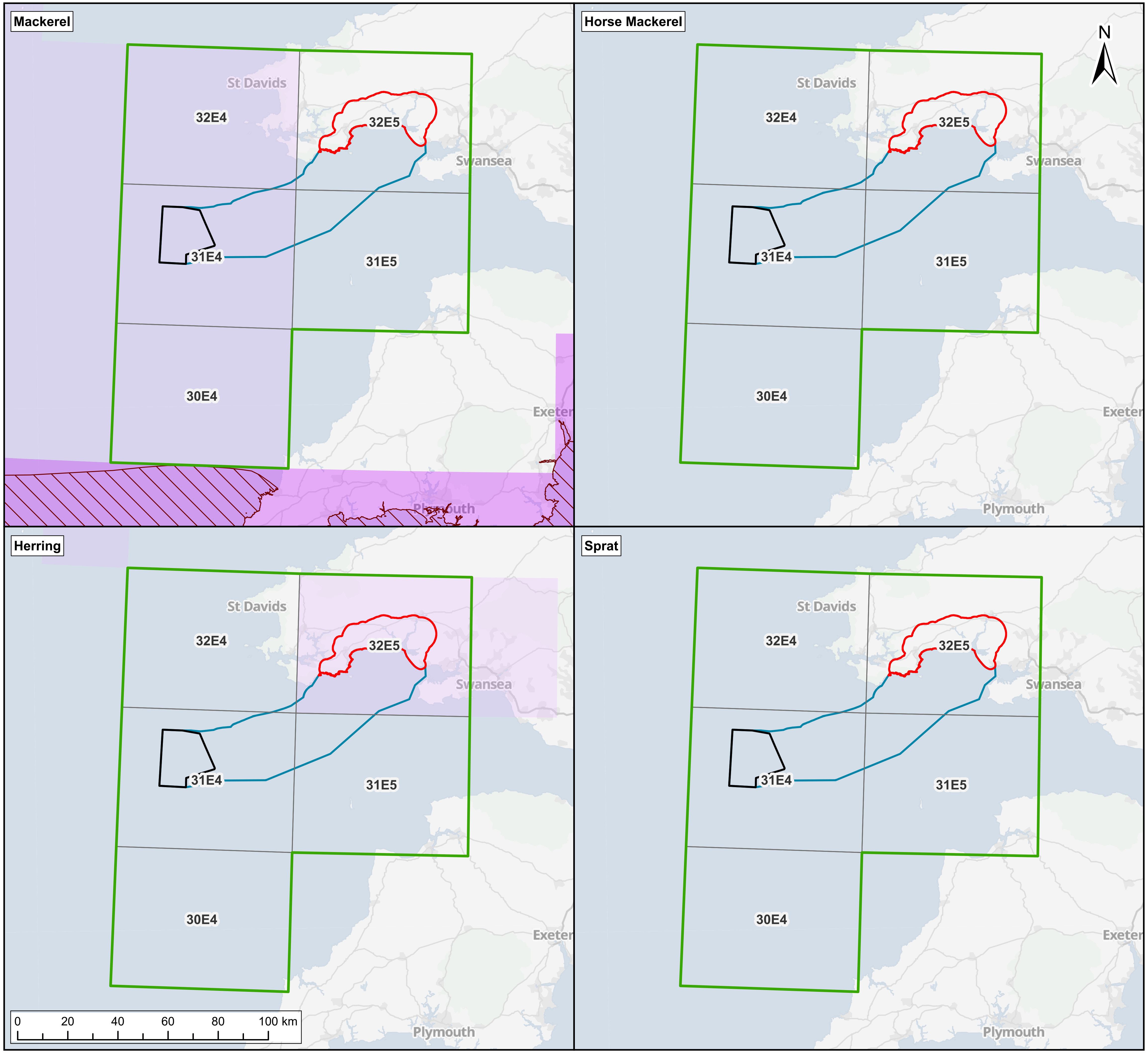

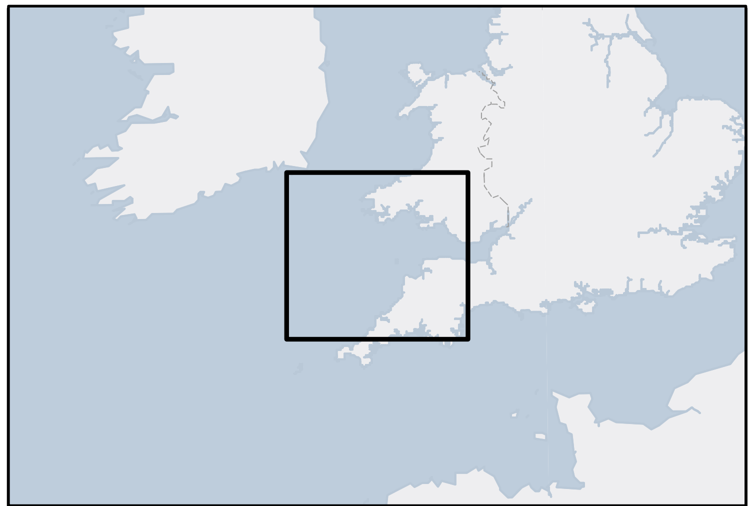

Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Nursery Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Nursery Grounds Overlapping
the Fish and Shellfish Ecology Study Area

Figure: 2.3.3a	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0075				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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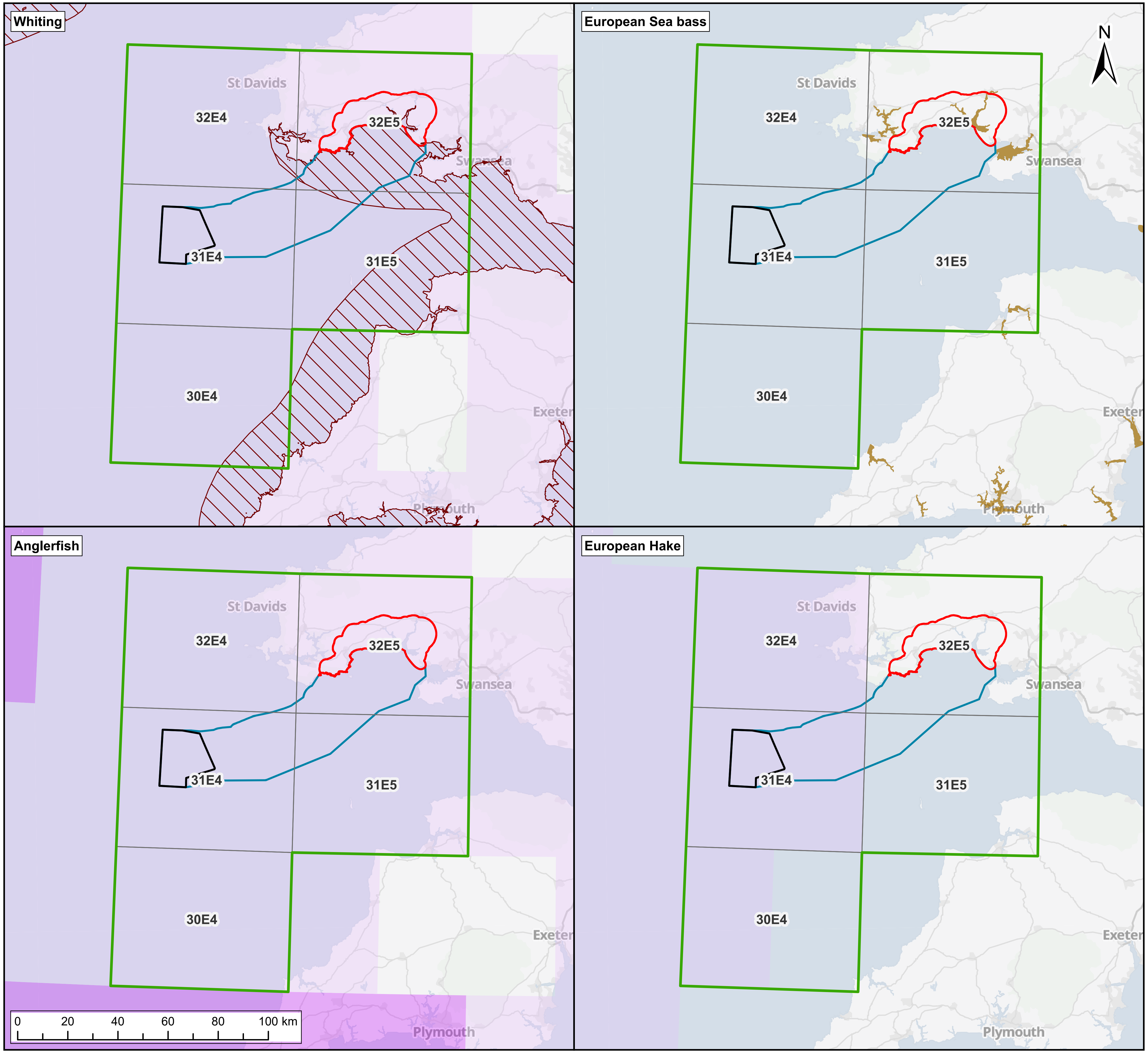

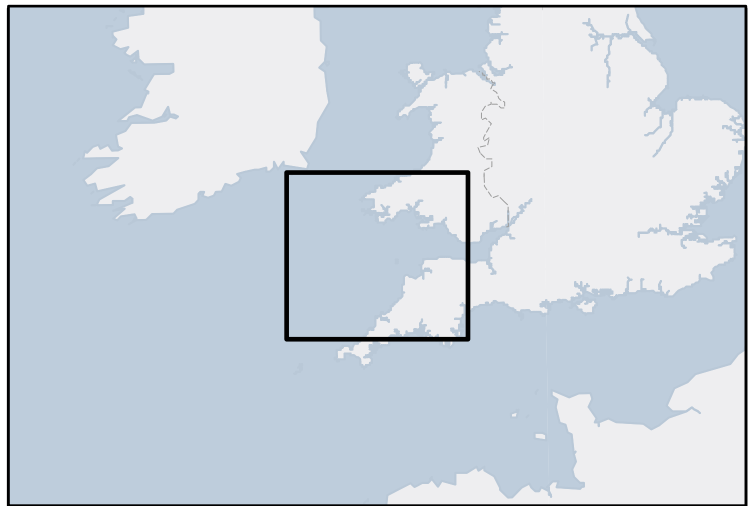

Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Nursery Grounds (Coull et al 1998)
- Nursery Grounds (Cefas 1999)

Intensity (Ellis et al 2010)

- High
- Low

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Nursery Grounds Overlapping
the Fish and Shellfish Ecology Study Area

Figure: 2.3.3b	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0076				
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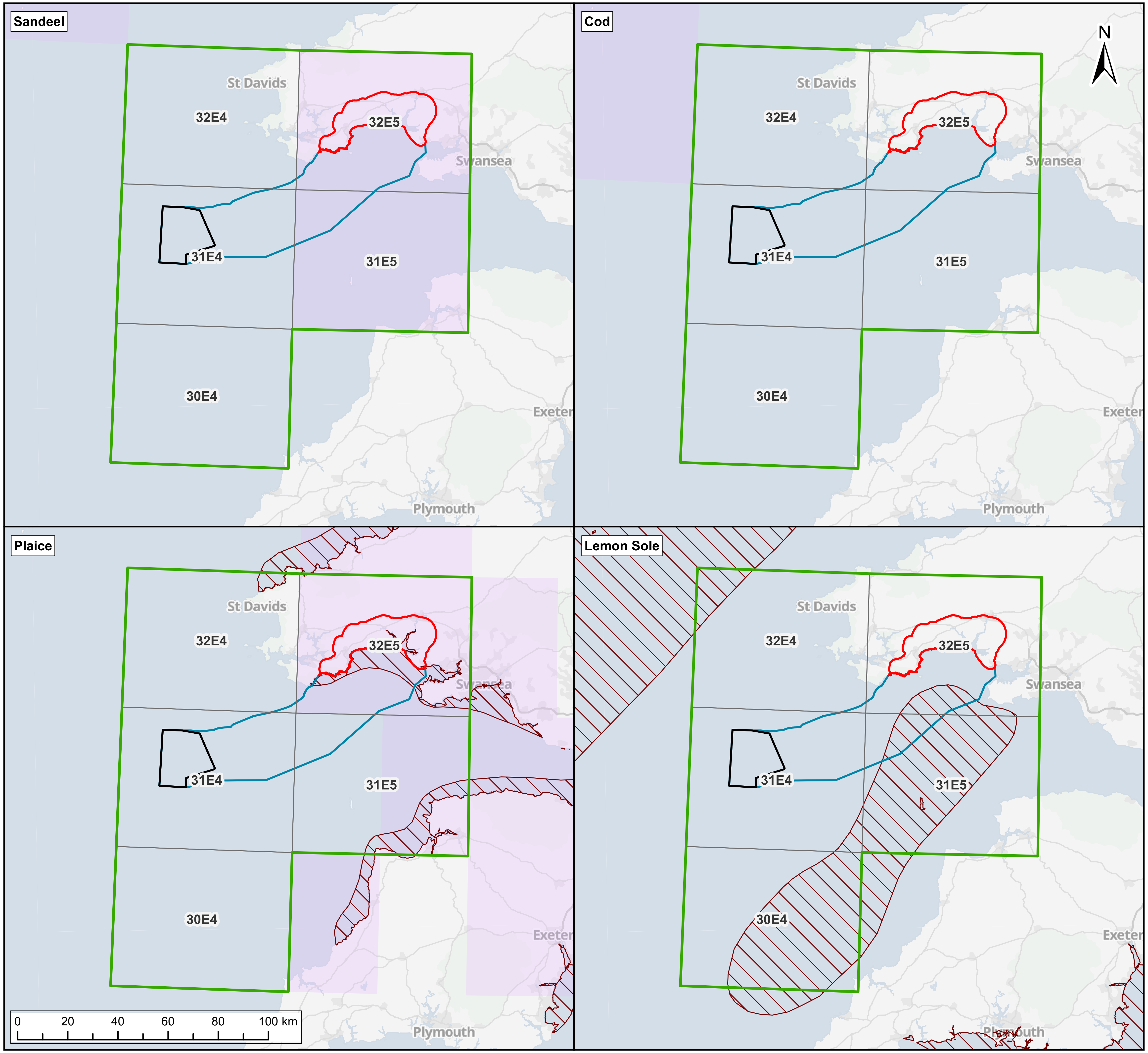

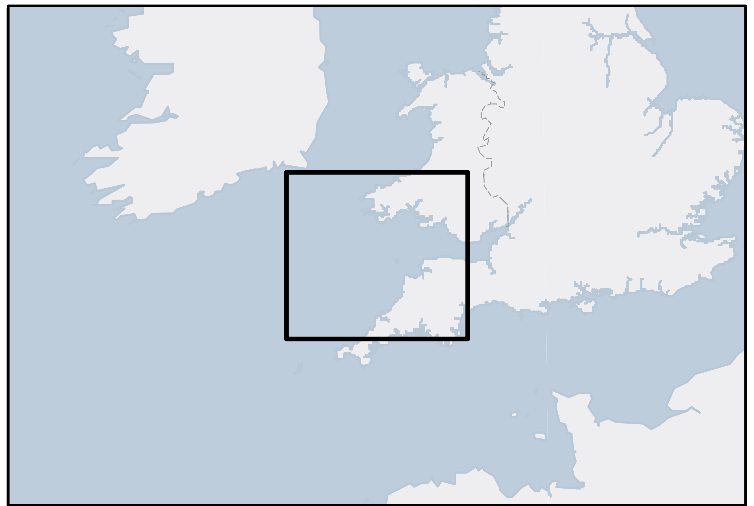

Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Nursery Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Nursery Grounds Overlapping
the Fish and Shellfish Ecology Study Area

Figure: 2.3.3c	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0077				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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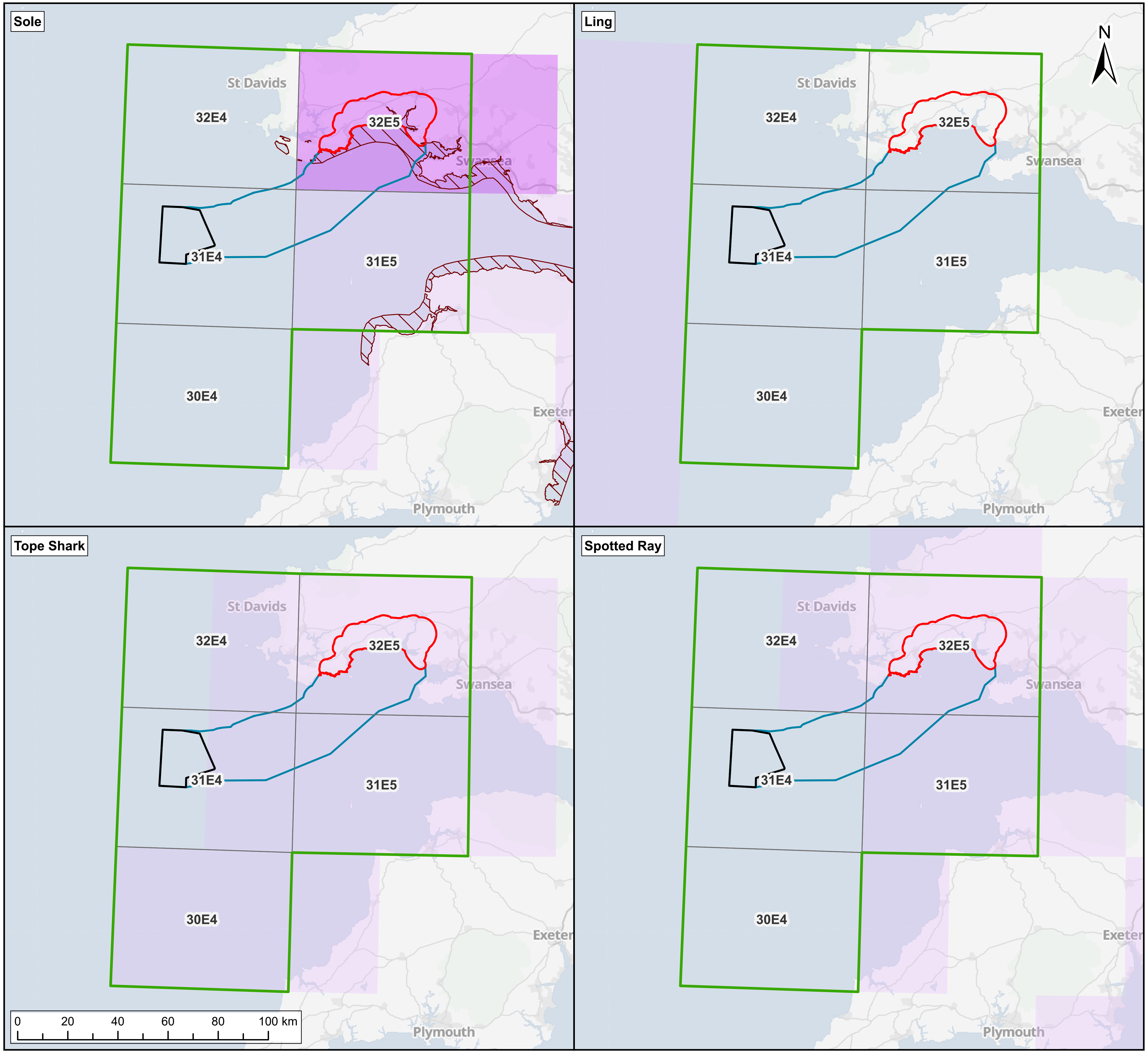

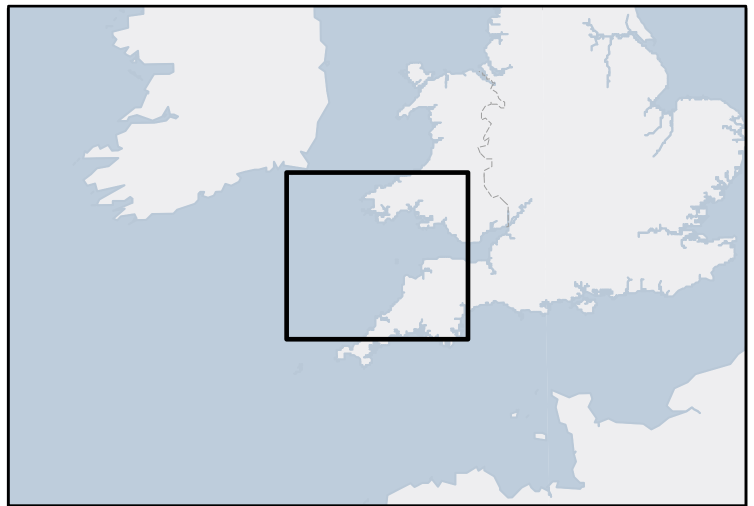

Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Nursery Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

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Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Nursery Grounds Overlapping
the Fish and Shellfish Ecology Study Area

Figure: 2.3.3d	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0078				
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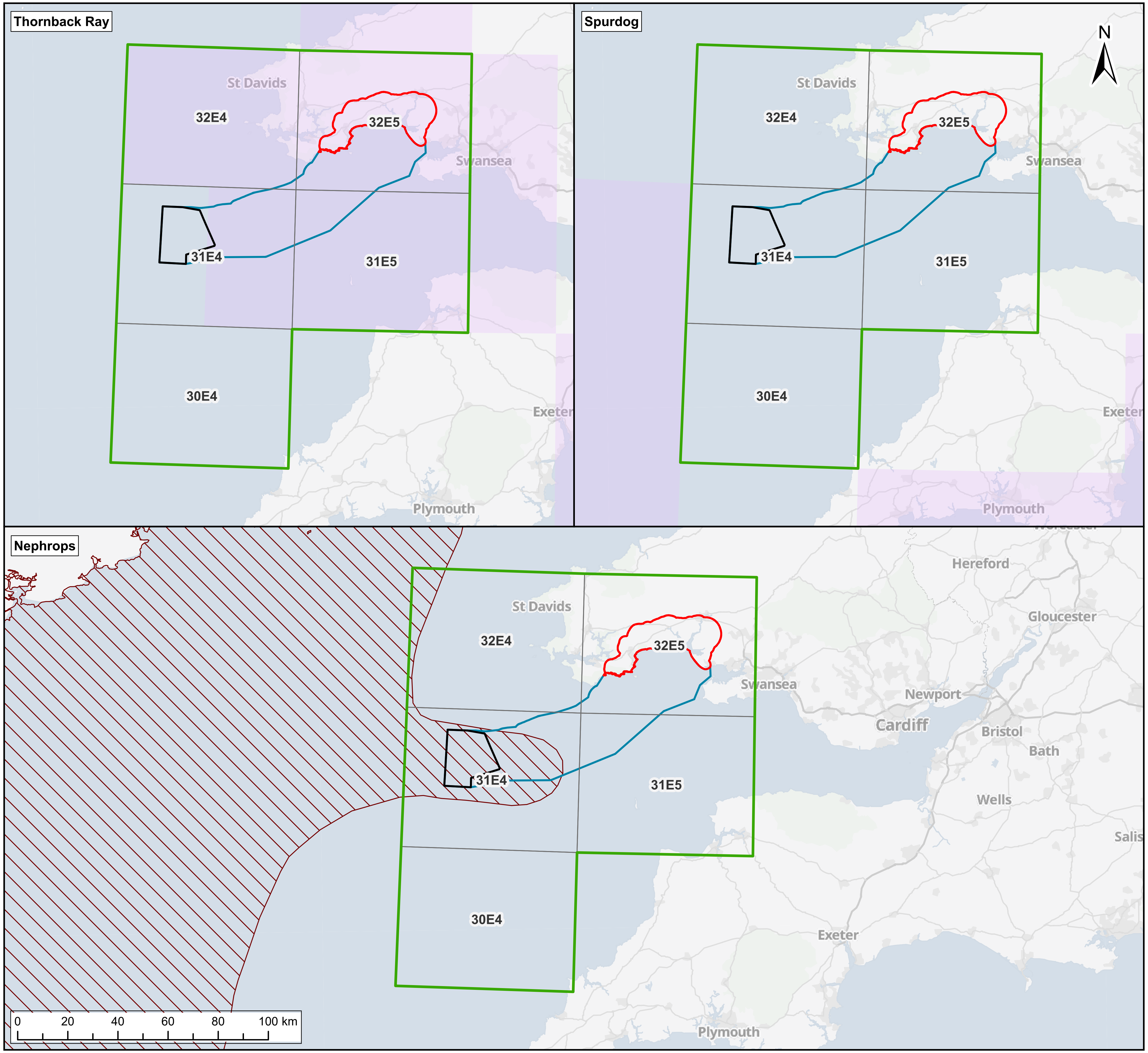

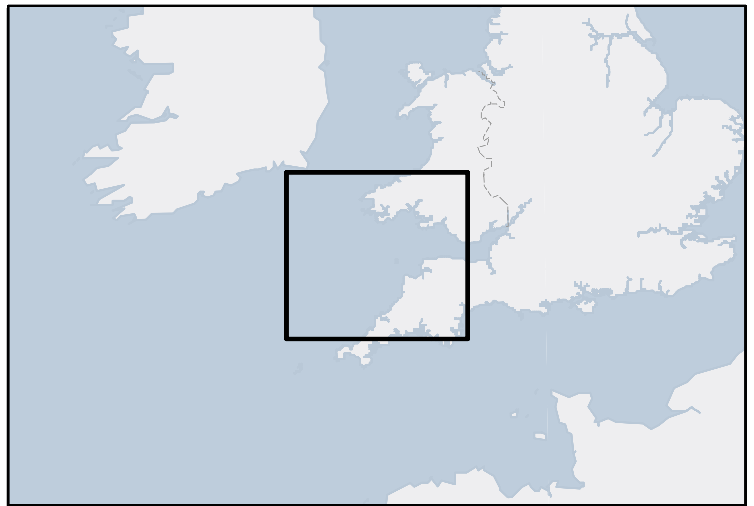

Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Fish and Shellfish Ecology Study Area
- ICES Statistical Rectangles
- Nursery Grounds (Coull et al 1998)

Intensity (Ellis et al 2010)

- High
- Low

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Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Nursery Grounds Overlapping
the Fish and Shellfish Ecology Study Area

Figure: 2.3.3e	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0079				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	24/03/2026	MW	GLD	A3	1:1,500,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

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355. Intertek (2018) identifies that the coastal waters of South Wales support important nursery habitat for European sea bass, with several inshore areas serving as juvenile development zones. In response to historic declines in recruitment and increased fishing pressure, management measures (e.g. seasonal restrictions and juvenile protections) have been implemented by the Welsh Government and, for adjacent English waters, by the MMO. Although the Scoping Boundary is mainly located offshore, European sea bass are present in inshore areas (Cefas, 1999; **Figure 2.3.3b**). Recognising the regional importance of inshore nursery areas for sea bass provides useful ecological context for the Development, particularly in relation to any nearshore / Offshore Export Cable interactions (Intertek, 2018; MMO, 2026).

2.3.2.2 Pelagic Fish

356. Pelagic fish in the Fish and Shellfish Ecology Study Area are typical of the Celtic Sea, including schooling, mid-water species. Key species recorded by ICES trawl surveys include mackerel, horse mackerel, herring, and sprat. Blue whiting and, further south, sardine *Sardina pilchardus* also contribute to the wider assemblage (EMODnet, 2019). These species undertake seasonal feeding and spawning migrations across the Celtic Sea.

357. Long-term datasets such as the ICES International Herring Larvae Surveys (IHLS) and regional trawl surveys show regular use of the wider area by herring, mackerel and blue whiting through different life stages. Pelagic fish are reflected as 1% of the total landings reported for the relevant ICES rectangles. They act as a key prey resource for seabirds, elasmobranchs and marine mammals but are not recorded by landings data within the Fish and Shellfish Ecology Study Area (ICES, 1967 to 2016; MMO, 2026; EMODnet, 2019).

2.3.2.3 Demersal Fish

358. The demersal community is diverse and well-represented in the Celtic Sea, including whiting, boarfish *Capros aper*, haddock *Melanogrammus aeglefinus*, Atlantic cod, European hake, anglerfish, megrim *Lepidorhombus whiffiagonis*, lemon sole, plaice, sole, witch flounder *Glyptocephalus cynoglossus*, ling and John Dory *Zeus faber* (EMODnet, 2019).

359. Spawning and nursery grounds for cod, whiting, plaice, sole, and hake overlap with or occur near the Fish and Shellfish Ecology Study Area (Coull *et al*. 1998; Ellis *et al.* 2012 and **Section 2.3.2.1**). Variability in substrate type across the Celtic Sea underpins the distribution of habitat-dependent species, including sandeels, where suitable sands occur (**Figure 2.3.2b** and **2.3.3c**). Demersal species also contribute substantially to fisheries activity within the Fish and Shellfish Ecology Study Area especially otter trawl targeting rays, sole, bass and other species as outlined in in **Section 2.6 Commercial Fisheries** (Coull *et al.*, 1998; Ellis *et al.*, 2012; MMO, 2026; EMODnet, 2019).

2.3.2.4 Elasmobranch

360. The Celtic Sea supports high elasmobranch diversity. ICES survey data record spurdog, tope shark, starry smoothhound *Mustelus asterias*, small-spotted catshark *Scyliorhinus canicula*, cuckoo ray *Leucoraja naevus*, spotted ray, thornback ray, common stingray *dasyatis Pastinaca*, blonde ray *Raja brachyura* and angelshark *squatina squatina* within or near the Fish and Shellfish Ecology Study Area (SIARC, 2026; EMODnet, 2019).

361. Several ray and shark species use offshore habitats for feeding and migration. Juvenile concentrations / nursery areas for certain species (e.g., spurdog, some rays) are reported in the

wider Celtic Sea. While the detailed spatial pattern of nursery grounds varies between years, these species may occur throughout the Fish and Shellfish Ecology Study Area, contributing to the trophic structure of the region (Ellis *et al*., 2012).

362. Additional regional context notes seasonal observations of basking shark Cetorhinus maximus around western UK coasts during summer (Manx Wildlife Trust, 2024). Oceanic and pelagic visitors are also recorded, including blue shark Prionace glauca, regularly seen off Pembrokeshire and the Celtic Deep, and occasional thresher shark *Alopias vulpinus* and shortfin mako *Isurus oxyrinchus* (Celtic Deep, 2019). Ocean sunfish *Mola mola* are also relatively common in the wider region during warmer months (Manx Wildlife Trust, 2024). Low numbers of ocean sunfish were recorded in the neighbouring Llŷr 1 OWF aerial survey (three in total) (March 2020 to March 2022; Llŷr Floating Wind Ltd, 2024). Increasing occurrences of Atlantic bluefin tuna *Thunnus thynnus*, further illustrate broader ecosystem off Wales (Welsh Government, 2025b). These occurrences inform the wider Celtic Sea context but are not specific to the Array Scoping Boundary.

2.3.2.5 Diadromous Fish

363. The Celtic Sea is a migratory corridor for diadromous species including Atlantic salmon *Salmo salar*, sea trout *Salmo trutta*, European eel *Anguilla anguilla*, twaite shad, allis shad, sea lamprey *Petromyzon marinus* and river lamprey *Lampetra fluviatilis*.

364. These species are typically transient in offshore areas but are ecologically relevant due to the proximity of designated coastal and freshwater SACs in Wales that support their freshwater life-stages (NRW, 2026a) and their migrations passing through the Fish and Shellfish Ecology Study Area as part of broader migrations (NRW, 2026a; Intertek, 2018).

365. Carmarthen Bay and Estuaries SAC lists allis and twaite shad as qualifying Annex II features. Allis shad *Alosa alosa* and twaite shad *Alosa fallax* may occur intermittently in the offshore areas of the Celtic Sea especially in Welsh waters (Intertek, 2018; Welsh Government, 2026). There have been no confirmed recent records of allis shad in the Carmarthen Bay and Estuaries SAC and population numbers are thought to be very low. It is currently classified as Critically Endangered (presumed extinct) in Wales (Wynter *et al*., 2025). Twaite shad migrate through the Carmarthen Bay and Estuaries SAC to reach spawning sites in the River Tywi SAC and are likely to use the inshore coastal waters of Carmarthen Bay for feeding, and the Three Rivers estuary for nursery areas (Wynter *et al*., 2025). Populations from other regions (Rivers Severn, Wye and Usk) are likely to contribute to the Carmarthen Bay population of twaite shad.

366. Lamprey migrations (sea and river) and Atlantic salmon migrations take place in several Welsh SACs including the Wye, Usk and Severn in South Wales (NRW, 2026a).

367. While drivers of decline (e.g., water quality change, barriers to migration) are primarily freshwater / estuarine, inclusion here ensures the EIA baseline reflects regional ecological linkages relevant to Wales and the Celtic Sea (NRW, 2026; Intertek, 2018; DECC, 2016).

2.3.2.6 Shellfish

368. Commercially fished shellfish in the wider Celtic Sea include brown crab *Cancer pagurus*, European lobster *Homarus gammaru*, queen scallop *Aequipecten opercularis*, king scallop Pecten maximus, cuttlefish Sepia officinalis, and squid *Loligo forbesii*, L. vulgaris. Nephrops may occur locally where fine mud is present, although suitable habitat is patchier in the central Celtic Sea (Intertek, 2018; EMODnet, 2019).

369. Shellfish distributions are closely linked to seabed type; hence, habitat type across the Fish and Shellfish Ecology Study Area influences shellfish presence. Landings data indicate regional commercial importance for brown crab, lobster, Nephrops, queen and king scallops and whelk *Buccinum undatum* (MMO, 2026; Intertek, 2018; EMODnet, 2019).

370. In addition, spider crab *Maja brachydactyla* forms an abundant and locally important component of the shellfish community, particularly around Pembrokeshire and the Celtic Deep, where they are regularly caught and targeted seasonally by both static-gear and pot fisheries. Their increasing prevalence in parts of western UK waters provides useful additional context for regional shellfish ecology and commercial activity, even though they are not expected to be a key species within the Array Scoping Boundary.

371. Further details on shellfish are also presented in **Section 2.6 Commercial Fisheries**.

2.3.2.7 Receptors

372. There are several designated marine and coastal sites within 30km of the Fish and Shellfish Ecology Study Area. These demonstrate the ecological connectivity to the Celtic Sea through features such as Annex II migratory fish, reef / sandbank habitats that support fish and shellfish, and predator species reliant on fish prey (Welsh Government, 2026).

373. Further afield, sites such as North Anglesey Marine SAC (harbour porpoise *Phocoena Phocoena*) and Y Fenai a Bae Conwy / Menai Strait and Conwy Bay (sandbanks) add to the regional context for prey and habitats potentially linked to pelagic / demersal fish use of the Celtic Sea.

374. The following designated sites contain receptors that may be sensitive to changes in Fish and Shellfish Ecology and are therefore included in **Table 2.3.2**.

Table 2.3.2 Relevant Receptors for the Fish and Shellfish Ecology Assessment

RECEPTOR	CLOSEST DISTANCE TO THE ARRAY SCOPING BOUNDARY (KM)	CLOSEST DISTANCE TO THE OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Afonydd Cleddau SAC (Rivers Cleddau SAC)	58	9
Bristol Channel Approaches SAC (Dynesfeydd Môr Hafren SAC)	12	0
Carmarthen Bay and Estuaries SAC	62	0
Limestone Coast of South West Wales SAC	41	0
Pembrokeshire Marine SAC	24	0.2
West Wales Marine SAC (Gorllewin Cymru Forol SAC)	14	0

RECEPTOR	CLOSEST DISTANCE TO THE ARRAY SCOPING BOUNDARY (KM)	CLOSEST DISTANCE TO THE OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Burry Inlet Ramsar	89	0
Lundy MCZ	53	17
North-West of Lundy MCZ	32	0
Skomer MCZ	38	25

2.3.3 Data Sources

375. **Table 2.3.3** outlines existing primary data that have been used to inform this section and would also be used to inform the EIA.

Table 2.3.3 Data Sources to Inform the Fish and Shellfish Ecology Assessment

DATASET	YEARS	DESCRIPTION
EMODnet (2022) EMODnet Biology and EUSeaMap broad-scale seabed habitat datasets	2022	Provides broad-scale species distribution data, biological records, and sensitivity information for marine species and habitats across European waters, including the Celtic Sea. Used to provide regional ecological context.
Welsh Government (datamapwales) (2026)	2026	Provides information on designated sites in Wales.
Mapping spawning and nursery areas of species to be considered in Marine Protected Areas (MCZs) (Ellis, 2010)	2010	Provides information on fish spawning and nursery grounds.
Spawning and nursery grounds of selected fish species in UK waters. Scientific Series Technical Report (Ellis *et al*., 2012)	2012	
Bass Nursery Areas Maps (Cefas, 1999)	1999	Provides information on nursery areas and early-life habitat use for European sea bass, supporting understanding of juvenile distribution patterns in UK and adjacent waters, including the Celtic Sea.
Fisheries Sensitivity Maps in British Waters (Coull *et al.*, 1998)	1998	Used to provide information on likely spawning or nursery areas for commercial species.

DATASET	YEARS	DESCRIPTION
Popper *et al*. (2014) Sound Exposure Guidelines for Fishes and Sea Turtles	2014	Provides internationally recognised criteria for assessing potential impacts of underwater noise on fish and shellfish receptors, used to classify hearing groups and impact thresholds.
Awel y Môr ES and associated technical supporting documents (Awel y Môr OWF Ltd., 2022)	2022	Provides relevant methodological comparators and regional marine ecology context for Welsh offshore wind projects.
Erebus OWF ES and associated technical supporting documents (Blue Gem Wind, 2022)	2022	Provides a directly comparable assessment framework for floating offshore wind in Welsh waters.
Llŷr FLOW Project (Llŷr Floating Wind Ltd., 2024)	2024	Provides a directly comparable assessment framework for floating offshore wind in Welsh waters.
MarramWind OWF (MarramWind Limited, 2026)	2026	Provides a directly comparable assessment framework for floating offshore wind in UK waters.
UK Atlas of Seabed Habitats (2025) (JNCC, 2025a)	2025	Predictive broad-scale seabed habitat map for UK waters, used to determine seabed types and interpret habitat-dependent species distributions.
ICES IHLS (2024)	2024	Long-term ICES programme providing quantitative estimates of herring larval abundance across the North Sea and adjacent waters, used to understand regional spawning dynamics.
Marine Environmental Data and Information Network (MEDIN) (2025)	2025	National marine data portal providing standardised access to, curated datasets across UK waters, including bathymetry, seabed substrates, historic survey records and marine environmental datasets supporting baseline characterisation and habitat species distribution interpretation.
Manx Wildlife Trust	2024	Information on fish species of conservation interest and general marine biodiversity in Manx waters, used to provide contextual information on species presence and conservation status.
ICES International Bottom Trawl Survey (IBTS) (2019)	2019	Fishery-independent multispecies trawl surveys providing species abundance, distribution and demographic data for demersal and pelagic fish.

DATASET	YEARS	DESCRIPTION
MMO Landings Data (2026)	2026	MMO datasets of landings (weight and value) by ICES rectangle, used to identify commercially targeted species relevant to the Study Area.

376. In addition to the data in **Table 2.3.3, Table 2.3.4** describes the surveys that will be undertaken to support the assessment. Survey methodologies will be agreed in advance with stakeholders where possible.

377. These site-specific datasets will complement existing data sources and provide a refined understanding of habitat characteristics and potential ecological sensitivities within the Fish and Shellfish Ecology Study Area. Grab samples will support interpretation of substrate-dependent species distributions (e.g., sandeel habitat suitability), whilst underwater noise modelling will define the spatial extent of potential behavioural or physiological effects on fish and shellfish receptors. eDNA sampling will offer an additional tool for confirming species presence within the Fish and Shellfish Ecology Study Area.

Table 2.3.4 Site-specific Survey Data

DATASET	DATASET DESCRIPTION	SURVEY YEAR / TIMINGS	SPATIAL COVERAGE
The Crown Estate Surveys for Round 5	eDNA	2025	Array Scoping Boundary
Site specific benthic survey	Benthic (drop-down camera, grab sampling (macrobenthic, PSD, contaminants)	September 2025	Array Scoping Boundary
Gwynt Glas surveys	Benthic (drop-down camera, grab sampling (macrobenthic, PSD, contaminants)	To be completed in 2027	Offshore Export Cable Scoping Boundary

2.3.4 Approach to Impact Assessment

378. The impact assessment methodology would be based on a S-P-R model that is described in **Section 1.8 EIA Methodology**, adapted to make it applicable to the assessment of Fish and Shellfish Ecology features, and aligned with the key guidance document produced on impact assessment of Fish and Shellfish Ecology receptors (CIEEM, 2024).

379. A key source of information would be fisheries landings data; these provide both large spatial coverage and effort. These datasets would be complimented with existing site-specific data available from other projects in surrounding areas for example White Cross and Blue Gem Wind (listed in **Table 2.3.3**).

380. In addition, the impact assessment for Fish and Shellfish Ecology would draw on noise data from underwater noise modelling. The assessment would follow recognised best-practice guidance, including Popper *et al*. (2014) which provide criteria for assessing potential behavioural and injury

thresholds for fish and shellfish species. These frameworks are widely used in UK offshore wind assessments and are supported by NRW as appropriate tools for evaluating noise risks to marine fauna.

381. Where relevant, the assessment would also consider approaches previously applied in Welsh waters and the Celtic Sea for offshore renewable developments, ensuring consistency with expectations under the WNMP and NRW marine licensing requirements and advice available on NRW's website (NRW, no date (c)).

382. The assessment would be informed by data from the site-specific benthic surveys (detailed in **Table 2.3.4**), recognising the strong relationship between substrate type, sound propagation and the distribution of sensitive species (e.g. sandeel habitat). Where available, evidence from regional ICES survey data and MMO landings information for the Fish and Shellfish Ecology Study Area would be integrated to understand how underwater noise may interact with fisheries activity and fish distribution patterns in the Celtic Sea.

2.3.5 Potential Impacts

383. A range of potential impacts on Fish and Shellfish Ecology have been identified which may occur during the construction, O&M, and decommissioning stages of the Development, which are presented below.

2.3.5.1 Potential impacts during the construction stage

2.3.5.1.1 Temporary habitat loss and physical disturbance

384. Construction activities have the potential to cause temporary habitat loss and physical disturbance to the seabed. Disturbance may occur during installation of innovative deepwater solutions, Inter-Array Cables, Offshore Export Cables, anchors and mooring systems. It may also arise from seabed preparation activities, including PLGRs, sand-wave clearance or other localised preparatory works. These activities can temporarily displace fish and shellfish species and may disrupt Benthic Habitats used for feeding, spawning or juvenile development. Any effects are expected to be temporary and highly localised, occurring at the scale of the immediate construction footprint in the context of the wider Celtic Sea. However, the extent of disturbance would depend on the installation methods, sediment type and the spatial footprint of the works. Therefore, temporary habitat loss and physical disturbance are **scoped in** to the EIA.

2.3.5.1.2 Increased SSCs and Sediment Re-Deposition

385. During construction activities, temporary increases in SSCs and localised sediment deposition may occur. Elevated SSCs have the potential to interfere with key biological functions such as respiration, filter-feeding and reproduction, and may temporarily disrupt migration or spawning behaviour (Kjelland *et al.*, 2015). Sediment deposition, particularly where it alters the existing seabed characteristics, may also affect the quality of spawning and nursery habitats for sensitive fish and shellfish species. Therefore, increased SSCs and sediment re-deposition are **scoped in** to the EIA.

2.3.5.1.3 Remobilisation of Existing Contaminated Sediments (if present)

386. Potential impacts associated with the resuspension of contaminated sediments are currently **scoped in** for assessment (see **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**). Should the results of the Development's benthic sampling indicate that contamination levels are low or negligible, the Applicant would seek agreement through stakeholder engagement to scope this impact out of further assessment at the pre-application consultation stage/ ES stage. Therefore, remobilisation of contaminated sediments is **scoped in** to the EIA. However, should baseline sampling confirm the absence of contaminants within surface sediments, this impact pathway would be scoped out of the EIA.

2.3.5.1.4 Underwater Noise and Vibration

387. Underwater noise generated by pile driving and other construction activities including UXO clearance may result in physical injury or mortality, disturbance and displacement of fish species and have the potential to affect spawning behaviour, nursery areas and migration patterns. Therefore, underwater noise and vibration is **scoped in** to the EIA.

2.3.5.1.5 Barrier Effects

388. Acoustic barrier effects (noting the potential presence of migratory species as outlined in **Section 2.3.2.5**) may also arise as a result of underwater noise during construction and would be included as part of the underwater noise assessment. Therefore, barrier effects are considered to be **scoped in** to the EIA.

2.3.5.1.6 Changes in Fishing Activity

389. The construction of the Development could result in changes to fishing activity in the Fish and Shellfish Ecology Study Area but also in the wider area due to displacement of fishing activity into other areas. This could in turn affect commercially targeted fish stocks. Therefore, changes in fishing activity are **scoped in** to the EIA.

2.3.5.2 Potential Impacts During the O&M Stage

390. During the O&M stage, potential impacts on Fish and Shellfish Ecology would primarily arise from the permanent loss or alteration of seabed habitat caused by the physical presence of infrastructure, including anchors, mooring systems and any areas of cable protection. Routine and non-routine maintenance activities may also result in localised disturbance to seabed habitats; however, these effects are expected to be of a lower magnitude than those occurring during construction.

2.3.5.2.1 Temporary Habitat Loss and Physical Disturbance

391. During the O&M stage, physical disturbance and temporary habitat loss may occur as a result of vessel movements, routine and non-routine inspection activities and interactions between mooring lines and the seabed. In particular, the swept area of catenary mooring lines can disturb surface sediments through continual low-level movement, with disturbance intensity increasing during more energetic sea states, resulting in localised abrasion, sediment mobilisation and repeated disturbance of Benthic Habitats. Localised seabed disturbance associated with Inter-Array Cables and Offshore Export Cable maintenance or repair may also temporarily disturb the

seabed. Although such effects are typically smaller in scale and frequency compared to construction activities, they can still cause short-term habitat alteration or displacement of fish receptors within the immediate footprint of maintenance works. Therefore, temporary habitat loss and physical disturbance are **scoped in** to the EIA.

2.3.5.2.2 Permanent Habitat Loss

392. Permanent loss or alteration of seabed habitat would be limited to the footprint of infrastructure placed on the seabed. These structures create a relatively small area of seabed take when compared with the wider Celtic Sea environment. The level of effect would vary with the type of habitat affected, its distribution within the surrounding area, and the extent to which particular species rely on that habitat. For Scoping purposes, a realistic worst-case assumption is that these areas represent long-term habitat loss, recognising that the operational lifetime of the Development (up to 40 years) spans multiple generations of most fish and shellfish species. Therefore, permanent habitat loss is **scoped in** to the EIA.

2.3.5.2.3 Increased SSCs

393. During the O&M stage, limited increases in SSCs may occur because of routine inspection and maintenance activities. Disturbance may arise from vessel manoeuvring, remotely operated vehicle operations, or localised interaction between mooring lines and the seabed. Any resulting sediment plumes are expected to be highly localised and of short duration, and substantially lower in magnitude than those generated during construction. Temporary increases in suspended sediments have the potential to affect feeding, respiration or behaviour in sensitive fish and shellfish species. Therefore, increased SSCs is **scoped in** to the EIA.

2.3.5.2.4 Remobilisation of Contaminated Sediments

394. During the O&M stage, small-scale seabed disturbance may occur as a result of routine and non-routine inspections, maintenance vessel anchoring (if required), or interactions between mooring lines and the seabed. Such activities could remobilise small amounts of sediment, including any contaminants (if present) in surface layers. The magnitude of any remobilisation would be considerably lower than during construction and would depend on baseline sediment quality, which would be characterised through site-specific grab sampling as outlined in **Table 2.3.4**. Therefore, remobilisation of contaminated sediments is **scoped in** to the EIA. However, should baseline sampling confirm the absence of contaminants within surface sediments, this impact pathway would be scoped out of the EIA.

2.3.5.2.5 Underwater Noise and Vibration

395. Operational underwater noise would arise from the ongoing functioning of wind turbines, mooring line movement (if the Development uses FSSs), and routine vessel activity associated with O&M activities. These sound sources are typically ongoing and low-intensity, resulting in potential behavioural responses in nearby pelagic, demersal and elasmobranch species, but are not expected to generate injury-level noise. Any impulsive noise sources, such as UXO clearance or other maintenance-enabling works, would be assessed separately under construction-stage impacts, where injury-level effects may be relevant. Therefore, operational noise is **scoped in** for behavioural disturbance only, with injury or mortality effects **scoped out** of further assessment within the EIA.

2.3.5.2.6 Barrier Effects

396. During the O&M stage, the presence of FSSs and/or innovative deepwater solutions, mooring lines and maintenance vessel activity may result in localised behavioural changes in fish movement or habitat use. The Array may act as a behavioural barrier for some species, leading to minor route deviation, localised avoidance, or changes in how fish and shellfish utilise habitat within or adjacent to the Fish and Shellfish Ecology Study Area. These effects are expected to be limited to the immediate Fish and Shellfish Ecology Study Area and are consistent with assessments for other offshore wind farms (Blue Gem Wind, 2022; White Cross, 2023a and Llŷr 1 & Llŷr 2, 2024). Therefore, barrier effects are **scoped in** to the EIA.

2.3.5.2.7 Introduction of Hard Substrate

397. During the O&M stage, areas of hard substrate would remain on the seabed associated with the presence of offshore infrastructure required along the inter-Array Cables and Offshore Export Cables. These structures represent long-term additions of hard material in what is predominantly a soft-sediment environment. Over time, these features may be colonised by epifaunal communities, potentially altering local Benthic Habitat composition and influencing the distribution of fish and shellfish species that are associated with substrate types. Such effects are expected to remain highly localised to the immediate footprint of the installed infrastructure and are not anticipated to extend beyond the Array Scoping Boundary or Offshore Export Cable Scoping Boundary footprint. Therefore, introduction of hard substrate is **scoped in** to the EIA.

2.3.5.2.8 Changes in Fishing Activity

398. Operation and maintenance stage activities may influence fishing activity both within the Fish and Shellfish Ecology Study Area and in surrounding waters, primarily through changes to access or navigational patterns. Any displacement of fishing effort away from the Fish and Shellfish Ecology Study Area could alter local fishing distribution and, indirectly, the spatial patterns of capture for commercially targeted fish and shellfish species. Therefore, changes in fishing activity are **scoped in** to the EIA.

2.3.5.2.9 Heat Impacts from Cables

399. Operational inter-array and Offshore Export Cables, including dynamic cable sections within the water column, generate minor resistive heat during electricity transmission. The magnitude and spatial extent of any seabed heating is dependent on cable specification, load, burial depth, and the thermal conductivity of surrounding sediments (Emeana *et al*., 2016). Evidence from modelling and post-consent monitoring at UK offshore wind projects (including Blue Gem Wind, 2022; White Cross, 2023a and Llŷr 1 & Llŷr 2, 2024) demonstrates that temperature increases at the cable sediment interface are small (typically up to a few degrees Celsius), highly localised, and attenuate to background levels within metres of the cable. For dynamic cable sections, predicted water-column temperature changes are extremely small and rapidly dissipated by ambient currents and vertical mixing, remaining within natural background thermal variability. No measurable behavioural or ecological effects on demersal fish or benthic-dwelling shellfish species have been identified.

400. Heat loss represents an inherent inefficiency in subsea power transmission and is minimised through embedded design measures, including conductor sizing, armouring, cable burial depth and optimisation of transmission efficiency. Thermal emissions from buried subsea cables are

highly localised and dissipate rapidly into surrounding sediments and the overlying water column. This behaviour is consistent with OSPAR's assessment (2009), which identifies thermal radiation from submarine power cables as a spatially limited, low-magnitude effect with very limited ecological relevance for benthic and pelagic receptors. Given the very small magnitude of predicted temperature elevations, rapid dissipation, and consistent findings of non-significant effects in comparable offshore EIAs, operational heat effects are considered negligible for fish and shellfish receptors and would only affect a negligible proportion of available habitat relative to the wide distribution of these receptors within the Celtic Sea. There is no credible pathway for population-level consequences, as such heat impacts from cables is therefore **scoped out** of further assessment within the EIA.

2.3.5.2.10 EMF Impacts from Cables

401. EMF generated by operational subsea cables are **scoped in** to the EIA, consistent with approaches adopted for other Welsh offshore wind projects (e.g. Awel y Môr Offshore Wind Limited, 2022 Mona Offshore Wind Limited, 2024; Blue Gem Wind, 2022). EMF has the potential to elicit behavioural responses in certain electro-sensitive receptors, including elasmobranchs (e.g. rays and dogfish) and crustaceans such as brown crab, for which regulatory consultees (e.g. NRW and MMO) have highlighted ongoing uncertainty. EMF effects associated with inter-array and export cables, whether buried or protected, are therefore considered within the assessment. Ongoing research programmes, including the FLOWERs project led collaboratively by Plymouth University and The Crown Estate (The Crown Estate, 2025), would be utilised to improve understanding of how EMF from cables from the Development may influence fish and shellfish receptors. Thermal emissions associated with cable loading are addressed separately above and would be incorporated where relevant to benthic or demersal species.

2.3.5.2.11 Potential Impacts During the Decommissioning Stage

402. It is anticipated that the decommissioning impacts would be similar in nature to those of construction outlined in **Section 2.3.5.1**, although the magnitude of effect is likely to be lower. Therefore, the same impacts have been scoped in / out of the EIA for the decommissioning stage as for construction.

2.3.5.3 Potential Inter-relationship Impacts

403. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.3.5.4 Potential Cumulative Impacts

404. There is potential for cumulative impacts on Fish and Shellfish Ecology to arise from other activities occurring within the wider Celtic Sea region. The methodology for assessing potential cumulative effects is provided in **Section 1.8 EIA Methodology**.

405. For the Development, relevant offshore wind projects and other marine activities (including, where applicable, subsea cabling) would be identified through a cumulative effects screening exercise. The impacts assessed cumulatively would align with those considered for the

Development-alone assessment; however, some impact pathways may be screened out where effects are highly localised to the Fish and Shellfish Ecology Study Area or where existing management and mitigation measures across projects minimise the likelihood of cumulative interactions.

406. The cumulative assessment for Fish and Shellfish Ecology would specifically consider key pathways such as cumulative underwater noise, the combined extent of habitat loss or temporary disturbance to seabed habitats, and any wider regional pressures that could interact with the Development. Therefore, cumulative impacts on Fish and Shellfish Ecology are proposed to be **scoped in** to the EIA.

2.3.5.5 Potential Transboundary Impacts

407. The distribution of marine Fish and Shellfish species is independent of national administrative boundaries. As such, the EIA would consider the distribution of fish stocks and populations across the wider area, including adjacent areas of English and Irish waters where relevant to species movements or ecological functioning. Although certain spawning, nursery or migratory pathways may extend across the Wales-England and / or Wales-Ireland marine boundary, these represent natural ecological connections rather than discrete transboundary effects.

408. Given that the Array Scoping Boundary does not overlap with any designated fish features and does not generate transboundary impact pathways, a standalone transboundary assessment for the array is not considered necessary. However, the Offshore Export Cable Scoping Boundary does intersect with SACs designated for migratory fish species, and these interactions would be fully assessed in the relevant ecological sections rather than through a separate transboundary assessment. This approach is consistent with several previous UK offshore wind EIA where mobile marine species use waters of multiple jurisdictions but do not trigger transboundary impact pathways under EIA regulations.

2.3.5.6 Summary of Potential Impacts

409. **Table 2.3.5** outlines the impacts which are proposed to be **scoped in** to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.3.5 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Fish and Shellfish Ecology Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Temporary habitat loss and physical disturbance	✓	✓	✓
Permanent habitat loss	x	✓	x
Increased SSCs	✓	✓	✓
Remobilisation of contaminated sediments	✓	✓	✓

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Underwater noise and vibration	✓	✓[10]	✓
Barrier effects	✓	✓	✓
Introduction of hard substrate	x	✓	x
Changes in fishing activity	✓	✓	✓
Heat impacts from cables	x	x	x
EMF impacts from cables	x	✓	x
Inter-relationship impacts	✓	✓	✓
Cumulative impacts	✓	✓	✓
Transboundary impacts	x	x	x

2.3.6 Potential Mitigation Measures

410. Embedded mitigation measures relating to Fish and Shellfish Ecology are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

411. Requirements for any additional mitigation measures would be determined through the EIA.

412. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All the proposed mitigation measures would comply with regulatory requirements and good practice.

10 For behavioural disturbances only.

2.4 Marine Mammals and Marine Turtles

413. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Marine Mammals and Marine Turtles.

414. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Marine Mammals and Marine Turtles in the Development's ES.

415. The Marine Mammals and Marine Turtles assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

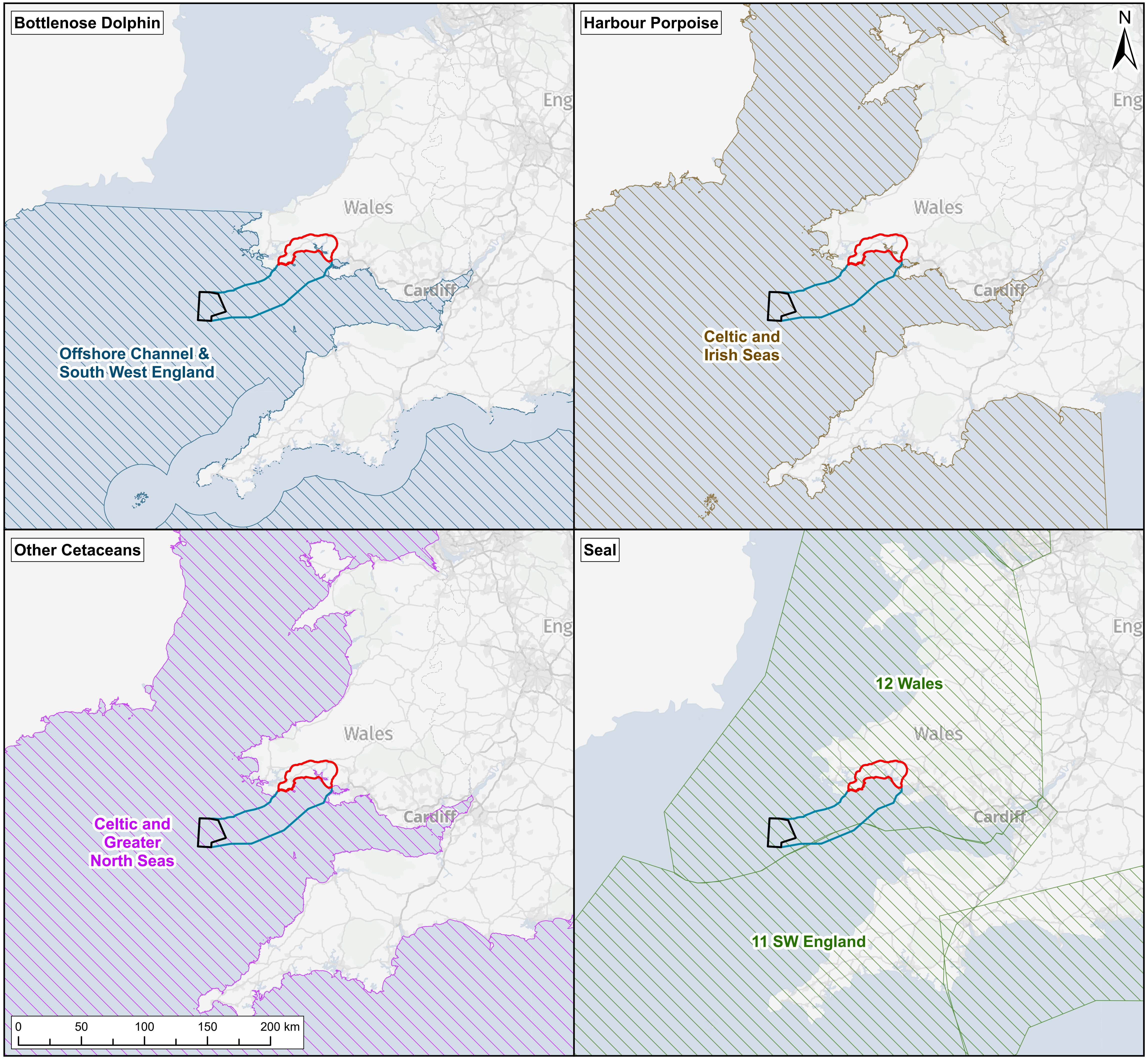
- **Section 1.5 Development Description;**
- **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**;
- **Section 2.2 Benthic Habitat**;
- **Section 2.3 Fish and Shellfish Ecology**;
- **Section 2.6 Commercial Fisheries**; and
- **Section 2.7 Shipping and Navigation**.

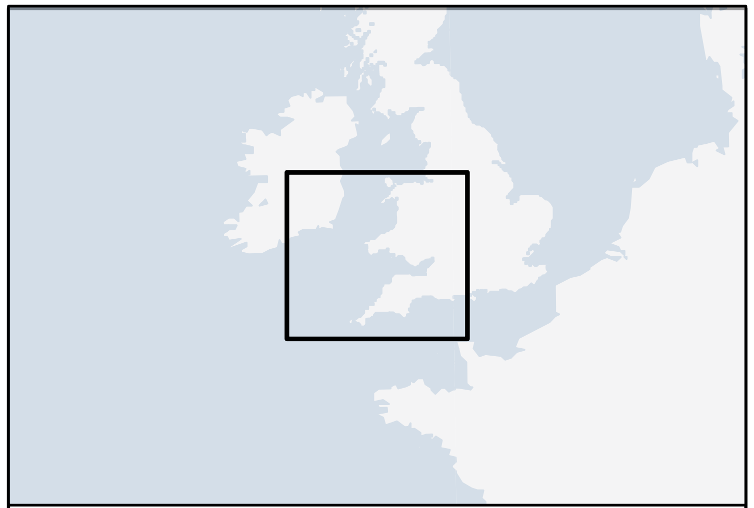
The following questions are posed to consultees to help them frame and focus their response to the Marine Mammal and Marine Turtles scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Marine Mammals and Marine Turtles Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?
- Do you agree with the proposed approach to assessment?

2.4.1 Study Area

416. The Marine Mammal and Marine Turtle Study Area is based on the wider Celtic and Irish Seas (CIS) to consider the wide ranges and movements of marine mammals and relevant Management Units (MU) (**Figure 2.4.1**).





Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Bottlenose Dolphin Management Units
- Harbour Porpoise Management Units
- Other Cetacean Management Units
- Seal Monitoring Units

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Marine Mammals and Marine Turtles Study Area

Figure: 2.4.1	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0089				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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2.4.2 Baseline Environment

417. An initial assessment of the distribution of marine mammals throughout the CIS have identified seven marine mammal species that could occur within or near to the Development and wider area (site-specific survey data (**Section 2.4.2.1**) Gilles *et al*., 2023; Carter *et al*., 2025; Hammond *et al*., 2021; Paxton *et al*., 2016; Evans and Waggitt, 2023, Waggitt *et al*., 2019; DECC (now DESNZ) 2022; Special Committee on Seals (SCOS), 2025; 24). These species and relevant MUs (Inter-Agency Marine Mammal Working Group (IAMMWG), 2023; SCOS, 2025), include:

- Harbour porpoise *Phocoena Phocoena* (CIS MU);
- Bottlenose dolphin *Tursiops truncatus* (Offshore Channel and South-West England MU);
- Risso's dolphin *Grampus griseus* (Celtic and Greater North Seas (CGNS) MU);
- Common dolphin *Delphinus delphis* (CGNS MU);
- Minke whale *Balaenoptera acutorostrata* (CGNS MU);
- Fin whale *Balaenoptera physalus*; and
- Grey seal *Halichoerus grypus* (Wales and South-West England SMUs).

418. Other marine mammal species that have been recorded in the Celtic and Irish Sea in lower numbers include white-beaked dolphin *Lagenorhynchus albirostris* and humpback whale *Megaptera novaengliae*.

419. A full assessment of the baseline environment would be undertaken through the EIA process, and would inform, alongside the results of the site-specific aerial and boat-based surveys, the species to be included in the EIA. However, it is expected that the seven species listed above at least would be taken forward for assessment, based on the information and data currently available. It is likely that there would be insufficient data on fin whales to undertake a full quantitative assessment, and therefore a qualitative assessment would be undertaken wherever relevant.

420. Other neighbouring offshore wind farms to the Development have also undertaken aerial site-specific surveys. White Cross, Llŷr 1, and Erebus OWF surveys indicated harbour porpoise, common dolphin, minke whale and grey seal (White Cross, 2023b, Llŷr Floating Wind Ltd, 2024; Blue Gem Wind Ltd, 2021). Erebus also recorded low numbers of bottlenose and Risso's dolphin.

421. The Small Cetaceans in European Atlantic Waters and the North Sea (SCANS) IV survey (Gilles *et al*., 2023) is a large-scale survey (the fourth in a series of surveys) focusing on the presence and abundance of cetacean species in European Atlantic waters, most recently undertaken in the summer of 2022 (survey block CS-C overlaps with the Development). These survey results indicate common dolphin to be the most abundant species. Other species present in CS-C include harbour porpoise, bottlenose dolphin, Risso's dolphin, minke whale and fin whale.

422. The Joint Cetacean Protocol (JCP) Phase III report (Paxton *et al*., 2016) shows similar results, with only relatively high densities of common dolphin and harbour porpoise in the Offshore Scoping Boundary, and lower densities of minke whale, bottlenose dolphin, and Risso's dolphin.

423. Distribution maps of cetacean species in Wales (Evans and Waggitt, 2023) and the north-east Atlantic (Waggitt *et al*., 2019) also indicate that harbour porpoise and common dolphin would be the most likely species to be present in the Offshore Scoping Boundary. Minke whale and Risso's

dolphin are also observed in the Array Scoping Boundary. Bottlenose dolphin may also be present in the wider area but in lower numbers.

424. This is further supported by DECC (now DESNZ) (2016), which states that the Celtic Sea has particularly large numbers of common dolphins present. It also states, in the Irish Sea, five species are commonly encountered including harbour porpoise, bottlenose dolphin, short-beaked common dolphin, Risso's dolphin and minke whale.

425. Grey seals have a number of haul-out sites in the Celtic Sea around Pembrokeshire and further up the coast within Cardigan Bay (SCOS, 2024). There are known breeding colonies of grey seal in Wales and south-west England (SCOS, 2025). For grey seal, densities in the Offshore Scoping Boundary are relatively low, with areas of increased densities towards the Pembrokeshire coast, in the Offshore Export Cable Scoping Boundary (Carter *et al*., 2022).

426. There are few harbour seal reported in the CIS, except along the coast of Northern Ireland, with no breeding sites known along the Welsh coast (DECC, 2016; SCOS, 2024). Distribution estimate data also indicates harbour seal densities are very low across the CIS region and the Offshore Scoping Boundary (Carter *et al*., 2022). The latest harbour seal total population estimate is less than five in Wales; therefore, harbour seal has been screened out (SCOS, 2025). Another recent Welsh OWF project that also screened out harbour seal is Awel y Môr (RWE Renewables, 2023).

427. Of the seven marine turtle species in the world, five have been recorded as rare vagrant species in UK waters. Of these, only one is regularly reported in the Marine Mammal and Marine Turtle Study Area; the leatherback turtle *Dermochelys coriacea*. Leatherback turtles are known to use the Irish Sea with sightings recorded off Anglesey and the Isle of Man (TURTLE database). DECC (now DESNZ) (2016), also state a large proportion of UK's leatherback turtle sightings occur in the western English Channel, and Celtic Sea region. Leatherback turtles are protected under Annex IV of Habitats Directive. Once further assessment of the presence of turtles in the Marine Mammals and Marine Turtles Study Area has been undertaken, it can be determined whether they can be scoped out of the assessment, however, no marine turtles have been observed in the site-specific survey data currently available (**Section 2.4.2.1**), and therefore they are likely to be scoped out of further assessment.

2.4.2.1 Site-specific Survey Information

428. Aerial surveys commenced in September 2023 until August 2025. The surveys were conducted monthly, with 24 months of data collected for the site. The surveys were undertaken over the whole Round 5 Celtic Sea PDAs. At time of writing, the first year of data was available (September 2023 to August 2024). The aerial surveys recorded 1,972 common dolphin, 43 harbour porpoise, 10 grey seal, eight fin whale and three minke whale. 19 unidentified seals, 16 unidentified dolphins, eight unidentified cetaceans and four unidentified seals or small cetaceans were also recorded. No marine turtles were observed.

429. During geophysical and geotechnical surveys over the whole Round 5 Celtic Sea PDAs from August to September 2023 and May to August 2024, marine mammal observations were undertaken. These observations (both visual and acoustic) resulted in 814 marine mammal detections over the period. Consistent with the aerial surveys, the majority of these were common dolphin, with 494 common dolphin, 271 unidentified dolphins, 27 fin whales, seven minke whale, five grey seal, four unidentified baleen whales, three unidentified marine mammals, two bottlenose dolphins and one harbour porpoise. No marine turtles were observed.

2.4.2.2 Designated Sites

430. The Offshore Scoping Boundary overlaps with the Bristol Channel Approaches SAC, and the West Wales Marine SAC; both of which are designated sites for harbour porpoise. Connectivity between the Development and all SACs with harbour porpoise as a qualifying feature in the CIS MU has been considered in the **Gwynt Glas OWF Habitat Regulations Assessment (HRA) Screening Report**, submitted alongside this Scoping Report.

431. For grey seal, tagging studies and information on species' movements would be reviewed to determine the potential for connectivity between the Development and all SACs with grey seal as a qualifying feature in the CIS area in the HRA screening. Grey seal is a primary reason for the selection of the Pembrokeshire Marine SAC (JNCC, 2015) the closest designated site for this species, which overlaps the Offshore Export Cable Scoping Boundary. Grey seal is also a qualifying feature for the Lundy SAC, 20km at its closest point to the Offshore Export Cable Scoping Boundary.

2.4.3 Data Sources

432. **Table 2.4.1** outlines existing primary data that have been used to inform this section and would also be used to inform the EIA.

Table 2.4.1 Data Sources to Inform the Marine Mammal Assessment

DATASET	SPATIAL COVERAGE	SURVEY YEAR / TIMINGS
Distribution maps of cetacean and seabird populations in Wales and surrounding waters (Evans and Waggitt, 2023)	Wales and surrounding waters	Various
Distribution maps of cetacean and seabird populations in the North-East Atlantic (Waggitt *et al.*, 2019)	North-East Atlantic (including the North Sea)	Various
UK seal at sea density estimates and usage maps (Carter *et al.*, 2022)	North-East Atlantic (including the North Sea)	Various
Transboundary seal distribution estimates (Carter *et al.*, 2025	North-west European Shelf	Various
SCANS-IV: Estimates of cetacean abundance (Gilles *et al.*, 2023	European Atlantic waters	Summer 2022
Review MU boundaries for cetaceans in UK waters (IAMMWG, 2023)	UK waters	Various

433. In addition to the data and information presented above in **Table 2.4.1, Table 2.4.2** describes the surveys that have been undertaken to date, and those that would be undertaken in 2027 by the Applicant to support the assessment. Survey methodologies would be agreed in advance with stakeholders where possible.

Table 2.4.2 Site-specific Survey Data

DATA SET	DESCRIPTION	SPATIAL COVERAGE	SURVEY TIMINGS
The Crown Estate Surveys for Round 5	Aerial surveys	PDA 1-3	September 2023 – August 2025
	Passive Acoustic Monitoring (PAM)	PDA 1	May 2024 – May 2025
	Boat-based surveys	PDA 1-3	August to September 2023 and May to August 2024

434. Other data and information available to inform the EIA includes:

- Aerial Surveys of Cetaceans and Seabirds in Irish waters: Occurrence, distribution and abundance in 2021 – 2023 (Giralt Paradellet *et al.*, 2024);
- Aerial thermal-imaging survey of seals in Ireland in August 2024 (Morris *et al.*, 2025);
- SCANS-III: Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys (Hammond *et al*. 2021);
- Welsh Acoustic Marine Mammal Survey final field report and data analysis (Merchant *et al.*, 2025);
- Census of grey seals (*Halichoerus grypus)* around Wales during August 2023 using aerial survey (Thomson, 2025);
- Grey Seal Breeding Census Skomer Island NRW Evidence Reports 2014 – 2023;
- Temporal trends and phenology in grey seal (*Halichoerus grypus*) pup counts at Marloes Peninsula, Wales (Bull *et al.*, 2017);
- Grey Seal Pupping Phenology on Ynys Dewi / Ramsey Island, Pembrokeshire (Morgan *et al.*, 2018);
- Skomer MCZ Grey Seal Survey, Marloes Peninsula 1992-2016 (Lock *et al.*, 2017);
- Bottlenose Dolphin Monitoring in Cardigan Bay, 2014 – 2016 (Lohrengei *et al.*, 2018);
- Risso's dolphins of Ynys Enlli / Bardsey Island: Photo-ID catalogue (Eisfield-Pierantonio *et al.*, 2018);
- The identification of discrete and persistent areas of relatively high harbour porpoise density in the wider UK marine area (Heinänen and Skov 2015);
- Revised Phase III data analysis of JCP data resources (Paxton *et al*. 2016);

- Offshore Energy Strategic Environmental Assessment (SEA) (including relevant appendices and technical reports) (DECC, 2016);
- MARINElife surveys from ferry routes;
- Site-specific survey data from other OWFs in close proximity (Llŷr Floating Wind Limited, 2024; Blue Gem Wind Ltd, 2021; White Cross, 2023b);
- Sea Watch Foundation volunteer sightings;
- Seal telemetry data (e.g. Sharples *et al*. 2008; Russel and McConnell 2014; Barker *et al*. 2014; Vincent *et al*. 2017);
- SCOS annual reporting of scientific advice on matters related to the management of seal populations (e.g. SCOS 2024, 2025);
- TURTLE database records (published and unpublished) of turtle stranding and sightings around the UK and the Republic of Ireland; and
- Manx Wildlife Trust seal information.

435. The latest and most up to date references would be applied to the assessment and data used would also be supplemented with appropriate results of ongoing research and studies as it becomes available.

2.4.4 Approach to Impact Assessment

436. To inform the impact assessment, underwater noise modelling will be undertaken. The modelling will consider:

- Any impact pile driving (including pin-piles for anchors);
- Non-impact piling anchor installation;
- Other construction activities, including seabed preparations, rock placement (for scour or cable protection) and cable installation;
- Vessels;
- Operational wind turbine and mooring noise; and
- Maintenance activities, including rock placement, cable repair and replacement and vessels.

437. Underwater noise modelling will be undertaken for the clearance of UXO. However, any UXO clearance, if required, will be assessed as part of a separate ML and not part of the DCO submission or NRW ML. Therefore, worst-case impacts for UXO clearance would be included as an Appendix within the Development ES for information only. A more detailed assessment would be undertaken for the separate ML when more information on the requirement for any UXO clearance is available.

438. Potential noise impacts would be considered against existing baseline data in order to quantify the potential impact on the reference populations for marine mammals.

439. Where possible, the magnitude of effect would be quantified. The impact significance would be determined by a matrix approach supported by expert judgement, taking into account the value and sensitivity of the receptor.

440. Consultation with key marine mammal stakeholders would be ongoing during the EIA process, through a Marine Mammal ETG, and would include discussion of the best available information to use, for example, to determine species density estimates and define reference populations for the assessment.

2.4.5 Potential Impacts

2.4.5.1 Potential Impacts During the Construction Stage

441. There is the potential for surveys to be undertaken during the pre-construction stage, such as geophysical surveys. The potential impacts of such surveys would be assessed separately in an EPS risk assessment prior to each survey.

442. The potential impacts for marine mammals during construction **scoped in** for further assessments in the EIA are outlined below.

2.4.5.1.1 Auditory Injury Resulting from Underwater Noise

443. Potential impacts during construction would result from underwater noise, principally from piling activities and UXO clearance.

444. Site-specific underwater noise modelling will be undertaken for all potential noise sources that could impact marine mammals. The potential impacts associated with underwater noise during construction have been **scoped in** and would be assessed in the EIA, considering the most recent and robust research, NRW guidance and other relevant guidance and information available.

2.4.5.1.2 Behavioural and Disturbance Impacts Resulting from Underwater Noise (including from Vessels)

445. Potential impacts during construction could result from underwater noise, principally from piling activities and UXO clearance, but also from geophysical surveys, cable installation activities and the presence of vessels.

446. The potential impacts associated with underwater noise can include disturbance and behavioural effects. The potential disturbance impacts from underwater noise have been **scoped in** and would be assessed in the EIA, taking into account the most recent and robust research, guidance and information available.

2.4.5.1.3 Barrier Effects from Underwater Noise

447. Barrier effects can occur as a result of disturbance and displacement due to underwater noise from piling, UXO clearance or vessel noise. However, this is unlikely to be significant due to the temporary nature of the construction works. Other OWFs neighbouring the Development, such as Llŷr 1 and Erebus OWF, did not take forward barrier effects from underwater noise in assessments (Llŷr Floating Wind Limited, 2024; Blue Gem Wind Ltd, 2021). Therefore, this impact has been **scoped out** of from further assessment.

2.4.5.1.4 Disturbance at Seal Haul-Out Sites

448. Disturbance from construction activity and vessel journeys to and from the Development and ports has the potential to disturb seals at haul-out sites and those foraging at sea, depending on the route and proximity to the haul-out sites. The potential for disturbance at seal haul-out sites has been **scoped in** and would be assessed in the EIA, considering the most recent and robust

research, guidance and information available. This may be scoped out later with agreement with the ETG if further information becomes available.

2.4.5.1.5 Vessel Interaction (Increase in Risk of Collision)

449. The potential for interactions and / or an increase in collision risk with construction vessels would need to be considered. Despite the potential for marine mammals to detect and avoid vessels, ship strikes are known to occur (Wilson *et al*., 2007). An increase in vessels could potentially lead to an increase in vessel collision risk and is therefore **scoped in** to the EIA.

2.4.5.1.6 Changes to Prey Resource

450. The assessment would consider potential for any indirect impacts as a result of changes in availability of prey species. Potential impacts on prey species during construction can result from:

- Physical disturbance and temporary habitat loss of seabed habitat, spawning or nursery grounds or migration;
- Permanent habitat loss;
- Increased suspended sediments and sediment re-deposition;
- Re-mobilisation of contaminated sediment;
- Underwater noise impacts to hearing sensitive species during pile driving and other activities (vessels, seabed preparation, cable installation etc); and
- Introduction of anchors, foundations, scour protection and hard substrate and associated fish aggregation.

451. The potential for any changes to prey resources for marine mammals during construction is **scoped in** and would be assessed further in the EIA based on **Section 2.3 Fish and Shellfish Ecology**.

2.4.5.1.7 Changes to Water Quality

452. The increases in suspended sediments and for the accidental release of contamination during construction has the potential to impact marine mammals and their prey. Any changes to water quality would be localised and short lived, and the potential for any impacts from changes in water quality on marine mammals or their prey is expected to not be significant. Marine mammals are not sensitive to changes in the turbidity of the water column as they rely primarily on sound for navigation and hunting. Given the limited potential for effect, and that marine mammals are not sensitive to changes in turbidity, changes to water quality on marine mammals is **scoped out** of the assessment. The potential for changes in water quality to affect prey would be assessed through the prey assessment.

2.4.5.2 Potential Impacts During the O&M Stage

453. The potential impacts for marine mammals during O&M that are **scoped in** for further assessments in the EIA are outlined below.

2.4.5.2.1 Auditory Injury Resulting from Underwater Noise

454. Potential impacts during operation would mostly result from the presence of O&M vessels in the Development Area. Underwater noise may also be generated by operational turbines, and activities such as works on Offshore Export Cables (e.g. cable repair, re-burial, cable protection placement). However, due to the type of works it is unlikely for there to be significant auditory injury effects. Potential impacts would be lower in magnitude than those assessed for construction due to the absence of pile driving and with fewer vessels required for maintenance. Therefore, the potential impact of auditory injury has been **scoped out** from further assessment within the EIA.

2.4.5.2.2 Behavioural and Disturbance Impacts Resulting from Underwater Noise (including from Vessels)

455. There is the potential for disturbance and behavioural effects from O&M activities such as geophysical surveys, cable replacement, re-burial, cable protection placement, and the presence of vessels. The potential for disturbance from underwater noise during the O&M stage would be based on the most recent and robust research, guidance and information available. The magnitude is expected to be less than that for construction due to less activities, for example no piling, during the O&M stage. However, this potential impact has been **scoped in** to the EIA.

2.4.5.2.3 Barrier Effects from Underwater Noise

456. Due to no piling or UXO clearance requirements during the O&M stage, it is highly unlikely for there to be a potential for barrier effects from underwater noise. Other OWFs in close proximity to the Development, such as Llŷr 1 and Erebus OWF, also did not take forward barrier effects from underwater noise forward in assessments (Llŷr Floating Wind Limited, 2024; Blue Gem Wind Ltd, 2021). Therefore, this impact has been **scoped out** of the EIA.

2.4.5.2.4 Disturbance at Seal Haul-Out Sites

457. Disturbance from O&M activities and vessel journeys to and from the Development and ports has the potential to disturb seals at haul-out sites and those foraging at sea. However, it is not anticipated for the port to be near the haul-out sites around Pembrokeshire. The magnitude of disturbance is likely to be much less during the O&M stage compared to the construction stage. Due to disturbance being limited to vessel disturbance only, the potential for disturbance at seal haul-out sites has been **scoped out** of the EIA.

2.4.5.2.5 Vessel Interaction (Increase in Risk of Collision)

458. During operation, there would be O&M vessels present in the Development area which can lead to an increase in vessel interactions / collision risk. These would be similar to impacts assessed for construction, but lower in magnitude due to fewer vessels required for maintenance than construction, however, has been **scoped in** to the EIA.

2.4.5.2.6 Secondary Entanglement

459. Due to the potential for the Development to have FSSs, there is the potential for secondary entanglement, which is indirect entanglement from anthropogenic debris such as fishing gear caught in the mooring system. Therefore, secondary entanglement during the O&M stage is **scoped in** to the EIA.

2.4.5.2.7 Changes to Prey Resource

460. The potential for changes to prey resource for marine mammals during O&M has been **scoped in** and would be assessed further in the EIA. Impacts would be based on the assessments in the **Section 2.3 Fish and Shellfish Ecology**. These would be similar to impacts assessed for construction, but lower in magnitude due to a smaller scale of works.

2.4.5.2.8 Changes to Water Quality

461. Potential impacts to marine mammals and their prey related to changes in water quality during operation are **scoped out** from the assessment, as per in the construction stage (see **Section 2.4.5.1.7**).

2.4.5.2.9 Barrier Effects from the Physical Presence of the Development

462. The potential for impacts due to barrier effects from the physical presence of the Development once constructed has been **scoped out** of the EIA. The spacing between wind turbines would allow animals to move between devices and through the Development. Studies at Dutch and Danish wind farms have shown that harbour porpoise and seal presence in operational wind farms show no evidence of exclusion (for example, Diederichs *et al*. 2008; Lindeboom *et al*. 2011; Marine Scotland 2012; McConnell *et al*. 2012; Scheidat *et al*. 2011; Teilmann *et al*. 2006; Tougaard *et al*. 2005, 2009a, 2009b). Both harbour porpoise and seals have been shown to forage within operational wind farm sites (e.g. Lindeboom *et al*. 2011) indicating no restriction to movements.

2.4.5.2.10 Effects from EMFs

463. The potential for impacts from EMF has been **scoped out** of the EIA. This is consistent with other recent neighbouring projects including for Erebus, which also scoped out this impact (Blue Gem Wind Ltd, 2021). Other examples include Norfolk Vanguard and Norfolk Boreas (The Planning Inspectorate 2016; 2017a), East Anglia ONE North and East Anglia TWO (The Planning Inspectorate 2017b; 2017c), and both the Dudgeon Extension and Sheringham Shoal Extension Projects (The Planning Inspectorate; 2019)) as there is no evidence of any impact. OWFs in close proximity to the Development which assessed this potential impact concluded negligible effects (not significant) for all marine mammal species (Llŷr Floating Wind Limited, 2024; White Cross, 2023b).

2.4.5.3 Potential Impacts During the Decommissioning Stage

464. Impacts during decommissioning are expected to be similar in nature to those anticipated during construction, but of smaller magnitude.

465. The same potential impacts noted for construction are therefore expected to be **scoped in** (and **out**) for decommissioning.

2.4.5.4 Potential Inter-relationship Impacts

466. The impact assessment would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.4.5.5 Potential Cumulative Impacts

467. The CEA would consider displacement due to cumulative underwater noise and impacts on prey species. The assessment would also consider displacement due to the presence of offshore vessels and maintenance activities during the operational stage. Therefore, these impacts are **scoped in** to the CEA. All other impacts would be **scoped out** of the cumulative assessment.

2.4.5.6 Potential Transboundary Impacts

468. There is a significant level of marine development being undertaken or planned by EU Member States in the wider region. Populations of marine mammals are highly mobile and there is potential for transboundary impacts especially when considering noise impacts. Transboundary impacts have been **scoped in** to the EIA along with the other cumulative impacts.

2.4.5.7 Summary of Potential Impacts

469. **Table 2.4.3** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.4.3 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Marine Mammal and Marine Turtle Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Auditory injury resulting from underwater noise	✓	x	✓
Behavioural and disturbance impacts resulting from underwater noise (including from vessels)	✓	✓	✓
Barrier effects from underwater noise	x	x	x
Disturbance at seal haul-out sites	✓	x	✓
Vessel interaction (increase in risk of collision)	✓	✓	✓
Secondary entanglement	x	✓	x
Changes to prey resource	✓	✓	✓
Changes to water quality	x	x	x
Barrier effects from the physical presence of the wind farm	x	x	x
Effects from EMFs	x	x	x
Inter-relationship impacts	✓	✓	✓

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Cumulative impacts	✓	✓	✓
Transboundary impacts	✓	✓	✓

2.4.6 Potential Mitigation Measures

470. Embedded mitigation measures relating to Marine Mammals and Marine Turtles impacts are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

471. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All of the proposed mitigation measures would comply with regulatory requirements and good practice.

472. The results of the EIA and HRA would inform the need for any additional mitigation requirements over and above the standard measures typically used for OWF construction. Potential additional mitigation measures would be in line with the latest guidance and policies at the time, such as NRW's position with the Department for Environment, Food and Rural Affairs (Defra) offshore wind piling limit currently in consultation. Examples of additional measures that could be considered include (noting that more options may be available in the future):

- Primary measures:
  - Noise Abatement Systems to reduce noise at source for piling and UXO; and
  - Lower impact methods of construction, such as low-order detonation for UXO, alternate foundations and piling installation techniques.
- Secondary measures:
  - Use of Acoustic Deterrent Devices to ensure marine mammals are not within any potential permanent auditory injury zone; and
  - Seasonal restrictions / timing considerations for noisy activities.

2.5 Offshore Ornithology

473. This section of the Scoping Report considers the potential impacts of the construction, O&M, and decommissioning stages of the Development on Offshore Ornithology receptors.

474. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Offshore Ornithology receptors in the Development's ES. This section should be read alongside the **Gwynt Glas OWF HRA Screening Report**, which considers the potential for likely significant effects on relevant European sites arising from the project, either alone or in combination.

475. The Offshore Ornithology assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description;**
- **Section 2.2 Benthic Habitat**; and
- **Section 2.3 Fish and Shellfish Ecology**.

The following questions are posed to consultees to help them frame and focus their response to the Offshore Ornithology scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Offshore Ornithology Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?

2.5.1 Study Area

2.5.1.1 Offshore Digital Aerial Survey Study Area

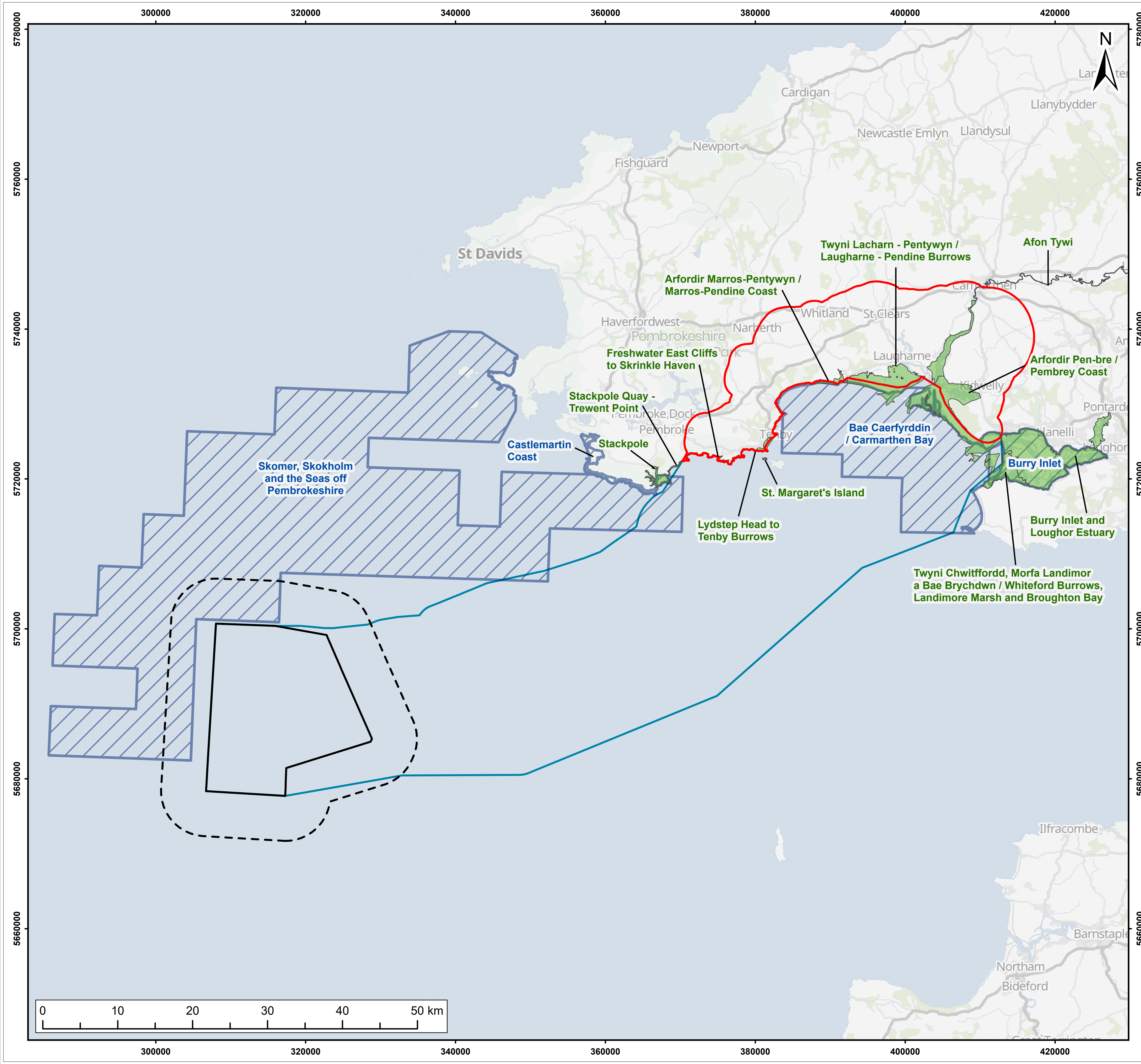
476. The Offshore Ornithology Study Area encompasses the digital aerial survey (DAS) Study Area, which is the Array Scoping Boundary plus a 6km buffer, totalling 952km^2 (**Figure 2.5.1**). The 6km buffer is an appropriate size to provide a robust ornithological baseline for the assessment in relation to the Development and is predicted to encompass areas in and beyond which construction, O&M, and decommissioning effects are expected to occur for key bird species expected to be present in the Offshore Ornithology Study Area.

2.5.1.2 Offshore Ornithology Regional Study Area

477. The Offshore Ornithology Regional Study Area is defined by the area within which breeding and non-breeding migratory and seabird species could be impacted by the Development. The species assessed would be determined by their presence in the DAS Study Area described above. The Offshore Ornithology Regional Study Area would also encompass the Offshore Export Cable Scoping Boundary outside of the DAS Study Area.

478. For the breeding season, the Offshore Ornithology Regional Study Area has been defined by the foraging ranges of each individual species (**Table 2.5.1**), which were obtained from Woodward *et al*. (2024). During the breeding season, many seabird species have large foraging ranges which extend several hundred kilometres from their colonies. Therefore, some seabird colonies may have connectivity with the Development, despite being located a significant distance away. Screening of European designated sites with qualifying seabird colonies (SPAs and Ramsar sites) for potential connectivity to the Development has been detailed within the HRA Screening Report (Gwynt Glas OWF Limited, 2026a). Connectivity with any nationally designated sites (i.e. SSSIs)) is detailed in this section and would be subsequently assessed as part of the EIA.

479. Outside of the breeding season, seabirds are not constrained by colony location and can range widely within UK seas and beyond, depending on the species involved. Therefore, during the non-breeding season, the Offshore Ornithology Regional Study Area has been defined as the Biologically Defined Minimum Population Scales (BDMPS) spatial areas for each species (**Table 2.5.1**), as described in Furness (2015). The exceptions to this are guillemot *Uria aalge* and herring gull *Larus argentatus*, which are considered to remain in the broad vicinity of breeding colonies during the non-breeding season (Buckingham *et al*., 2022; Wernham *et al*., 2002) and therefore the non-breeding season regional Study Area for these species are considered to be the same as for the breeding season.



Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Digital Aerial Survey Study Area
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)

Source: © Haskoning UK Ltd, 2026, © Natural Resources Wales
Base map: Contains OS data © Crown Copyright and database right 2026. Contains data from OS Zoomstack

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Offshore Ornithology DAS and Offshore Cable Corridor Study Areas with the Overlapped Designated Sites

Figure:	2.5.1	Drawing No:	PC6850-HAS-OF-DR-GS-0055		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	19/03/2026	MW	DM	A3	1:500,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

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2.5.2 Baseline Environment

480. The Celtic Sea is important for seabirds throughout the year. It provides foraging grounds for seabirds breeding in adjoining coastal areas in the UK and Ireland during the breeding season (many of them colonies of international importance designated as SPAs). Outside the breeding season, seabirds from breeding colonies further afield, and migratory birds, occur on passage or overwinter, and sub-adult seabirds (pre-breeding age) may be present throughout the year.

481. The programme of site-specific DAS undertaken by The Crown Estate (see **Figure 2.5.1**) over a 24-month period would be used to characterise the ornithological baseline. As a minimum, the DAS data would have at least 10% coverage of the DAS Study Area, to be in keeping with the guidance set out by NRW (2023). The Offshore Ornithology assessment would be informed by analysis of this data and expert understanding of the seasonal distribution and movements of seabirds and migratory birds in the Celtic Sea. The full results of these surveys were not available at the time of writing, therefore the indicative seabird species list is derived from the first year DAS report only.

482. The potential for connectivity of the Development to sites with statutory designation for nature conservation with relevant qualifying features, would be reviewed. Three classes of statutory designated sites would be considered: SPAs, Ramsar sites and SSSIs. The first two are afforded higher status, as they signify sites of international importance, while SSSIs indicate sites of national importance.

483. The Array Scoping Boundary does not overlap with any ornithological designations, however, the 6km buffer incorporated into the DAS Study Area overlaps with approximately 138km^2 (8%) of the southern part of the Skomer, Skokholm and the Seas off Pembrokeshire SPA.

484. The European designated sites partially overlapped by the Offshore Export Cable Scoping Boundary (forming part of the Offshore Ornithology Regional Study Area) are:

- Skomer, Skokholm and the Seas off Pembrokeshire SPA;
- Carmarthen Bay SPA;
- Burry Inlet SPA and Ramsar Site; and
- Castlemartin Coast SPA.

485. Potential impacts on the individual SPAs stated above are detailed in the **Gwynt Glas OWF HRA Screening Report**. The actual overlap of these sites is expected to reduce once the final Offshore Export Cable route has been decided. Screening for potential connectivity with European designated sites (SPAs and Ramsar sites) beyond those listed above is also detailed within the **Gwynt Glas OWF HRA Screening Report**. The RIAA, which would form part of the EIA, would undertake the assessment for those sites and features for which a likely significant effect cannot be excluded.

486. The Offshore Export Cable Scoping Boundary also overlaps with the following SSSIs designated for relevant ornithological features:

- Twyni Chwitffordd, Morfa Landimor a Bae Brychdwn / Whiteford Burrows, Landimore Marsh and Broughton Bay SSSI;
- Afon Tywi / River Tywi SSSI;

- Arfordir Pen-bre / Pembrey Coast SSSI;
- Burry Inlet and Loughor Estuary SSSI;
- Clogwyni Freshwater East I Skrinkle Haven / Freshwater East Cliffs to Skrinkle Haven SSSI;
- Penrhyn Lydstep I Dwyni Dinbych – Y- Pysgod / Lydstep Head to Tenby Burrows SSSI;
- St. Margaret's Island SSSI;
- Ystagbwll / Stackpole SSSI;
- Cei Ystagbwll – Yrwyn Tre-went / Stackpole Quay - Trewent Point SSSI;
- Twyni Lacharn - Pentywyn / Laugharne - Pendine Burrows SSSI; and
- Arfordir Marros-Pentywyn / Marros-Pendine Coast SSSI.

487. Potential connectivity with SSSIs designated for relevant Offshore Ornithology receptors beyond those listed above have been detailed in **Table 2.5.3** (**Section 2.5.2.1**). SSSIs taken forward, where these do not form component parts of seabird SPAs, would be assessed for potential impacts within the EIA. A separate assessment for SSSIs that form part of a seabird SPA would not be undertaken, as effects on the qualifying seabird species would be addressed through the HRA process.

488. The designated sites with the greatest potential for connectivity to the Development would be those designated for breeding seabirds. During the breeding season, these sites would be **scoped in** firstly based on boundary overlap with the DAS Study Area and the Offshore Export Cable Scoping Boundary as detailed above, followed by those within species specific mean maximum foraging ranges (plus one standard deviation (SD) where applicable) (**Table 2.5.1**) of the Array Scoping Boundary.

489. During the non-breeding season(s), connectivity would be based on relevant regional populations, including not only birds from the UK but also birds from overseas populations that pass through UK waters on migration or winter in UK waters (Furness, 2015). The regional populations would, therefore, be defined by the BDMPS within which the Development is located; for the majority of species, this is the UK Western Waters BDMPS (Furness, 2015).

Table 2.5.1 Mean Maximum Foraging Range plus 1 SD for seabird species expected to be present within the Array Scoping Boundary (Woodward et al., 2024) and their relevant BDMPS spatial areas (Furness, 2015).

SPECIES	FORAGING RANGE (KM)	METRIC	BDMPS AREA
Manx shearwater Puffinus puffinus	1,346.8 ± 1,018.7	MM +1SD	UK Western Waters
Northern fulmar Fulmarus glacialis	542.6 ± 657.9	MM +1SD	UK Western Waters and UK North Sea Waters
Great skua Stercorarius skua	443.3 ± 487.9	MM +1SD	UK Western Waters
Northern gannet Morus bassanus	315.2 ± 194.2	MM +1SD	UK Western Waters
European storm petrel Hydrobates pelagicus	400.6	MM[1]	UK Western Waters
Black-legged kittiwake Rissa tridactyla	156.1 ± 144.5	MM +1SD	UK Western Waters
Atlantic puffin Fratercula arctica	137.1 ± 128.3	MM +1SD	UK Western Waters
Lesser black-backed gull Larus fuscus	127 ± 109	MM +1SD	UK Western Waters
Razorbill Alca torda	88.7 ± 75.9	MM +1SD	UK Western Waters
Common guillemot Uria aalge	73.2 ± 80.5	MM +1SD	UK Western Waters
Herring gull Larus argentatus	58.8 ± 26.8	MM +1SD	UK Western Waters
Great black-backed gull Larus marinus	73	MM[1]	UK Western Waters
Common gull Larus canus	50	MM[1]	UK Western Waters
Arctic tern Sterna paradisaea	25.7 ±14.8	MM +1SD	UK Western Waters
Common tern Sterna hirundo	18 ± 8.9	MM +1SD	UK Western Waters
[1] Mean maximum foraging is presented without a SD for species where the sample size for the foraging range calculations was too small (Woodward *et al.*, 2024).			

490. This section has considered existing data sources in predicting the likely composition of species expected to be present in the DAS Study Area and the anticipated nature of the impact assessment. Drawing on past studies and wind farm impact assessments in the Celtic Sea, the seabird species expected to be present are provided in **Table 2.5.2** along with their seasonal definitions (primarily derived from Furness, 2015) which would be used for assigning impacts to appropriate populations. It should be noted that in some instances alternative seasonal

definitions may be appropriate (e.g. for apportioning impacts to designated sites). It should also be noted that the composition of species in this list may change upon the receipt of the site-specific DAS data for the Development.

491. In addition to those listed below, for potential quantitative assessment, it has been noted that there is potential for Balearic Shearwater *Puffinus mauretanicus* to pass through the DAS Study Area during their autumn migration period. At this stage, the first year DAS Report is available for the Round 5 Celtic Sea PDAs as a whole (which this Development is a part of). As this data does confirm the presence of Balearic shearwater in the general area, there is a risk that they may utilise the Array Scoping Boundary. Particularly whilst trying to access the Celtic Sea Front or flying from this region through the Array Scoping Boundary to reach feeding areas to the north-west (Phillips *et al*. 2021). However, the exact number of Balearic shearwater seen in the Array Scoping Boundary is unknown at the time of writing as the data has not yet been made fully available. As this species is of very high conservation value both nationally and internationally; red-listed as a Bird of Conservation Concern in Wales since 2016 , a UKBAP priority species, a Section 7 SPI under the Environment (Wales) Act 2016, listed on Annex I of the EU Birds Directive (2009 / 147 / EEC), and ‘critically endangered’ on the IUCN red-list, a qualitative assessment of the potential impacts on this species would be carried out in the EIA.

Table 2.5.2 Species Specific Definitions of Biological Seasons (Furness, 2015, unless otherwise stated) for Seabird Species Expected to be Present within the Array Scoping Boundary.

SPECIES	BREEDING	MIGRATION-FREE BREEDING	MIGRATION - AUTUMN	WINTER	MIGRATION - SPRING	NON-BREEDING
Common gull[1]	-	May-Jul	-	-	-	Aug-Apr
Great Black-backed gull	Mar-Aug	May-Jul	Aug-Nov	Dec	Jan-Apr	Sep-Mar
Herring gull	Mar-Aug	May-Jul	Aug-Nov	Dec	Jan-Apr	Sep-Feb
Lesser black-backed gull	Apr-Aug	May-Jul	Aug-Oct	Apr-Aug	May-Jul	Aug-Oct
Kittiwake	Mar-Aug	May-Jul	Aug-Dec	-	Jan-Apr	-
Common tern	May-Aug	Jun	Jul-Sep	-	Apr-May	-
Arctic tern	May-Aug	Jun	Jul-Sep	-	Apr-May	-
Great skua	May-Aug	May-Jul	Aug-Oct	Nov-Feb	Mar-Apr	-
Guillemot	Mar-Jul	Mar-Jun	Jul-Oct	Nov	Dec-Feb	Aug-Feb
Razorbill	Apr-Jul	Apr-Jul	Aug-Oct	Nov-Dec	Jan-Mar	-
Puffin	Apr-Aug	May-Jun	Jul-Aug	Sep-Feb	Mar-Apr	Mid-Aug-Mar
Fulmar	Jan-Aug	Apr-Aug	Sep-Oct	Nov	Dec-Mar	-
Manx shearwater	Apr-Aug	Jun-Jul	Aug-Oct	Nov-Feb	Mar-May	-
Gannet	Mar-Sep	Apr-Aug	Sep-Nov	-	Dec-Mar	-
Storm petrel[1]	May-Oct	-	-	-	-	Nov-Apr
[1]Taken from NatureScot (2020).						

2.5.2.1 Receptors

492. **Table 2.5.3** details the Offshore Ornithology receptors that may be affected by the potential impacts detailed in **Section 2.5.5** and their connectivity to the Study Areas detailed in **Section 2.5.1**.

Table 2.5.3 Relevant receptors for the Offshore Ornithology assessment

RECEPTOR GROUP	RECEPTOR	CLOSEST DISTANCE TO THE DAS STUDY AREA	CLOSEST DISTANCE TO THE OFFSHORE EXPORT CABLE SCOPING BOUNDARY
Regional populations of seabird species occurring in the DAS Study Area[1]	Indicative seabird species list in descending order of abundance (raw counts)[1]: - Manx shearwater - Guillemot - Kittiwake - Razorbill - Puffin - Gannet - Lesser black-backed gull - Fulmar - Herring gull - Great black-backed gull - European storm petrel[2] - Sooty shearwater *Puffinus griseus*[2] - Corey's shearwater *Calonectris diomedea*[2] - Great shearwater *Puffinus gravis*[2] - Balearic shearwater[2] - Arctic tern[2] - Common tern[2] - Common gull[2] - Little gull[2] - Sandwich tern *Sterna sandvicensis*[2] - Great Skua[2] - Arctic Skua *Stercorarius parasiticus*[2]	N/A (recorded within DAS Study Area i.e. Array Scoping Boundary +6km buffer)	N/A (Study Area located within BDMPS for regional populations and is partially overlapped by the DAS Study Area)

RECEPTOR GROUP	RECEPTOR	CLOSEST DISTANCE TO THE DAS STUDY AREA	CLOSEST DISTANCE TO THE OFFSHORE EXPORT CABLE SCOPING BOUNDARY
	- Leach's storm petrel *Oceanodroma leucorhoa*[2] - Shag *Phalacrocorax aristotelis*[2]		
Designated seabird colonies for species occurring within the DAS Study Area. **(SPAs addressed in HRA Screening Report)**	Skomer, Skokholm and the Seas off Pembrokeshire SPA is the closest to the Development.	6km Buffer overlaps with 138km2 (8%) of this SPA	Offshore Export Cable Scoping Boundary overlaps with 36km2 (2%) of this SPA
	SPAs and SSSIs within mean maximum foraging range (from Woodward *et al*., 2024) of qualifying breeding seabird species. SPAs and SSSIs where qualifying adult seabird population is >1% of the relevant non-breeding BDMPS population (from Furness, 2015)	Connectivity of other designated sites to the DAS Study Area would be determined following the receipt of the DAS results.	Connectivity of other designated sites to the Offshore Cable Corridor Scoping Boundary would be determined following the receipt of the DAS results.
Migratory non-seabird species	Migratory non-seabird species named as qualifying species for SPAs within 100km of the Development	N/A (potentially passing through the Offshore Ornithology Study Area)	N/A (potentially passing through the Offshore Ornithology Study Area)

[1] Indicative list based on the first year DAS Report for the Round 5 Celtic Sea PDAs as a whole.

[2] Less abundant species with < 100 birds counted in the first year DAS Report for the Round 5 Celtic Sea PDAs as a whole.

2.5.3 Data Sources

493. **Table 2.5.4** outlines sources of guidance and data (beyond the DAS) that have been used to inform this Offshore Ornithology section and would be used to inform the EIA where appropriate.

Table 2.5.4 Guidance and Data Sources to Inform the Offshore Ornithology Assessment.

DATASET	YEAR(S)	DESCRIPTION
Caneco (2022). Graphical User Interface (GUI) developed for a stochastic avian Collision Risk Model (CRM). (https://dmpstats.shinyapps.io/sCRM/)	2022	Recommended model for undertaking CRM.

DATASET	YEAR(S)	DESCRIPTION
Furness (2015). Non-breeding season populations of seabirds in UK waters: Population sizes for BDMPS	2015	Key information source for biogeographic population estimates for non-breeding seabirds in UK waters.
Furness, R. W., Wade, H. M., and Masden, E. A. (2013). Assessing vulnerability of marine bird populations to offshore wind farms. Journal of Environmental Management, 119, 56-66.	2013	Used to inform likely vulnerability of species to different potential effects of OWFs, including susceptibility to disturbance and provision of nocturnal activity factor scores for use in the Stochastic Collision Risk Model (sCRM).
Garthe, S. and Hüppop, O. (2004). Scaling Possible Adverse Effects of Marine Wind Farms on Seabirds: Developing and Applying a Vulnerability Index	2004	Used to inform likely vulnerability of species to different potential effects of OWFs, including susceptibility to disturbance and provision of nocturnal activity factor scores for use in the sCRM.
Horswill and Robinson (2015). Review of Seabird Demographic Rates and Density Dependence	2015	Provides survival and productivity rates for assessment of impacts on seabird populations.
JNCC (2025b). UK Protected Areas. **(UK Protected Areas | Advisor to Government on Nature Conservation | JNCC)**	2025	Used for citation information and conservation objectives for UK designated sites.
JNCC and British Trust for Ornithology (BTO) Seabird Monitoring Programme (SMP) (2025) **(SMP | JNCC)**	2025	Breeding seabird colony population numbers.
Johnston *et al* (2014a). Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. Journal of Applied Ecology, 51. Doi: 10.1111/1365-2664.12191 **Johnston, A., Cook, A.S.C.P., Wright, L.J., Humphreys, E.M. and Burton, N.H.K. (2014b). Corrigendum. Journal of Applied Ecology, 51, doi: 10.1111/1365-2664.12260**	2014	Recommended reference for generic seabird flight heights within the sCRM tool.
Llŷr OWF – Marine Ornithology ES Chapter (Llŷr, 2024)	2024	Used as relevant reference for species expected to be present in the Celtic Sea area, prior to receipt of the full set of DAS data.
National Parks & Wildlife Service. Protected Sites in Ireland	2026	Used for information on designated sites in the Republic of Ireland

DATASET	YEAR(S)	DESCRIPTION
(Protected Sites in Ireland | National Parks & Wildlife Service)		
NE Phase I Guidance Document **Parker *et al*. (2025a). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards Phase I: Expectations for pre-application baseline data for designated nature conservation and landscape receptors to support offshore wind applications.**	2025	Used for guidance information on methods of assessment for Offshore Ornithology.
NE Phase III Guidance Document **Parker *et al*. (2025b). Environmental considerations for offshore wind and cable projects - Phase III Data and evidence expectations at examination V2.0 May 2025.pdf - All Documents**	2025	Used for guidance information on methods of assessment for Offshore Ornithology.
NRW (n.d.). Designated site search. **(NRW / Find protected areas of land and sea)**	2026	Used for information on designated sites in Wales.
Project Erebus ES: Chapter 11 Offshore Ornithology (Blue Gem Wind Ltd, 2021)	2021	Used as relevant reference for species expected to be present in the Celtic Sea area, prior to receipt of the full set of Gwynt Glas DAS data.
Searle *et al* (2019). A Population Viability **Analysis Modelling Tool for Seabird Species.**	2019	Recommended tool to model potential effects of collision and displacement mortality on populations of key seabird species from relevant breeding colonies.
Woodward *et al* (2024). The value of seabird foraging ranges as a tool to investigate potential interactions with offshore wind farms.	2024	Key reference for representative foraging range statistics for seabirds around breeding colonies.

494. Other data and information available to inform the EIA includes:

- FAME and STAR tracking data (for kittiwakes, guillemots and razorbills) (Wakefield *et al.*, 2017);
- SeaMaST data (Bradbury *et al.*, 2014);and
- Seabird density mapping (Cleasby *et al.*, 2018).

2.5.4 Approach to Impact Assessment

495. The impact assessment methodology would be based on that described in **Section 1.8 EIA Methodology**, adapted to make it applicable to the assessment of offshore ornithological features, and aligned with the key guidance document produced on impact assessment of

ecological / ornithological receptors (Bird Survey and Assessment Steering Group, 2025). The assessment approach would use a 'S-P-R' model.

496. The aerial surveys will provide information on species (or species-groups if species identification is not possible), abundance, distribution, behaviour, location, sex and age (where possible) and flight direction.

497. The Applicant proposes to use design-based density estimates (with associated confidence intervals and levels of precision) for the assessment of all seabird species **scoped in** for assessment. While model-based methods are typically considered to be superior to design-based ones, the latter do not require the larger sample sizes necessary for successful model fitting. Furthermore, given the distance of the site from land, it is unlikely that available covariates for model-based estimates would enable substantial improvement to those produced through the design-based method. Any potential use of model-based density estimates will, therefore, be reviewed and discussed with stakeholders as appropriate.

498. Site-specific flight height data derived from the aerial survey imagery, using an advanced photogrammetry method, would potentially be available to inform the CRM. In addition, some existing boat-based height data from the area collected using a laser rangefinder is also available. However, for the majority of existing consented offshore wind farms, generic flight data (Johnston *et al.* 2014a, 2014b) has been used in CRM, as this approach has been favoured by the Statutory Nature Conservation Bodies (SNCB(s)). The approach to the use of flight height data would be discussed and agreed with SNCBs prior to the assessment.

499. Quantitative methods to be used in the assessment would include:

- Displacement matrices, following the SNCB advised approach, combining ranges of displacement and mortality to obtain estimates of displacement mortality;
- CRM using the deterministic Band model, and / or the stochastic version (Caneco, 2022); The use of appropriate models would be discussed with relevant stakeholders; and
- Population viability analysis (PVA) (using NE PVA tool) to provide predictions of the population consequences of the impacts for the Development alone as well as cumulatively and in-combination with other wind farms. Note that this would only be used where an increase in baseline mortality of ≥1% is predicted.

500. Reference population sizes for each species would be based on the best available information at the time of undertaking the assessment and would be agreed with key stakeholders. These are likely to be derived from the SMP (JNCC and BTO, 2025) and the most recent seabird census count (Burnell *et al.*, 2023) for breeding colony estimates and Furness (2015) for non-breeding populations.

2.5.5 Potential Impacts

2.5.5.1 Potential Impacts During the Construction Stage

2.5.5.1.1 Presence and Movement of Construction Vessels

501. Impacts on ornithological receptors during construction relate to disturbance due to the presence and movement of construction vessels and associated construction activities within the Offshore Scoping Boundary which can cause displacement from areas used by the birds (e.g. for foraging).

As well as construction vessels themselves, the sources of disturbance may include vessels moving to and from the site, and associated support vessels and helicopters, if used for crew transfers. Therefore, impacts from the presence and movement of construction vessels are proposed to be **scoped in** to the EIA.

2.5.5.1.2 Indirect effects from Impacts on Fish Prey Resources

502. Seabed preparation and installation activities involved in the construction of the Offshore Scoping Boundary also have the potential to impact Offshore Ornithology receptors through indirect disturbance and habitat loss effects on prey fish species. While there may be a very small amount of permanent habitat loss (e.g. of seabed around the wind turbine anchors and/or innovative deepwater solutions and sub-sea cable hubs), most of these potential impacts would be expected to be short-lived and are unlikely to lead to long-term effects. However, given the potential for disturbance and indirect effects on prey availability, this impact has been **scoped in** to the EIA.

2.5.5.1.3 Artificial Lighting Present on Construction Site, Vessels and Substructures

503. Artificial lighting present on construction sites, vessels and other substructures have the potential to be a source of attraction (phototaxis), or displacement, for birds. Phototaxis can be a serious hazard for fledglings of some seabird species (e.g. shearwater and petrel species) but typically occurs over short distances in response to bright white light close to breeding colonies of these species (Furness, 2018). Given the proximity of the Development to sites designated for storm petrel and Manx shearwater, this impact is **scoped in** for assessment.

2.5.5.2 Potential Impacts During the O&M Stage

2.5.5.2.1 Disturbance and Displacement from Turbines and Maintenance Activities

504. Impacts on ornithological receptors during operation relate to the presence of the wind turbines themselves. These include the risk of birds avoiding the wind turbines and therefore potentially being displaced from foraging areas, which may have knock-on demographic effects (e.g. reductions in survival and / or productivity). Avoidance may also lead to foraging or migration routes being extended as a result of the wind farms acting as a barrier to movement and consequently increasing energetic costs. As these effects may influence behaviour and population dynamics, this impact is proposed to be **scoped in** to the EIA.

2.5.5.2.2 Collision Mortality from Turbine Blades

505. Birds which are not displaced and fly through an OWF at the height of the rotating blades are then at risk of collision with operational wind turbines. Collisions are likely to result in direct mortality. Studies indicate that collisions do occur but are rare events (e.g. Skov *et al*., 2018; Tjørnløv *et al*., 2021; Cook, 2026), hence assessment involves modelling the risk of collision for individual species. Given the potential for direct mortality, collision impacts during the O&M stage are considered and have been **scoped in** to the EIA.

2.5.5.2.3 Indirect Effects from Impacts on Fish Prey Resources

506. There may also be indirect effects on Offshore Ornithology receptors through impacts on fish prey species. During the O&M stage, these impacts on the fish prey species may result from underwater noise (e.g. from the operation of the wind turbines), temporary habitat loss (e.g. due

to maintenance activities) and the generation of suspended sediments (e.g. due to maintenance activities). Therefore, this impact is proposed to be **scoped in** to the EIA.

2.5.5.2.4 Disturbance from Artificial Lighting

507. There is the potential that seabird species could be affected by artificial lighting during the O&M stage of the Development. Navigation and aviation lighting on structures within the Array and service vessels at night or periods of poor visibility may potentially be a source of attraction (phototaxis), or displacement, for birds. Therefore, disturbance from artificial lighting is proposed to be **scoped in** to the EIA.

2.5.5.2.5 Secondary Entanglement from Debris attached to Subsea Infrastructure

508. Entanglement associated with subsea infrastructure associated with the Development also poses a potential risk to diving seabird species. It is considered very unlikely that seabirds would become entangled with the mooring lines, dynamic sections of the Inter-Array Cables and other subsea structures directly (primary entanglement); however, there is the risk of secondary entanglement if, for example, fishing gear were to become caught on subsea infrastructure associated with the Development (Maxwell *et al*. 2022). Therefore, impacts associated with secondary entanglement are **scoped in** to the EIA.

2.5.5.3 Potential Impacts During the Decommissioning Stage

509. Impacts during decommissioning are expected to be similar, but of smaller magnitude, to those anticipated during construction (see **Section 2.5.5.1**). The same potential impacts noted for construction are therefore expected to be **scoped in** (and out) for decommissioning.

2.5.5.4 Potential Inter-relationship Impacts

510. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.5.5.5 Potential Cumulative Impacts

511. There may be potential for cumulative impacts to occur on Offshore Ornithology receptors as a result of other activities in the area. The Development wide approach to assessment of potential cumulative impacts is set out in **Section 1.8 EIA Methodology**. The list of offshore wind projects to include in this assessment would follow industry best practice and statutory advice.

512. These projects would be **scoped in** based on the following criteria:

- Projects that have breeding season connectivity to the breeding colonies considered in the Project-alone assessments; and
- Projects within the same BDMPS (UK Western Waters) for the non-breeding season.

513. The Applicant acknowledges that there are historic offshore wind projects for which quantitative analyses were not undertaken at the time of the assessment and/or consent of those historic projects. For these projects, the Applicant proposes to utilise 'gap-filling' data presented by the

Mona, Morgan and Morecambe projects in the cumulative assessment, unless more recent data (e.g. from the proposed cumulative effects framework) becomes available.

514. The potential impacts considered in the cumulative assessment as part of the EIA would be in line with those described for the Development-alone assessment, though it is possible some would be scoped out on the basis that impacts are highly localised or where management measures in place for the Development and other projects would reduce the risk of impacts occurring.

515. The risk of cumulative effects during construction and decommissioning are **scoped in** on the basis that there is the potential for impacts from PDA 2 and 3 to the south of the Development, to overlap with the Development during these stages. This could change depending on the information published in the Scoping Reports due to be submitted by these other projects.

516. Cumulative impacts expected to be **scoped in** would therefore include disturbance and displacement due to the presence of the wind turbines and collision risk during the O&M stage only. Given the wide-ranging nature of many seabird species the CEA of the Development with other wind farms and relevant developments would be an essential element of the EIA and HRA.

2.5.5.6 Potential Transboundary Impacts

517. Given the level of proposed OWF development in the Celtic Sea and Irish Sea (including projects off the east and south coast of Irelantitue of ed as well as other UK Round 5 projects), and the fact that birds are highly mobile and migratory, there is potential for transboundary impacts especially regarding displacement / barrier effects and collision risk during the O&M stage. Any potential transboundary effects that are identified would be assessed as per other cumulative impacts and are therefore **scoped in** to the EIA.

2.5.5.7 Summary of Potential Impacts

518. **Table 2.2.5** outlines the potential impacts related to Offshore Ornithology receptors which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.5.5 Summary of Impacts Proposed to be Scoped in (✓) or out (x) of the Offshore Ornithology Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Direct disturbance impacts due to presence and movement of vessels and other plant	✓	✓	✓
Disturbance and / or phototaxis impacts due to artificial lighting	✓	✓	✓
Disturbance and displacement impacts due to presence of wind turbines	x	✓	x
Barrier effects due to presence of wind turbines	x	✓	x

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Collision impacts with turbines	x	✓	x
Combined collision and displacement impacts due to turbine presence (Gannet only)	x	✓	x
Indirect impacts on ornithological features due to impacts on prey species and habitats	✓	✓	✓
Entanglement	x	✓	x
Inter-relationship Impacts	✓	✓	✓
Cumulative impacts	✓	✓	✓
Transboundary impacts	x	✓	x

2.5.6 Potential Mitigation Measures

519. Embedded mitigation measures relating to Marine Mammals and Marine Turtles impacts are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

520. Additional mitigation measures may be proposed in response to impact assessments. These would evolve as the Development design develops and the EIA progresses, and / or in response to consultation. To assess the efficacy of any mitigation measures, pre and post construction monitoring of seabirds may be required.

521. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All of the proposed mitigation measures would comply with regulatory requirements and good practice. A key mitigation measure which may be considered is increasing the turbine air gap (i.e. the distance between the lower rotor blade tip and the sea). This can have a marked effect in reducing the estimated collision risk for some species such as kittiwake and gannet, and to a lesser extent for large gull species. NIRAS (2024) note the reduction in potential impacts on these species when the rotor swept area is reduced. Subsequently, the Round 5 plan-level HRA AA (The Crown Estate, 2024) states "*In order to reduce the impact of the plan on Kittiwake and Lesser Black-Backed Gull at the Skomer, Skokholm and Seas off Pembrokeshire SPA, and provide confidence in the conclusion of no Adverse Effect On Site Integrity), it has been recommended that the rotor swept area with which birds in flight could interact is reduced, and therefore that there is a cap, across the plan areas, below 80m of 2,786,850m^2, which is equivalent to raising the minimum tip height of the turbines to 25m*" (NIRAS, 2024).

522. It is also noted that there is ongoing strategic research and investigation into the behaviour of birds within and around OWFs. This includes studies aimed at providing further empirical evidence on collision rates and refining industry standard methods for estimating bird mortality from collisions; as well as understanding the mechanisms for and estimating the effects of bird displacement. Should any further findings of relevance to mitigation emerge during an appropriate timescale for the Development, these would also be considered.

2.6 Commercial Fisheries

523. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Commercial Fisheries.

524. This Section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Commercial Fisheries receptors in the Development's ES.

525. For the purpose of this Scoping Report, 'Commercial Fisheries' is defined as any form of fishing activity legally undertaken with catch sold for taxable profit.

526. The Commercial Fisheries assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description**;
- **Section 2.3 Fish and Shellfish Ecology**; and
- **Section 2.7 Shipping and Navigation**.

The following questions are posed to consultees to help them frame and focus their response to the Commercial Fisheries scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Commercial Fisheries Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?

2.6.1 Study Area

527. The Commercial Fisheries Study Area is located within the ICES Subarea 7, within UK exclusive economic zone (EEZ) waters. The Array Scoping Boundary is located within ICES Division 7g (Celtic Sea North) and the Offshore Export Cable Scoping Boundary is located in Divisions 7g and 7f (Bristol Channel). For the purpose of recording Commercial Fisheries landings, ICES Subarea 7 is divided into statistical rectangles, of which the Array Scoping Boundary overlaps with 31E4 and the Offshore Export Cable Scoping Boundary overlaps with 31E4, 31E5, 32E4 and 32E5.

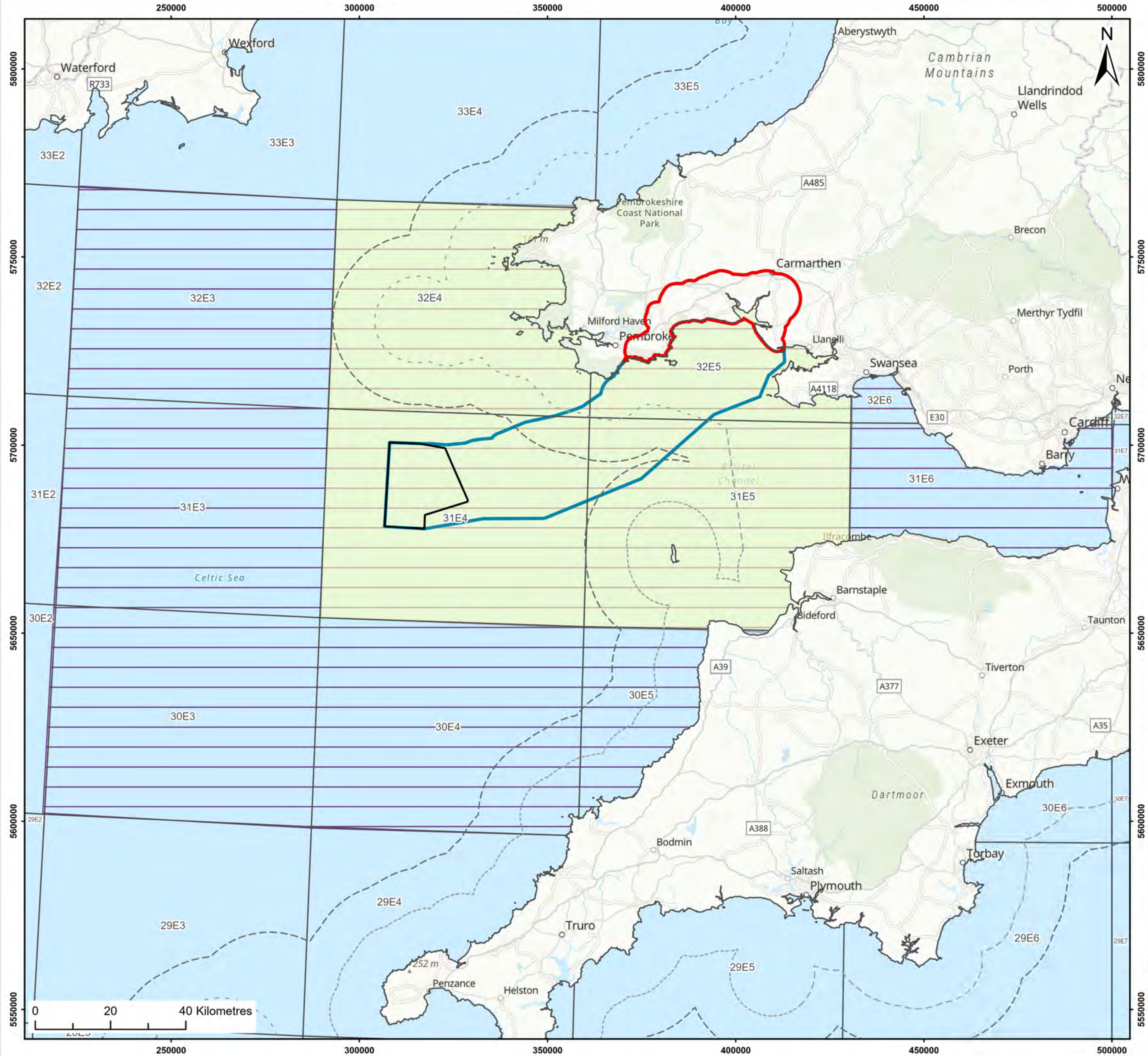
528. For the purposes of this Scoping Report, the Commercial Fisheries Local Study Area comprises the four ICES rectangles with which the Offshore Scoping Boundary overlaps: 31E4, 31E5, 32E4 and 32E5.

529. A wider Regional Study Area is defined to include the Commercial Fisheries Local Study Area plus immediately adjacent ICES rectangles, except where those rectangles are separated by land, meaning they are not functionally connected to the Local Study Area in terms of fishing activity. The Commercial Fisheries Regional Study Area therefore comprises 11 ICES rectangles: 30E3, 30E4, 30E5, 31E3, 31E4, 31E5, 31E6, 32E3, 32E4, 32E5, 32E6. ICES rectangles 30E6, 33E4 and 33E5 are not included due to separation by land mass, with Dyfed, Wales to the north and Devon, England to the south.

530. The Commercial Fisheries Study Areas have been defined in accordance with FLOWW guidance and provide a proportionate basis for identifying Commercial Fisheries receptors with potential to interact with the Offshore Scoping Boundary and for assessing potential effects. The Commercial Fisheries Regional Study Area is not intended to represent the full operational range of all vessels or fleet segments active in the wider region; where relevant, wider fishing patterns and operational ranges would be considered in the interpretation of effects and in the cumulative assessment.

531. The Commercial Fisheries Study Areas are shown on **Figure 2.6.1** and defined as:

- Commercial Fisheries Local Study Area: 31E4, 31E5, 32E4 and 32E5; and
- Commercial Fisheries Regional Study Area: 30E3-E5, 31E3-E6, 32E3-E6.



Legend:

- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- Commercial Fisheries Regional Study Area
- Commercial Fisheries Local Study Area
- ICES Statistical Rectangles
- 6 nm Limit
- 12 nm Limit

Source: © Haskoning UK Ltd, 2026
Base map: Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, METI/NASA, USGS, Esri, USGS

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Commercial Fisheries Study Areas

Figure: 2.6.1	Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0001			
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/05/2026	FN	AS	A3	1:1,000,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

Haskoning
Enhancing Society Together

Gwynt GLAS

2.6.2 Baseline Environment

532. A range of UK and EU Commercial Fisheries fleets operate throughout the Commercial Fisheries Local Study Area.

533. Data from the MMO on Commercial Fisheries statistics provides details of landings by UK vessels into UK and non-UK ports and details of EU vessel landings into UK ports. The findings from this dataset are presented in this section.

534. Landings by EU vessels into EU ports is identified as a data gap for Scoping, which would be addressed following submission of this Scoping Report through data requests to EU Member State scientific bodies to improve understanding of non-UK fishing activity in the Commercial Fisheries Local and Regional Study Areas.

535. For the purposes of this Scoping Report, Commercial Fisheries data are summarised over a five-year period from 2020 to 2024, as a proportionate and recent dataset to inform the identification of key receptors, activities and potential issues at the scoping stage. However, this period includes atypical conditions, notably COVID-19 operating restrictions in 2020 and market and trade changes associated with the UK's exit from the EU during 2020 to 2021, which may have influenced fishing activity and landings patterns. As these years may not be fully representative of longer-term fishing activity, the Development ES would draw on a longer-term dataset of at least a ten-year period of landings data. This would provide a more robust baseline by capturing interannual variation and enabling recent trends to be considered in the context of longer-term patterns.

2.6.2.1 UK Activity in the Commercial Fisheries Local Study Area

536. UK landings from the Commercial Fisheries Local Study Area had an annual average first sales value of approximately £7.5 million across the years 2020 to 2024 (MMO, 2025), with landings values peaking in 2024 at £8.9 million and being at their lowest in 2020 at £5.3 million (likely due to a combination of COVID-19 restrictions and the UK EU-exit). Over the same time period, the annual average weight of landings from the Commercial Fisheries Local Study Area was 3,500 tonnes, peaking at approximately 4,500 tonnes in 2022.

537. Landings of shellfish species dominated the catch from the Commercial Fisheries Local Study Area, accounting for 68% of the total landed value and 79% of landed weight (based on 2020-2024 data from MMO, 2025). Landings of demersal fish species accounted for 31% of the total landed value (and 18% of the weight), and pelagic species for 1% of the total landed value (and 4% of the weight).

538. Landings are predominately by English and Welsh registered vessels, with 50% of the value landed by English vessels (£3.8 million per annum) and 48% of the value landed by Welsh vessels (£3.6 million per annum) (**Plate 2.6.1**). Smaller quantities of landings are recorded for vessels registered in Scotland and Northern Ireland.

539. Landings by UK vessels are made into the following top five ports (in order of average annual landed value):

- Milford Haven;
- Ilfracombe;
- Saundersfoot;

- Padstow; and
- Burry Port.

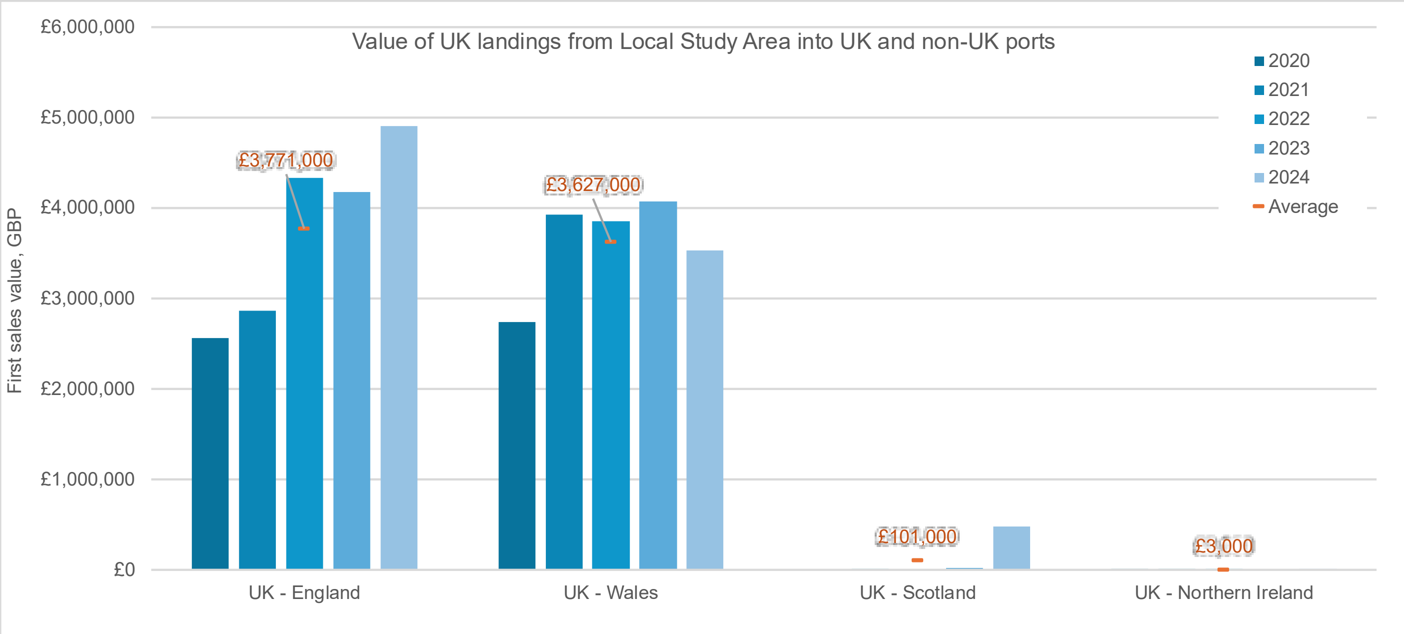


Plate 2.6.1 Value of UK landings from the Commercial Fisheries local study area into UK and non-UK ports from 2020-2024 (Data source: MMO, 2025)

540. **Plate 2.6.2** and **Plate 2.6.3** show the top 15 species landed from the Commercial Fisheries Local Study Area by value and weight respectively, from 2020 to 2024 (MMO, 2025).

541. Across the Commercial Fisheries Local Study Area, whelk *Buccinum undatum* dominates the value of landings, with an average annual value of ~£2.82 million over 2020–2024. The next most valuable species are lobster *Homarus gammarus* (£1.22 million), brown crab *Cancer pagurus* (£0.80 million), sole *Solea solea* (£0.70 million) and bass *Dicentrarchus labrax* (£0.60 million). All other species contribute comparatively smaller values (generally <£0.35 million on average), including blonde ray *Raja brachyura* (£0.32 million) and thornback ray *Raja clavata* (£0.20 million), with several finfish and shellfish species contributing <£0.10 million per year on average (e.g. dogfish *Scyliorhinus canicula,* king scallop *Pecten maximus*, horse mackerel *Trachurus trachurus*). Interannual variability is evident for several species, but the overall pattern remains consistently whelk-led.

542. Landings by weight show the same broad pattern, with whelk accounting for the majority of landed tonnage, averaging ~2,220 tonnes per year.

543. The prominence of whelk in both landed value and tonnage is also reflected in the management regime applicable to the fishery. In Welsh waters, the whelk fishery is subject to specific management controls, including a permit-based system, annual and monthly catch limits, and a minimum catch, carriage and landing size of 65 millimetres (mm). This contrasts with the position in English waters, where whelk is not currently subject to a national catch limit and the national minimum conservation reference size in offshore waters is 45 mm, although more restrictive

measures may apply locally within Inshore Fisheries and Conservation Authority districts. These differing management regimes provide important context for understanding the scale and value of whelk landings recorded within the Commercial Fisheries Study Area.

544. The next highest volumes are substantially lower, led by brown crab (~300 tonnes per year), with a range of other species generally averaging ~20–130 tonnes per year (e.g. horse mackerel, rays (Rajidae), bass, dogfish, sole, lobster, king scallop). Several stocks show year-to-year fluctuations, including occasional higher landings in individual years, but the landed weight profile is strongly dominated by whelk, with all other species forming a relatively minor proportion of total tonnage.

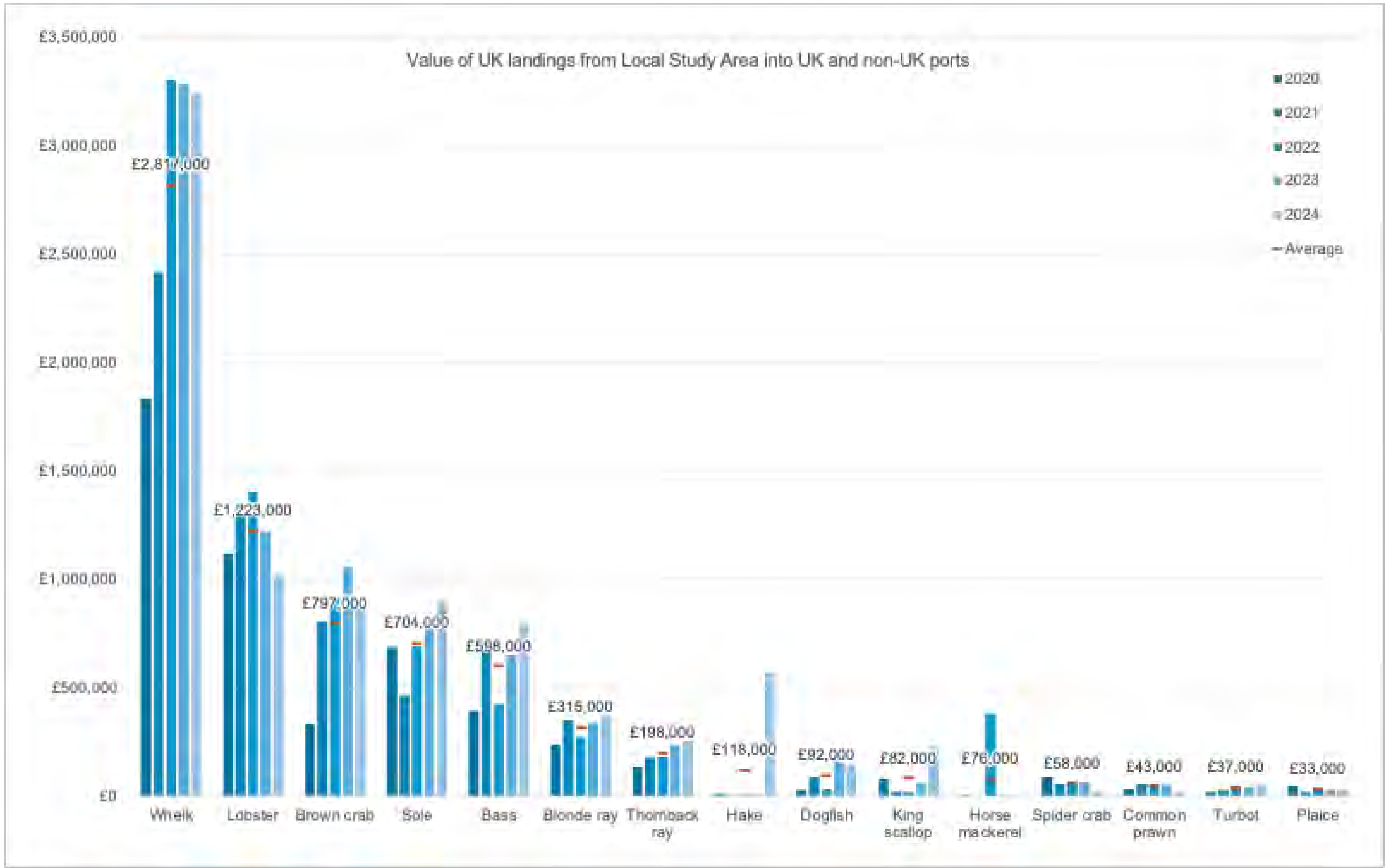


Plate 2.6.2 First sales value (Great British Pound (GBP)) of UK landings from Commercial Fisheries Local Study Area into UK and non-UK ports by species from 2020 to 2024 (Data source: MMO, 2025)

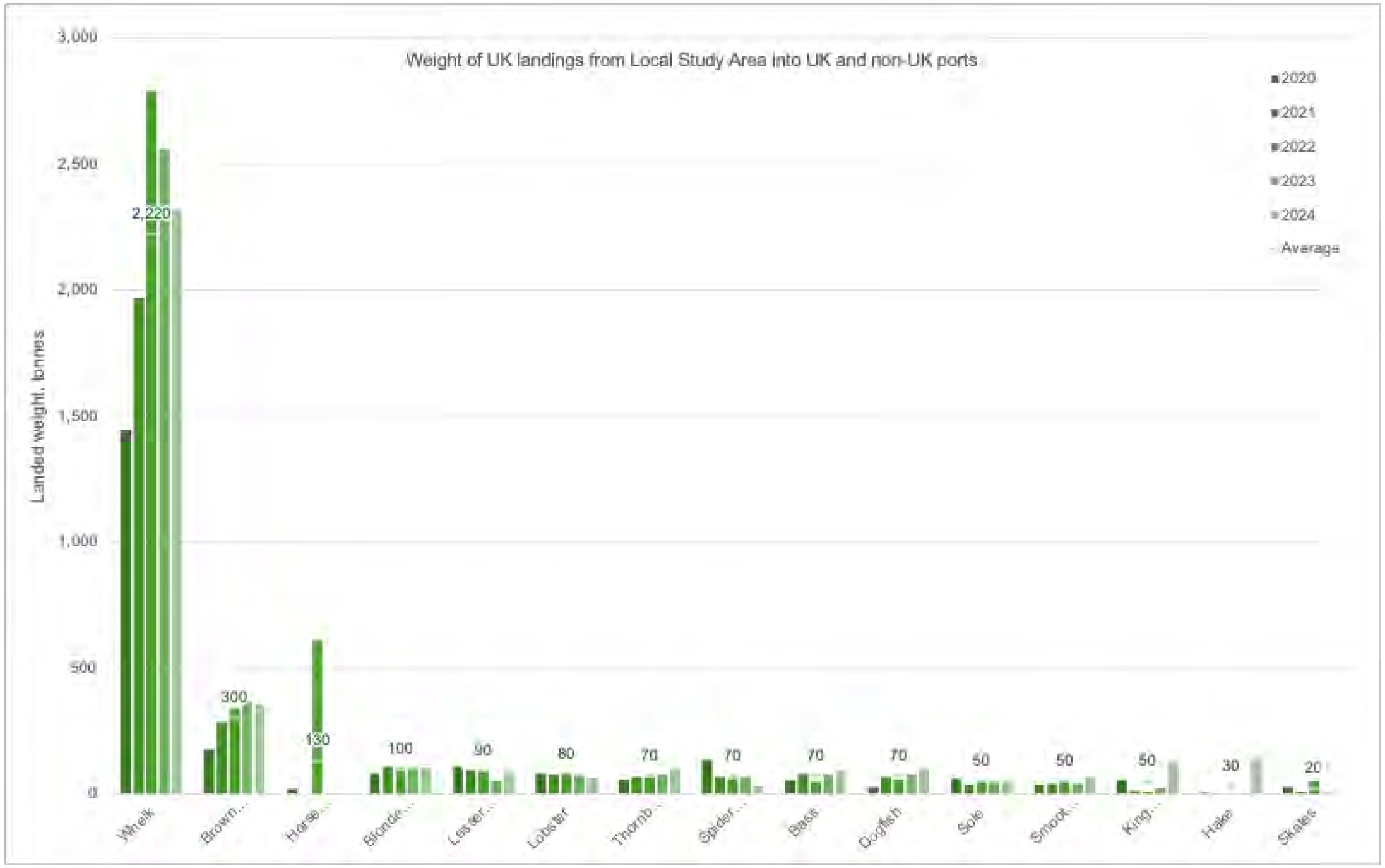


Plate 2.6.3 Landed weight (tonnes) of UK landings from Commercial Fisheries Local Study Area into UK and non-UK ports by species from 2020 to 2024 (Data source: MMO, 2025)

545. Landings by UK vessels by gear type is shown in **Plate 2.6.4** indicating that the majority of catch is taken by pots and traps (66% by value), followed by demersal otter trawl (14%), beam trawl (7%), static nets (6%) and handline (4%).

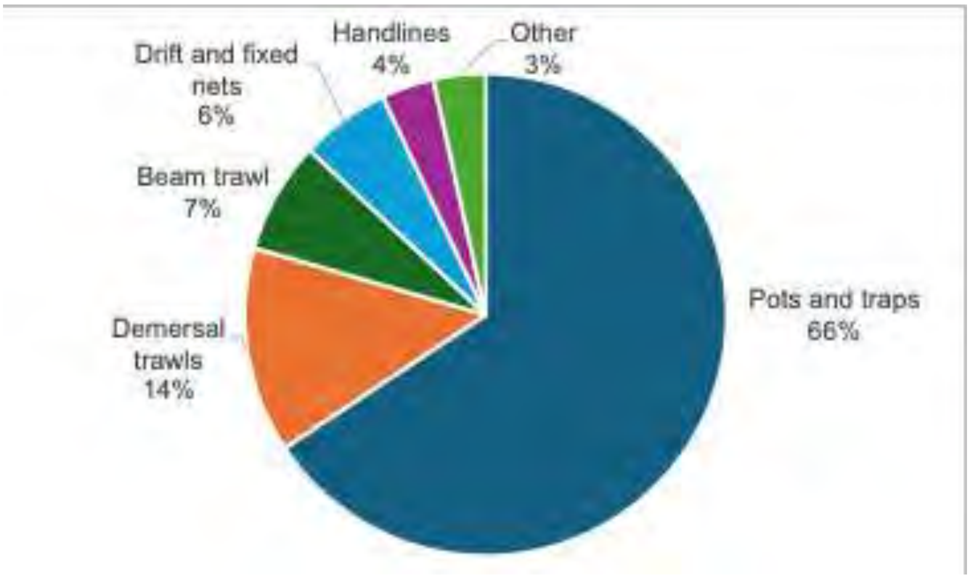


Plate 2.6.4 Proportion of UK vessel landings from the Commercial Fisheries Local Study Area by gear type based on an average from 2020 to 2024 (Data source: MMO, 2025)

2.6.2.2 Non-UK Activity in the Commercial Fisheries Local Study Area

546. Non-UK activity presented in terms of landings is based on MMO data, which records landings by non-UK vessels into UK ports only. It does not include landings by non-UK vessels made into ports outside the UK.

547. On the basis of information provided by the FLO, non-UK fishing activity in the Commercial Fisheries Local Study Area is expected to include vessels registered in Belgium, Ireland and France.

548. Landing statistics indicate that Belgium registered vessels landed £5.5 million into UK ports in 2020 (**Plate 2.6.5**). Landings in 2020 were dominated by sole and made by vessels deploying beam trawl gear.

549. In the Commercial Fisheries Local Study Area, Belgian vessels landed sole with a first sales value of approximately £3.8 million in 2020. Other species landed included megrim, monkfish and plaice, each with values of approximately £350,000; as well as blonde ray and turbot, each with values approximately £200,000.

550. For the period 2020 to 2024, minimal landings into UK ports are recorded for Belgian vessels from 2021 onwards, likely due to the UK's exit from EU. It is understood that the Belgian fleet remain active in the Commercial Fisheries Local Study Area, and that statistics indicate that landings by the Belgian fleet are made into other EU ports (not into the UK).

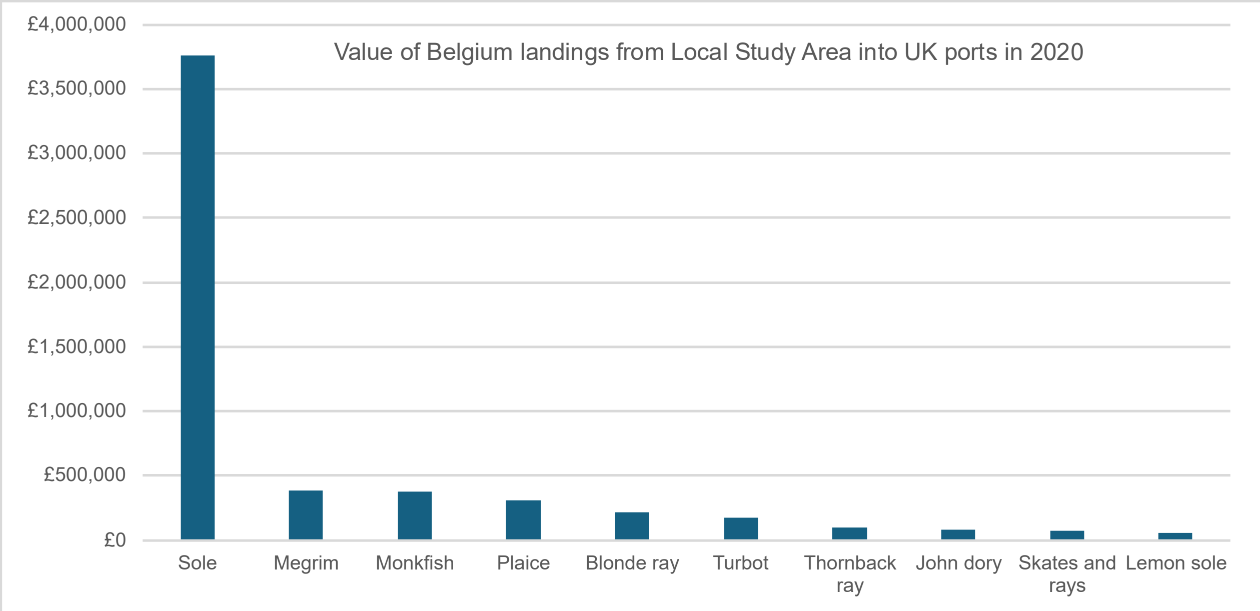


Plate 2.6.5 First sales value (GBP) of Belgium landings from Commercial Fisheries Local Study Area into-UK ports by species in 2020 (Data source: MMO, 2025)

551. Landing statistics indicate that Irish registered vessels landed £15,000 into UK ports in 2021 (**Plate 2.6.6**); specifically, these landings were made into Kilkeel in Northern Ireland in June 2021. Landings are dominated by whiting and haddock and made by vessels deploying demersal otter trawl gear.

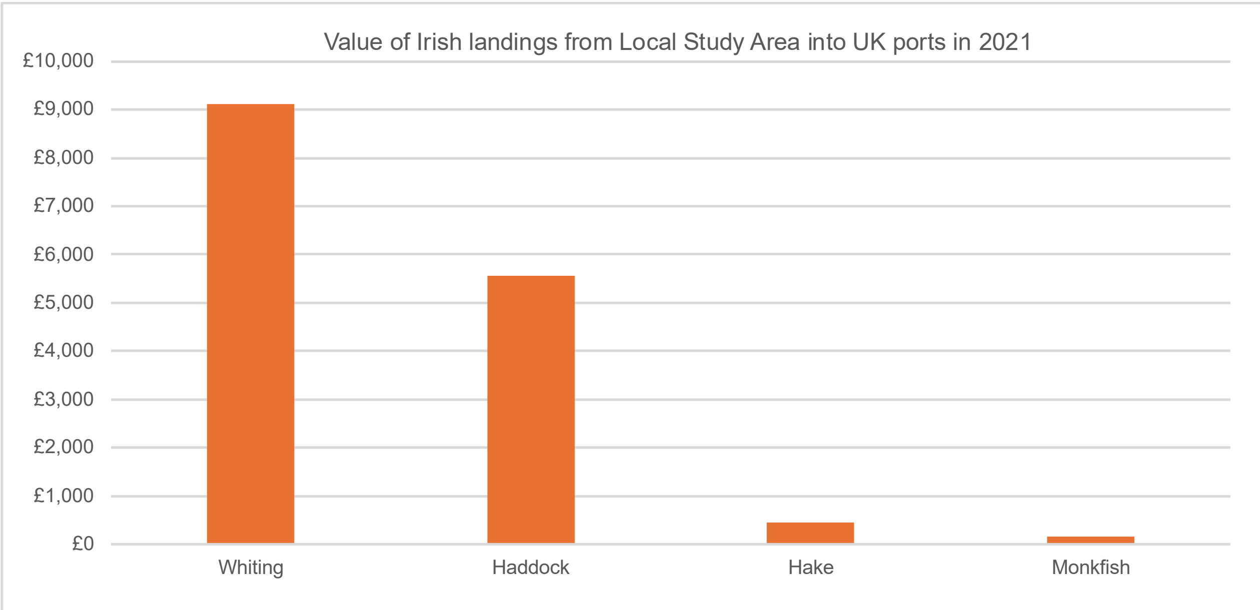


Plate 2.6.6 First sales value (GBP) of Irish landings from Commercial Fisheries Local Study Area into-UK ports by species in 2021(Data source: MMO, 2025)

2.6.3 Data Sources

552. **Table 2.6.1** outlines the primary data sources that would be analysed in inform the EIA Commercial Fisheries Technical Report and ES Chapter. Data from 2020 to 2024 has been used to inform this section. If any further data sources from 2025 are published prior to the submission of the ES, these would be incorporated to the Commercial Fisheries assessment.

Table 2.6.1 Data sources to inform the Commercial Fisheries assessment

DATASET	SPATIAL COVERAGE	YEARS
UK annual fisheries landings statistics, MMO iFISH dateset (MMO, 2025)	Full coverage for UK vessels; partial coverage for non-UK vessels	2015 to 2024
MMO/Defra fisheries activity mapping outputs UK over 12-m fleet	Coverage for UK vessels 12m and over in length	2016 to 2023
DataMapWales Fleet Landings by Port and Sea Area	Coverage for Welsh vessels	Up to 2024
Welsh Vessel Monitoring System (VMS) data	Coverage for Welsh vessels in Welsh waters	To be confirmed
UK VMS data, MMO (2023)	Coverage for UK vessels 15m and over in length	2016 to 2020
Fisheries Sensitivity Mapping and Displacement Modelling	Coverage for UK and EU vessels 12m and over in length	2012 to 2021
EU annual fisheries landings statistics **Scientific, Technical and Economic Committee for Fisheries (STECF), (EU Data Collection Framework, 2020)**	Full coverage for EU vessels	2004 to 2016
EU VMS data	Coverage for UK and EU vessels 12m and over in length	2016 to 2020
Fishing vessel route density data **European Maritime Safety Agency (EMSA, 2025)**	Coverage for UK and EU vessels 12m and over in length	2020 to 2024
Surveillance data	Full coverage for UK and EU vessels	2020 to 2024

553. It should be noted that the quantitative datasets identified in **Table 2.6.1** may not capture all Commercial Fisheries activity in the Commercial Fisheries Study Areas. For instance, the VMS datasets only covers vessels ≥12 m (ICES data) or ≥15 m (MMO data) in length. Note that UK

vessels ≥12 m in length have VMS on board, however, to date, the MMO provide amalgamated VMS datasets for ≥15 m vessels only.

554. However, in addition to VMS data, other published data does provide a useful insight into Commercial Fisheries activity undertaken in inshore areas and by smaller vessels not captured by VMS data (e.g., inshore fisheries mapping) and would be utilised where appropriate. Extensive consultation with fisheries stakeholders and industry would continue throughout the EIA process and would be important to ground-truth baseline data analysis, provide locally specific knowledge of the fishing activity and inform the impact assessment in the Development's ES.

555. Consultation with representatives of fishermen's associations and organisations would be undertaken to corroborate the findings of desk-based baseline data analysis and to provide insight into specific fishing grounds and activity of any vessels active in the Commercial Fisheries Study Areas. Consultation would also be important to inform gear specifications for vessels active in the Commercial Fisheries Study Areas, which would allow a full understanding of how different vessels and different gear configurations may be affected. This information would be used to inform constraints mapping and iterative project design, including the identification of areas of heightened Commercial Fisheries sensitivity to support the avoidance and reduction of potential effects, where practicable

556. Variations and trends in Commercial Fisheries activity are an important aspect of the baseline assessment. For scoping purposes, a recent dataset has been used to provide a proportionate overview of current baseline conditions; however, longer time series would be assessed within the EIA to place recent activity in context and to distinguish longer-term patterns from short-term fluctuations or atypical years. It is noted that available landings data spans the period of the COVID-19 pandemic, which is understood to have temporarily affected market demand and supply chains. Furthermore, changes in fishing patterns resulting from the withdrawal of the UK from the EU would be reflected in data sets for 2021 onwards. Long term environmental and climatic changes may be expected to be detectable within the five-year time series but may benefit from longer-term analysis dependant on the target species. Inclusion of such longer-term analysis would be informed by stakeholder consultation.

557. In addition to the data in **Table 2.6.1, Table 2.6.2** describes the surveys that will be undertaken to support the assessment. Survey methodologies will be agreed in advance with stakeholders where possible.

Table 2.6.2 Site-specific survey data

DO DATA SET	SPATIAL COVERAGE	SURVEY TIMINGS
Vessel traffic surveys	Offshore Scoping Boundary	2027

558. Other information sources available to inform the EIA includes:

- ICES species stock assessments;
- Cefas species stock assessments; and
- Other ES for developments in the region.

2.6.4 Approach to Impact Assessment

559. The EIA would follow the general approach outlined in **Section 1.8 EIA Methodology**. Definitions specific to Commercial Fisheries in relation to assessing the sensitivity of the receptor and magnitude of an impact are provided in **Table 2.6.3** and **Table 2.6.4** respectively.

Table 2.6.3 Definition of Sensitivity Levels for Commercial Fisheries Receptors and Example Indicators

SENSITIVITY	DEFINITION	EXAMPLE INDICATORS
High	Receptor is highly vulnerable to impacts that may arise from the Development, and recoverability is long term or not possible. And / or: No alternative fishing grounds are available.	Area represents core or primary fishing ground; Gear types/location highly specific with no feasible alternatives; and Minimal opportunity to relocate fishing effort.
Medium	Receptor is somewhat vulnerable to impacts that may arise from Development and has moderate levels of recoverability. And / or: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.	Affected grounds contribute materially to seasonal activity in terms of availability of grounds targeted; Some difficulty relocating effort without displacement or loss; and Limited spatial mobility or operational constraints (e.g. gear type, vessel size).
Low	Receptor is not generally vulnerable to impacts that may arise from the Development and /or has high recoverability. And / or: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.	Area is not delineated or recognised as a regular fishing ground and accounts for only a small proportion of fleet effort spatially; Similar grounds are accessible within normal operational range; and Flexible gear use or target species.
Negligible	Receptor is not vulnerable to impacts that may arise from the Development and /or has high recoverability. And / or: Extensive alternative fishing grounds available and / or fishing fleet is highly adaptive and resilient to change.	No reliance on affected grounds; Vessel(s) operates across multiple regions or grounds; and Impacts are spatially or temporally insignificant to operations.

Table 2.6.4 Definition of Magnitude Levels for Commercial Fisheries Receptors and Example Indicators

MAGNITUDE	DEFINITION	EXAMPLE INDICATORS
High	Impact is expected to result in one or more of the following: Substantial loss of target fish or shellfish biological resource (e.g. loss of substantial proportion of resource); and Substantial loss of ability to carry on fishing activities (e.g. substantial loss of geographic extent); And / or Impact is of long-term duration (e.g. greater than 12 years duration) and / or is of extended physical extent.	Affected area represents core or critical fishing ground in terms of value of catch; High dependence and value confirmed through verified data sources and evidence from consultation; Long-term or permanent reduction in ability to catch commercial resource is anticipated; and Loss of fishing grounds has the potential to result in unacceptable business impacts, including the risk that affected fishing businesses may no longer remain viable.
Medium	Impact is expected to result in one or more of the following: Partial loss of target fish or shellfish biological resource (e.g. moderate loss of resource); and Partial loss of ability to carry on fishing activities (e.g. moderate loss of geographic extent). And / or: Impact is of medium-term duration (e.g. less than 12 years) and / or is of moderate physical extent.	Affected area represents an important, but not core or critical, fishing ground in terms of value of catch; Moderate dependence and value indicated through available data sources and/or consultation evidence; Medium- to long-term reduction in ability to catch commercial resource may be anticipated; and Loss or reduced access to fishing grounds has the potential to result in material business impacts, but is not expected to threaten the overall viability of affected fishing businesses.
Low	Impact is expected to result in one or more of the following: Minor loss of target fish or shellfish biological resource (e.g. minor loss of resource); and Minor loss of ability to carry on fishing activities (e.g. minor loss of geographic extent). And / or:	Affected area represents a low-value or infrequently used fishing ground in terms of value of catch; Low dependence and value indicated through available data sources and/or consultation evidence; Short term reduction in ability to catch commercial resource is anticipated; and Loss or reduced access to fishing grounds may result in minor inconvenience to fishing activity, but is not expected to affect overall catch levels.

MAGNITUDE	DEFINITION	EXAMPLE INDICATORS
	Impact is of short-term duration (e.g. less than 2 years) and/or is of limited physical extent. The short-term time period is based on professional judgement and is not definitive dependent on the nature of the impact.	
Negligible	Fishing activity absent or minimal within affected area (as evidenced by baseline data and corroborated through industry consultation). And / or: Impact is expected to result in one or more of the following: Slight loss of target fish or shellfish biological resource (e.g. slight loss of resource); and Slight loss of ability to carry on fishing activities (e.g. slight loss of fishing effort). And / or: Impact is of very short-term duration (e.g. less than 1 year) and/or physical extent of impact is negligible and broadly undetectable from pre-Development baseline conditions.	Very low or no fishing activity recorded in the area; Negligible dependence and value indicated through available data sources and/or consultation evidence; No material reduction in ability to catch commercial resource is anticipated; and Loss or reduced access to fishing grounds is not expected to result in any detectable change to normal fishing vessel business operations.

2.6.4.1 Receptors

560. The following receptors in **Table 2.6.5** have been identified as potentially being affected by the Development, indicating if interaction is likely across the Array Scoping Boundary and / or Offshore Export Cable Scoping Boundary.

Table 2.6.5 Relevant Receptors for the Commercial Fisheries Assessment

RECEPTOR	ACTIVITY ACROSS THE ARRAY SCOPING BOUNDARY	ACTIVITY ACROSS THE OFFSHORE EXPORT CABLE SCOPING BOUNDARY.
UK potting targeting whelk	✓	✓
UK potting targeting lobster and crab species	✓	✓

RECEPTOR	ACTIVITY ACROSS THE ARRAY SCOPING BOUNDARY	ACTIVITY ACROSS THE OFFSHORE EXPORT CABLE SCOPING BOUNDARY.
UK demersal otter trawl targeting rays, sole, bass and other species	✓	✓
UK beam trawl targeting sole and other species	✓	✓
UK netting targeting bass	✓	✓
UK handline targeting bass	✓	✓
UK commercial hand gathering targeting shellfish species	×	✓
UK pelagic trawl targeting horse mackerel	✓	×
UK dredge targeting king scallop	✓	✓
Belgium beam trawl targeting sole	✓	✓
Irish demersal otter trawl targeting whitefish	✓	×
Other EU vessels including French	✓	×

2.6.5 Potential Impacts

561. The potential impacts on Commercial Fisheries are considered in this scoping exercise during all stages of the Development, including construction, O&M and decommissioning. These impacts may be temporary or longer term in nature, depending on the Development stage.

2.6.5.1 Reduction in Access to, or Exclusion from Established Fishing Grounds within the Array Scoping Boundary

562. Construction, O&M, and decommissioning of the Development may reduce or prevent access to established fishing grounds within the Array Scoping Boundary. At this scoping stage, the final Development design, including foundation type, mooring configuration, separation distances and technology solution, has not yet been confirmed. The design envelope would be further defined through the EIA process and would inform the assessment of potential loss or reduction of access to commercial fishing grounds.

563. Depending on the design taken forward, the extent to which fishing may be able to resume within the Array Scoping Boundary may vary. For example, fishing resumption may be less likely where mooring systems occupy a substantial proportion of the array area, whereas technologies such as TPL(s) may present greater potential for fishing activity to resume, subject to safety and navigational considerations. The EIA would therefore set out and justify the assumptions made

regarding whether, and to what extent, fishing activity may be able to resume within the Array Scoping Boundary.

564. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.2 Reduction in Access to, or Exclusion from Established Fishing Grounds in the Offshore Export Cable Scoping Boundary

565. Construction, where required, maintenance, and decommissioning of the Offshore Export Cables may temporarily reduce access to fishing grounds within the Offshore Export Cable Scoping Boundary through the presence of works vessels, advised safe working distances and localised cable protection if required. However, as the export cables would be buried or protected where necessary, fishing is expected to resume across the majority of the corridor following installation, with any longer-term restriction likely to be limited to the cable footprint, cable protection locations and temporary maintenance areas.

566. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.3 Displacement Leading to Gear Conflict and Increased Fishing Pressure on Adjacent Grounds

567. Reduced access to fishing grounds within the Array Scoping Boundary, and to a lesser extent within parts of the Offshore Export Cable Scoping Boundary, may displace fishing effort into adjacent grounds. The extent of any displacement would depend on the final project design, construction and operational parameters, including the degree to which fishing activity can safely resume within the Array Scoping Boundary. Where access is reduced or prevented, displaced effort could increase competition for space, fishing pressure and the potential for interaction or conflict between different gear types, particularly where vessels move into grounds already targeted by other fleets.

568. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.4 Disturbance Of Commercially Important Fish and Shellfish Resources Leading to Displacement or Disruption of Fishing Activity

569. Construction, O&M and decommissioning activities may disturb commercially important fish and shellfish resources through pathways such as underwater noise, seabed disturbance, habitat alteration, sediment suspension and, during operation, effects such as EMF. Any resulting changes in the distribution, availability or behaviour of target species could disrupt fishing patterns and reduce the effectiveness of fishing activity in and around the Development.

570. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.5 Increased Vessel Traffic Associated with the Development in Fishing Grounds Leading to Interference with Fishing Activity

571. Development-related vessel movements during construction, maintenance and decommissioning may temporarily interfere with fishing activity within established fishing grounds. Increased traffic from construction and support vessels, together with associated safety measures, may require fishers to avoid active work areas or adjust normal fishing operations, potentially resulting in short-term disruption.

572. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.6 Additional Steaming to Alternative Fishing Grounds for Vessels That Would Otherwise Fish within the Development

573. Where access to established grounds is reduced, particularly within the Array Scoping Boundary, affected vessels may need to travel further to reach alternative fishing grounds. This may increase steaming time, fuel use and operating costs, and may reduce fishing efficiency for some fleets, especially those that would otherwise target grounds within or close to the Development area.

574. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.7 Physical Presence of Infrastructure, Mooring/Anchorage Systems, Export Cables and Potential Exposure of That Infrastructure Leading to Gear Snagging

575. The physical presence of infrastructure within the Array Scoping Boundary, and Offshore Export Cables and any associated protection or exposed sections within the Offshore Export Cable Scoping Boundary, may create a risk of gear interaction or snagging. This could result in loss of or damage to fishing gear, and associated loss in earnings.

576. Therefore, this impact is **scoped in** to the EIA for all stages of the Development.

2.6.5.8 Potential Inter-relationship Impacts

577. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.6.5.9 Potential Cumulative Impacts

578. The CEA would follow the methodology set out in **Section 1.8 EIA Methodology**.

579. Offshore wind projects and other activities, such as subsea cables and pipelines, relevant to the assessment of cumulative impacts on Commercial Fisheries would be identified through a screening exercise. The potential impacts considered in the cumulative assessment would be in line with those described for the Development-alone assessment, though it is possible that some would be screened out on the basis that the impacts are highly localised (i.e., they occur only within Development boundaries). Key potential cumulative impacts may result from:

- Reduction in access to, or exclusion from established fishing grounds;
- Displacement leading to gear conflict and increased fishing pressure on adjacent grounds; and
- Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity.

580. Therefore, cumulative impacts are **scoped in** to the EIA.

2.6.5.10 Potential Transboundary Impacts

581. Transboundary impacts are **scoped in** to the EIA and would be considered based on any potential displacement of fishing activity into the French and Irish EEZs.

2.6.5.11 Summary of Potential Impacts

582. **Table 2.6.6** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.6.6 Summary of Impacts Proposed to be Scoped In (✓) and / or Out (X) of the Commercial Fisheries Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Reduction in access to, or exclusion from established fishing grounds within the Array Scoping Boundary	✓	✓	✓
Reduction in access to, or exclusion from established fishing grounds within the Offshore Export Cable Scoping Boundary	✓	✓	✓
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds	✓	✓	✓
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity	✓	✓	✓
Increased vessel traffic associated with the Development within fishing grounds leading to interference with fishing activity	✓	✓	✓
Additional steaming to alternative fishing grounds for vessels that would otherwise fish within the Development	✓	✓	✓
Physical presence of infrastructure and potential exposure of that infrastructure leading to gear snagging	✓	✓	✓
Cumulative impacts	✓	✓	✓
Transboundary impacts	✓	✓	✓

2.6.6 Potential Mitigation Measures

583. Embedded mitigation measures relating to Benthic Habitat are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology).**

584. Requirements for any additional mitigation measures would be determined through the EIA.

585. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and

assessment process. All of the proposed mitigation measures would comply with regulatory requirements and good practice.

2.7 Shipping and Navigation

586. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Shipping and Navigation.

587. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Shipping and Navigation receptors in the Development's ES.

588. The Shipping and Navigation assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

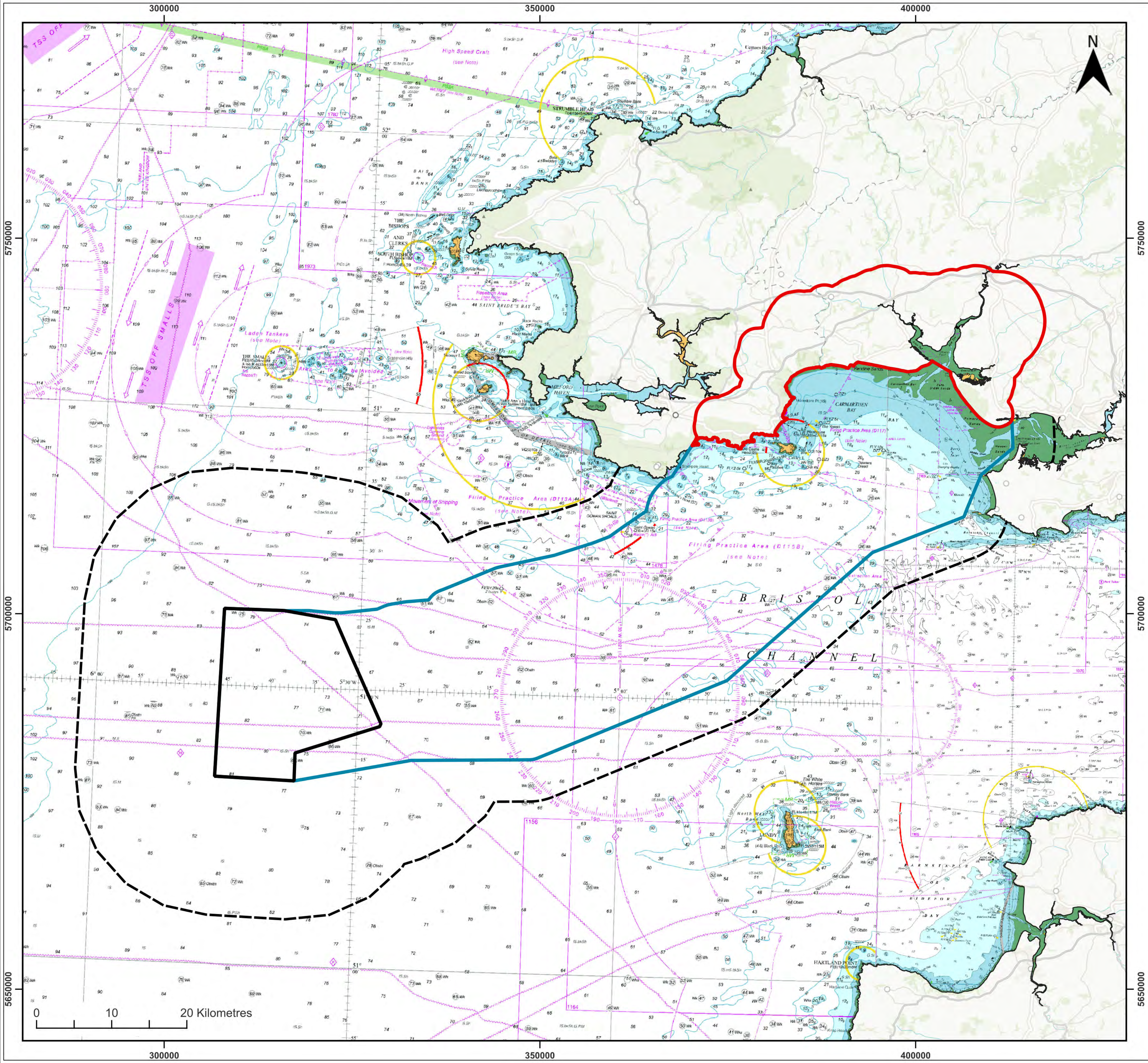
- **Section 1.5 Development Description;**
- **Section 2.6 Commercial Fisheries**;
- **Section 2.8 Aviation and Radar**;
- **Section 2.9 Infrastructure and Other Users**;
- **Section 4.1 Population and Human Health**;
- **Section 4.2 Socio-economics**; and
- **Section 4.3 Tourism and Recreation**.

The following questions are posed to consultees to help them frame and focus their response to the Shipping and Navigation scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Shipping and Navigation Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in for further assessment?
- Do you agree that appropriate Shipping and Navigation consultees have been identified?
- Do you agree with the proposed approach to the NRA and EIA assessment?

2.7.1 Study Area

589. The Shipping and Navigation Study Area is defined as the Array Scoping Boundary, plus a 10nm buffer (**Figure 2.7.1**). The 10nm buffer is consistent with industry best practice and other Shipping and Navigation assessments as it is large enough to encompass vessel routeing which may be impacted, while remaining site-specific to the area being studied. The Shipping and Navigation Study Area for the Offshore Export Cable Scoping Boundary would be a 3nm buffer. For Scoping, the 3nm buffer has been applied around the whole area within which the Offshore Export Cable could be located. Where appropriate, other important features located outside of the Shipping and Navigation Study Area which are contextually relevant or affect routeing through the Shipping and Navigation Study Area, would be highlighted and described



Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary

Source: © Haskoning UK Ltd, 2026
Admiralty Charts from Triton Software Ltd. (2026).

Project:	Gwynt Glas Offshore Wind Farm Scoping Report
Title:	Shipping and Navigation Study Area

Figure:	2.7.1	Drawing No:	PC6850-HAS-ZZ-ZZ-DR-GS-0001		
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Co-ordinate system: ETRS89 / UTM zone 30N

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2.7.2 Baseline Environment

2.7.2.1 Key Navigational Features

590. The key navigational features identified in the vicinity of the Shipping and Navigation Study Area are presented on **Figure 2.7.2**. Information on the features within this Study Area have been extracted from relevant nautical publications including nautical charts (Admiralty, 2025a) and sailing directions (Admiralty, 2025b). The Development is located in unobstructed deep waters, 22nm from the coastline with no existing offshore developments within the vicinity.

591. The Off Smalls Traffic Separation Scheme (TSS) is located 15nm north-west of the Array Scoping Boundary. A TSS is an International Maritime Organisation (IMO) designated routeing system that reduces collision risk by separating opposing streams of vessel traffic into organised, one-way lanes with a central separation zone. Situated near Smalls Lighthouse, south-west of Milford Haven, the Off Smalls TSS is one of the established TSSs within the Irish Sea and serves to separate north-south traffic flows, to enhance navigational safety. A large proportion of traffic navigating through the Off Smalls TSS continue south to the Off Land's End TSS (east of the Isles of Scilly) and the West of the Scilly Isles TSS.

592. The Array Scoping Boundary is located 25nm (83km) south of the Port of Milford Haven which is the UK's largest energy port and the biggest port in Wales and includes Pembroke Port, Milford Marina and the Milford Fish Docks (Milford Haven Port Authority, 2026). The port operates 24/7 and handles cargo, ferries, fishing activity, marina services and cruise call. Pilotage is mandatory for all ships or tug and tow combinations of 50m or more in length overall (LOA) (Milford Haven Port Authority, 2016). A pilot boarding station is located 16nm north-east of the Development. The port has a Vessel Traffic Service which provides information messages to ships, such as position of other traffic or meteorological hazard warnings, to extensive management of traffic within a port or waterway.

593. The Array Scoping Boundary is located at the entrance to the Bristol Channel which includes several major ports such as the ports of Bristol, Newport, Talbot, Cardiff, Swansea and Neath. Associated British Port (ABP) South Wales operates five ports in the region. The closest major ports in addition to the Port of Milford Haven are:

- The Port of Swansea (ABP), handles vessels up to 30,000 Deadweight tonnage (DWT), manages a wide range of cargo including agribulks, construction materials, forest products, steel, energy components, project cargo, and cruise vessels (ABP South Wales, 2026). Pilotage is mandatory for vessels over 85m LOA (ABP South Wales, Pilotage directions 2025).
- Port Talbot (ABP) is a deep-water harbour accommodating cape-size vessels up to 170,000 DWT and handling primarily bulk carriers transporting coking coal, ores, minerals, aggregates, steel cargoes, heavy-lift vessels and offshore-energy logistics (ABP South Wales, 2026).Pilotage is mandatory for vessels over 85 m LOA (ABP South Wales, Pilotage directions 2025).
- The Port of Neath is managed by Neath Port Authority. The port handles vessels up to 6,000 DWT, mainly steel coil, scrap metal, sand and gravel, coal and animal feed (Neath Port Authority, 2026). Pilotage is mandatory for all vessels over 22m LOA (Neath Port Authority, Pilotage directions, 2022).

594. The Offshore Export Cable Scoping Boundary extends from St Govan's Head and 1.6nm North of Worm's Head. There are two small crafts mooring areas on the east side of the Carmarthen Bay

in vicinity of the Port of Tenby and the Port of Saundersfoot, which are both busy recreational harbours. An unrestricted anchorage area is located 0.2nm from Tenby. Burry Port is located West of Carmarthen Bay and mostly welcomes recreational boats and has a capacity of 450 berths (CCC, 2026).

595. There are several charted wrecks within the Offshore Export Cable Scoping Boundary Study Area but which do not pose a risk to navigational safety. Further detail is provided in **Section 2.10 Offshore Archaeology and Cultural Heritage**.

596. There is no active oil and gas infrastructure near the Development.

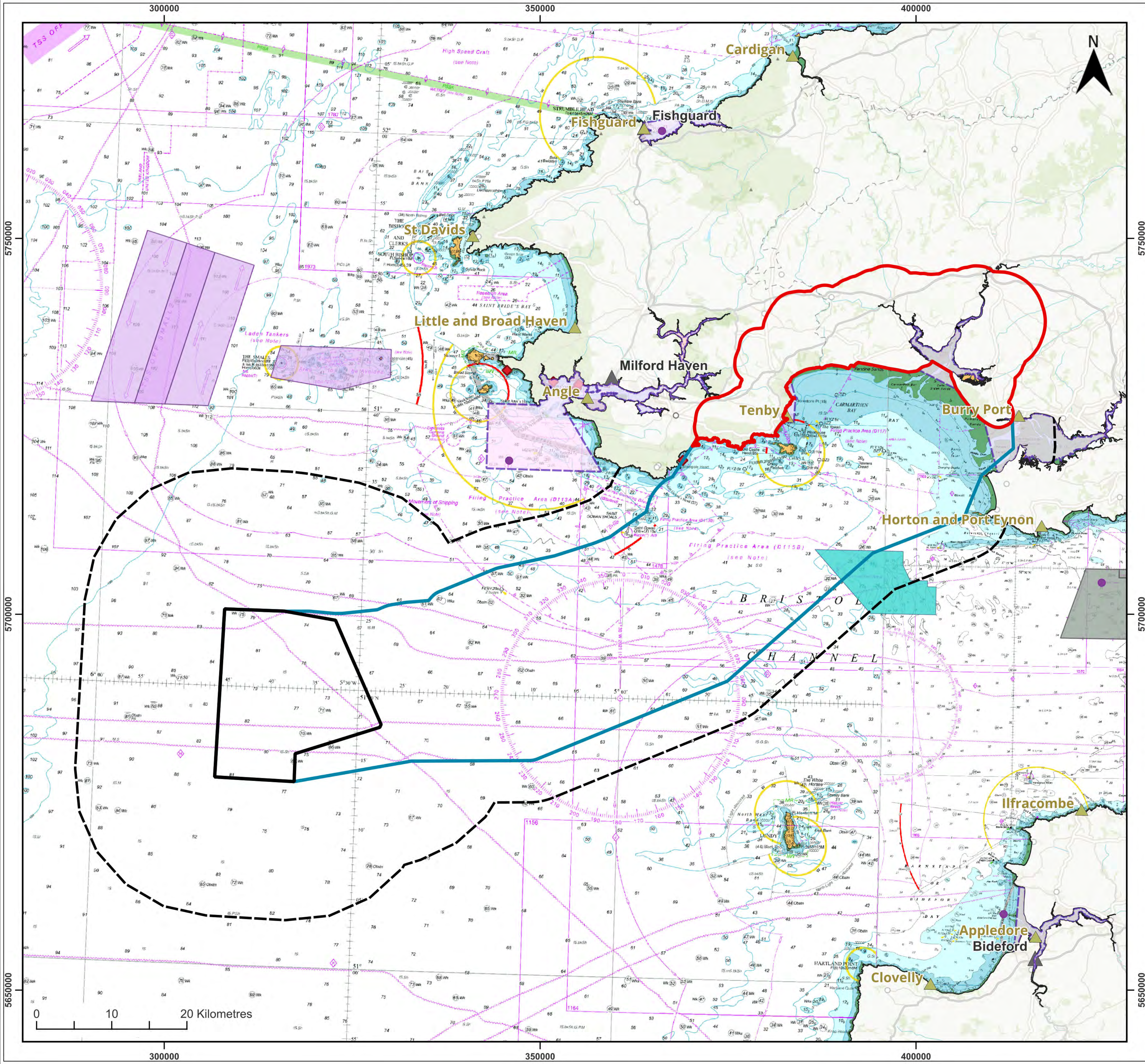
597. There are several Practice and Exercise Areas (PEXA) located within the Shipping and Navigation Study Area. This includes two aerial practice areas intersecting the Array Scoping Boundary (D064B/D064C) and seven intersecting the Offshore Export Cable Scoping Boundary (including D113A/B, D115A/B, D117, D118 and X5104).

598. An extraction area (Nobel Banks 476) is located 35nm east of the Array Scoping Boundary and within 3nm of the Offshore Export Cable Scoping Boundary.

599. Milford Haven houses the HM Coastguard Maritime Rescue Coordination Centre which coordinates Search and Rescue (SAR) within the Celtic Sea.

600. The Pembrokeshire and Carmarthenshire coasts are supported by several Royal National Lifeboat Institution (RNLI) lifeboat stations that provide emergency response coverage near the anticipated Onshore Scoping Boundary (RNLI, 2026). St Davids (St Justinian) and Fishguard stations cover the northern Celtic Sea and St George's Channel with both all-weather and inshore lifeboats, while Angle Lifeboat Station safeguards the southern and central Celtic Sea from the entrance to Milford Haven. Little & Broad Haven Station, located in St Brides Bay, offers one of the closest response points to offshore areas near Pembrokeshire. The nearest Accident & Emergency facility for the Development is Withybush General Hospital in Haverfordwest. There are two RNLI stations in Carmarthen Bay (Tenby Port and in Burry Port), and six stations between Swansea and Cardiff.

601. SAR helicopters are coordinated and deployed by the HM Coastguard SAR at Caernarfon Airport and St Athans (HM Coastguard, no date). Caernarfon is the closest HM Coastguard SAR helicopter base covering Wales and the Irish Sea.



Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary

Key Navigation Features

- Port
- RNLI Lifeboat Station
- Pilot Boarding Station
- Other Anchorage Location
- Anchorage Area
- IMO Routeing Measure
- Harbour Authority Area
- Aggregate Production Area

Source: © Haskoning UK Ltd, 2026, Admiralty Charts from Triton Software Ltd. (2026). IMO Routing from UKHO, RNLI Stations from RNLI (Contains public sector information licensed under the Open Government Licence v3.0). Aggregate Areas from The Crown Estate (Contains data provided by The Crown Estate that is protected by copyright and database rights). Ports Data provided by National Geospatial-Intelligence Agency, Anchorage Areas, Harbour Areas and Pilot Boarding Stations digitised from charts

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Key Navigation Features

Figure:	2.7.2	Drawing No:	PC6850-HAS-ZZ-ZZ-DR-GS-0002		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: ETRS89 / UTM zone 30N

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2.7.2.2 Vessel Traffic

602. EMODnet (2025) has been used to identify the vessel traffic activity in the Shipping and Navigation Study Area supported by a review of other datasets of the Celtic Sea held by NASH Maritime. This is presented by vessel type on **Figure 2.7.3** to **Figure 2.7.8**. Regulation 19, Chapter V of the SOLAS, states that ships of 300 Gross Tonnage (GT) and above on international voyages, cargo ships of 500GT and above not on international voyages, and all passenger ships regardless of size are required to carry and operate Automatic Identification System (AIS) at all times (IMO, 1974).

603. **Figure 2.7.3** displays all vessels traffic density in 2024. Two major routes can be observed along the western edge of the Shipping and Navigation Study Area, with vessels transiting between the TSS Off Smalls (located West of Saint Bride's Bay) and the TSS Off Land's End (located between Seven Stones and Longships). The TSS Off Smalls is located 14.5nm north of the Array Scoping Boundary, where approximately 1,200 vessel transits each year. Two other key routes are notable, firstly between the TSS Off Land's End and Milford Haven, passing immediately to the east of the Array Scoping Boundary. AIS data indicates that approximately 450 vessel transits per year take this route, mostly large tankers. Secondly, from / to the TSS Off Land's End into the Bristol Channel, passing south of Lundy. Thirdly, **Figure 2.7.3** also shows that there is a coastal route transiting from / to the Bristol Channel and Milford Haven, intersecting the Offshore Export Cable Scoping Boundary.

2.7.2.2.1 Cargo Vessels

604. Relatively few cargo vessels transit through the Offshore Scoping Boundary (**Figure 2.7.4**) with approximately 200 transits per year identified, principally in an east/west orientation into the Bristol Channel. Most of the cargo vessels in the Shipping and Navigation Study Area transit between the TSS Off Smalls and the TSS Off Land's End, thereby passing 2nm of the Array Scoping Boundary or between the TSS Off Land's End and the Bristol Channel, well to the south. A less trafficked route is passing between the Array Scoping Boundary and Milford Haven, across the Offshore Export Cable Scoping Boundary.

2.7.2.2.2 Tankers

605. Tanker traffic is significant through the Offshore Scoping Boundary (**Figure 2.7.5**) with more than 750 transits per year identified. This includes vessels bound from/to Milford Haven to the TSS Off Lands's End as well as loitering activity of vessels either awaiting an available berth or awaiting orders. The greatest concentration of tanker activity in the Shipping and Navigation Study Area is within the route between the between the TSS Off Smalls and the TSS Off Land's End, which passes 2 nm to the west of the Array Scoping Boundary.

2.7.2.2.3 Passenger Vessels

606. AIS data identifies limited passenger vessel transits through the Offshore Scoping Boundary (**Figure 2.7.6**) and is limited to occasional cruise ships on passage. The main route used by passenger vessels goes from Pembroke Dock to Rosslare Harbour in Ireland and within the Smalls TSS, passing well clear of the Array Scoping Boundary (**Figure 2.7.6**) also shows passenger vessels transiting between the TSS Off Smalls and the TSS Off Land's End, including cruise ships and services between Ireland and Europe. A passenger service operates between Tenby and Caldey Island within the Offshore Export Cable Scoping Boundary. These boats which are owned by local

boatman, only operate between Easter and October. Due to their small size, they do not transmit on AIS and hence do not appear on **Figure 2.7.6**.

2.7.2.2.4 Fishing Vessels

607. Fishing activity is distributed across the Shipping and Navigation Study Area (**Figure 2.7.7**), including with the Offshore Scoping Boundary and to the west, north-east and south. The intensity of fishing activity, particularly near shore, would be underrepresented within **Figure 2.7.3** as there is no legal obligation for smaller fishing vessels to transmit on AIS. Further information on commercial fishing activity can be found in the baseline description section of **Section 2.6 Commercial Fisheries**.

2.7.2.2.5 Recreational Craft

608. As with fishing vessels, smaller recreational craft would also be under-represented on **Figure 2.7.3**, as they are not legally required to transmit AIS. Available AIS data indicates that most recreational vessels transited clear of the Array Scoping Boundary, either staying close to the Pembrokeshire coast, around St Govan's Head, or transiting in a north-south orientation between Milford Haven and Padstow. One key recreational route is observed to intersect the Shipping and Navigation Study Area, which is transiting between the eastern side of the TSS Off Land's End and Milford Haven. Carmarthen Bay is popular for recreational vessels with a variety of small recreational users active near the Onshore Scoping Boundary.

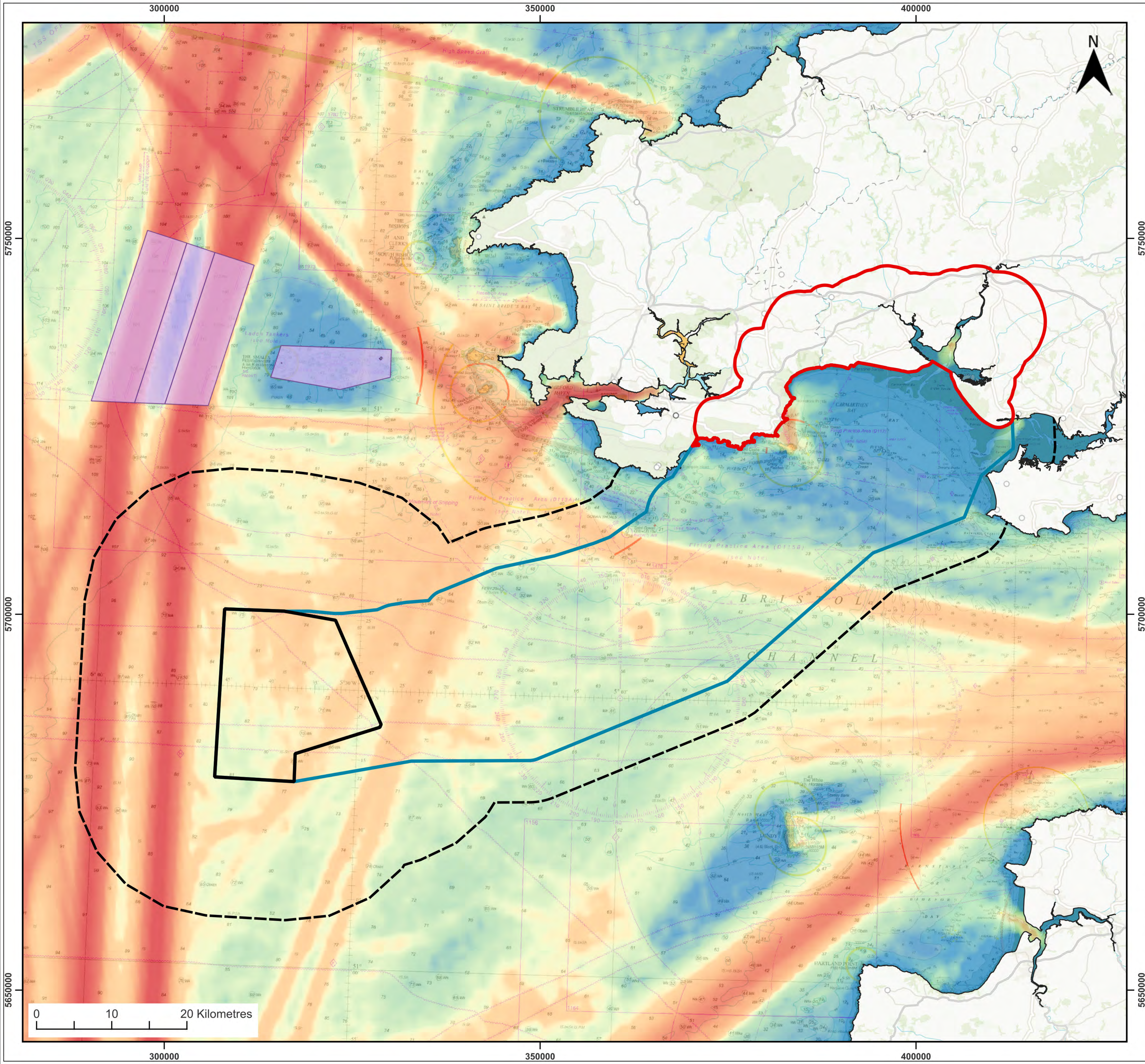
2.7.2.2.6 Other Vessels

609. The 'other' vessels category shown on **Figure 2.7.8** includes recreational craft and service vessels. A small cluster of these vessels has been recorded within the Offshore Scoping Boundary, associated with surveys related to the Round 5 developments. A high density of vessel movements, up to 1,250 transits per year, has been observed at the entrance to Milford Haven and includes tugs and pilot vessels servicing the port.

2.7.2.3 Historical Incident Data

610. To support this section, particularly in relation to the identification of potential impacts, analysis of historical incident data has been undertaken. Analysis of the Marine Accident Investigation Branch (MAIB) and RNLI records indicates that within 10nm of the Array Scoping Boundary, the most frequent incident type is mechanical failure or vessel damage, accounting for 15 events between 1990 and 2024 (MAIB). MAIB records also identify four fishing-vessel foundering incidents, including two very serious cases, as well as four incidents involving personal injury. Overall, 68% of all recorded incidents involved fishing vessels. Of the 25 recorded incidents, only two resulted in total vessel loss, and no fatalities were reported within the 10nm buffer area. RNLI data further shows that 20% of all incidents recorded between 2008 and 2024 occurred in 2024, indicating a recent increase in activity or reporting.

611. Whilst outside of the Shipping and Navigation Study Area, in February 1996, the Liberian-registered tanker Sea Empress struck rocks at the entrance to the Milford Haven waterway, resulting in the release of 70,000 tonnes of oil (MAIB, 1997), becoming the UK's second-largest oil spill.



Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- IMO Routeing Measure

All Vessel Traffic Density 2024 (km² / Yr)

- <= 10
- 10-20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-250
- 250-500
- 500-1,250
- > 1,250

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Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: All Vessel Traffic Density

Figure: 2.7.3	Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0003				
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Co-ordinate system: ETRS89 / UTM zone 30N

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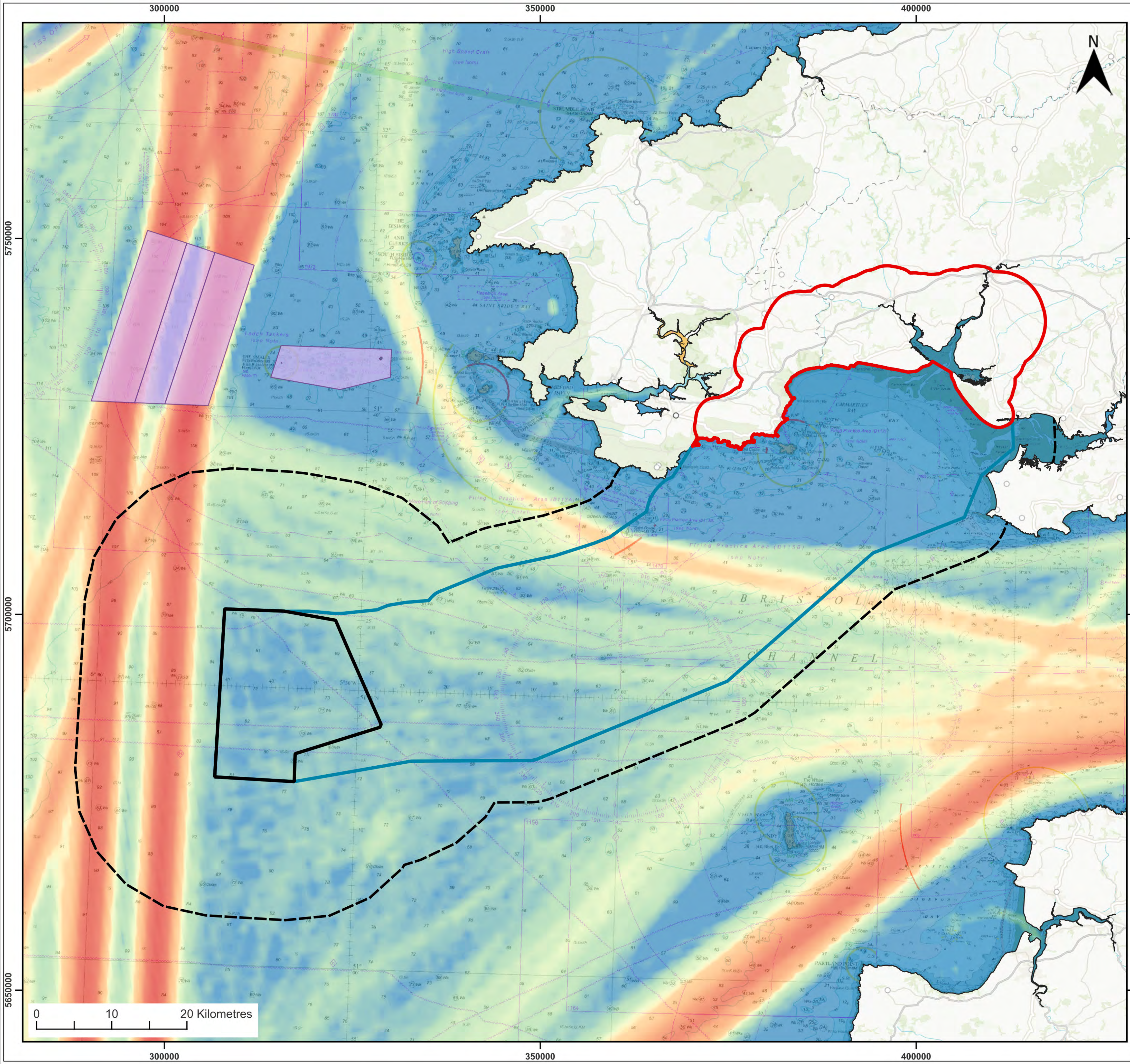

Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- IMO Routeing Measure

Cargo Traffic Density 2024 (km² / Yr)

- <= 10
- 10-20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-250
- 250-500
- 500-1,250
- > 1,250

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Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Cargo Vessel Traffic Density

Figure:	2.7.4	Drawing No:	PC6850-HAS-ZZ-ZZ-DR-GS-0004		
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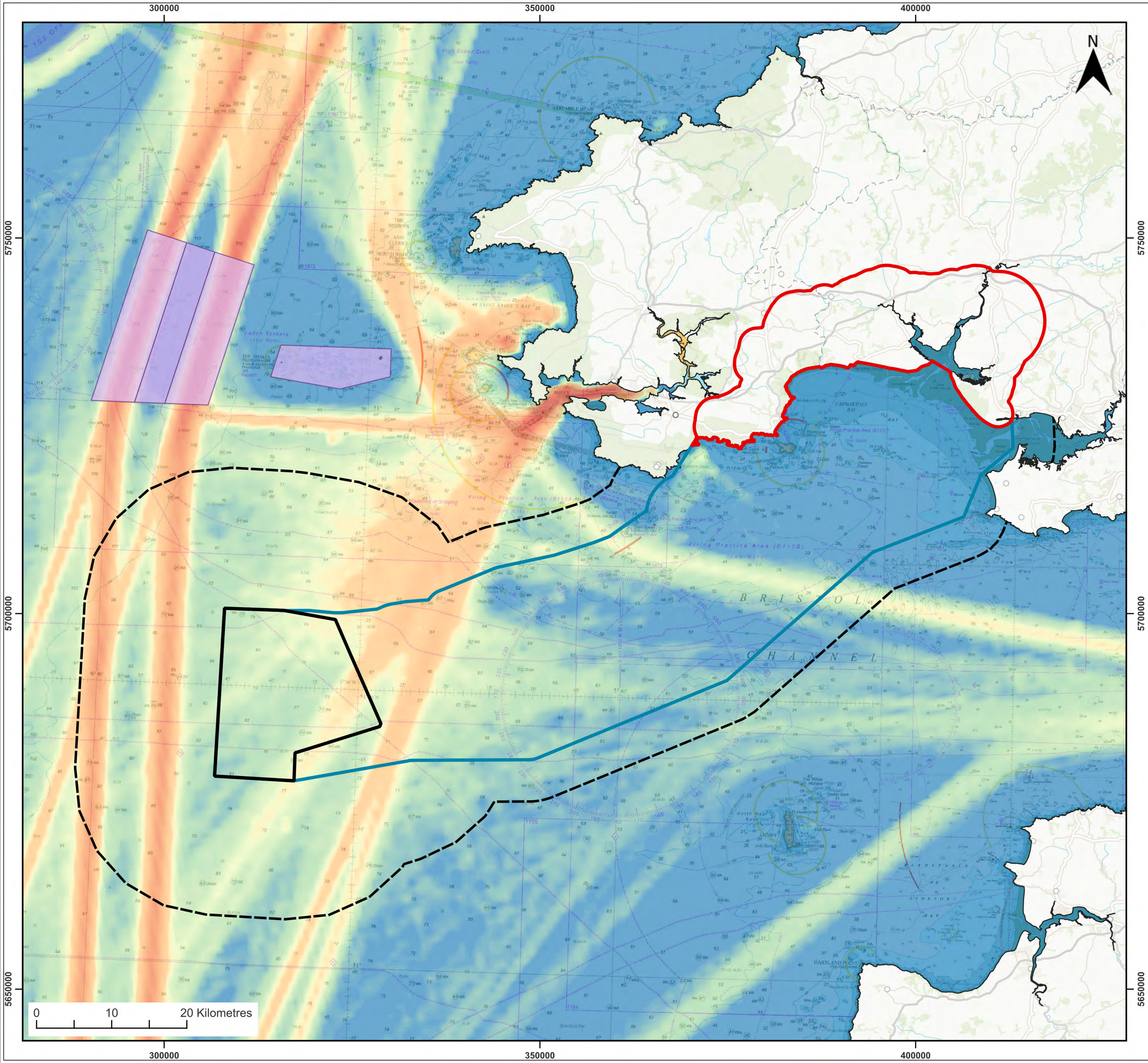

Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- IMO Routeing Measure

Tanker Traffic Density 2024 (km² / Yr)

- <= 10
- 10-20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-250
- 250-500
- 500-1,250
- > 1,250

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Project:	Gwynt Glas Offshore Wind Farm Scoping Report				
Title:	Tanker Vessel Traffic Density				
Figure: 2.7.5	Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0005				
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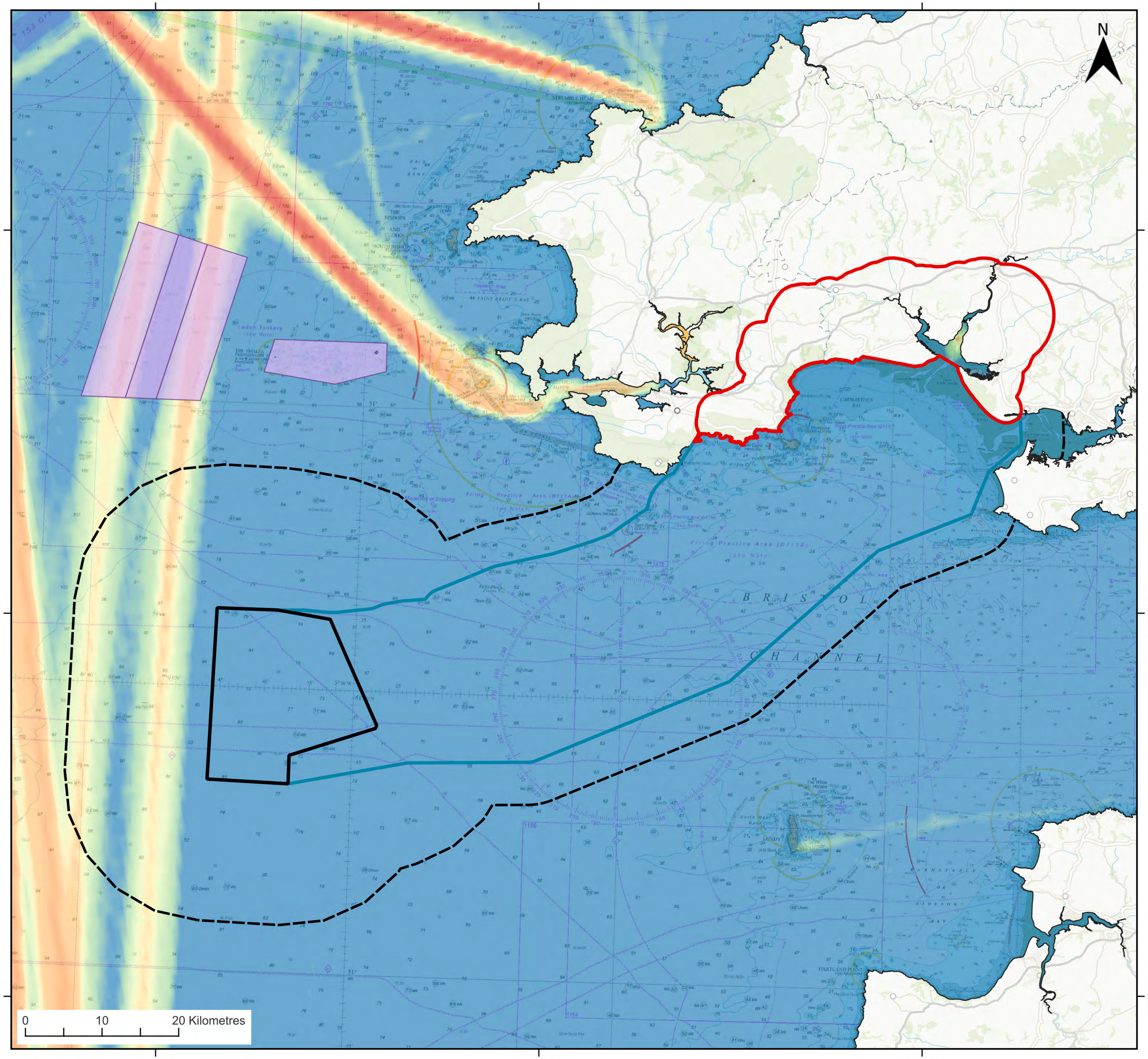

Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- IMO Routeing Measure

Passenger Traffic Density 2024 (km² / Yr)

- <= 10
- 10-20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-250
- 250-500
- 500-1,250
- > 1,250

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Project:	Gwynt Glas Offshore Wind Farm Scoping Report				
Title:	Passenger Vessel Traffic Density				
Figure: 2.7.6	Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0006				
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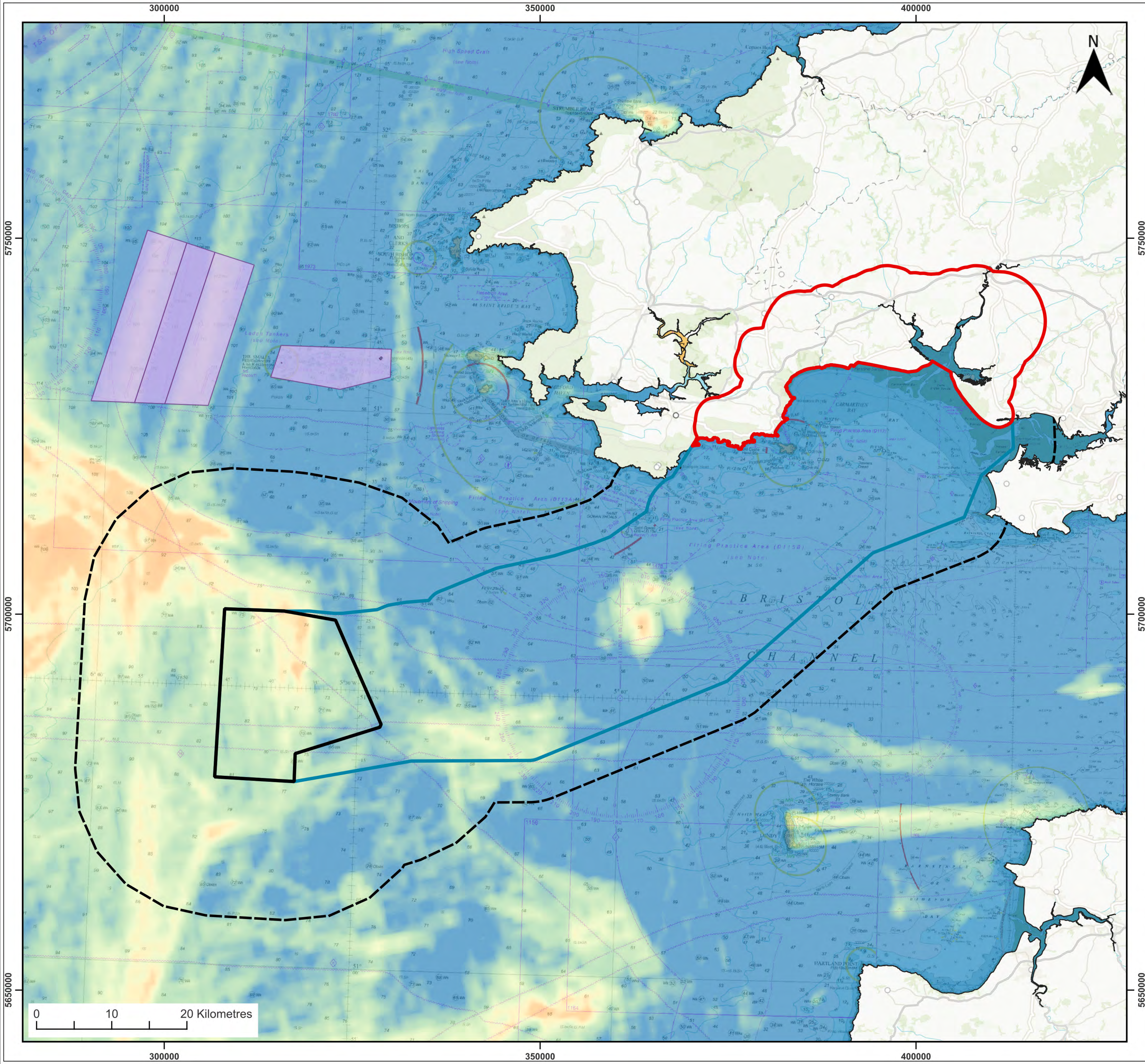

Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- IMO Routeing Measure

Fishing Traffic Density 2024 (km² / Yr)

- <= 10
- 10-20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-250
- 250-500
- 500-1,250
- > 1,250

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Project:	Gwynt Glas Offshore Wind Farm Scoping Report				
Title:	Fishing Vessel Traffic Density				
Figure: 2.7.7	Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0007				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RM	AR	A3	1:500,000
Co-ordinate system:	ETRS89 / UTM zone 30N				

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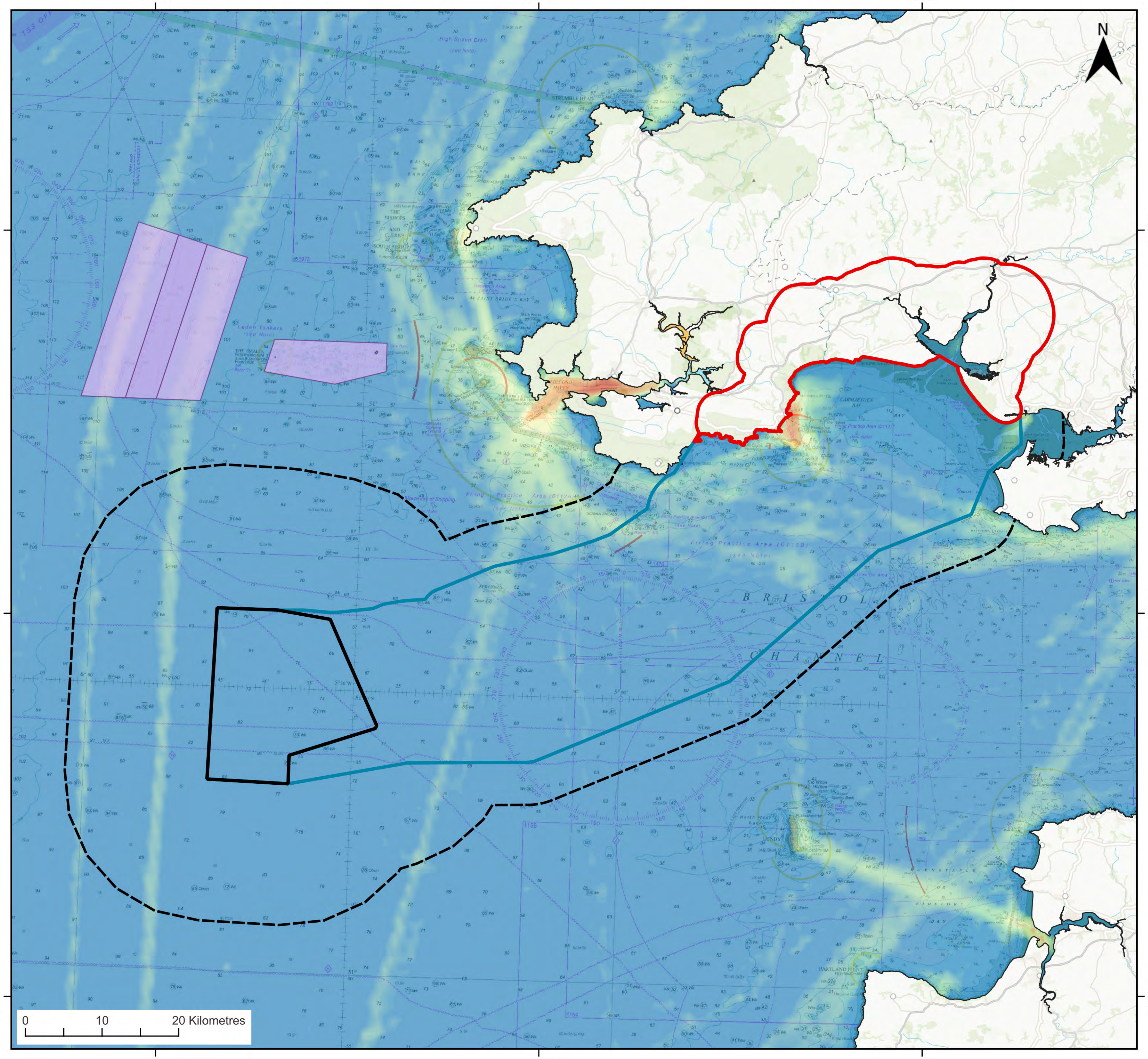

Legend:

- Shipping and Navigation Study Area
- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- IMO Routeing Measure

Other Traffic Density 2024 (km² / Yr)

- <= 10
- 10-20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-250
- 250-500
- 500-1,250
- > 1,250

Source: © Haskoning UK Ltd, 2026, Admiralty Charts from Triton Software Ltd. (2026), ©Data/information used in this map was made available by the EMODnet Human Activities project, www.emodnet-humanactivities.eu, funded by the European Commssion Directorate General for Maritime Affairs and Fisheries. IMO Routing from UKHO (Contains public sector information licensed under the Open Government Licence v3.0)

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Other Vessel Traffic Density

Figure: 2.7.8 | Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0008

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RM	AR	A3	1:500,000

Co-ordinate system: ETRS89 / UTM zone 30N

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2.7.3 Data Sources

612. **Table 2.7.1** outlines existing primary data that have been used to inform this section and would also be used to inform the EIA.

Table 2.7.1 Data Sources to Inform the Shipping and Navigation Assessment

DATASET	SPATIAL COVERAGE	SURVEY YEAR/TIMINGS
Nautical Charts (1121 and 1123)	Celtic Sea	2025
Sailing Directions (NP 37)	Celtic Sea	2025
AIS Data from the EMODnet (2025)	European	2025
Boundaries of existing and proposed marine activities (including offshore wind and aggregates). From The Crown Estate	UK waters	2025
Location of maritime incidents reported to MAIB	UK waters	1992-2025
RNLI Incident Data	UK waters	2008-2025

613. In addition to the data sources outlined in **Table 2.7.1**, up-to-date AIS, radar, and visual survey data will be collected through two separate 14-day surveys (28 days in total), to be undertaken in winter 2026 / 2027 and in summer 2027 to capture seasonal variations in marine traffic within the Array Scoping Boundary. The survey methodology and timing will be agreed with the MCA in accordance with MGN 654 to support the EIA (MCA, 2021). Radar and visual observations will be used primarily to supplement fishing and recreational vessel datasets, as these activities may be under-represented when relying solely on AIS data. A longer term 12-month AIS dataset for the Shipping and Navigation Study Area would also be used along with other datasets where appropriate.

2.7.4 Approach to Impact Assessment

614. The approach to EIA would follow the general approach outlined in **Section 1.8 EIA Methodology** of this Scoping Report. In addition, the assessment of Shipping and Navigation would also give due regard to the following guidance documents where they are specific to this topic:

- MCA MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021) and its annexes.
- The IMO Formal Safety Assessment (FSA) (IMO, 2025).
- MGN 372 Amendment 1 OREIs- Guidance to Mariners operating in the vicinity of UK OREIs (MCA, 2022).
- International Association of Lighthouse Authorities (IALA) Guideline G1162, Ed1.0 - The marking of offshore man-made structures (IALA, 2021).

- OWEKH ERN: Shipping and Navigation (OWEKH, 2026).

615. The principal guidance for assessing impacts to Shipping and Navigation is described in MGN 654 (MCA, 2021). Annex 1 of MGN 654 describes the methodology by which NRA should be undertaken, including data collection and consultation requirements.

616. Consultation with key Shipping and Navigation stakeholders would be undertaken following submission of the Scoping Report and used to inform the NRA and EIA (including impact assessment) ensuring a representative cross section of maritime users are considered. Stakeholders would be contacted by email and telephone where appropriate, with meetings and/or HAZID Workshops with key stakeholders arranged to discuss activities in the Shipping and Navigation Study Area and any potential impacts of the Development on those activities. The list of consultees is anticipated to include:

- MCA;
- Trinity House;
- Chamber of Shipping;
- Regional Ports and Harbours, principally Milford Haven Port Authority;
- Ferry operators;
- RYA;
- Cruising Association;
- Local yacht clubs;
- National Federation of Fishermen's Organisations;
- Local fishing organisations including Welsh Fishermen’s Association – Cwmdeithas Pysgotwyr Cymru, Inshore Fisheries Groups and individual smaller vessel operators or collectives where appropriate; (more details in **Section 2.6 Commercial Fisheries**) and
- Commercial regular runners / operators as identified in the AIS data.

617. As per MGN 654, the NRA would follow the IMO’s FSA methodology, an internationally recognised approach for conducting maritime risk assessments. The FSA is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and, if appropriate, cost-benefit assessment. There are five steps within the FSA process:

- Identification of hazards;
- Risk analysis;
- Risk control options;
- Cost-benefit assessment (if applicable); and
- Recommendations for decision making.

618. Hazards would be identified, and their likelihood and consequence scored to produce a risk score. Where necessary, risk controls would be identified in order to mitigate any unacceptable risks and reduce the risks to As Low as Reasonably Practicable (ALARP). This would be presented in the form of a hazard log and used to inform the EIA. The hazard log would also be used to identify standard

and additional mitigation measures required to demonstrate that the hazards are broadly acceptable or tolerable on the basis of ALARP declarations, in line with regulatory requirements. This would be presented in the form of a hazard log and used to inform the EIA.

619. Magnitude and sensitivity are required to be considered together to determine the significance of an effect. The definitions for magnitude and sensitivity would be dependent on the findings of the NRA. **Table 2.7.2** and **Table 2.7.3** demonstrates how the combination of magnitude and sensitivity provide an assessment of significance of effect.

Table 2.7.2 Navigation Risk Assessment Risk Matrix

RISK MATRIX								
Sensitivity / Severity of consequences	Major	5	5	10	15	20	25
	Serious	4	4	8	12	16	20
	Moderate	3	3	6	9	12	15
	Minor	2	2	4	6	8	10
	Negligible	1	1	2	3	4	5
			1	2	3	4	5
			Remote	Extremely unlikely	Unlikely	Reasonably probable	Frequent
			Magnitude / Frequency of Occurrence				

620. In order to determine whether a significant effect may result from the Development, significance categories are utilised to provide a threshold (**Table 2.7.3)** Significant effects are defined in NRA terms as Unacceptable or Medium Risk – but not ALARP.

Table 2.7.3 Navigation Risk Assessment Risk Level

HAZARD SCORES	ACCEPTABILITY	DESCRIPTION
Negligible Risk (1.0 to 3.99)	Broadly Acceptable	Generally regarded as not significant and adequately mitigated. Additional risk reduction should be implemented if reasonably practicable and proportionate.
Low Risk (4.0 to 8.99)		
Medium Risk (9.0 to 14.99)	Tolerable if ALARP	Generally regarded as within a zone where the risk may be tolerable in consideration of the Development. Requirement to properly assess risks, regularly review and implement risk controls to maintain risks to within ALARP where possible.
High Risk (15.0 to 19.99)	Unacceptable	Generally regarded as significant and unacceptable for the Development to proceed without further review.
Extreme Risk (20.0 to 25.0)		

2.7.5 Potential Impacts

2.7.5.1 Potential Impacts During Construction, O&M and Decommissioning Stages

621. The following potential impacts on Shipping and Navigation are considered in this scoping exercise during all stages of the Development.

2.7.5.1.1 Impact on Vessel Routeing

622. Vessels (including commercial operators and ferries) would potentially be displaced from existing routes due to the construction/decommissioning activities associated with the Development which could impact costs and schedules. Impacted routes include those in typical and adverse weather routeing and all navigating vessel types. Therefore, impacts on vessel routeing are proposed to be **scoped in** to the EIA.

2.7.5.1.2 Increased Collision Risk

623. Marine craft associated with construction, O&M, and decommissioning would be transiting to / from the area throughout these periods. There would be potential interaction with other vessels transiting the area which leads to an increased risk of collision.

624. Displacement of shipping routes into Milford Haven and the Bristol Channel around the construction / decommissioning area could result in more encounters and increased collision between passing vessels.

625. Displacement of shipping routes during the O&M stage could result in hot spots and increased collision risk between passing vessels. Therefore, impacts associated with increased collision risk would be **scoped in** to the EIA.

2.7.5.1.3 Increased Contact / Allision Risk

626. The presence of structures undergoing construction or decommissioning could increase the risk of allision for either powered or drifting vessels transiting the area or engaged with activities on the Development.

627. Infrastructure in the area would create a risk of contact for either powered or drifting vessels transiting the area as well as operations and maintenance vessels. Therefore, increased risk of contact would be **scoped in** to the EIA.

2.7.5.1.4 Increased Grounding Risk and Reduction in Under Keel Clearance due to Subsurface Infrastructure

628. Changes to vessel routeing as a result of the Development, including Offshore Export Cable, or project vessels may lead to a potential increase in the risk of grounding.

629. Use of cable protection associated with the Development has the potential to reduce the available depth of water along the Offshore Export Cable Corridor. This would reduce the available under keel clearance for vessels transiting the area.

630. Due to the implications for vessel safety, impacts associated with grounding risk and reduction in under keel clearance is proposed **scoped in** to the EIA.

2.7.5.1.5 Risk of Breakout / Loss of Station, Tow or Wind Turbine

631. Wind turbines undergoing construction / decommissioning may become detached from their moorings or tow during transportation, posing a navigational hazard to passing vessels.

632. Wind turbines could experience a structural failure at site which poses a subsurface risk to navigating vessels. Therefore, impacts associated with breakout / loss of station, tow or wind turbine would be **scoped in** to the EIA.

2.7.5.1.6 Snagging of Anchors and Fishing Gear

633. The presence of moorings (for FSSs) and Offshore Export Cables would introduce a risk of snagging of fishing gear or anchors. These may be present without corresponding surface floating wind turbines if wet stored at site. Therefore, the potential snagging of anchors and fishing gear is proposed to be **scoped in** to the EIA.

2.7.5.1.7 Impact on Emergency Response and SAR

634. Impacts on emergency response and SAR are proposed to be **scoped in** to the EIA given that the presence of infrastructure may reduce access for SAR responders and could affect response capability.

635. The increase in vessel activity during construction / decommissioning may result in an increase in incidents further affecting capability.

2.7.5.1.8 Interference with Marine Radar, Communications and Positioning Systems

636. Navigation, communication and positioning systems may be affected by the presence of infrastructure including wind turbines and Offshore Export Cables, therefore potential interference with marine radar, communications and positioning systems are proposed to be **scoped in** to the EIA.

2.7.5.1.9 Impact of Wet Storage / Marshalling Areas

637. There may be a need for storage of Development infrastructure both during assembly and whilst waiting to be taken to the Array Scoping Boundary. Depending on location, this may affect routeing, port operations and navigational safety, therefore impacts of wet storage / marshalling areas are proposed to be **scoped in** to the EIA.

2.7.5.1.10 Impact on Access to Ports / Harbours

638. Access to local ports may be affected by the presence of the Development and operations associated with it, including pilotage or access channels, specifically to Milford Haven Port Authority. As this could affect port operations and vessel movements, this impact would be **scoped in** to the EIA.

2.7.5.2 Potential Inter-relationship Impacts

639. The impact assessment would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts on shipping and navigation assets are **scoped in** to the EIA.

2.7.5.3 Potential Cumulative Impacts

640. The process by which potential cumulative impacts would be assessed through the CEA is described in **Section 1.8 EIA Methodology**. There are potential cumulative effects on Shipping and Navigation receptors as a result of the Development when considered collectively with any other existing and proposed offshore renewable projects. Therefore cumulative impacts are proposed to be **scoped in** to the EIA.

641. A search area consisting of the Celtic Sea up to 50nm (93km) from Development would be used to screen for and identify cumulative projects, although consideration would be given beyond 50nm (93km) to the wider Celtic Sea and in relation to potential transboundary impacts. Feedback from stakeholders on previous NRAs is that 50nm (93km) from the Development is considered an appropriate spatial scope and is consistent with other NRAs.

642. By following MGN 654 guidance (MCA, 2021), impacts assessed within the NRA would be considered both in isolation and cumulatively with other plans, developments or activities. The extent to which cumulative assessments can be undertaken, and the projects included, would

depend to some extent on the nature of the information available for other developments at the point of assessment, and the certainty with which they may come forward.

2.7.5.4 Potential Transboundary Impacts

643. Given the nature of Shipping and Navigation, all activities and operations can have a transboundary element. These can range from the transhipment of goods internationally between ports, fishing by vessels from other countries, and recreational yachting between countries. This means that all the potential impacts identified above can have a transboundary effect and as such is proposed to be **scoped in** to the EIA.

2.7.5.5 Summary of Potential Impacts

644. **Table 2.7.4** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. At this stage no Shipping and Navigation impacts are proposed to be scoped out of the EIA. This may be refined as additional information and data become available.

Table 2.7.4 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Shipping and Navigation Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Impact on vessel routeing	✓	✓	✓
Increased collision risk	✓	✓	✓
Increased contact / allision risk	✓	✓	✓
Increased grounding risk and reduction in under keel clearance due to subsurface infrastructure	✓	✓	✓
Risk of breakout / loss of station, tow or wind turbines	✓	✓	✓
Snagging of anchors and fishing gear	✓	✓	✓
Impact to emergency response and SAR capability	✓	✓	✓
Interference with radar, communications and positioning systems	✓	✓	✓
Impact on wet storage / marshalling areas	✓	✓	✓
Impact on port / harbours and nearshore operations	✓	✓	✓
Inter-relationship impacts	✓	✓	✓
Cumulative impacts	✓	✓	✓

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Transboundary impacts	✓	✓	✓

2.7.6 Potential Mitigation Measures

645. Embedded mitigation measures relating to Shipping and Navigation impacts are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

646. Requirements for any additional mitigation measures would be determined through the EIA.

647. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All of the proposed mitigation measures would comply with regulatory requirements and good practice.

2.8 Aviation and Radar

648. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Aviation and Radar.

649. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Aviation and Radar receptors in the Development's ES.

650. The Aviation and Radar assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description**;
- **Section 2.5 Offshore Ornithology**;
- **Section 2.7 Shipping and Navigation**;
- **Section 2.9 Infrastructure and Other Users**; and
- **Section 2.11 SLVIA**.

The following questions are posed to consultees to help them frame and focus their response to the Aviation and Radar scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Aviation and Radar Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?

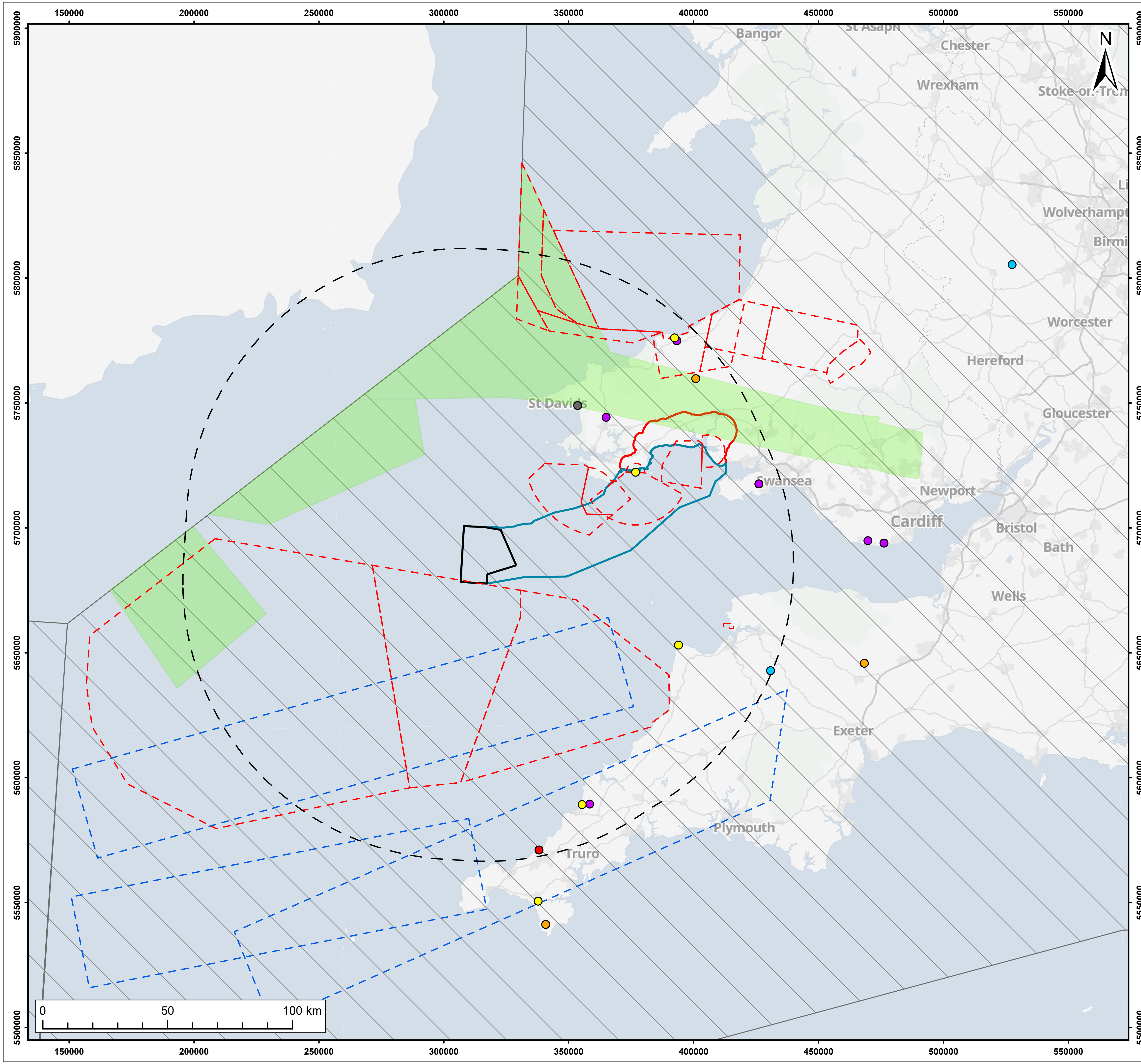
2.8.1 Study Area

651. This section describes the Aviation and Radar Study Area and how it has been defined. The purpose of a study area is to set the geographical boundary within which the existing environment is described, and the EIA would be conducted.

652. The main factor to be considered when determining the spatial extent of the Aviation and Radar Study Area, is the potential for wind turbines in the Array Scoping Boundary to have an impact on civil and military radars through the review of radar operational ranges. Primary Surveillance Radars (PSRs) installed on civil and military airfields have an operational range from 40 to 60nm. All radar-equipped airfields within 60nm of the Array Scoping Boundary are therefore included in

the Aviation and Radar Study Area. En-route radars operated by NATS and military Air Defence radars are required to provide coverage at ranges in excess of 60nm. All such radars with potential Radar Line of Sight (RLoS) of wind turbines in the Array Scoping Boundary are therefore included.

653. The Aviation and Radar Study Area is defined by the Array Scoping Boundary and a buffer of 60nm, as shown on **Figure 2.8.1**. This ensures that all airspace in the vicinity of the Array Scoping Boundary is considered in this section. This includes airspace between the Array Scoping Boundary, the UK and the Republic of Ireland, extending from Clee Hill, located 230.6km to the north-east and Predannack weather radar, 138.4km to the south of the Array Scoping Boundary.



Legend:
- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Gwynt Glas 60 nm
- Danger Areas
- AARAs
- FIR
- CTA
- Cawdor Barracks
- Civil Aerodromes
- Military AD Radars
- Military Radars
- NATS Radars
- Weather Radars

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Aviation and Radar Study Area

Figure:	2.8.1	Drawing No:	PC6850-HAS-ZZ-ZZ-DR-GS-0106		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	10/04/2026	MW	AS	A3	1:1,500,000

Co-ordinate system: ETRS 1989 UTM Zone 30N

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654. The following criteria have been used to identify receptors within the Aviation and Radar Study Area:

- Civil aerodromes;
- MOD;
- NATS facilities;
- Meteorological radio facilities; and
- Other aviation activities.

2.8.1.1 Civil Aerodromes

655. Civil Aviation Publication (CAP) 764 Policy and Guidelines on Wind Turbines (CAA, 2025b) states the distances from various aerodromes where consultation is necessary. These distances include:

- Aerodromes with a surveillance radar – within 30km;
- Non-radar equipped licensed aerodromes with a runway of more than 1,100m – within 17km;
- Licensed aerodromes where the wind turbines would lie within the airspace coincidental with a published Instrument Flight Procedure (IFP);
- Unlicensed aerodromes with runways of more than 800m – within 4km;
- Unlicensed aerodromes with runways of less than 800m – within 3km;
- Gliding sites – within 10km; and
- Other aviation activities such as parachute sites and microlite sites within 3km.

656. CAP 764 states that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments would be approved or within which they would be objected to. For example, aerodromes may utilise their radars at ranges in excess of 30km. These ranges are intended as a prompt for discussion between aviation stakeholders and developers.

2.8.1.2 MoD

657. It is necessary to consider the aviation, air defence, and other activities of the MOD. This includes:

- MoD airfields, both radar and non-radar equipped;
- MoD air defence radars; and
- MoD PEXAs for both aviation and non-aviation activities.

2.8.1.3 NATS Facilities

658. It is necessary to consider the possible effects of wind turbines upon NATS radar systems, a network of PSRs and Secondary Surveillance Radars (SSRs) around the country.

2.8.1.4 Meteorological Radar Facilities

659. Wind turbines have the potential to adversely impact meteorological facilities such as weather radars. The Met Office must be consulted by developers if wind turbines are within RLoS of their radars.

2.8.1.5 Other Aviation Activities

660. Other aviation activities of relevance could include:

- General military low flying operations;
- Military and civilian 'off-route' fixed-wing and helicopter operations including SAR missions and offshore helicopter operations in support of the oil and gas industry; and
- Other aviation activity.

2.8.2 Baseline Environment

2.8.2.1 Civil Aviation

661. The airspace above and adjacent to the Array Scoping Boundary is used by civil and military aircraft and lies within the London Flight Information Region (FIR) for Air Traffic Control (ATC), which is regulated by the UK CAA. The London FIR is adjacent to the Shannon FIR and Shanwick Oceanic FIR. The Shannon FIR and Shanwick Oceanic FIR are regulated by the Irish Aviation Authority and UK CAA respectively. The boundary of the Shannon FIR is located 65km to the north-west of the Array Scoping Boundary and the Shanwick Oceanic FIR is located 158.2km to the west of the Array Scoping Boundary.

662. Airspace is classified as either controlled or uncontrolled and is divided into several classes depending on what kind of Air Traffic Services (ATS) is provided and under what conditions. In the UK there are five classes of airspace: specifically; A, C, D, E and G. The first four (A, C, D and E) are controlled airspace, while class G is uncontrolled. Within controlled airspace, aircraft are monitored and instructed by ATC. Aircraft within uncontrolled airspace are not subject to ATC instruction but rather operate according to a simple set of regulations. ATC may still provide information, if requested, to ensure flight safety.

663. Aircraft operate under one of two flight rules:

- Visual Flight Rules (VFR), conducted with visual reference to the natural horizon; or
- Instrument Flight Rules, requires reference solely to aircraft instrumentation.

664. From sea level to Flight Level (FL) 195 (approximately 19,500ft Above Mean Sea Level (AMSL)), the airspace is Class G uncontrolled airspace. The airspace within this area is predominantly used by low level flight operations and generally by aircraft flying under VFR.

665. Above FL195 is Class C controlled airspace in the form of a Temporary Reserved Area (TRA). This airspace, TRA 001 has an upper limit of FL245 (approximately 24,500ft AMSL). A TRA is a defined volume of airspace normally under the jurisdiction of one aviation authority and temporarily reserved by common agreement, for the specific use by another aviation authority and through which other traffic may be allowed to transit under an ATS authority.

666. Laterally, the closest lower airspace to the Array Scoping Boundary is Strumble Control Area (CTA) 1, located 51.3km to the north of the Array Scoping Boundary. Strumble CTA 1 is class A controlled airspace and has a lower limit of FL155 (approximately 15,500ft AMSL) and an upper limit of FL195 (approximately 19,500ft AMSL).

667. The nearest licensed UK airport to the Array Scoping Boundary is Haverfordwest Airport, which is approximately 61.7km to the north-east. Considering the distance between the Array Scoping Boundary and the airport, there should be no impact to operations at Haverfordwest Airport.

668. The second nearest licensed UK airport is Cornwall Newquay Airport, located 97.3km away to the south south-east of the Array Scoping Boundary. Cornwall Newquay Airport is a certificated radar-equipped airport with established IFPs. The Array Scoping Boundary is not located within airspace coincident with Cornwall Newquay Airport IFPs and should therefore have no impact on IFPs. Preliminary RLoS analysis indicates that wind turbines in the Array Scoping Boundary would be within RLoS of the PSR at Cornwall Newquay Airport. Consultation with the airport operator, Cornwall Airport Ltd. is required.

669. Swansea Airport is a licensed aerodrome located 13.8km to the east of the Offshore Scoping Boundary. Swansea Airport is a non-surveillance equipped aerodrome with a runway length exceeding 1,100m which results in a recommended consultation zone of 17km from guidance in CAP 764. A section of the Offshore Scoping Boundary is located within this range. The Array Scoping Boundary is located far beyond this consultation zone at 102.5km at its closest point.

670. Pembury West Wales Airport is an unlicensed airfield located 3.3km to the north-east of the Offshore Scoping Boundary. Pembury West Wales Airport is a non-surveillance equipped aerodrome with a current runway length of 797m. There is a runway extension of 350m planned which when completed would bring the runway length to a total of 1,147m. With a runway length exceeding 1,100m, Pembury West Wales Airport would have a recommended consultation range of 17km based on guidance from CAP 764. This zone is overlapped by the northern section of the Offshore Boundary. The Array Scoping Boundary is located far beyond this zone at 92.7km at its closest point.

671. The nearest unlicensed airfield to the Array Scoping Boundary is Rosemarket, located 54.5km to the north-east of the Array Scoping Boundary. Rosemarket is a non-surveillance equipped airfield with a grass runway strip less than 800m in length. This airfield therefore has a recommended consultation range of 3km based on guidance from CAP 764. The Array and Offshore Export Cable Scoping Boundaries are located beyond this zone.

672. Lundy Island is an unlicensed airfield located 56.9km to the east of the Array Scoping Boundary. Lundy Island is a non-surveillance equipped airfield with a grass runway strip less than 800m in length. This airfield therefore has a recommended consultation range of 3km based on guidance from CAP 764. The Array Scoping Boundary is located far beyond this zone. This airfield also provides a helicopter service which operates between Lundy Island and Hartland Point in the winter months (November to March).

673. The nearest PSR in the Republic of Ireland to the Array Scoping Boundary is at Dublin Airport, 226km to the north of the Array Scoping Boundary. The Array Scoping Boundary is outside of the operational range of the radar at Dublin Airport; wind turbines would therefore have no impact on this radar.

674. NATS provides en-route civil ATS within the London FIR. NATS operate a network of radar facilities providing en-route information for both civil and military aircraft. The closest NATS radars to the Array Scoping Boundary are based at Burrington, 110.3km to the south-east of the Array Scoping Boundary, and Clee Hill, 230.6km to the east north-east of the Array Scoping Boundary. Preliminary RLoS analysis indicates that wind turbines in the Array Scoping Boundary would be within RLoS of Burrington, but not Clee Hill. Consultation with NATS is required.

675. NATS operate and provide ATS for Cardiff Airport, and St Athan Airfield, located 147.8km and 141.3km to the east of the Array Scoping Boundary respectively. Preliminary RLoS analysis for the radar at Cardiff Airport indicates wind turbines in the Array Scoping Boundary would not be within RLoS of Cardiff Airport PSR.

676. NATS facilities are combined with SSR systems. CAP 670 states that the wind turbines have less impact on SSRs than PSRs provided they are more than 10km away from the SSR. Furthermore, NATS do not consider the impact of wind turbines on SSR to be material or relevant for wind turbines that are beyond approximately 28km from their SSR facilities. The nearest SSR at Burrington is located 110.3km to the south-east of the Array Scoping Boundary. Wind turbines would therefore have no impact on SSRs.

2.8.2.2 Military Aviation

677. The nearest primary radar-equipped military airfield to the Array Scoping Boundary is Royal Naval Air Station (RNAS) Culdrose, 128.7km to the south of the Array Scoping Boundary. Preliminary RLoS analysis indicates that wind turbines in the Array Scoping Boundary would not be within RLoS of RNAS Culdrose.

678. There are three military radars within 60nm of the Array Scoping Boundary. The Manorbier Firing Range, Hartland Point, and Aberporth, located 58.7km to the east north-east, 72.6km to the east south-east, and 103.6km to the north-east of the Array Scoping Boundary, respectively. Preliminary RLoS analysis indicates that wind turbines in the Array Scoping Boundary would be within RLoS of Manorbier and Hartland Point, but not Aberporth. Consultation with the MoD is required.

679. The nearest MoD Air Defence radar to the Array Scoping Boundary is Remote Radar Head (RRH) Portreath, located 108km to the south. Preliminary RLoS analysis indicates that wind turbines in the Array Scoping Boundary would be within RLoS of RRH Portreath.

680. The MoD is proposing to install Deep Space Advanced Radar Capability (DARC) radars at Cawdor Barracks, located 58.5km to the north-east of the Array Scoping Boundary. The purpose of installing DARC radars at Cawdor Barracks is to identify and track objects in Earth's orbit, including satellites, space debris and asteroids. There, radars would not be impacted by wind turbines in the Array Scoping Boundary.

681. The southern extent of the Array Scoping Boundary is located beneath the South-West Complex Managed Danger Area (MDA), one of four MDA complexes in UK airspace that, when activated, provide segregated airspace for military flying training. Specifically, the southern extent of the Array Scoping Boundary is located beneath EGD064B. This airspace has a lower and upper limit of FL50 (approximately 5,000ft AMSL) and FL660 (approximately 66,000ft AMSL) respectively. Activities in this area include high energy manoeuvres.

682. The Array Scoping Boundary is located in the vicinity of Air-to-Air Refuelling Areas (AARAs) 10 West, 11, and 12, located 88.5km, 94.3km, and 26.4km to the south of the Array Scoping Boundary respectively. AARAs 10 West and 11 both have a lower limit of FL80 (approximately 8,000ft AMSL) and an upper limit of FL260 (approximately 26,000ft AMSL). AARA has a lower limit of FL70 (approximately 7,000ft AMSL) and an upper limit of FL280 (approximately 28,000ft AMSL). These AARAs are permanently available to military air traffic.

683. The UK is divided into 20 separate Low Flying Areas (LFAs). Low flying occurs in most parts of the UK at any height up to 2,000ft above the surface. This activity is mostly concentrated between 250ft and 500ft. The south section of the Array Scoping Boundary is within LFA 2, and the north section of the Array Scoping Boundary is within LFA 7 for day low flying.

684. Low flying training may be undertaken at night. Most night-time flying by MoD aircraft is undertaken by crews equipped with Night Vision Goggles, therefore Infrared aviation warning lights that meet MoD requirements would be necessary for wind farms located in Night-Time LFAs. The south section of the Array Scoping Boundary lies within the Night Rotary Region (NRR) 2 and the north section of the Array Scoping Boundary lies within NRR7S.

685. Sections of the Offshore Export Cable Scoping Boundary lie within the Castlemartin, Manorbier, Pendine and Pembrey Danger Areas, details of which are listed in **Table 2.8.1**. The Castlemartin Danger Areas, EGD113A and EDG113B both begin at sea level, but have upper limits of 40,000ft AMSL and 45,000ft AMSL respectively. The Manorbier Danger Areas, EGD115A and EGD115B, both begin at sea level and have upper limits of 27,000ft AMSL and 50,000ft AMSL respectively. The Pendine Danger Area, EGD117 begins at sea level and has an upper limit of 23,000ft AMSL which can occasionally be raised to 27,000ft AMSL. The Pembrey Danger Area, EGD118 begins at sea level and has an upper limit of 12,000ft AMSL which can occasionally be raised to 23,000ft AMSL. Coordination with the MoD would be necessary to facilitate the safe installation and placement of offshore cables and other infrastructure.

Table 2.8.1 Military Airspace

RANGE	KEY FUNCTIONS / TRAINING USE	WEAPONS / MUNITIONS FIRED	TARGETS USED	SEA / AIR DANGER AREAS	ACCESS RESTRICTIONS
Castlemartin Training Area	UK's primary armoured fighting vehicle range; combined arms live firing	Challenger 2 tank 120mm; Warrior guns; Javelin; small arms; mortars; helicopter ordnance	Old AFVs; knock-down targets; purpose-built hard targets	Sea Danger Area up to 12 NM; active 44 weeks / year	Active 44 weeks per year. Non-active weeks usually coincide with public school holidays Trawling prohibited; restricted access; Notices to Mariners
Air Defence Range Manorbier	UK's main Close Air Defence range	Starstreak HVM; Martlet; MGs up to 35mm; RF energy weapon trials	Drone targets; surface markers	Large sea danger area (~220 square mile); ir danger area	Access restricted during live firing

RANGE	KEY FUNCTIONS / TRAINING USE	WEAPONS / MUNITIONS FIRED	TARGETS USED	SEA / AIR DANGER AREAS	ACCESS RESTRICTIONS
Pembrey Sands Air Weapons Range	Air-to-ground live / inert training; Royal Air Force & North Atlantic Treaty Organisation; Joint Terrorism Analysis Centre	27 / 30mm strafing; BDU practice bombs; inert CRV-7 rockets; 7.62 / 12.7mm MG	Dive circles; strafe panels; old vehicles / aircraft; inflatable target	Coastal danger area; red flags	Beach access is restricted during live firing Usually open to the public on weekends
Pendine (Qinetiq)	MoD testing & evaluation; 9km shoreline	Primarily test infrastructure, not weapons-focussed	Prepared test areas; Permanent infrastructure	Sea Danger Area 18km^2; Air Danger Area up to 23,000 ft	Beach access is restricted during live firing Usually open to the public on weekends Tidal range 8m affects access

2.8.2.3 Meteorological Radio Facilities

686. The nearest Met Office radars to the Array Scoping Boundary are Crug y Gorllwyn, Cobbacombe Cross, and Predannack, located 98.9km to the north-east, 145.3km to the east south-east, and 138.4km to the south of the Array Scoping Boundary, respectively. Preliminary RLoS analysis indicated that wind turbines in the Array Scoping Boundary would be within RLoS of Crug Y Gorllwyn but not Cobbacombe Cross and Predannack.

2.8.2.4 Offshore Helidecks

687. To achieve a safe operating environment under low visibility, a consultation zone with a 9nm radius is present around each helideck. This means obstacles such as wind turbines within this radius must be consulted on with the helideck operators to maintain safe offshore helicopter operations alongside the Offshore Scoping Boundary. There are no offshore oil and gas helidecks in the vicinity of the Array Scoping Boundary.

688. CAP 764 states that when a helideck is located within a wind farm, there may be operational difficulties when manoeuvring for a stabilised approach. Obstacle clearance around a helideck within a wind farm should allow aircraft to achieve final approach track and 0.5nm (926m) stabilised approach Visual Meteorological Conditions gate. For operations in a Degraded Visual Environment, a second stabilised approach gate is introduced at 1nm (1,852m).

2.8.2.5 SAR

689. Bristow Group operate SAR operations in the vicinity of the Array Scoping Boundary. For SAR operations to be carried out safely and efficiently, they require developers to fulfil wind turbine

spacing, marking and lighting requirements set out by the MCA. The nearest SAR helicopter facility to the Array Scoping Boundary is Cornwall Newquay Airport, located 97.3km to the south.

2.8.2.6 Receptors

690. The following receptors, detailed in **Table 2.8.2** may be sensitive to change and would be assessed in the EIA.

Table 2.8.2 Relevant Receptors for the Aviation and Radar Assessment

RECEPTOR	CLOSEST DISTANCE TO THE ARRAY SCOPING BOUNDARY (KM)
Cornwall Newquay Airport PSR	91.6
NATS Burrington PSR	76.7
Manorbier Firing Range PSR	Within Array Scoping Boundary
Hartland Point PSR	44.6
RRH Portreath	108.7
Low Flying Aircraft	Within Array Scoping Boundary
Danger Area Activities and Vessels Involved in Development Activities	Within Array Scoping Boundary
Crug Y Gorllwyn Weather Radar	21.4
Aircraft Involved in SAR Activities	Within Array Scoping Boundary
Pembury	3.3
Swansea	13.8

2.8.3 Data Sources

691. The primary source of aviation related data to be used during desk-based studies in support of the EIA is the UK Aeronautical Information Publication (AIP). The AIP contains details on airspace and enroute procedures as well as charts and other air navigation information. A summary of relevant data sources providing information and guidance that would be considered as part of the EIA process is provided in **Table 2.8.3**.

Table 2.8.3 Data Sources to Inform the Aviation and Radar Assessment

DATASET	SPATIAL COVERAGE	SURVEY YEAR / TIMINGS
CAP 032: UK AIP (2026b)	Full coverage	2026
UK Military AIP (2026)	Full coverage	2026
Irish AIP	Republic of Ireland	2026
NATS Wind Farm Self-Assessment Maps (2012)	Full coverage	2012
Offshore Infrastructure Data, North Sea Transitional Authority (NSTA)	Full coverage	2025
Operational Programme for the Exchange of Weather Radar Information Database	Full coverage	2026

692. In addition to the data sources listed in **Table 2.8.3**, consultation was undertaken with the DIO on 5th May 2026 to introduce the Development and to seek information on the location, use, and operational requirements of nearby military PEXAs, to inform the EIA.

693. Other data and information available to inform the EIA includes:

- Air Navigation Order 2016 (CAA, 2026a);
- CAP 168: Licensing of Aerodromes (CAA, 2025c);
- CAP 437: Standards for Offshore Helicopter Landing Areas (CAA, 2026b);
- CAP 670: ATS Safety Requirements (CAA, 2019);
- CAP 764: Policy and Guidance on Wind Turbines (CAA, 2025b)
- CAP 774: UK Flight Information Services (CAA, 2021); and
- CAP 1616: Airspace Change (CAA, 2025a).

2.8.4 Approach to Impact Assessment

694. The approach to impact assessment would be supported by further desk-based studies, including RLoS modelling, that would identify and examine in greater detail sensitive Aviation and Radar receptors. Studies would be undertaken in parallel with consultation with relevant stakeholders to provide a detailed understanding of potential impacts. It is expected that consultation would be an iterative process, allowing for any concerns that are raised to be considered in the wind farms design optimisation process.

2.8.5 Potential Impacts

2.8.5.1 Potential Impacts During the Construction Stage

695. Potential impacts on Civil and Military Aviation and Radar during the construction stage are associated with:

- The presence of tall crane vessels and partially constructed structures increasing the risk of collision with low-flying aircraft;
- Increased air traffic in relation to wind farm activities; and
- Extending aircraft routeing to avoid obstructions.

696. These construction impacts have been **scoped in**.

697. Due to the potential for the Development to be constructed in a phased manner (see **Section 1.5.2**), there is the potential that wind turbines in one phase may be rotating during the construction stage of another phase, and therefore at this stage, impacts on civil and military radars have also been **scoped in** during the construction stage.

2.8.5.2 Potential Impacts During the O&M Stage

698. Wind turbines have the potential to affect civil and military aviation (fixed-wing and helicopters), either through their physical dimensions limiting access and affecting safeguarding or safe passage, or through their effects on radar systems. Potential impacts on Civil and Military Aviation and Radars during operation are associated with:

- The presence of wind turbines increasing the risk of collision with low-flying aircraft;
- Extending aircraft routeing to avoid obstructions;
- Increased air traffic in the area in relation to wind farm activities; and
- Impact on military and civil PSRs.

699. Helicopter traffic as a result of planned activities in support of the Development, if required, would raise the overall level of air traffic in the area and increase the likelihood of aircraft-to-aircraft collision. This impact has been **scoped in** for further assessment.

2.8.5.3 Potential Impacts During the Decommissioning Stage

700. Impacts during decommissioning are expected to be similar in nature to those anticipated during construction, but of smaller magnitude.

701. The same potential impacts noted for construction are therefore expected to be scoped in (and out) for decommissioning.

702. Although, wind turbines would not be rotating during the decommissioning stage, therefore impacts to civil and military radars has been **scoped out** during this stage.

2.8.5.4 Potential Inter-relationship Impacts

703. The impact assessment would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the

relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.8.5.5 Potential Cumulative Impacts

704. The cumulative assessment would consider the impacts in combination with other offshore wind farms and associated aviation activities, including increased collision risk and cumulative impacts on radars. Therefore, cumulative impacts are **scoped in** to the EIA.

2.8.5.6 Potential Transboundary Impacts

705. The airspace around the Development is used by international civil aviation and is adjacent to the Shannon FIR and Shanwick FIR. The potential impacts on international use of the airspace would therefore be considered and therefore transboundary impacts are **scoped in** to the EIA.

2.8.5.7 Summary of Potential Impacts

706. **Table 2.8.4** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.8.4 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Civil and Military Aviation and Radar Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Creation of an aviation obstacle environment for civil and military aircraft	✓	✓	✓
Increased air traffic in the area in relation to wind farm activities	✓	✓	✓
Impact to civil and military PSRs	✓	✓	x
Inter-relationship Impacts	✓	✓	✓
Cumulative impact to military and civil PSRs	x	✓	x
Cumulative creation of an aviation obstacle environment	✓	✓	✓
Cumulative increased air traffic in the area in relation to wind farm activities	✓	✓	✓
Transboundary Impacts	✓	✓	✓

2.8.6 Potential Mitigation Measures

707. Embedded mitigation measures relating to Aviation and Radar are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

708. Requirements for any additional mitigation measures would be determined through the EIA.

709. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All the proposed mitigation measures would comply with regulatory requirements and good practice.

710. Additional mitigation measures would be necessary to mitigate the potential impact wind turbines in the Array Scoping Boundary may have on civil and military radars. A suitable radar mitigation is achieved through consultation with the relevant stakeholder / operator of each radar and varies on a case-by-case basis. Some PSRs may also have built-in wind farm mitigation capabilities.

711. One potential radar mitigation for PSRs may be to blank coverage over the Array of the impacted PSRs and establish a Transponder Mandatory Zone (TMZ) around the Array. TMZs are controlled airspace in which the carriage and operation of aircraft transponder equipment is mandatory. This enables such aircraft to be detected and tracked by SSR systems in absence of PSR coverage. In order to establish a TMZ, an Airspace Change Process is required which can take several years.

712. In late summer 2023, the MoD launched Programme NJORD, calling for potential Air Defence solution providers to participate in prequalification trails. Updates as to progress on Programme NJORD are not currently in the public domain. However, the SoS for the Department of Energy Security and Net Zero (DESNZ) noted in a speech on 17 September 2024 that Air Defence mitigation delays have been potentially impacting deployment of offshore wind through the CfD Allocation Rounds.

713. The Clean Power 2030 Action Plan revealed the full costs of the long-term radar mitigation solutions identified by Programme NJORD will be funded via an alternative route delivered by government. This position has been reflected and reinforced in the most recent updates to the NPS (DESNZ, 2025a), which clarify that strategic aviation mitigation will be addressed at a national level rather than through project-specific obligations. As a result, offshore wind projects are no longer expected to bear the financial burden of these system-wide solutions, providing greater certainty for developers and supporting the accelerated deployment of offshore wind capacity.

2.9 Infrastructure and Other Users

714. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Infrastructure and Other Users.

715. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing impacts on Infrastructure and Other Users receptors in the Development's ES.

716. The Infrastructure and Other Users assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

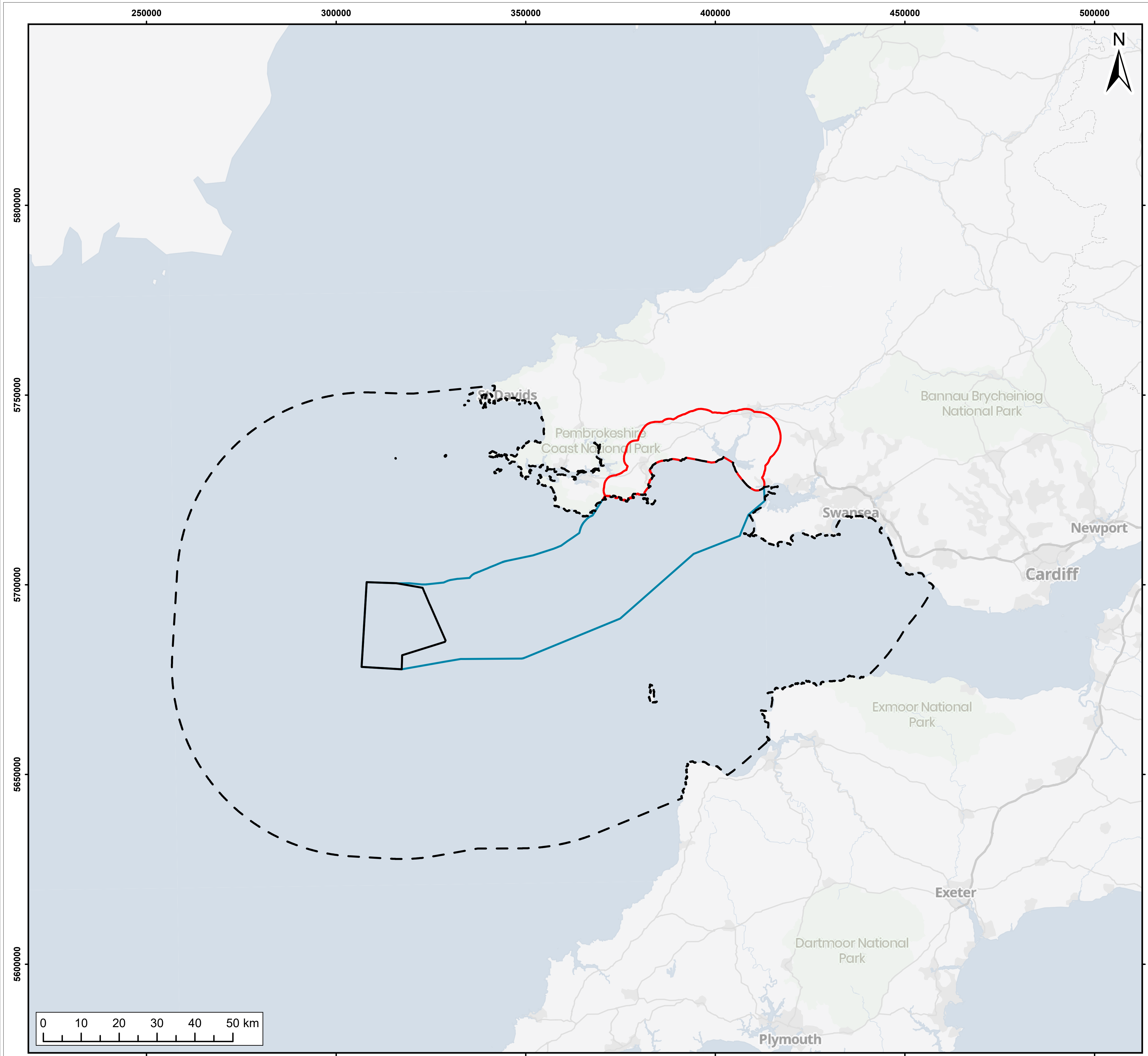
- **Section 1.5 Development Description;**
- **Section 2.6 Commercial Fisheries**;
- **Section 2.7 Shipping and Navigation**; and
- **Section 2.8 Aviation and Radar.**

The following questions are posed to consultees to help them frame and focus their response to the Infrastructure and Other Users scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Infrastructure and Other Users Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in this chapter?
- Have all the potential impacts resulting from the Development been identified in this chapter?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?

2.9.1 Study Area

717. The Infrastructure and Other Users Study Area comprises an initial 50km radius from the Development's Scoping Boundary as shown on **Figure 2.9.1**. This Infrastructure and Other Users Study Area has been used to identify the existing Infrastructure and Other Users which may be directly or indirectly affected by the Development.



Legend:

Array Scoping Boundary

Onshore Scoping Boundary

Offshore Export Cable Scoping Boundary

Infrastructure and Other Users Study Area

Source: © Haskoning UK Ltd, 2026
Base map: Contains OS data © Crown Copyright and database right 2026. Contains data from OS Zoomstack

Project: Gwynt Glas Offshore Wind Farm Scoping Report					
Title: Infrastructure and Other Users Study Area					
Figure: 2.9.1	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0050				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	13/03/2026	MW	CB	A3	1:1,000,000
Co-ordinate system: ETRS 1989 UTM Zone 30N					

Haskoning Enhancing Society Together

Gwynt GLAS

2.9.2 Baseline Environment

718. This section describes the Infrastructure and Other Users receptors, using publicly available data sources deemed of relevance to the Infrastructure and Other Users Study Area.

719. **Figure 2.9.2** provides locations of the identified Infrastructure and Other Users receptors present in the existing environment with a description of these being provided in the subsequent sections.

2.9.2.1 OWF Developments

720. There are seven planned OWF developments within the Infrastructure and Other Users Study Area as shown in **Table 2.9.1.**

Table 2.9.1 OWF Developments within the Infrastructure and Other Users Study Area

OFFSHORE WIND FARM	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Erebus	Consent Authorised	0.01	0
Llŷr 1	Consent Application Submitted	0.01	0
Llŷr 2	Concept / Early Planning	12	0
PDA 2	Concept / Early Planning	1	1
White Cross	Consent Authorised	17	11
PDA 3	Concept / Early Planning	23	22
Danu – Maritime Area D	Concept / Early Planning	49	49

2.9.2.2 Subsea Cables

721. There are several subsea cables located in the Study Area, as shown in **Table 2.9.2**.

Table 2.9.2 Subsea cables within the Infrastructure and Other Users Study Area

CABLE NAME	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY(KM)
Tata Atlantic North	Active	0	0
Gemini North	Not in Use	0	0
PTAT	Not in Use	0	0

CABLE NAME	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY(KM)
Hibernia Express	Active	0	0
UK-Ireland 2 Crossing	Active	0	0
SOLAS	Active	3	0
Unknown	Unknown	65	0
Unknown	Unknown	65	0
Unknown	Unknown	65	0
TAT 11	Not in Use	30	8
Swansea/Brean	Active	95	12
Greenlink (FID1203)	Under Construction	25	13
Apollo North	Active	25	25
Tata Atlantic South	Active	39	28
UK-Ireland Crossing 1	Active	30	30
Tata W.Europe UK-Portugal	Active	42	30
Tata W.Europe UK-Spain	Active	41	30
Unknown	Unknown	54	38
Unknown	Unknown	39	39
ESAT 1	Active	40	40
Yellow	Active	45	45
Hibernia D	Active	47	47
FID 1202	Unknown	65	0
FID 1204	Unknown	65	0
FID 1205	Unknown	65	0

CABLE NAME	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY(KM)
FID 1159	Unknown	54	38
FID 1547	Unknown	3	39
Erebus	Planned	4	3
White Cross	Planned	1	25
Llŷr (1,2)	Unknown	Unknown	Unknown

2.9.2.3 Pipelines

722. There are several outfall pipelines in the Study Area. The majority of these outfall pipelines are in Milford Haven waterway, Carmarthen Bay, Swansea Bay and along the Tenby coastline. Three of these outfall pipelines are located within the Offshore Export Cable Scoping Boundary, located adjacent to Penally and Llansteffan.

2.9.2.4 Wave and Tidal

723. There are three wave and tidal development zones located within the Infrastructure and Other Users Study Area as shown in **Table 2.9.3**.

Table 2.9.3 Wave and Tidal Developments within the Infrastructure and Other Users Study Area

PROJECT	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Pembrokeshire Demonstration Zone	Pre-planning Application	19	0
Marine Energy Test Area	Active	41	4
Ramsey Sound	Inactive	53	38

2.9.2.5 MoD

724. There are several MoD exercise areas and sea danger areas in the Infrastructure and Other Users Study Area as shown in **Table 2.9.4**.

Table 2.9.4 MoD Exercise and Sea Danger Areas within the Infrastructure and Other Users Study Area

IDENTIFICATION	TYPE	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
D064B	Exercise Area	0	0
D113A	Exercise Area	19	0
D113A	Danger Area	19	0
D113B	Exercise Area	34	0
D113B	Danger Area	34	0
D115B	Exercise Area	38	0
D115A	Exercise Area	55	0
X5104	Exercise Area	62	0
D117	Exercise Area	67	0
D118	Exercise Area	84	0
D064C	Exercise Area	10	5
Limit of Milford Port (Blue)	Danger Area	2	8
D202D	Exercise Area	88	16
D202A	Exercise Area	102	17
D202B	Exercise Area	110	25
X5001	Exercise Area	31	31
D201J	Exercise Area	90	32
D064A	Exercise Area	34	34
D201A	Exercise Area	88	43
D201F	Exercise Area	82	32

725. Further information on aviation activity is provided in **Section 2.8 Aviation and Radar.** This includes MoD aviation activity and designated danger areas.

2.9.2.6 Munition Points

726. There are eight OSPAR reported munition finds and three historic munition dump sites in the Study Area. The majority of these reported munition finds and historic munition dump sites are located within and adjacent to the Milford Haven waterway and Swansea Bay. One OSPAR reported munition find is located within the Offshore Export Cable Scoping Boundary.

2.9.2.7 Unexploded Ordnance

727. There is currently a limited amount of data available on the quantity, type and distribution of Unexploded Ordnance (UXO) within the Infrastructure and Other Users Study Area. Due to the proximity of the Infrastructure and Other Users Study Area to active and historic firing ranges and historic munitions dumping sites, the potential for UXO is considered to be high. The Development is intending to undertake geophysical surveys within the Offshore Export Cable Scoping Boundary in 2027 to assess the potential for UXO in the Offshore Scoping Boundary. The Development has acquired geophysical data of the Array Scoping Boundary from The Crown Estate which it is assessing to determine whether there is a requirement for further geophysical surveys to assess the potential for UXO in the Array Scoping Boundary (see **Table 2.9.7**).

2.9.2.8 Ports and Harbours

728. Milford Haven, Pembroke Dock, Swansea and Port Talbot ports are the largest ports and harbours in the Infrastructure and Other Users Study Area. These ports facilitate the transfer of oil and cargo shipments as well as ferry services, with vessels transiting across the Infrastructure and Other Users Study Area to these port facilities. A number of other smaller ports and harbours (e.g. Saundersfoot, Burry Port and Fishguard) are also within the Infrastructure and Other Users Study Area which are used by Commercial Fisheries and recreational vessels.

729. Further information on vessel activity, including from these ports and harbours is provided in **Section 2.7 Shipping and Navigation**.

2.9.2.9 Marine Disposal Sites

730. There are thirteen marine disposal sites in the Infrastructure and Other Users Study Area as shown in **Table 2.9.5**. Only three sites are in use.

Table 2.9.5 Disposal Sites within the Infrastructure and Other Users Study Area

DISPOSAL SITE NAME	IDENTIFICATION	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Milford Haven Industrial	LU040	Closed	0	0
Milford Haven Two	LU168	Open	25	3
Milford Haven	LU170	Closed	37	16

DISPOSAL SITE NAME	IDENTIFICATION	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Milford Haven Three	LU169	Open	17	17
St Anne's Head	LU180	Closed	38	17
Bristol Channel	LU160	Closed	96	24
Swansea Bay (Outer)	LU130	Open	108	2
Swansea Bay (Inner)	LU120	Closed	112	25
Bristol Channel Old	LU047	Closed	95	27
Fishguard	IS010	Closed	79	29
Hartland Point	LU020	Closed	65	32
Bristol Channel (Rough Weather)	LU050	Closed	105	34
Morte Bay	LU030	Closed	83	40

2.9.2.10 Marine Aggregates

731. There is one marine aggregate site, Nobel Banks, which is located within the Offshore Export Cable Scoping Boundary. Llanelli Sand Dredging Limited has an active ML to extract marine aggregates from Nobel Banks within an area of 86km^2. The current ML is due to expire in 2031.

2.9.2.11 Aquaculture

732. There are five fisheries orders and aquaculture sites located within the Study Area as shown in **Table 2.9.6**.

Table 2.9.6 Fisheries Orders and Aquaculture Sites within the Infrastructure and Other Users Study Area

FISHERIES ORDERS / AQUACULTURE SITES	STATUS	DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
Fisheries Orders: The Lydstep Haven Mussel Fishery Order 2013	Active	61	0
Mumbles Swansea Bay	Active	108	20
Fisheries Orders: The Swansea Bay Mussel Fishery Order 2012	Active	107	21
Fisheries Orders: The Mumbles Oyster Fishery Order 2013	Active	108	21
Woodstown Bay	Active	110	22

2.9.2.12 Recreational Charter Angling and Wildlife Tours

733. The Infrastructure and Other Users Study Area is situated in an area that is used for recreational charter angling and wildlife tours. Recreational charter angling and wildlife tours are subject to seasonal variations to coincide with suitable weather to undertake the activities.

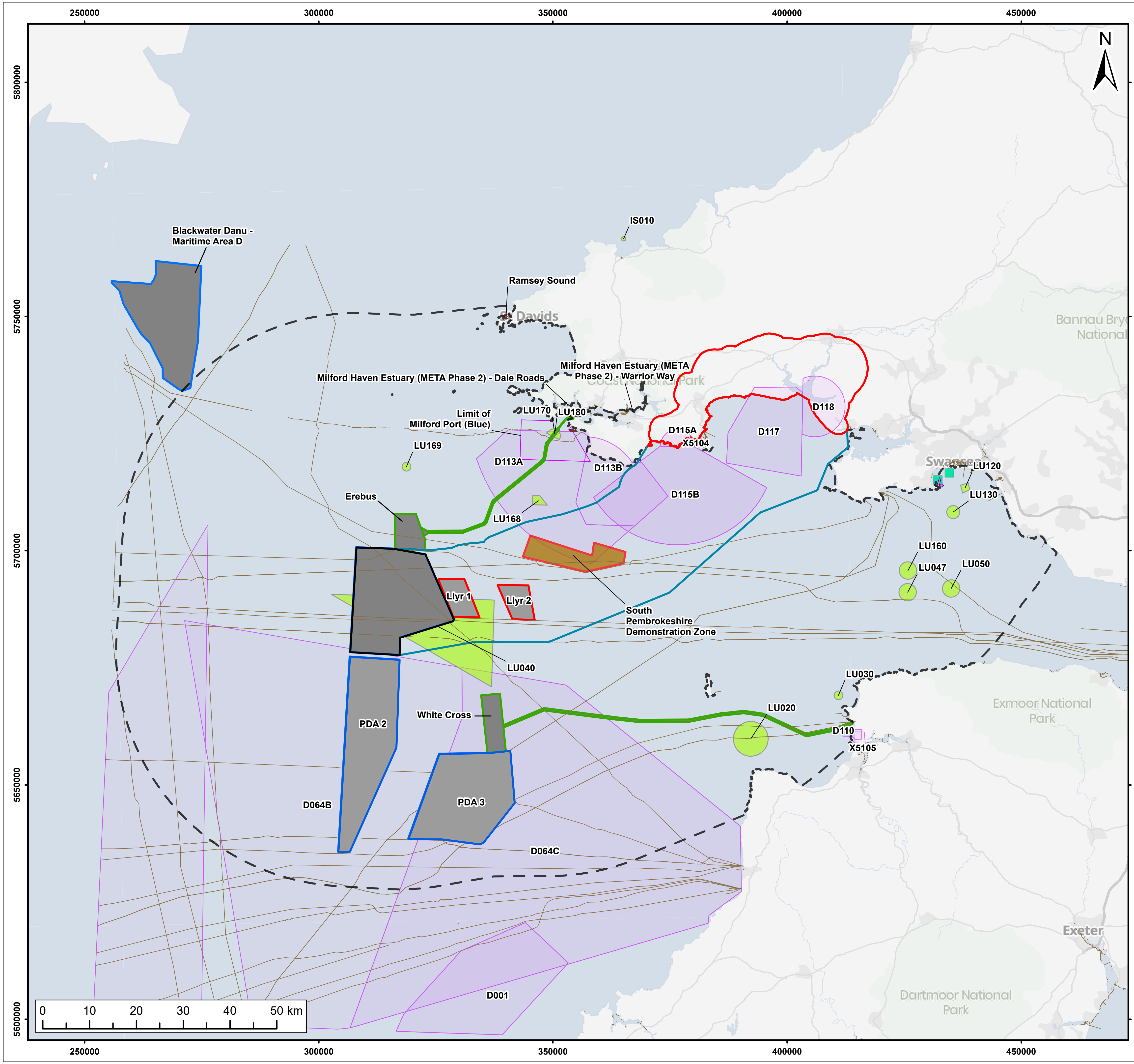
734. Further information on the recreational vessel activity is provided in **Section 4.3 Tourism and Recreation**.

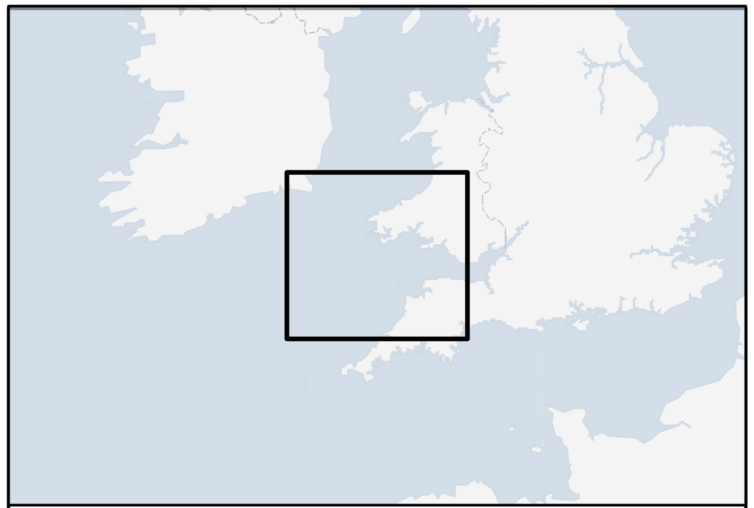
2.9.2.13 Offshore Oil and Gas Operations

735. There is no existing or proposed oil and gas extraction infrastructure or active licence blocks in the Infrastructure and Other Users Study Area and are therefore **scoped out** from further consideration in the EIA. There are three historic exploratory wells within the Infrastructure and Other Users Study Area. One of the historic exploratory wells is 4km east of the Array Scoping Boundary. The other two are 3km and 43km south-west of the Array Scoping Boundary. All three wells have been abandoned and decommissioned.

2.9.2.14 Carbon Capture and Storage

736. There are no carbon capture and storage sites in the Infrastructure and Other Users Study Area or the wider south-west coast of the UK and are therefore **scoped out** from further consideration in the EIA.





Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary
- Infrastructure and Other Users Study Area
- Tidal Site
- Wave Site
- Wave Site (In Planning)
- Disposal Site
- MOD Exercise Area
- Fisheries Orders
- Subsea Cable
- Mussel Cultivation

Windfarm Development Area

- Consented/Pre-construction
- In Planning
- Pre-planning

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Title:
Infrastructure and Other Users Study Area

Figure:	2.9.2	Drawing No:	PC6850-HAS-ZZ-OF-DR-GS-0052		
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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2.9.3 Data Sources

737. Data sources and information available to inform this section include:

- MMO Interactive Map;
- DataMapWales;
- Wales Marine Planning Portal;
- Geographic Information System (GIS) data from The Crown Estate;
- KIS-ORCA; and
- EMODnet.

738. In addition to the publicly available data sources**, Table 2.9.7** describes the surveys that have been undertaken to date, and those that would be undertaken in 2027 by the Applicant to support the assessment. Survey methodologies will be agreed in advance with stakeholders.

Table 2.9.7 Site-specific Survey Data

DATA SET	DATASET DESCRIPTION	SPATIAL COVERAGE	SURVEY TIMINGS
The Crown Estate Surveys for Round 5	Geophysical (multibeam echosounder, side scan sonar & sub bottom profiling) survey	Array Scoping Boundary	01/06/2024 – 15/07/2024
Gwynt Glas Surveys	Geophysical (multibeam echosounder, side scan sonar & sub bottom profiling) survey	Offshore Export Cable Scoping Boundary	To be completed in 2027

2.9.4 Approach to Impact Assessment

739. The Applicant would undertake consultation with all relevant developers, operators and marine users in the vicinity of the Development to ascertain any concerns relating to the Development. Any areas of concern would be identified and considered within the EIA.

740. The EIA would be based on existing data and supplementary information gathered through consultation. The EIA would focus on the Infrastructure and Other Users Study Area and consider Infrastructure and Other Users that overlap with this boundary. The assessment would consider agreed or best practice mitigation (detailed further in **Section 2.9.6**).

2.9.4.1 Receptors

741. The following receptors in the Infrastructure and Other Users Study Area may be sensitive to change and would be assessed in the EIA (**Table 2.9.8**).

Table 2.9.8 Relevant Receptors for the Infrastructure and Other Users Assessment

RECEPTOR	CLOSEST DISTANCE FROM ARRAY SCOPING BOUNDARY (KM)	CLOSEST DISTANCE FROM OFFSHORE EXPORT CABLE SCOPING BOUNDARY (KM)
OWF Developments	0.01	0
Subsea Cables	0	0
Pipelines	4	0
Wave and Tidal	19	0
MoD	0	0
Munition Points	28	0
UXO	Further assessment required	Further assessment required
Ports and Harbours	47	0
Marine Disposal Sites	0	0
Marine Aggregates	62	0
Aquaculture	61	0
Offshore Tourism and Recreation	Further assessment required	Further assessment required

2.9.5 Potential Impacts

742. A range of potential impacts on Infrastructure and Other Users have been identified which may occur during the construction, O&M and decommissioning stages of the Development, which are presented below.

743. Potential impacts to ports and harbours are also assessed in **Section 2.7 Shipping and Navigation**.

2.9.5.1 Potential Impacts During the Construction Stage

2.9.5.1.1 Marine Renewable Energy Developments / Activities

744. The construction activities associated with the Development and the implementation of safety zones around construction vessels installing the Development's infrastructure may obstruct the development activities of the other OWF developments located within the Celtic Sea and the Pembrokeshire Demonstration Zone which is located within the Offshore Export Cable Scoping Boundary. Therefore, impacts on other marine renewable energy developments / activities are proposed to be **scoped in** to the EIA.

2.9.5.1.2 Subsea Cables and Pipelines

745. Construction activities associated with the Development's subsea infrastructure are proposed to be **scoped in** to the EIA as they may interact and cause damage with the existing subsea cables and pipelines located within the Array Scoping Boundary and Offshore Export Cable Scoping Boundary as identified in **Table 2.9.2** and **Section 2.9.2.3**.

2.9.5.1.3 MoD Activities

746. The presence of vessels during the construction of the Development may disturb and displace military activities in exercise and sea danger areas located within the Array Scoping Boundary and Offshore Export Cable Scoping Boundary as identified in **Table 2.9.4.** As this may affect established defence operations, this impact is **scoped in** to the EIA.

2.9.5.1.4 Marine Disposal and Aggregate Sites

747. Construction activities and the presence of construction and support vessels have the potential to impact the existing Nobel Banks marine aggregates site which is located within the Offshore Export Cable Scoping Boundary. The construction of the Development's infrastructure and implementation of safety zones around construction and support vessels may displace vessels transiting to this site and undertaking aggregate extraction activities. Similar potential impacts may occur for operational marine disposal sites. Therefore, the potential impacts associated with marine disposal and aggregate sites are proposed to be **scoped in** to the EIA.

2.9.5.1.5 Aquaculture

748. The presence of construction vessels and safety zones around construction activities associated with the Development have the potential to impact aquaculture cultivation operations by obstructing or altering existing transit corridors to aquaculture sites located within and adjacent to the Offshore Export Cable Scoping Boundary. Therefore, associated impacts on aquaculture are proposed to be **scoped in** to the EIA.

2.9.5.1.6 Offshore Tourism and Recreation

749. The construction of the Development's infrastructure and implementation of safety zones around construction and support vessels may displace vessels associated with existing offshore tourism and recreation activities. Therefore, impacts on offshore tourism and recreation are **scoped in** to the EIA.

750. Potential impacts during construction to offshore tourism and recreation are also assessed in **Section 4.3 Tourism and Recreation**.

2.9.5.2 Potential Impacts During the O&M Stage

2.9.5.2.1 Marine Renewable Energy Developments / Activities

751. The implementation of safety zones around vessels undertaking O&M activities for the Development may obstruct operations of the other OWF developments located within the Celtic Sea and the Pembrokeshire Demonstration Zone. Therefore, impacts on the operations and activities of marine renewable energy developments are proposed to be **scoped in** to the EIA.

752. The Applicant intends to carry out a wake effects assessment in relation to nearby offshore wind farms which are planned and consented (and, if any, operational) as recommended by paragraph 2.8.176 of EN-3. The Applicant notes that this is not a topic which lends itself straightforwardly to an EIA framework. In particular, the Applicant notes that there is no published guidance in relation to the methodology for such wake effects assessments in the context of a consent application, nor any published guidance on the calibration of the significance or otherwise of the conclusions of such assessments. Nor is there guidance or established custom and practice as regards mitigation measures which are considered to be effective and/or reasonable. The Applicant would consider any mitigations which may be reasonable in the light of its assessment, and the circumstances of this application, and would endeavour to discuss the question of wake effects with other relevant offshore wind developers as recommended by paragraphs 2.8.232 and 2.8.316 of EN-3.

2.9.5.2.2 Subsea Cables and Pipelines

753. O&M activities associated with the Development's cabling, such as surveying and cable reburial protection works, may interact and cause damage with the existing subsea cables located within the Array Scoping Boundary and Offshore Export Cable Scoping Boundary. Therefore, associated impacts on subsea cables and pipelines are proposed to be **scoped in** to the EIA.

2.9.5.2.3 MoD Activities

754. The presence of the Development's infrastructure and vessels undertaking O&M activities may disturb and displace military activities in exercise and sea danger areas, therefore is proposed to be **scoped in** to the EIA.

2.9.5.2.4 Marine Disposal and Aggregate Sites

755. The operations of vessels undertaking O&M activities within the Offshore Export Cable Scoping Boundary have the potential the potential to impact the Nobel Banks marine aggregates site by displacing vessels transiting to this site and undertaking aggregate extraction activities. Similar potential impacts may occur for operational marine disposal sites. Therefore, associated impacts on marine disposal and aggregate sites are proposed to be **scoped in** to the EIA.

2.9.5.2.5 Aquaculture

756. Vessels undertaking O&M activities have the potential to impact aquaculture cultivation operations by obstructing or altering transit corridors to existing aquaculture sites located within and adjacent to the Offshore Export Cable Scoping Boundary. Therefore, impacts on aquaculture are proposed to be **scoped in** to the EIA.

2.9.5.2.6 Offshore Tourism and Recreation

757. The presence of the Development's infrastructure and implementation of safety zones around vessels undertaking O&M activities may displace vessels associated with offshore tourism and recreation activities. Therefore, impacts associated with offshore tourism and recreation are proposed to be **scoped in** to the EIA.

758. Potential impacts during O&M to offshore tourism and recreation are also assessed in **Section 4.3 Tourism and Recreation**.

2.9.5.3 Potential Impacts During the Decommissioning Stage

759. Potential impacts associated with the decommissioning stage are expected to be similar to those anticipated for the construction stage. The same potential impacts identified for the construction stage are therefore expected to be scoped in and out for the decommissioning stage.

2.9.5.4 Potential Inter-relationship Impacts

760. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.9.5.5 Potential Cumulative Impacts

761. There is potential for cumulative impacts on Infrastructure and Other Users to arise from other activities occurring within the wider Celtic Sea region. The methodology for assessing potential cumulative impacts is provided in Section 1.8 EIA Methodology.

762. For the Development, relevant offshore wind projects and other marine activities would be identified through a cumulative effects screening exercise. The impacts assessed cumulatively would align with those considered for the Development-alone assessment; however, some impact pathways may be screened out where effects are highly localised to the Infrastructure and Other Users Study Area or where existing management and mitigation measures across projects minimise the likelihood of cumulative interactions.

763. The cumulative assessment for Infrastructure and Other Users would specifically consider key pathways such as the combined extent of marine renewable energy developments / activities or subsea cables, and any wider regional pressures that could interact with the Development.

764. These potential impacts are expected to be mitigated during consultation with the identified Infrastructure and Other Users through the agreement of measures such as cable crossing agreements and buffer zones around existing infrastructure. Other third-party operators, such as OWF developers that interact with the same identified receptors, would also be required to demonstrate there is no potential impact or agree suitable mitigation measures. It is proposed that these impacts are **scoped in** at this stage but following consultation may be able to be scoped out at a later stage. This consultation would include the developers of the other offshore wind farms identified within the Infrastructure and Other Users Study Area.

2.9.5.6 Potential Transboundary Impacts

765. The only potential transboundary receptor in the Infrastructure and Other Users Study Area is the Danu - Maritime Area D offshore wind development zone identified in Ireland’s south coast Designated Maritime Area Plan (DMAP), which is located 49km from the Array Scoping Boundary. Potential impacts on this development zone from the Development are considered low due to the separation distance from the Development. Any potential impacts to this development zone would be covered in the assessments outlined in this section. Therefore, there is no requirement for a separate transboundary assessment, and potential transboundary impacts have been **scoped out** from further consideration in the EIA.

2.9.5.7 Summary of Potential Impacts

766. **Table 2.9.9** outlines the impacts which are proposed to be scoped in to and / or out of the EIA for Infrastructure and Other Users. This may be refined as additional information and data become available.

Table 2.9.9 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Infrastructure and Other Users Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Impacts on other marine renewable energy developments / activities	✓	✓	✓
Impacts on subsea cables and pipelines	✓	✓	✓
Impacts on MoD activities	✓	✓	✓
Impacts on marine disposal and aggregate sites	✓	✓	✓
Impacts on aquaculture	✓	✓	✓
Impacts on offshore tourism and recreation	✓	✓	✓
Impacts on offshore oil and gas operations	x	x	x
Impacts on carbon capture and storage	x	x	x
Inter-relationship impacts	✓	✓	✓
Cumulative impacts	✓	✓	✓
Transboundary impacts	x	x	x

2.9.6 Potential Mitigation Measures

767. Embedded mitigation measures relating to Infrastructure and Other Users are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

768. Requirements for any additional mitigation measures would be determined through the EIA.

769. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All the proposed mitigation measures would comply with regulatory requirements and good practice.

2.10 Offshore Archaeology and Cultural Heritage

770. This section of the Scoping Report considers the scope of potential impacts of the construction, O&M, and decommissioning stages of the Development on Offshore Archaeology and Cultural Heritage.

771. This section provides an overview of the baseline environment and sets out the proposed methodology and approach to assessing effects on Offshore Archaeology and Cultural Heritage receptors in the Development's ES.

772. This section has been undertaken in accordance with *ERN - Marine Historic Environment* published by the OWEKH (OWEKH, 2026).

773. The ERN provides guidance on assessing the impacts of OWF projects on Offshore Archaeology and Cultural Heritage and provides an approach for streamlining the assessment of impacts. The aim is to reduce the need for lengthy descriptions of potential impacts that would not, or are unlikely, to occur, with the application of specific and standard mitigation (OWEKH, 2026). The ERN advocates for an initial categorisation and selection process, which must be properly detailed and documented, as a part of scoping, to ensure that only impacts that are likely to result in significant adverse effects are assessed at the EIA stage of an offshore wind farm. This process is documented in **Section 2.10.4**.

774. The Offshore Archaeology and Cultural Heritage assessment is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description**;
- **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**; and
- **Section 2.11 SLVIA**.

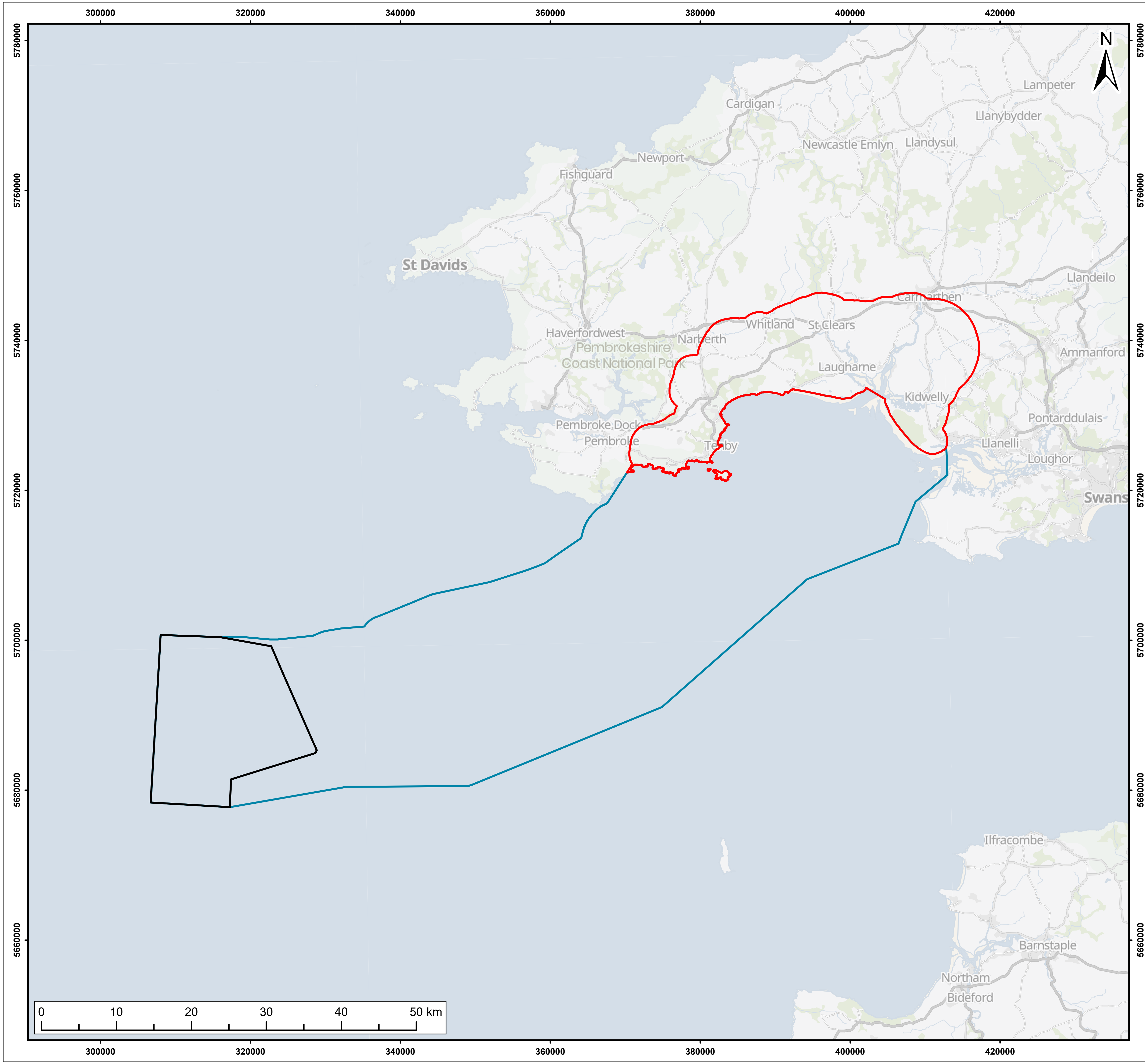
The following questions are posed to consultees to help them frame and focus their response to the Offshore Archaeology and Cultural Heritage scoping exercise which will in turn inform the Scoping Opinion:

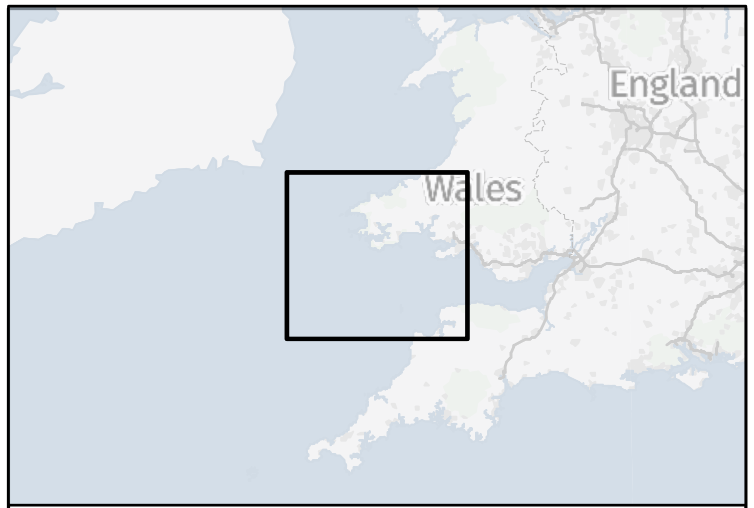
- Do you agree with the proposed Offshore Archaeology and Cultural Heritage Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?
- Do you agree with the proposed approach to assessment?

2.10.1 Study Area

775. The Offshore Archaeology and Cultural Heritage Study Area comprises the Offshore Scoping Boundary (**Figure 2.10.1**). This equates to the area in which impacts to cultural heritage assets are anticipated to occur.

776. As part of the EIA process, the Offshore Archaeology and Cultural Heritage Study Area would be updated based on refinements to the Development, such as preferred options for the wind turbine layout, Inter-Array Cable layout, Offshore Export Cable Corridor and Landfall. These would be indicative and based on a Rochdale Envelope approach. The Offshore Archaeology and Cultural Heritage Study Area to be used in the EIA would be agreed with consultees based on standard industry practices. The Offshore Archaeology and Cultural Heritage Study Area would also be reviewed with consideration of indirect impacts to cultural heritage assets due to changes to marine physical processes, should modelling for EIA show changes to extend beyond the Offshore Scoping Boundary (see **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**).





Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area

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Title:

Offshore Archaeology and Cultural Heritage Study Area

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2.10.2 Baseline Environment

2.10.2.1 Data Sources

777. For this scoping exercise, the baseline environment in the Offshore Archaeology and Cultural Heritage Study Area is defined as both the known archaeological and cultural heritage resource, and the potential for unrecorded assets within the Offshore Archaeology and Cultural Heritage Study Area. This includes:

- Seabed prehistory (i.e. archaeological remains on the seabed corresponding to the activities of prehistoric populations that may have inhabited what is now the seabed when sea levels were lower);
- Maritime archaeology (i.e. the remains of boats and ships and archaeological material associated with prehistoric and historic maritime activities);
- Aviation archaeology (i.e. the remains of crashed aircraft and archaeological material associated with historic aviation activities); and
- Buried archaeology (including palaeoenvironmental deposits) within the intertidal zone below MHWS.

778. The sources of data used for this scoping exercise are as follows:

- Records of wrecks and obstructions from the UKHO via the Admiralty Marine Data Portal (https://datahub.admiralty.co.uk/portal/apps/sites/#/marine-data-portal).
- Records of archaeological sites, monuments, buildings and maritime sites in Wales from the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) via Coflein (https://coflein.gov.uk/en/).
- Records of designated heritage assets in Wales from Cadw via Cof Cymru - National Historic Assets of Wales (https://cadw.gov.wales/advice-support/cof-cymru/search-cadw-records).
- National Monuments Record of Wales - Heritage Assets (Maritime) via https://datamap.gov.wales/layers/geonode:nmrw_maritimesites_rcahmw_wgs84.
- The West Coast Palaeolandscapes Survey GIS data – via https://archaeologydataservice.ac.uk/archives/view/wcpp_eh_2013/downloads.cfm.

779. In addition, this scoping exercise is supported by an initial desk-based review of existing literature and data sources including the archaeological assessment by Maritime Archaeology Limited (MAL) (MAL, 2025a) of geophysical and geotechnical survey data acquired by The Crown Estate in 2024. Details of the data acquired by The Crown Estate is further detailed in **Table 2.10.6**.

2.10.2.2 Seabed Prehistory

780. The Offshore Archaeology and Cultural Heritage Study Area stretches along the coastlines of Pembrokeshire and Carmarthenshire to the Array Scoping Boundary approximately 42km offshore.

781. The Quaternary geology of the marine environment is identified as till with thin layers of recent marine sediments (Holocene sands and gravelly sands) overlaying bedrock (BGS, no date; Intertek, 2018), thickening offshore in the west. There is a high tidal range in the area indicating potential

for the movement of sediment through the region. The presence of exposed bedrock suggests that there is potential for burial and exposure in localised areas.

782. From the beginning of the last glacial maximum, c. 18,000 years ago, ice sheets covered the majority of Britain and earlier, temporary human inhabitants in Britain retreated to the warmer climate of the European continent. Humans began to rapidly reinhabit Britain from c. 13,000 years ago following environmental warming, via a land bridge from continental Europe. Britain has been continuously inhabited from this period onwards, with successive phases of human migration (Fitch and Gaffney, 2011).

783. Sometime after 16,000BC Britain was cut off from Ireland with parts of the inshore areas of the Offshore Archaeology and Cultural Heritage Study Area remaining dry land until c.7000 BC. By the Mesolithic period the Bristol Channel changed drastically, with sea level rise causing the coastline to retreat further inland (Fitch and Gaffney, 2011).

784. The West Coast Palaeolandscapes Survey (Fitch and Gaffney, 2011) provides mapping relating to prehistoric, submerged landscapes in the region of the Bristol channel and Liverpool Bay. It primarily focuses on Late Quaternary and Holocene landscapes, and its findings indicate that that palaeochannels, seabed features and flood plain deposits (peat and organic material) may be present in the Offshore Archaeology and Cultural Heritage Study Area (**Figure 2.10.2**). The West Coast Palaeolandscapes Survey also categorises various broad seabed character types. Within the Offshore Study Area, the following character types are present:

- Early Holocene floodplains
- Latest Palaeolithic to Earliest Mesolithic plains
- Relative upland areas

785. Evidence for early human presence is well documented within the Offshore Archaeology and Cultural Heritage Study Area, with key Palaeolithic and Mesolithic sites including Coygan Cave near Laugharne, Hoyle's Mouth and Little Hoyle at Tenby, and Caldey Island (Research Framework for the Archaeological of Wales, 2016). Excavations at Coygan Cave have produced Neanderthal handaxes dating between roughly 64,000 and 38,000BC, confirming occupation by hunter-gatherer groups exploiting coastal resources during fluctuating climatic conditions (Walker, 2018). These findings align with the broader Palaeolithic record for Wales, where repeated phases of reoccupation occurred in response to environmental change (Heneb, 2011).

786. Exposures of peat and clay have been identified at Marros Sands and Whiteford Sands in 2004, 2005 and 2009. Both sites are within the intertidal zone of the Study Area. Similarly, submerged prehistoric forest has been identified at Marros Sands (Huckfield, 2016), Whiteford Sands (Gale, 1995) and Amroth (Hall and Sambrook, 2010). A worked timber was also found here within peat deposits (Graham, 2011). These are also recorded by the National Monuments Record for Wales (NMRW) along with contemporary finds. Of particular note, contemporary flint artefacts were identified in the early part of the 20th century with the submerged forest at Marros Sands which was radiocarbon dated to 4330 - 3970BC, 3650 - 3100BC. By the Neolithic period, the coastline around the UK was largely as it is today.

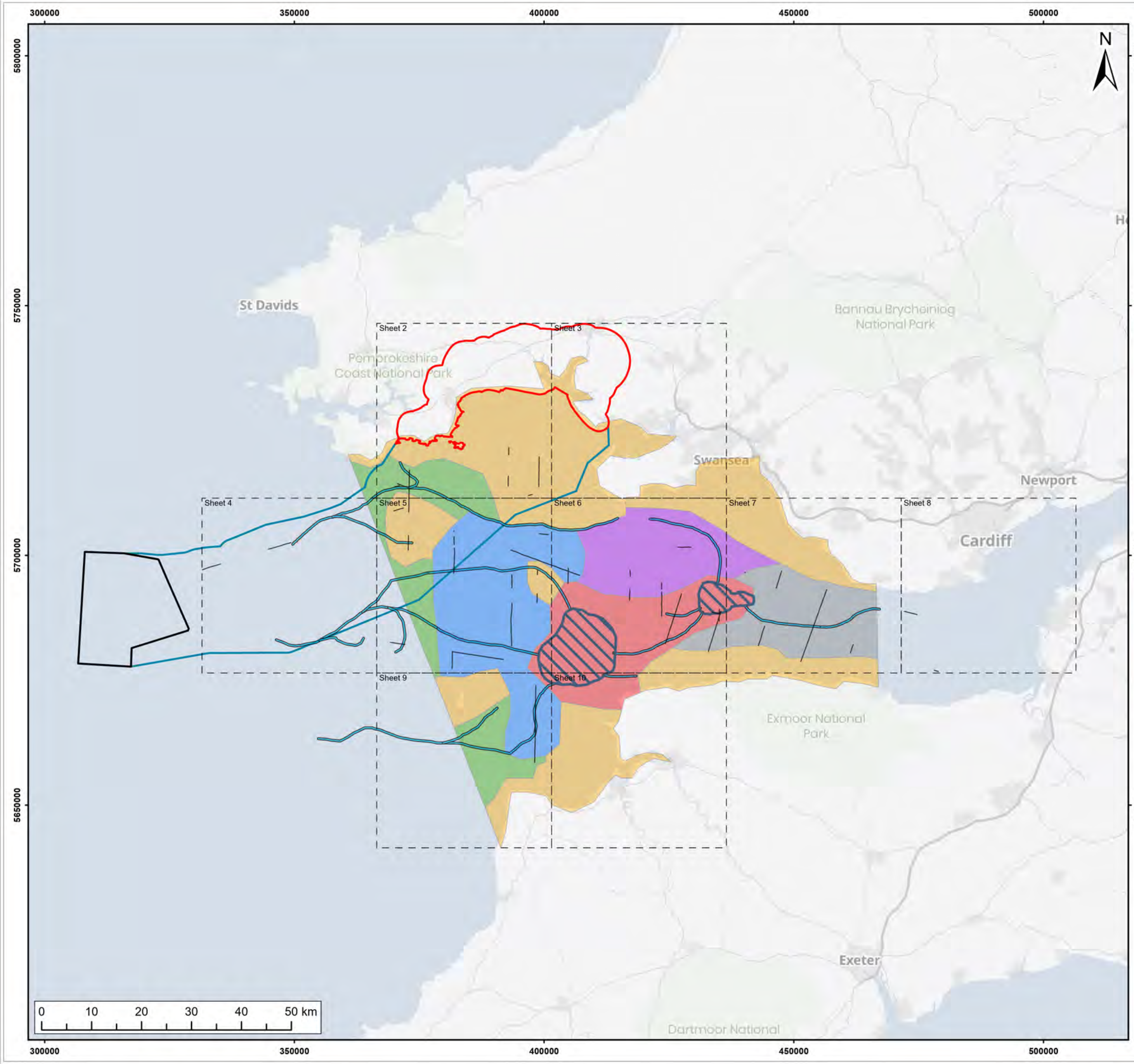
787. Based on the above, there is an overall high potential for there to be prehistoric remains of archaeological interest with the potential increasing closer to shore.

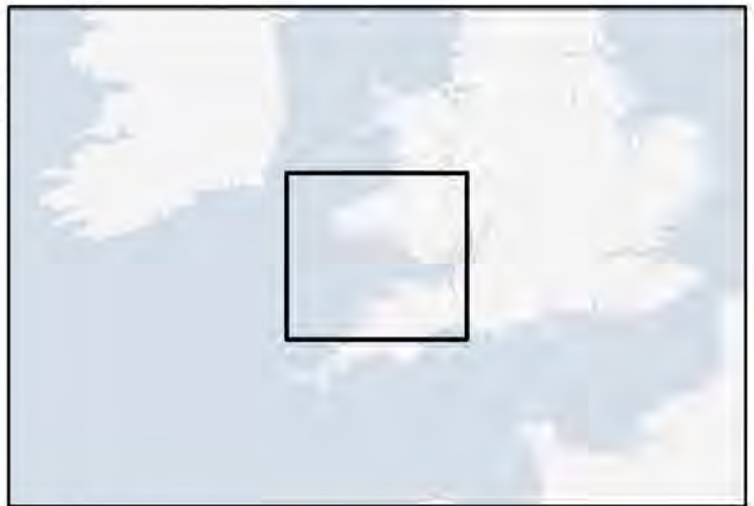
788. Geotechnical surveys of PDAs 1, 2 and 3, which overlap with the Offshore Archaeology and Cultural Heritage Study Area, have been undertaken by The Crown Estate to reduce the

uncertainty and risk for Developers and expedite the Development. A geoarchaeological assessment of the geotechnical data was undertaken by MAL, including a review of geotechnical logs from a total of 88 vibrocores spread across all three PDAs (Phase 1), followed by geoarchaeological laboratory recording of selected samples (Phase 2) (MAL, 2025b). These results were combined with an archaeological assessment of geophysical data to produce an initial deposit model for the Study Area. This deposit model identified eight stratigraphic units, of which Units 1 to 3 post-dated the pre-Quaternary bedrock, including glacial diamicts (Unit 3), Late Pleistocene / early Holocene channel fills (Unit 2) and seabed sediments (Unit 3).

789. This work was followed by palaeoenvironmental assessment (Phase 3) of selected vibrocores that contained deposits assigned a high geoarchaeological potential from Units 1, 2 and 3, including deposits interpreted as peat and organic-rich sands and clays (MAL, 2025b). Three vibrocores were assessed for pollen, seven for plant macrofossils, and two were radiocarbon dated.

790. The results of the Phase 3 assessment indicated that the organic deposits were related to reworking of Pleistocene or pre-Quaternary deposits, with the peats largely reinterpreted as reworked Palaeogene lignite (MAL, 2025c). Radiocarbon dates on reworked organic material from PDA1_07 returned an age of 30,250 - 29,850 cal. BP, placing it within late Marine Isotope Stage 3, whilst the ages on three dates from vibrocore PDA2_15 all exceeded the limit of detection for radiocarbon dating, indicating that they are older than 43,500 BP. These deposits were therefore assigned a low geoarchaeological potential and no recommendations were made for Phase 4 palaeoenvironmental analysis.





Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
- Sheet Extent Box
- Bristol Channel 2D Features

Bristol Channel 3D Features

- Channels
- Lakes

BC Landscape Characterisation

- Area of earlier channels
- Area of floodplain deposits and Pleistocene channel
- Early Holocene floodplains
- Latest Palaeolithic to Earliest Mesolithic plains
- Relative upland areas
- Zone of Holocene wetlands

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Title:
The West Coast Palaeolandscapes Survey Data
(Sheet 1 of 10)

Figure: 2.10.2a | Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108

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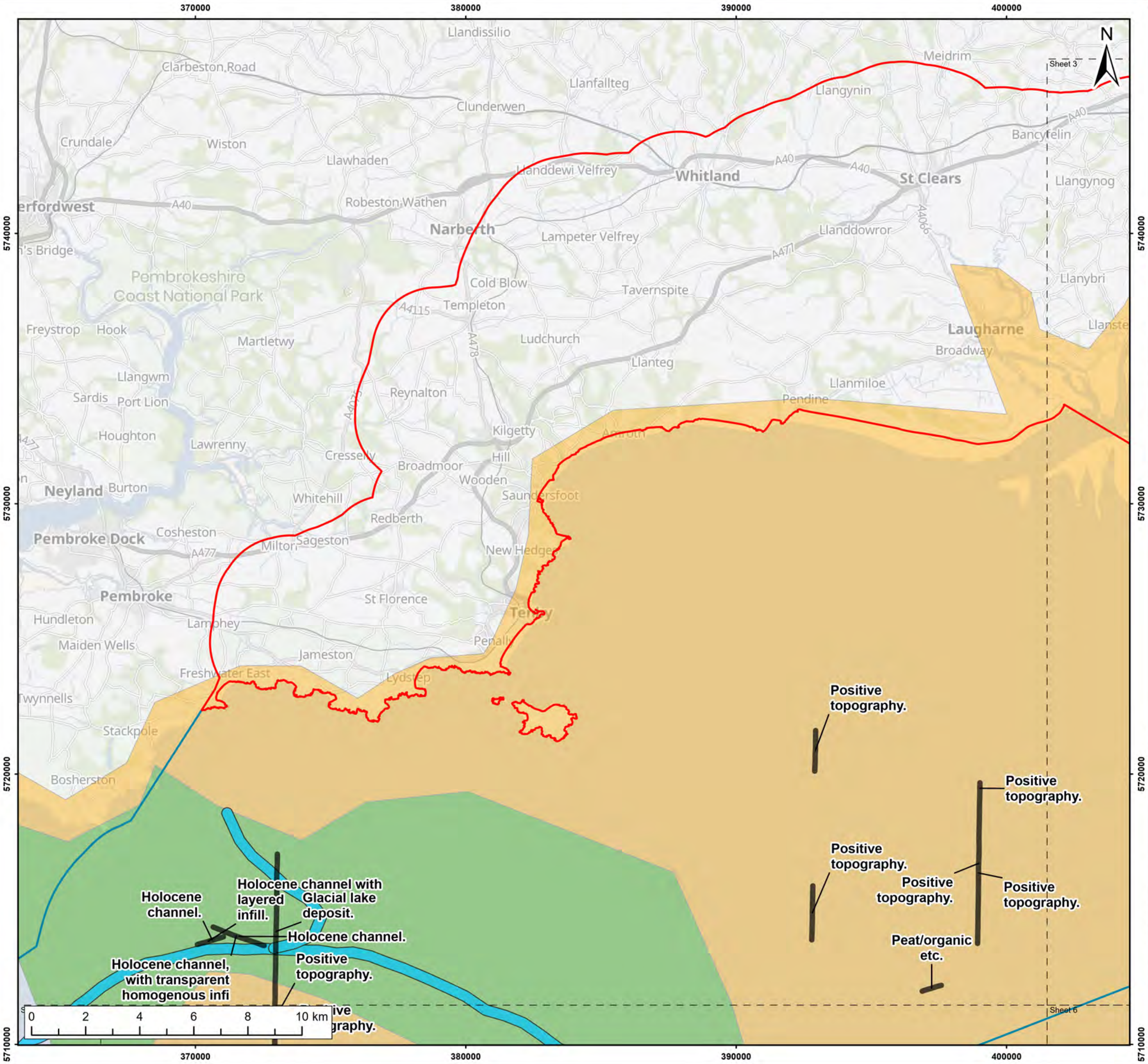

Legend:

- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
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- Bristol Channel 2D Features

Bristol Channel 3D Features

- Channels

BC Landscape Characterisation

- Latest Palaeolithic to Earliest Mesolithic plains
- Relative upland areas

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
The West Coast Palaeolandscapes Survey Data
(Sheet 2 of 10)

Figure: 2.10.2b	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
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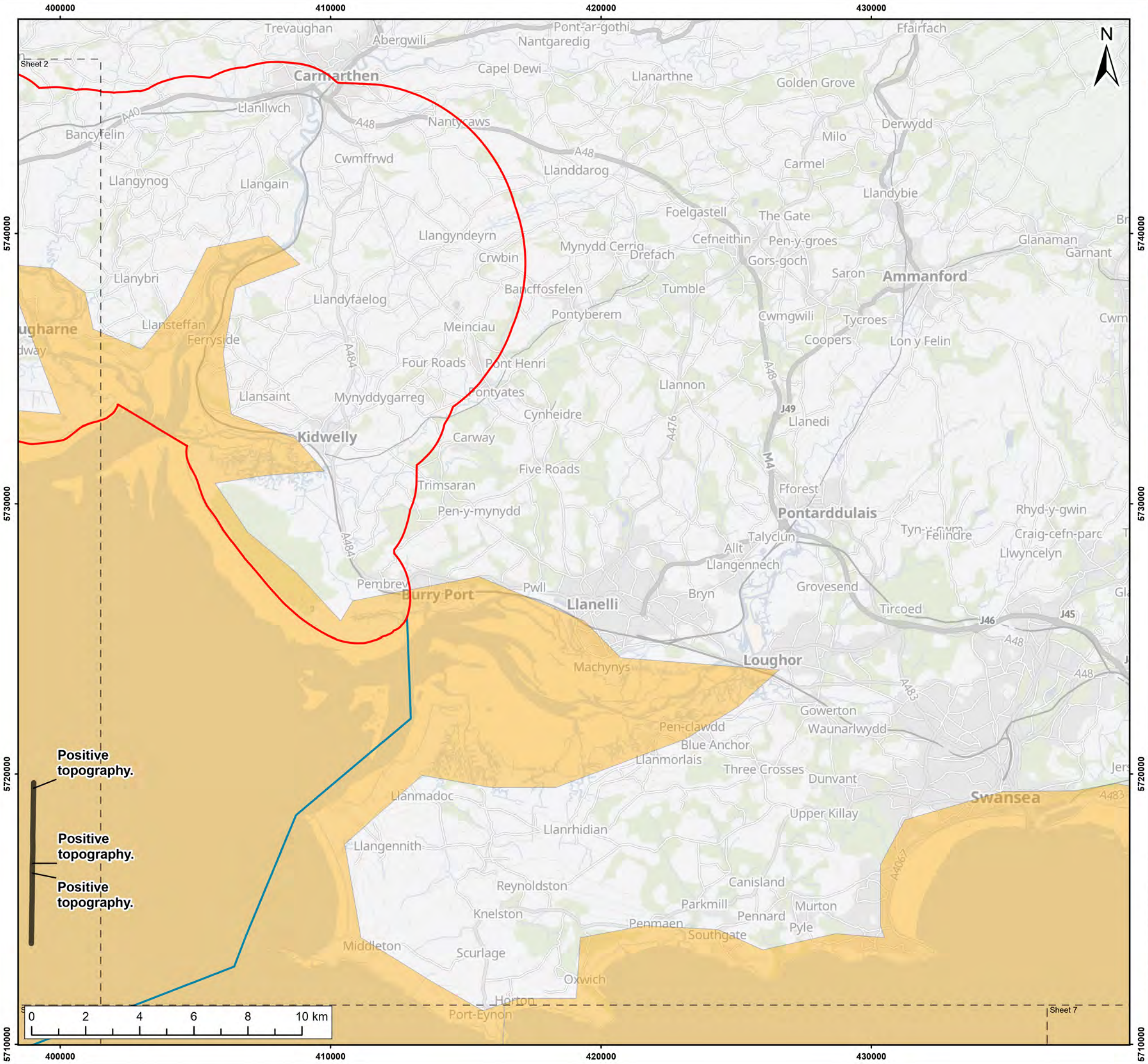

Legend:

- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
- Sheet Extent Box
- Bristol Channel 2D Features

BC Landscape Characterisation

- Relative upland areas

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
The West Coast Palaeolandscapes Survey Data (Sheet 3 of 10)

Figure: 2.10.2c	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
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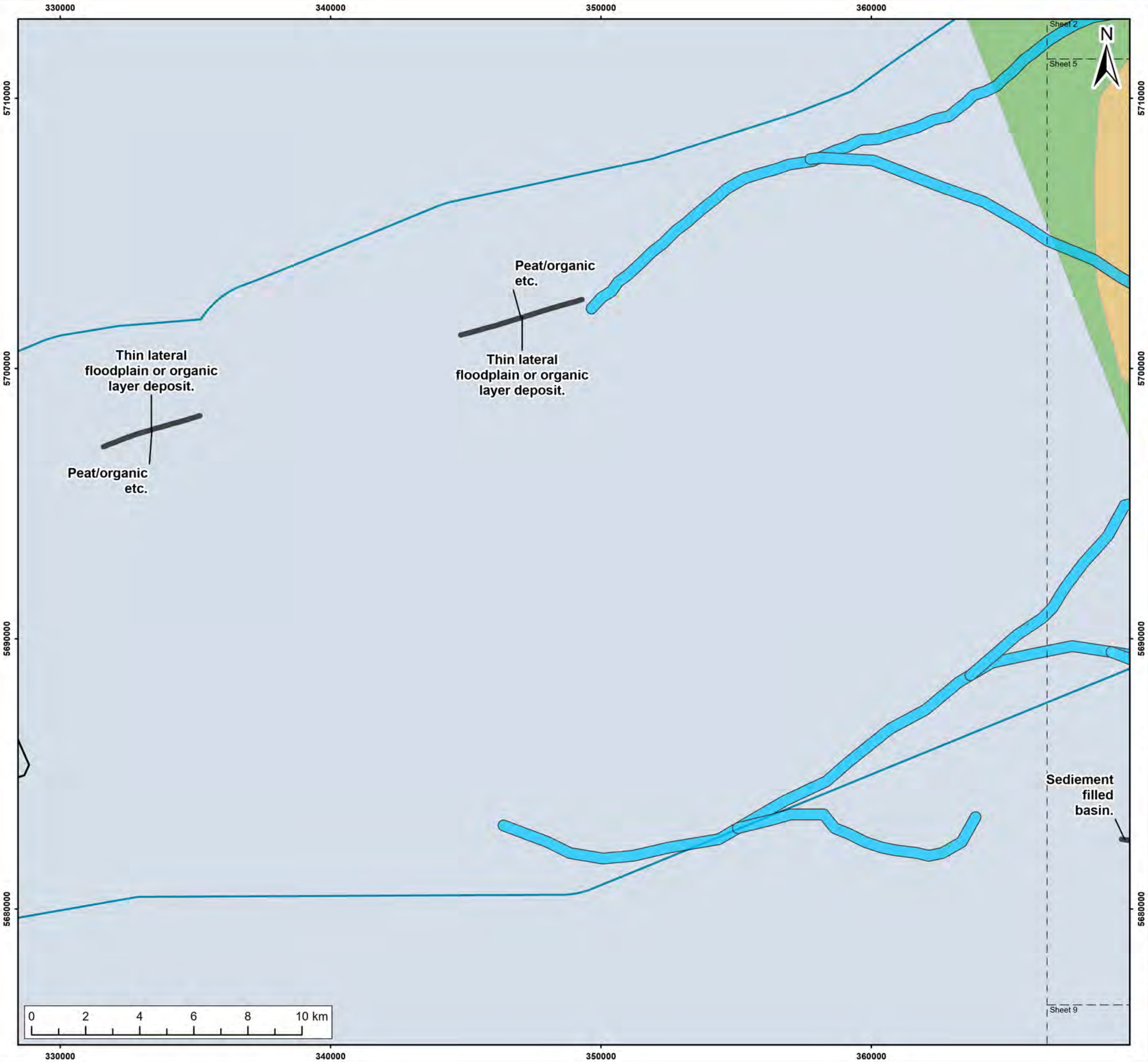

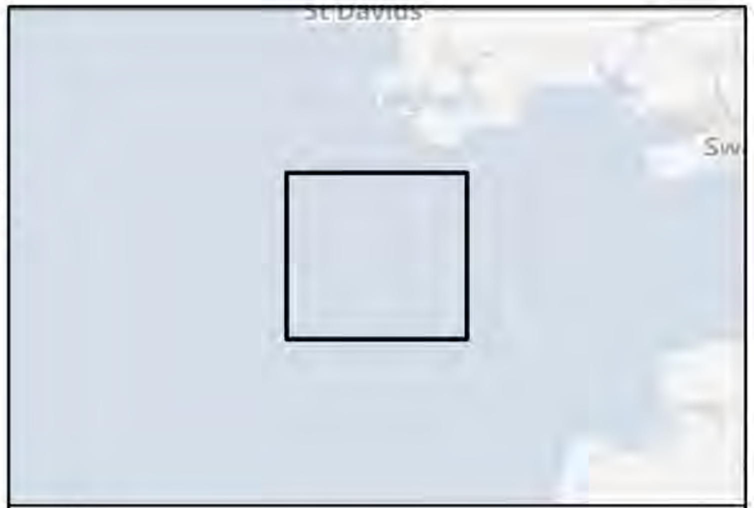

Legend:

- Array Scoping Boundary
- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
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Bristol Channel 3D Features

- Channels

BC Landscape Characterisation

- Latest Palaeolithic to Earliest Mesolithic plains
- Relative upland areas

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Title: The West Coast Palaeolandscapes Survey Data (Sheet 4 of 10)

Figure: 2.10.2d	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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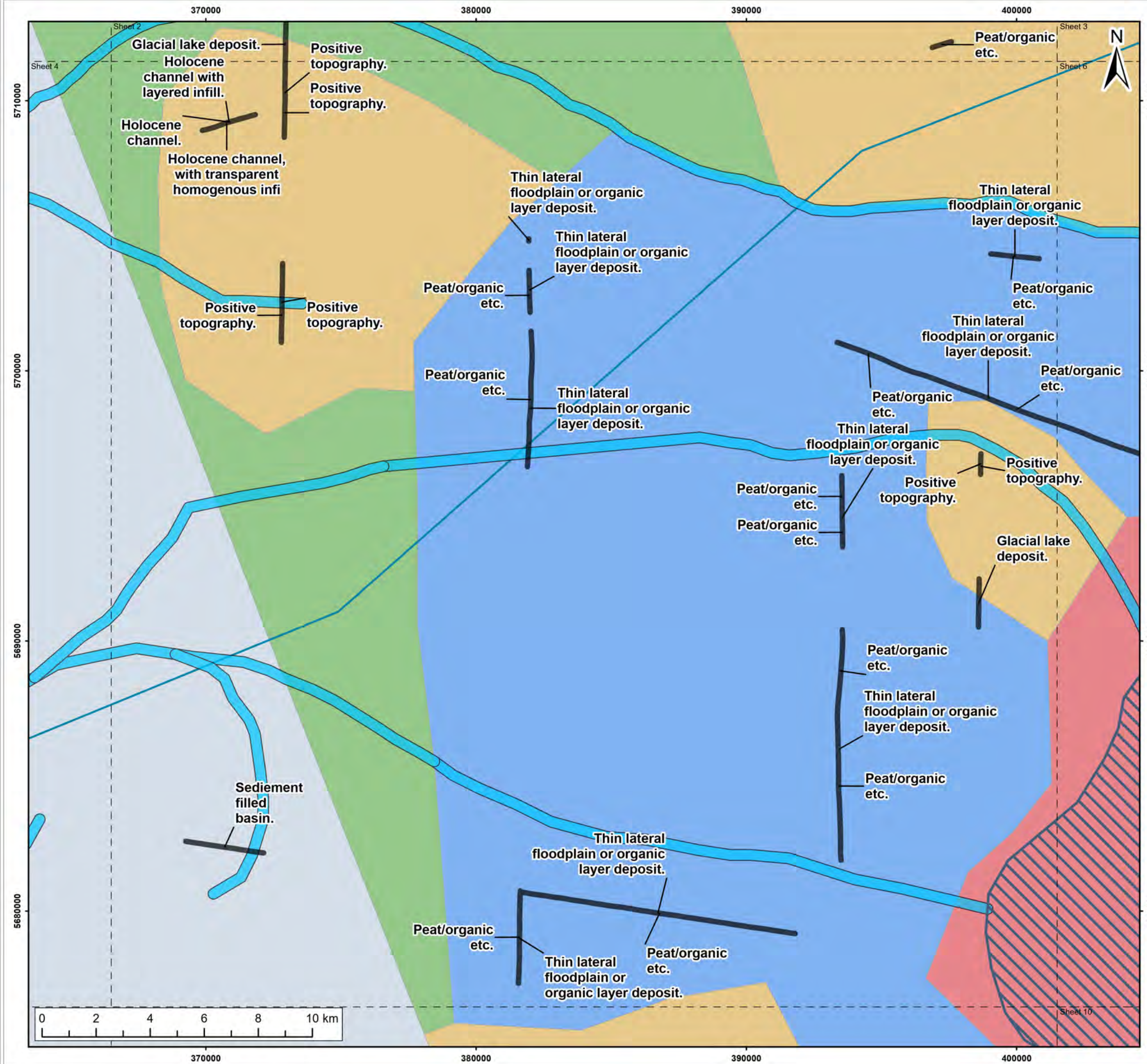

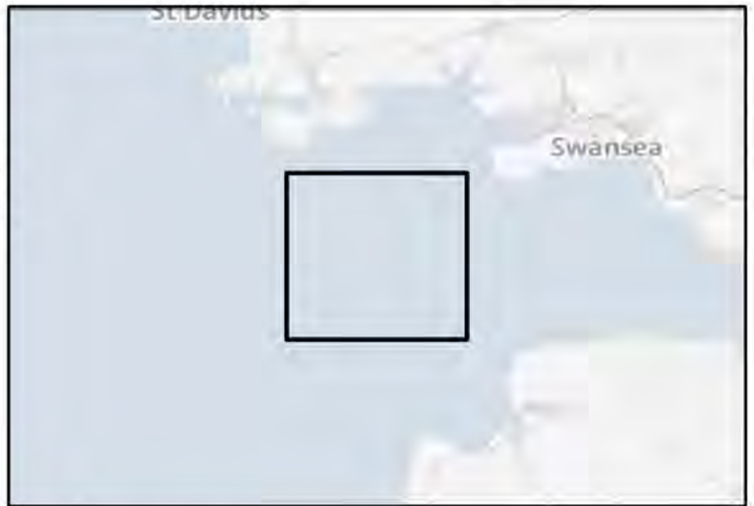

Legend:

- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
- Sheet Extent Box
- Bristol Channel 2D Features

Bristol Channel 3D Features

- Channels
- Lakes

BC Landscape Characterisation

- Early Holocene floodplains
- Latest Palaeolithic to Earliest Mesolithic plains
- Relative upland areas
- Zone of Holocene wetlands

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Gwynt Glas Offshore Wind Farm Scoping Report

Title:
The West Coast Palaeolandscapes Survey Data (Sheet 5 of 10)

Figure: 2.10.2e | Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108

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Co-ordinate system: ETRS 1989 UTM Zone 30N

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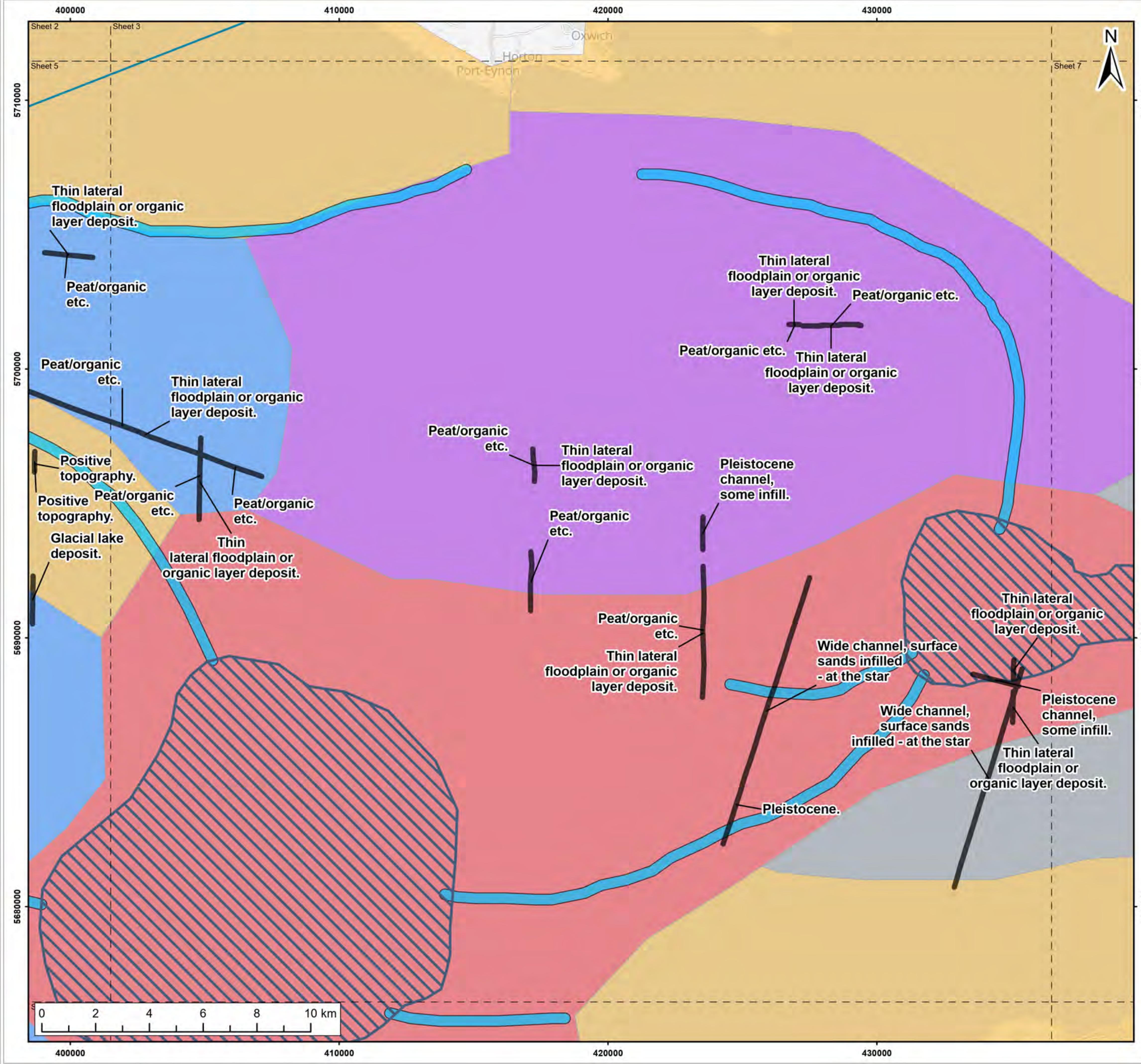

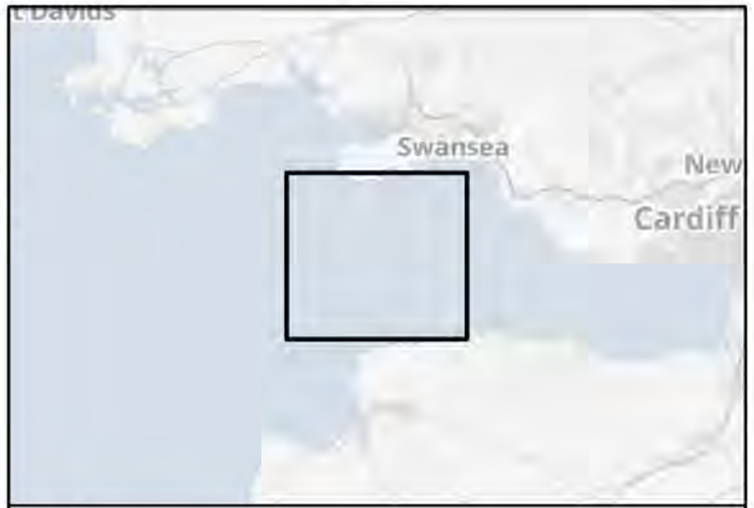

Legend:

- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
- Sheet Extent Box
- Bristol Channel 2D Features

Bristol Channel 3D Features

- Channels
- Lakes

BC Landscape Characterisation

- Area of earlier channels
- Area of floodplain deposits and Pleistocene channel
- Early Holocene floodplains
- Relative upland areas
- Zone of Holocene wetlands

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Title: The West Coast Palaeolandscapes Survey Data (Sheet 6 of 10)

Figure: 2.10.2f	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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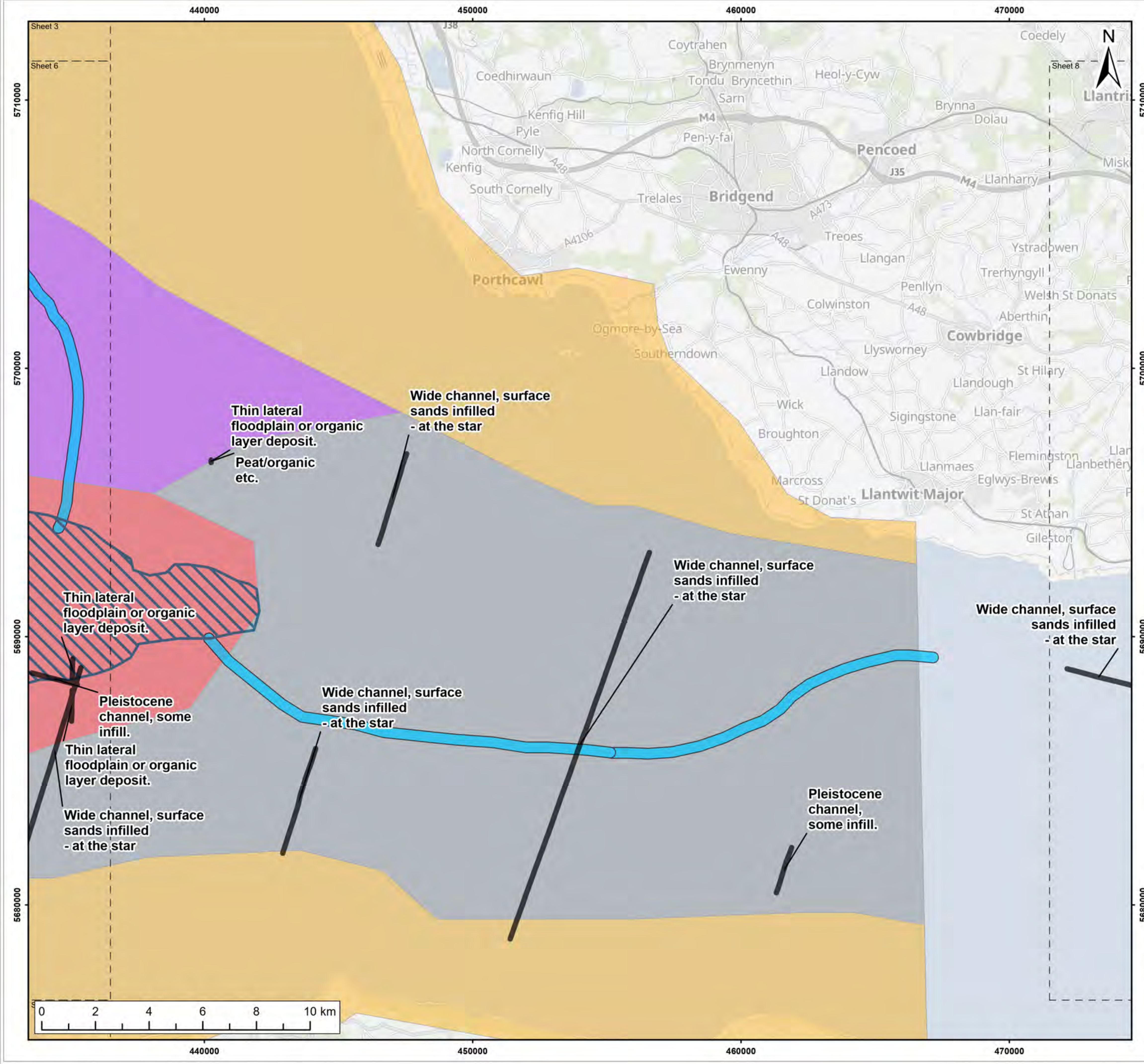

Legend:

- Sheet Extent Box
- Bristol Channel 2D Features

Bristol Channel 3D Features

- Channels
- Lakes

BC Landscape Characterisation

- Area of earlier channels
- Area of floodplain deposits and Pleistocene channel
- Relative upland areas
- Zone of Holocene wetlands

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Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: The West Coast Palaeolandscapes Survey Data (Sheet 7 of 10)

Figure: 2.10.2g	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
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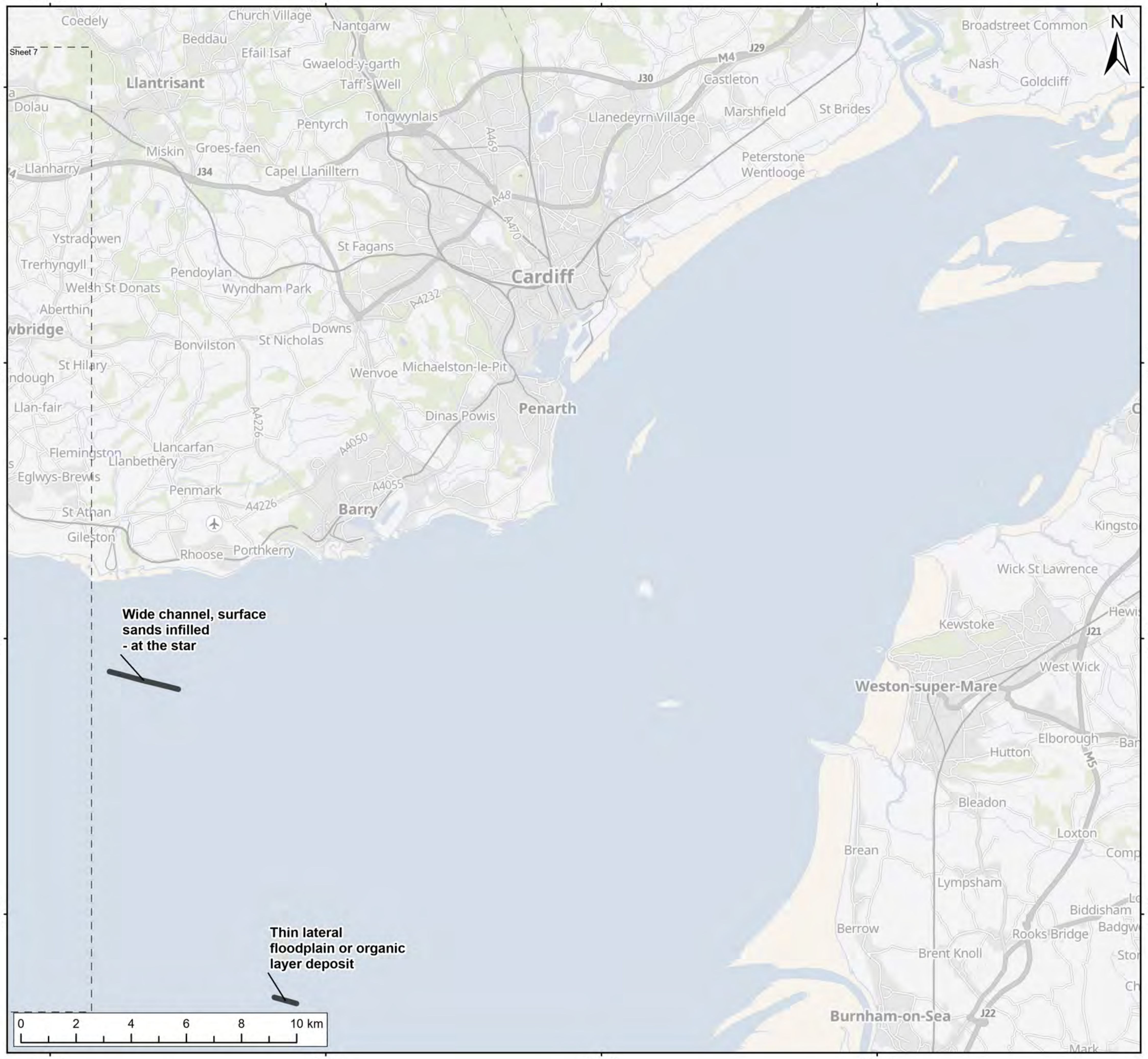

Legend:

Sheet Extent Box

Bristol Channel 2D Features

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Title: The West Coast Palaeolandscapes Survey Data (Sheet 8 of 10)

Figure: 2.10.2h	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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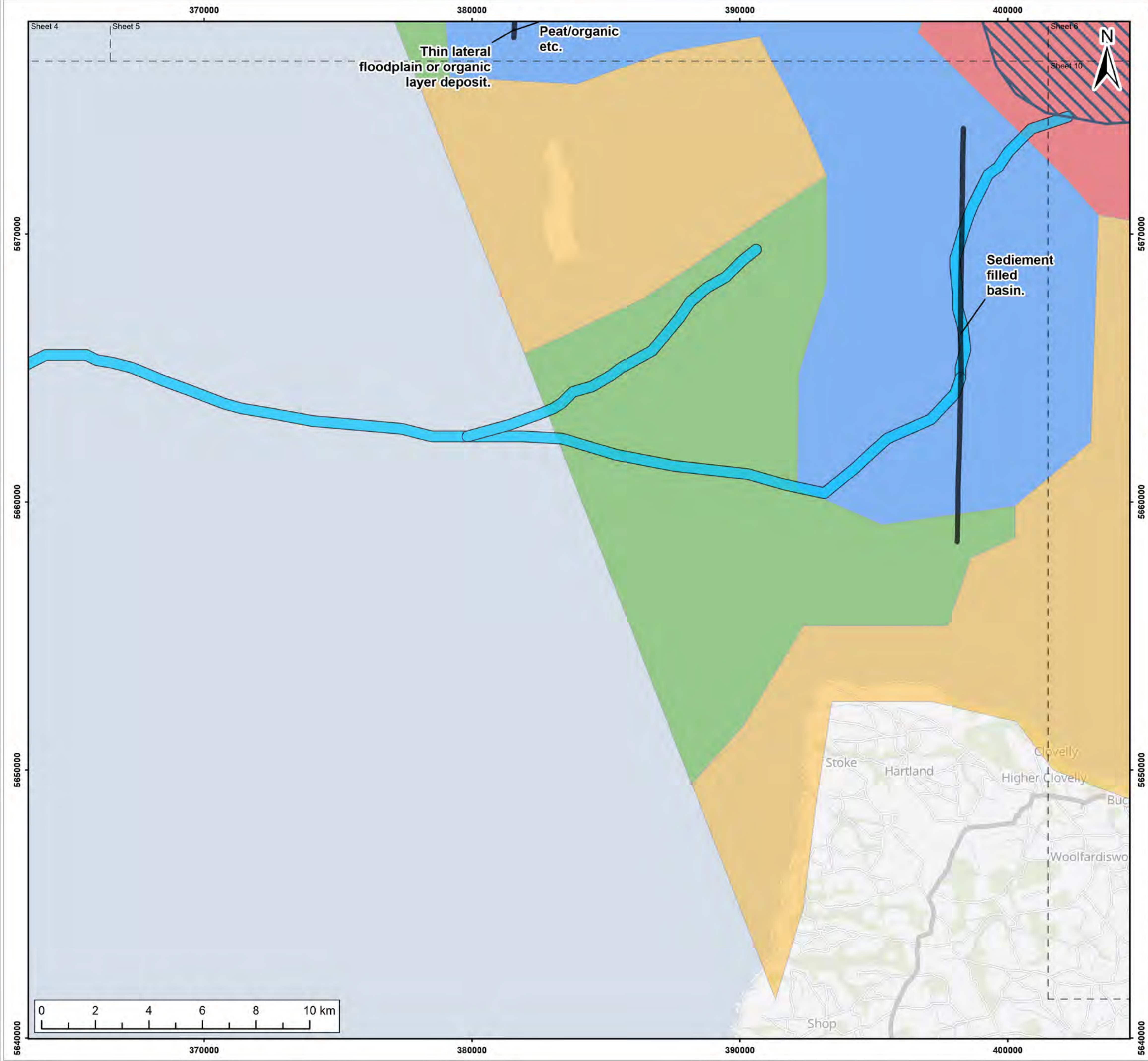

Legend:

Sheet Extent Box

Bristol Channel 2D Features

Bristol Channel 3D Features

Channels

Lakes

BC Landscape Characterisation

Early Holocene floodplains

Latest Palaeolithic to Earliest Mesolithic plains

Relative upland areas

Zone of Holocene wetlands

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: The West Coast Palaeolandscapes Survey Data (Sheet 9 of 10)

Figure: 2.10.2i	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
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Co-ordinate system: ETRS 1989 UTM Zone 30N

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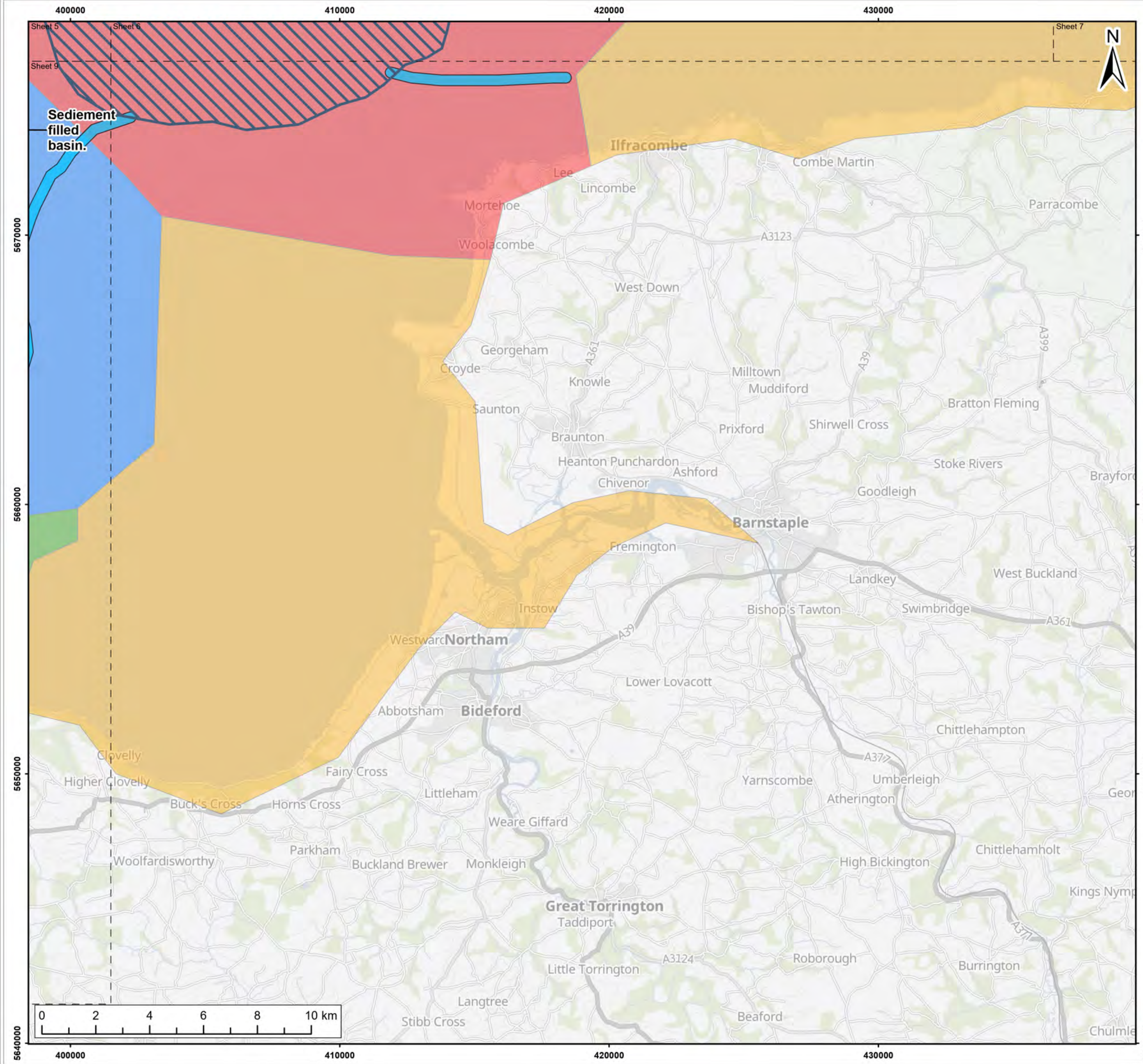

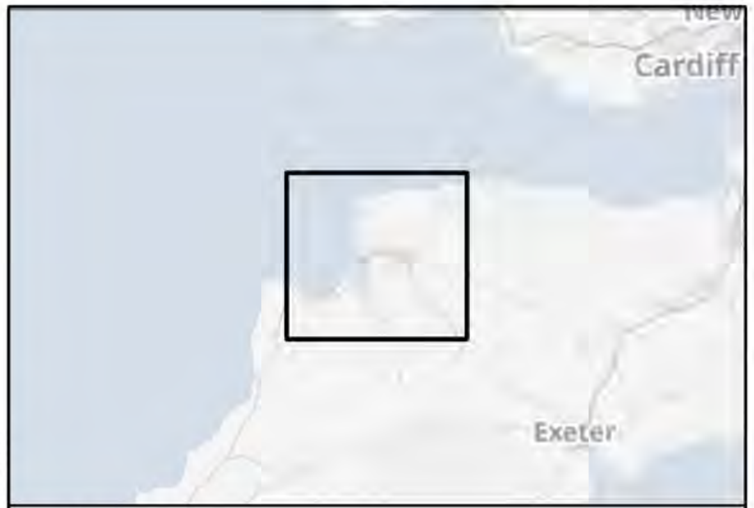

Legend:

Sheet Extent Box

Bristol Channel 2D Features

Bristol Channel 3D Features

Channels

Lakes

BC Landscape Characterisation

Early Holocene floodplains

Latest Palaeolithic to Earliest Mesolithic plains

Relative upland areas

Zone of Holocene wetlands

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Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
The West Coast Palaeolandscapes Survey Data
(Sheet 10 of 10)

Figure: 2.10.2j	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0108				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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2.10.2.3 Maritime Archaeology

791. Within the Offshore Archaeology and Cultural Heritage Study Area, there are no nationally important wrecks protected under the Protection of Wrecks Act 1973 or scheduled under the Ancient Monuments and Archaeological Areas Act 1979. Similarly, there are no wrecks designated as a protected place under the Protection of Military Remains Act 1986.

792. In the Offshore Archaeology and Cultural Heritage Study Area there 90 UKHO records (see **Figure 2.10.3**). Of these, 22 are named wrecks which are 'live', meaning they are considered to exist at their recorded location. These are presented in **Table 2.10.1** .

Table 2.10.1 Live UKHO Wrecks

UKHO ID	NAME	DESCRIPTION[11]	LOCATION
62648	MFV Christian Borum	British fishing vessel which sank in 2003.	Offshore Export Cable Scoping Boundary
12284	SS Corundum (Probably)	British steel cargo ship. Sank on 17th October 1914 after a collision with SS Kyleness.	Intertidal zone
12324	SV Craigwhinnie	British iron hulled barque ran aground and was wrecked at Cefn Sidn, Carmarthen Bay, England carrying a cargo of linseed on 20th December 1899.	Offshore Export Cable Scoping Boundary
12315	Creag Mhor	Small British fishing vessel which ran aground in 1977.	Offshore Export Cable Scoping Boundary
11885	Eleazar (Possibly)	British fishing trawler that was stopped by UC-51 and sunk by gunfire 25 miles SW x W of St. Ann's Head in 1917 with no loss of life.	Array Scoping Boundary
107084	Francis Beddoe	Wooden ketch built in 1877 and wrecked at Pendine in March 1924.	Intertidal zone
11910	Georgios Markettos (Probably)	Greek cargo ship sunk by the German submarine U-57 in 1917.	Offshore Export Cable Scoping Boundary
12327	Gratie Gods (Possibly)	Belgian fishing trawler which sank in 1942 following a German air raid.	Offshore Export Cable Scoping Boundary

[11] Where descriptions are missing from the UKHO this has been provided using information from https://coflein.gov.uk

UKHO ID	NAME	DESCRIPTION[11]	LOCATION
12280	Helwick Lt Float	British structure lost in 1943.	Offshore Export Cable Scoping Boundary
12283	SS Highgate (Possibly)	British steam powered cargo ship. Sank off Lundy Island in 1890 after being in collision with the Canadian sailing vessel Sovereign.	Offshore Export Cable Scoping Boundary
12286	SV Select (Possibly)	On April 16th, 1918, the British drifter Select sank after a collision, South of St. Govan's Head. There was one casualty.	Offshore Export Cable Scoping Boundary
12310	SS Juta	British steam powered cargo ship which ran aground in 1945.	Offshore Export Cable Scoping Boundary
12302	SS Kelvinia	British steam powered cargo ship which was sunk by a mine from the German submarine U-78 in 1916.	Offshore Export Cable Scoping Boundary
12304	Lady Sheila	Went missing on voyage Swansea to Dublin with coal on the 29th November 1954.	Offshore Export Cable Scoping Boundary
11877	LCT (Landing Craft Tank) 7009	Mark3 class LCT foundered while on tow of tug HMS Jaunty in 1951.	Array Scoping Boundary
12276	Maplefield (Possibly)	British steam powered cargo ship. Sank after a collision with SS Gateway City in 1945.	Offshore Export Cable Scoping Boundary
12325	Paul	German schooner Paul was wrecked in foggy weather in Carmarthen Bay on voyage from Halifax to St. Ann's Head with a cargo of timber.	Intertidal zone
12179	Shaleen	Small British fishing vessel which sank in 1991.	Offshore Export Cable Scoping Boundary
70529	Shane	British motor vessel which foundered in 2007.	Offshore Export Cable Scoping Boundary
12281	Sovereign (Possibly)	Canadian sailing ship which sank in 1890 following a collision.	Offshore Export Cable Scoping Boundary

UKHO ID	NAME	DESCRIPTION[11]	LOCATION
12303	St Kilda	British motor coaster capsized and sank in 1961 3.5nm SW of Caldy Island.	Offshore Export Cable Scoping Boundary
12356	Teviotdale	British barque which wrecked on Cefn Sidan Sands in Carmarthen Bay with the loss of her master, Captain J. Smith, and sixteen crew. In 1886.	Offshore Export Cable Scoping Boundary

793. Thirty-one of the UKHO records are recorded as 'dead', of which 15 are named wrecks, meaning they have not been identified at their recorded location and therefore are not considered to exist. This could be because a wreck has become so fragmented that it can be no longer detected or because the position of the vessel recorded at the time of wrecking was incorrect. These are presented in **Table 2.10.2**.

Table 2.10.2 Dead UKHO Records

UKHO ID	NAME	DESCRIPTION[12]	LOCATION
12350	Endeavour	Small fishing vessel which sank in 1989.	Offshore Export Cable Scoping Boundary
12318	SS Fermanagh	British stream powered coastal cargo ship. Sank after hitting rock off Tenby in 1938.	Offshore Export Cable Scoping Boundary
12308	Florrie	British fishing ketch which sank in 1918.	Offshore Export Cable Scoping Boundary
11915	Georgios Markettos	Greek cargo ship sunk by the German submarine U-57 in 1917. Recorded as 'dead' at this location.	Offshore Export Cable Scoping Boundary
12336	HMS Tormentor	British R class destroyer. Sank after running aground in 1929.	Intertidal zone
11875	Hungate	British iron hulled steam trawler that foundered off St. Anns Head, Pembrokeshire 1904.	Offshore Export Cable Scoping Boundary

[12] Where descriptions are missing from the UKHO this has been provided using information from https://coflein.gov.uk

UKHO ID	NAME	DESCRIPTION[12]	LOCATION
12153	LCG 16 (Possibly)	LCG-16 was of one two British landing craft including LCG-15 that sank in gale force winds on 25th April 1943 from Holyhead to St Ann´s Head. On their journey they asked permission to enter Fishguard harbour to shelter from the storm but were refused permission. They continued towards Milford Haven and headed straight into the south westerly gale force winds. The craft began taking on water faster than the pumps could handle. Upon reaching St Ann´s head they radioed for help. The coastguard called the Angle lifeboat but were told that it was out of commission. Six hours went by before the St David's lifeboat was eventually called out. It took them two and a half hours to reach the crafts, by which time it was dark, and nothing could be done. The two craft separated and the LCG-15 sank. HMS Rosemary was also on her way, and upon reaching the LCG-16 launched her lifeboat, but six men on board were drowned when the lifeboat overturned. The LCG-16 soon sank with all loss of life. The bodies were washed ashore in Freshwater Bay. People on the shore tried to resuscitate them but failed. Six bodies were left on the wreck and the site since has been classed as a war grave. The design of the vessel was said to be at fault and was changed after the accident.	Offshore Export Cable Scoping Boundary
12282	Maplefield	British steam powered cargo ship. Sank after a collision with SS Gateway City in 1945. Recorded as dead at this location.	Offshore Export Cable Scoping Boundary
12301	Meg Merrilies	British steam powered cargo ship. The ship was attacked by three Germans aircraft on 27 March 1941 about 1 mile S of St Govan's Lightship. Two bombs hit and the ship sunk while being towed to Milford Haven.	Offshore Export Cable Scoping Boundary
12335	Otway	British sailing vessel which sank in 1982 following a fire.	Offshore Export Cable Scoping Boundary
12399	Quog	British sailing yacht that sank in 1995.	Offshore Export Cable Scoping Boundary
69876	Rupee	FV Rupee was a British registered steam fishing smack. On the 4th October 1917 when 12 miles North from Lundy Island it was captured by German submarine U-96 and sunk by gunfire. 4 lives lost including skipper.	Offshore Export Cable Scoping Boundary

UKHO ID	NAME	DESCRIPTION[12]	LOCATION
12314	Tine Anderson	British fishing vessel which sank in 1969.	Offshore Export Cable Scoping Boundary
69936	Young Clifford	British fishing smack. On 4th October 1917, Young Clifford was sunk by gunfire by the German submarine U-96 12 miles north of Lundy Island.	Offshore Export Cable Scoping Boundary
12264	SS Canterbury Bell	British steam powered cargo ship which capsized and sank in Bristol Channel on 5th January 1922.	Offshore Export Cable Scoping Boundary

794. Two further named wrecks the *Pamela* (68168) and the *Good Shepherd* (12352) are recorded as 'lifted', meaning they were salvaged following their wrecking, although some remains may survive at the recorded locations.

795. The remaining 33 UKHO records all comprise unknown wrecks or structures, however, no status is provided for them so it is not possible to state whether they are 'live' or 'dead' so wreck material may be present at these locations.

796. NMRW records 484 wrecks in the Study Area. Most of these (423) records comprise a documentary reference to a shipping casualty which has been assigned to a maritime named location, an arbitrary point on the seabed which provides an indication for potential wreck remains in the vicinity, rather than the confirmed remains of a wrecked vessel. Two of the remaining records correspond to find spots of cannons while the remaining records correspond to UKHO wrecks.

797. The assessment of marine geophysical data by MAL on behalf of the Crown Estate has identified 123 anomalies of archaeological potential within PDA 1 (MAL, 2025a). A summary is presented in **Table 2.10.3**.

Table 2.10.3 Summary of Archaeological Anomalies

ARCHAEOLOGICAL POTENTIAL	NUMBER OF GEOPHYSICAL ANOMALIES
High (seen in multiple datasets)	8
High (MAG only)	34
Medium	6
Low	7

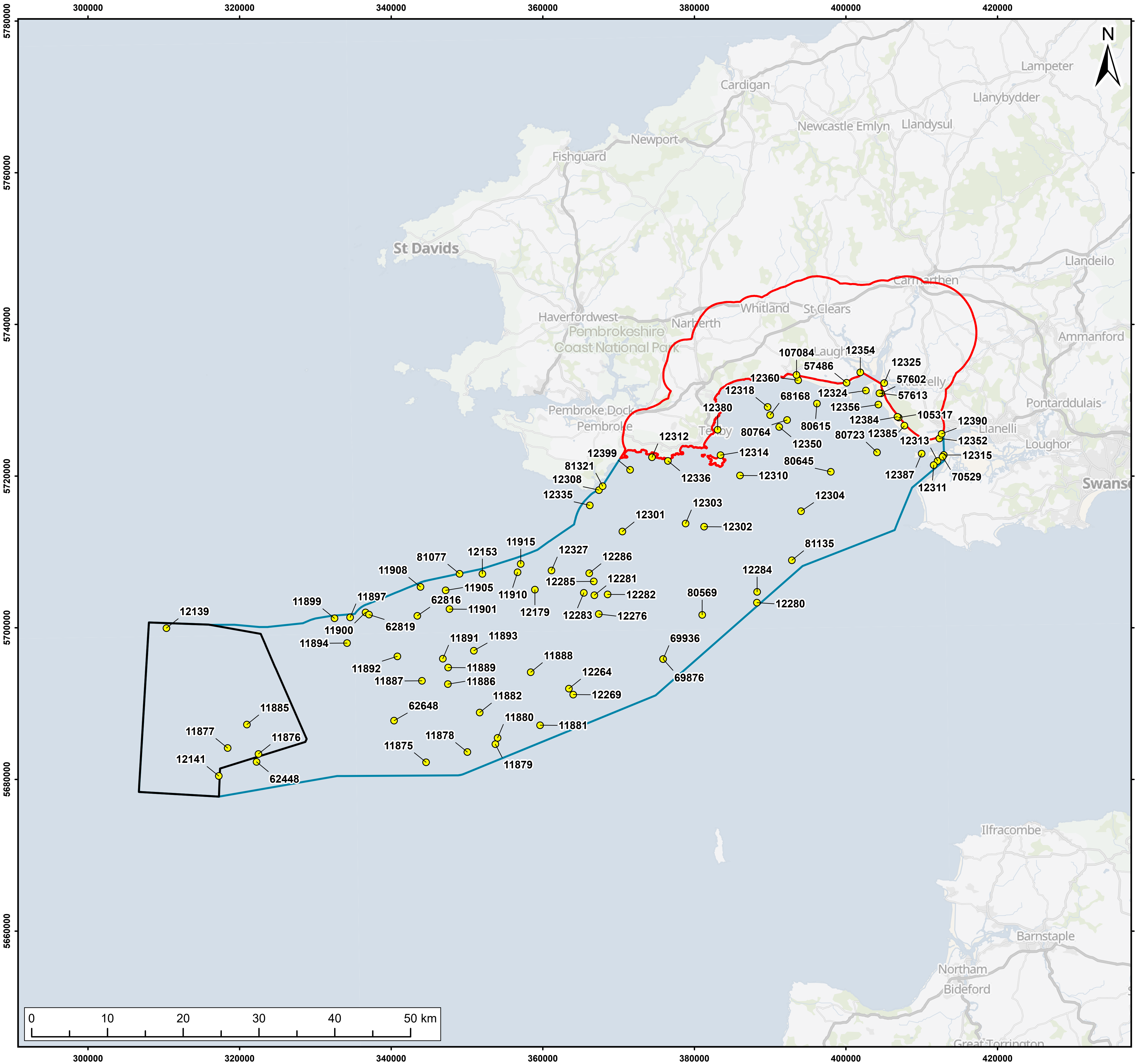
798. Of the 123 anomalies identified by MAL, four of the high potential anomalies correspond or may correspond to UKHO and NMRW records, however, they are unknown wrecks. These are summarised in **Table 2.10.4**.

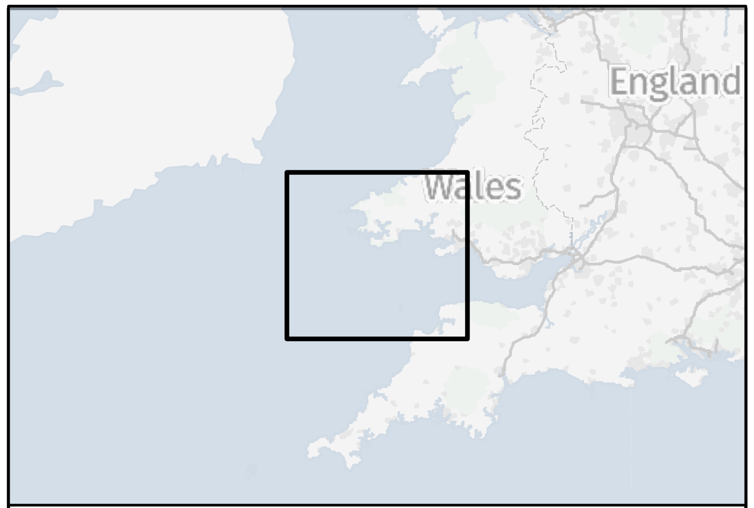
Table 2.10.4 High Potential Anomalies that Correspond to UKHO and National Monuments Record of Wales (NMRW) Records (MAL, 2025a).

MA ID	UKHO ID	NWRW ID	DESCRIPTION
MA0129	**12141**	**7089.**	Seen in the Side Scan Sonar (SSS) as a strong group of bright reflectors with extended masking shadow, and an ovate hull form with associated debris and superstructure. Seen in the Multi-Beam Echo Sounder (MBES) as an ovate raised feature measuring 60 x 8m with an upstanding feature at bow of vessel measuring 11 x 6m.
MA0134	**11877**	**7088**	Seen in the SSS as an isolated area of dark reflectors with shadow; potentially upstanding debris. Seen in the MBES as a raised feature measuring 60 x 16m with extended scour to north-west. Magnetic return of 44.4 nanotesla (nT) 50m east of main site.
MA0260	**11885**	**7086**	Seen in the SSS as an isolated linear reflector with shadow; probable debris or cable / chain. Within 50m of recorded location for UKHO 11885 / NMRW 7086. Seen in the MBES as an area of scour measuring 17 x 12m, approximately 90m north of the recorded location for UKHO11885 / NMRW 7086.
MA0290	**12139**	**6222**	Seen in SSS as an indistinct hard reflector with extended shadow. Seen in MBES as an ovate raised feature measuring 30 x 7m with scour to the north and south. Magnetic return of 133.6nT.

799. One anomaly (MA0002) identified by MAL, for which no previous record exists, may represent the remains of a wreck or wreck material, while the remaining anomalies may represent wreck remains or items of archaeological interest. All anomalies identified by MAL would be further reviewed alongside the data acquired for the Offshore Export Cable Corridor to inform the ES.

800. Based on the above, there is a high potential for maritime wreck related remains to be present within the Offshore Archaeology and Cultural Heritage Study Area. This would be further refined through the review of existing geophysical data and the assessment of geophysical data acquired from the Offshore Export Cable Corridor.





Legend:

- Array Scoping Boundary
- Onshore Scoping Boundary
- Offshore Export Cable Scoping Boundary / Offshore Archaeology and Cultural Heritage Study Area
- UKHO Wreck

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Title:
UKHO Records

Figure: 2.10.3	Drawing No: PC6850-HAS-ZZ-OF-DR-GS-0109				
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2.10.2.4 Aviation Archaeology

801. In the Offshore Archaeology and Cultural Heritage Study Area there are 43 records of aviation crash sites recorded by the NMRW. All of these are recorded at named locations, meaning they represent records of loss from documentary evidence or eyewitness accounts and, therefore, may not comprise physical remains. However, although not precisely recorded on the seabed, if present, any remains of military aircraft are automatically designated as Controlled Sites under the Protection of Military Remains Act 1986. Due to the number of records, there is a moderate to high potential for aviation remains to be present in the Offshore Archaeology and Cultural Heritage Study Area.

2.10.2.5 Intertidal Archaeology

802. Within the intertidal zone of the Offshore Archaeology and Cultural Heritage Study Area are several wrecks identified in **Table 2.10.1** and **Table 2.10.2,** in addition to the submerged forests discussed in **Section 2.10.2.2**. The majority of remaining records in the intertidal zone correspond to post-medieval fishing traps recorded by the NMRW. As such, there is high potential for further similar archaeological material to be present in the intertidal zone.

2.10.2.6 Receptors

803. The following receptors may be sensitive to change:

- Known heritage assets; and
- Potential heritage assets.

2.10.3 Data Sources

804. **Table 2.10.5** outlines existing primary data that would be used to inform the EIA in addition to those listed in **Section 2.10.2.1**.

Table 2.10.5 Data Sources to Inform the Offshore Archaeology and Cultural Heritage Assessment

DATASET	DATA CONTENTS
BGS	Historic borehole logs and the wider geological background for the region.
Heneb: Dyfed Historic Environment Record (HER) data	Contains data on all recorded non-designated historic assets. The data includes archaeological, historic landscape character and historic building information.
Existing archaeological studies and published source	Background information on the archaeology of the area, including the results of previous archaeological assessments, evaluation and investigations, where available.
A Research Framework for the Archaeology of Wales (IFA Wales, first published in 2008 – present: on-going).	Research framework that identifies some of the key questions still to be answered regarding the archaeology of Wales.

DATASET	DATA CONTENTS
Archaeological assessment of geophysical and geotechnical data by MAL (MAL, 2025a, 2025b, 2025c)	Archaeological assessment of geophysical and geotechnical data to provide an archaeological characterisation of PDA 1.

805. In addition to the data in **Table 2.10.5, Table 2.10.6** describes the surveys that have been undertaken to date, and those that would be undertaken in 2027 by the Applicant to support the assessment. Survey methodologies will be agreed in advance with stakeholders where possible.

Table 2.10.6 Site-specific Survey Data

DATASET	DESCRIPTION	SPATIAL COVERAGE	SURVEY TIMINGS
The Crown Estate Surveys for Round 5	Geophysical Survey (magnetometer, multibeam echosounder, side scan sonar and sub bottom profiler survey)	Array Scoping Boundary	01/06/2024 – 15/07/2024
	Geotechnical Survey	Array Scoping Boundary	05/08/2024 – 09/09/2024
Gwynt Glas surveys	Intertidal Walkover Survey	Targeted areas identified through desk-based baseline collation will be visited to identify potential unrecorded non-designated historic assets, as well as ground truthing of certain designated and non-designated assets in the intertidal zone. This will be undertaken following refinement of the landfall.	Q4 2026, Q1 2027
	Geophysical (multibeam echosounder, side scan sonar & sub bottom profiling) survey	Offshore Export Cable Scoping Boundary	To be completed in 2027
	Geotechnical CPT, vibrocore and borehole) surveys	Offshore Export Cable Scoping Boundary	To be completed in 2027

806. In addition to the data from PDA1 acquired by The Crown Estate, for which full assessment has already been undertaken (MAL, 2025a, 2025b, 2025c), all further geophysical and geotechnical data to be acquired from the Offshore Export Cable Scoping Boundary would be archaeologically assessed by a suitably qualified and experienced contractor. The MAL assessments would be further reviewed at ES stage to ensure full integration and alignment with the cable route assessment.

2.10.4 Approach to Impact Assessment

807. The approach to impact assessment follows the approach set out in the ERN - Marine Historic Environment (OWEKH, 2026).

808. This guidance recommends a three Step process for the identification of potential impacts as follows:

- **Step 1**: Identify potential Category A Impacts (impacts that have potential for significant adverse effects and require specific mitigation to be put in place) that require full impact assessment in the EIA.
- **Step 2:** Identify any Category C Impacts that (based on the evidence review) are unlikely to result in significant adverse effects.
- **Step 3:** Set out the range of Category B Impacts (impacts that are unlikely to result in significant adverse effects, if firm commitments to the implementation of standard mitigation are in place and secured through enforceable licence conditions) that will be included in the marine historic environment chapter of the ES but will not be subject to full impact assessment, with commitment to implementing, in all cases, the standard good practice mitigation to monitor, mitigate and control these impacts and risks.

2.10.4.1 Step One

809. As set out in the ERN, Category A impacts are those which have potential for significant adverse effects, even with the implementation of mitigation. Category A impacts comprise:

- Direct impacts on the cultural significance of known heritage assets during the construction stage (unavoidable).
- Impacts on the cultural significance of heritage assets resulting from changes to their setting from operation of an offshore wind farm.

810. No Category A impacts have been identified.

811. With the application of AEZs around known heritage assets, and micrositing of the Development design to avoid AEZs, it is anticipated that all direct impacts to known heritage assets would be avoided. Details of these AEZs, and a commitment to their implementation and observance, would be presented in the ES. As such, all direct impacts to known heritage assets would be avoidable (see ‘Step Three’ below).

812. Impacts on the cultural significance of heritage assets, resulting from changes to their setting from the operation of the project, would also not occur. The Array Scoping Boundary is located c.42km off the Welsh coast and c.56km from the nearest English coastline (Lundy Island). Wind turbines would be visible only as very distant elements of the background in a small number

of views from any assets located along the Welsh and English coastlines. As such, there would be no change to their setting and no discernible adverse effect to their cultural heritage.

2.10.4.2 Step Two

813. Category C impacts comprise:

- Direct impacts on the cultural significance of heritage assets located outside the defined project or application boundary.
- Direct impacts on the cultural significance of heritage assets within the defined project or application boundary during operation and decommissioning.
- Impacts on the cultural significance of heritage assets resulting from changes to their setting from construction and decommissioning of the OWF.
- Impacts on the cultural significance of heritage assets resulting from changes to their setting from operation of the OWF.

814. As outlined in Table 3 of the ERN (OWEKH, 2026), Category C impacts are those where there is clear evidence to support the rationale that the impacts would have no, or negligible, impact on Offshore Archaeology and Cultural Heritage and would not lead to any significant adverse effects.

815. Direct impacts on the cultural significance of heritage assets located outside the application boundary would not occur as there would be no pathway for direct disturbance, damage or alteration to heritage outside the Red Line Boundary.

816. Direct impacts on the cultural significance of heritage assets within the application boundary during operation and decommissioning would not occur as the areas where activities would be undertaken would already have been disturbed during construction and further impact would be limited and not significant. Known heritage assets would continue to be avoided through the implementation of AEZs throughout the lifetime of the Development.

817. Impacts on the cultural significance of heritage assets resulting from changes to their setting from construction and decommissioning of the Development would be temporary and of a relatively short duration that they would not give rise to significant effects.

818. In terms of impacts on the cultural significance of heritage assets resulting from changes to their setting from the operation of the project, as explained under Step One above, these would not occur due to the distance offshore.

819. In line with the ERN (OWEKH, 2026) Category C impacts would not be further assessed in the EIA although the following commitments would be included in the Offshore Archaeology and Cultural Heritage section:

- The retention, and monitoring, of AEZs throughout the project lifetime.
- The ongoing implementation of a Protocol for Archaeological Discoveries (PAD) throughout the project lifetime.
- The production of archaeological method statements in the event of exceptional maintenance events.

820. These commitments would be further secured through an Outline (Offshore) WSI (see **Section 2.10.6** for further details).

2.10.4.3 Step Three

821. Category B impacts comprise:

- Direct impacts on the cultural significance of known heritage assets during the construction stage (avoidable).
- Direct impacts on the cultural significance of potential heritage assets during the construction stage.
- Indirect impacts on the cultural significance of heritage assets associated with changes to physical processes during construction, operation and decommissioning.

822. These are impacts that have potential to have significant adverse effects on Offshore Archaeology and Cultural Heritage but for which standard mitigation measures are available. If these measures are appropriately secured through conditions, requirements and commitments, any residual effects should be reduced below the level of significant adverse.

823. As set out by the ERN (OWEKH, 2026) with these commitments, lengthy reporting is not required in an impact assessment chapter to determine likely effects. Rather, the EIA section would concisely summarise the marine historic environment baseline, including sufficient detail to demonstrate how mitigations, commitments and requirements would prevent significant effects.

824. As described under Step One above, direct impacts on the cultural significance of known heritage assets during the construction stage would be avoided. Once heritage assets have been identified, through the assessment of geophysical data, impacts would be avoided through the application of AEZs or through the micrositing of the project infrastructure. This would be secured through commitments set out in the EIA and the Outline WSI.

825. However, whilst impacts to known heritage assets can be avoided with the implementation of AEZs or micrositing, direct impacts may still occur if archaeological material, the presence of which is currently unknown, is encountered within the footprint of the Development (e.g. cabling, foundations, footprint of jack-up vessels).

826. Indirect impacts on the cultural significance of heritage assets associated with changes to physical processes during construction, operation and decommissioning may occur if the physical presence of construction vessels and offshore infrastructure impacts the hydrodynamic regime, which can extend beyond the Development boundary. Similarly, if seabed preparation associated with foundation and cable installation leads to localised effects upon sedimentary processes this could lead to indirect impacts to heritage assets. In most cases, impacts associated with changes to the hydrodynamic or sedimentary regime rarely result in significant adverse effects to the cultural significance of heritage assets. However, until these changes are understood following the Marine Geology, Oceanography and Physical Processes EIA assessment (see **Section 2.1 Marine Geology, Oceanography and Physical Processes including Water Quality**) the impact they would have on the cultural significance of heritage assets is unknown.

827. All Category B Impacts would be further assessed in the EIA. The Offshore Archaeology assessment undertaken at the EIA stage would be informed by the interpretation of the

geophysical survey data (namely the multibeam and side-scan sonar data to identify seabed features, such as wrecks, magnetometer data to identify magnetic anomalies and sub-bottom profiler and multibeam data to identify palaeolandscape features).

828. A DBA would be undertaken to establish the baseline for both known and potential heritage assets within the defined areas based upon the desk-based sources listed in **Table 2.10.5**. This would be presented in the EIA. Dependent upon the results, a walkover survey at the landfall may be conducted to ground truth existing records of heritage assets and identify any potential unrecorded heritage assets.

829. Due to the high potential for palaeoarchaeological remains, a geoarchaeological DBA would be undertaken to determine the geoarchaeological potential of the Offshore Archaeology and Cultural Heritage Study Area. This would be undertaken following the refinement of the Offshore Export Cable Corridor and Landfall.

830. The methodology for the assessment would also take account of existing studies, research frameworks and guidance including:

- West Coast Palaeolandscapes Study (Fitch and Gaffney, 2011);
- A Research Framework for the Archaeology of Wales (IFA Wales, 2016);
- Managing the Marine Historic Environment of Wales (Cadw, 2020);
- Heritage Impact Assessment in Wales (2017);
- Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008);
- Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Development (JNAPC, 2006);
- Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology, 2008);
- Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008);
- Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessments (DBA) (2020) and Code of Conduct (2025);
- Institute of Environmental Management and Assessment (IEMA), Institute of Historic Building Conservation (IHBC) and CIfA Principles of Cultural Heritage Impact Assessment (2021);
- Archaeological Written Schemes of Investigation for OWF Projects (The Crown Estate, 2021);
- ERN: Marine Historic Environment (OWEKH, 2026);
- Caring for Coastal Heritage (Cadw, 1999);
- Conservation Principles - for the sustainable management of the historic environment in Wales (Cadw, 2011); and
- Marine Geophysics Data Acquisition, Processing, and Interpretation Guidance Notes (2nd Edition) (Historic England, 2025).

831. Technical consultation with heritage stakeholders would be included as part of the EPP. This would help to identify and agree the primary methodologies, present initial findings and ensure potential historic environment issues and risk are identified and considered during the EIA.

2.10.5 Potential Impacts

832. As described in **Section 2.10.4** above, the impacts scoped in and out of further assessment are summarised below.

2.10.5.1 Potential Impacts During the Construction Stage

833. Potential impacts **scoped in** during the construction stage comprise:

- Direct impacts on the cultural significance of known heritage assets within the Offshore Scoping Boundary.
- Direct impacts on the cultural significance of potential heritage assets within the Offshore Scoping Boundary.
- Indirect impacts on the cultural significance of heritage assets associated with changes to physical processes.

834. Direct impacts on heritage assets beyond the Offshore Scoping Boundary, and impacts on the cultural significance of heritage assets resulting from changes to their setting from construction of the Development are **scoped out**.

2.10.5.2 Potential Impacts During the O&M Stage

835. Potential impacts **scoped in** during the O&M stage comprise:

- Indirect impacts on the cultural significance of heritage assets associated with changes to physical processes.

836. Direct impacts on known and potential heritage assets located within the Offshore Scoping Boundary during O&M and impacts on the cultural significance of heritage assets resulting from changes to their setting from operation of the Development are **scoped out**.

2.10.5.3 Potential Impacts During the Decommissioning Stage

837. Potential impacts **scoped in** during the decommissioning stage comprise:

- Indirect impacts on the cultural significance of heritage assets associated with changes to physical processes.

838. Direct impacts on known and potential heritage assets located within the Offshore Scoping Boundary during decommissioning and impacts on the cultural significance of heritage assets resulting from changes to their setting from the decommissioning of the Development are **scoped out**.

2.10.5.4 Potential Inter-relationship Impacts

839. The EIA would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship

between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts are **scoped in** to the EIA.

2.10.5.5 Potential Cumulative Impacts

840. There may be potential for cumulative impacts to occur on Marine Archaeology and Cultural Heritage receptors due to other activities (such other OWF infrastructure).

841. Offshore wind projects and other activities relevant to the assessment of cumulative impacts on marine archaeology and cultural heritage receptors would be identified through a screening exercise. The potential impacts considered in the cumulative assessment as part of EIA would be in line with those described for the Development-alone assessment, though it is possible that some would be screened out on the basis that the impacts are highly localised (i.e. they occur only within the Offshore Scoping Boundary) or where management measures in place for the Development and other projects would reduce the risk of impacts occurring.

842. Individual heritage assets would not be subject to cumulative direct impacts from other known plans or projects as there would be no physical overlap of different infrastructure as individual assets are discrete. However, although individual assets may be discrete, taken together they could have collective heritage significance. For example, if several vessels are known to have been lost in the same event across a large area the individual vessels could be impacted by different projects. As the vessels are known to have been lost in the same event, they would have a collective heritage significance. Therefore, multiple impacts upon similar assets could occur cumulatively.

843. In addition, there is potential for multiple developments to affect the larger scale archaeological features such as palaeolandscapes. The setting of heritage assets may also be affected.

844. There is also the potential for cumulative indirect impacts associated with changes to marine physical processes.

845. Therefore, cumulative impacts are **scoped in** to the EIA.

2.10.5.6 Potential Transboundary Impacts

846. Direct transboundary impacts may occur during construction if wrecks or aircraft of non-British nationality are subject to impact from development. Such wrecks may fall within the jurisdiction of another country, and may include, for example, foreign warships lost in UK waters. As AEZs would be implemented around wrecks of archaeological importance, no impact would occur. Therefore, direct transboundary impacts are **scoped out** of the EIA.

847. Similarly, where palaeolandscapes cross international boundaries, direct transboundary impacts may occur. However, the Development is approximately 36km from the UK EEZ territorial boundary between the UK and Ireland and so direct transboundary impacts to palaeolandscapes are unlikely to occur and are **scoped out** of the EIA.

848. Indirect transboundary impacts would be associated with changes to marine physical processes, where those changes cross an international boundary. As outlined in **Section 2.1** impacts would be restricted to a ZoI extending approximately 15km from the Scoping Boundary, there would be no pathway for transboundary impacts. As such, impacts to heritage

assets due to changes to marine physical process would not occur, therefore they are **scoped out** of the EIA.

2.10.5.7 Summary of Potential Impacts

849. **Table 2.10.7** outlines the impacts which are proposed to be scoped in to and / or out of the EIA. This may be refined as additional information and data become available.

Table 2.10.7 Summary of Impacts Proposed to be Scoped In (✓) and Out (X) of the Offshore Archaeology and Cultural Heritage Assessment

POTENTIAL IMPACT	CONSTRUCTION	O&M	DECOMMISSIONING
Direct impacts on the cultural significance of known heritage assets	✓	x	x
Direct impacts on the cultural significance of potential heritage assets	✓	x	x
Indirect impact to heritage assets from changes to physical processes	✓	✓	✓
Direct impacts on the cultural significance of heritage assets outside the defined project or application boundary	x	x	x
Impacts on the cultural significance of heritage assets resulting from changes to their setting	x	x	x
Inter-relationship Impacts	✓	✓	✓
Cumulative impacts	✓	✓	✓
Transboundary impacts	x	x	x

2.10.6 Potential Mitigation Measures

850. Embedded mitigation measures relating to CCR impacts are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**).

851. Requirements for any additional mitigation measures would be determined through the EIA.

852. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All the proposed mitigation measures would comply with regulatory requirements and good practice.

853. All commitments would be secured in an Outline WSI setting out the proposed approach to archaeological investigation and mitigation works associated with the Development and to be delivered post-application / post-consent. The implementation of a PAD would provide procedures for reporting and investigation of unexpected archaeological discoveries found

during the site investigations, construction and maintenance activities. If material of archaeological importance was identified this would be subject to additional mitigation measures which would be set out in Method Statements prepared in accordance with the WSI in consultation with Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW).

2.11 SLVIA

854. This section of the Scoping Report considers the scope of potential impacts of the Development's construction, O&M, and decommissioning stages of the offshore infrastructure on seascape, landscape and visual receptors. The LVIAs for the onshore transmission infrastructure are discussed in **Section 3.6 LVIA**.

855. This section provides an overview of the baseline seascape, landscape and visual environment and sets out the proposed methodology and approach to assessing effects on seascape, landscape and visual receptors in the Development's ES.

856. The SLVIA is likely to have key inter-relationships with the following topics, which would be considered appropriately where relevant in the EIA:

- **Section 1.5 Development Description;**
- **Section 2.10 Offshore Archaeology and Cultural Heritage;** and
- **Section 3.6 Landscape Visual Impact**.

The following questions are posed to consultees to help them frame and focus their response to the seascape, landscape and visual scoping exercise which will in turn inform the Scoping Opinion:

- Do you agree with the proposed Offshore SLVIA Study Area and that it is sufficient to capture the relevant impacts?
- Do you agree with the characterisation of the baseline environment?
- Have all the relevant data sources been identified in the Scoping Report?
- Have all the potential impacts resulting from the Development been identified in the Scoping Report?
- Do you agree with the impacts that have been scoped in (or scoped out) of further assessment?
- Do you agree with the proposed approach to assessment?

2.11.1 Study Area

857. An initial Offshore SLVIA Study Area has been identified for the SLVIA of the offshore infrastructure (as shown on **Figure 2.11.1**). This area has been established based on several factors including relevant guidance (Landscape Institute, 2013), the location and maximum parameters of the offshore Development infrastructure and the area within which likely significant effects may occur using professional judgement. It is referred to as an 'initial' SLVIA Study Area as it is expected that the SLVIA Study Area would be refined as the EIA process progresses, when further location details of the offshore infrastructure are confirmed.

858. As shown on **Figure 2.11.1**, the SLVIA would cover the potential areas of the Development that make up the initial SLVIA Study Area. These would include allowance for siting of the following infrastructure:

- Siting of the Offshore Export Cable route options;
- Siting of the wind turbines;
- Siting of the Offshore Transmission Station(s); and
- Siting of the Midpoint Compensation Reactor(s).

859. The Array Scoping Boundary is located in the Celtic Sea approximately 36km from the closest point of the Pembrokeshire coast at Skokholm Island and 39km from the closest point of the mainland coastline at St Ann's Head.

860. The 'SLVIA Study Area' (see **Figure 2.11.1)** consists of a 60km radius from the Array Scoping Boundary which would contain the wind turbines and Offshore Transmission Station(s). The need for or location of the Midpoint Compensation Reactor(s) has not yet been determined, therefore for the purposes of scoping the Onshore Scoping Boundary (as indicated on **Figure 2.11.1**) is referenced as forming the extended Study Area for assessment of the Midpoint Compensation Reactor(s), as this includes the relevant areas of coastline that may be affected by the Midpoint Compensation Reactor(s). Once the potential need and location(s) have been confirmed, if required the SLVIA Study Area would likely be extended to include the Midpoint Compensation Reactor(s) (likely 20km radius), which would potentially include the coastline of the PCNP and Gower National Landscape and their seascape setting.

861. The initial SLVIA Study Area presents a precautionary approach for the Scoping assessment, measured from the Array Scoping Boundary and it is expected that this initial Offshore SLVIA Study Area would be refined as the EIA progresses. Significant effects on seascape, landscape and visual receptors are anticipated to be more likely to occur close to the Array, Offshore Transmission Station(s) and Midpoint Compensation Reactor(s) (if required), with potential for significance reducing with distance towards the edges of the initial Offshore SLVIA Study Area. The initial SLVIA Study Area would be further refined as part of the assessment process to ensure a proportionate approach, focussed on likely significant effect.

862. For scoping purposes, a Blade Tip Zone of Theoretical Visibility (ZTV) has been produced to define the visual baseline and is shown on **Figure 2.11.5**. The ZTV is based on an indicative maximum design scenario (MDS) representing the maximum extent of potential visibility of wind turbines in the Array Scoping Boundary. The indicative MDS assumes that 66 wind turbines (which is the worst-case in terms of visual impact as the turbines have a higher blade tip-height) would be located throughout the full extents of the Array Scoping Boundary including around its perimeter.

863. The ZTV shows areas of higher and lower theoretical visibility based on the number of turbines that may theoretically be seen from any point in the SLVIA Study Area. The ZTV is based on the theoretical visibility of any part of a grid of turbines across the Array Scoping Boundary and placed around its perimeter using the maximum turbine blade tip height of 310m above HAT. The ZTV then represents the area over which any part of the Array could theoretically be visible. The purpose of the ZTV is to inform stakeholders of the approximate area within which it may be theoretically possible to have visibility of the Development. The ZTV also illustrates where there would be no visibility of the Development. The ZTV illustrates the 'bare ground'

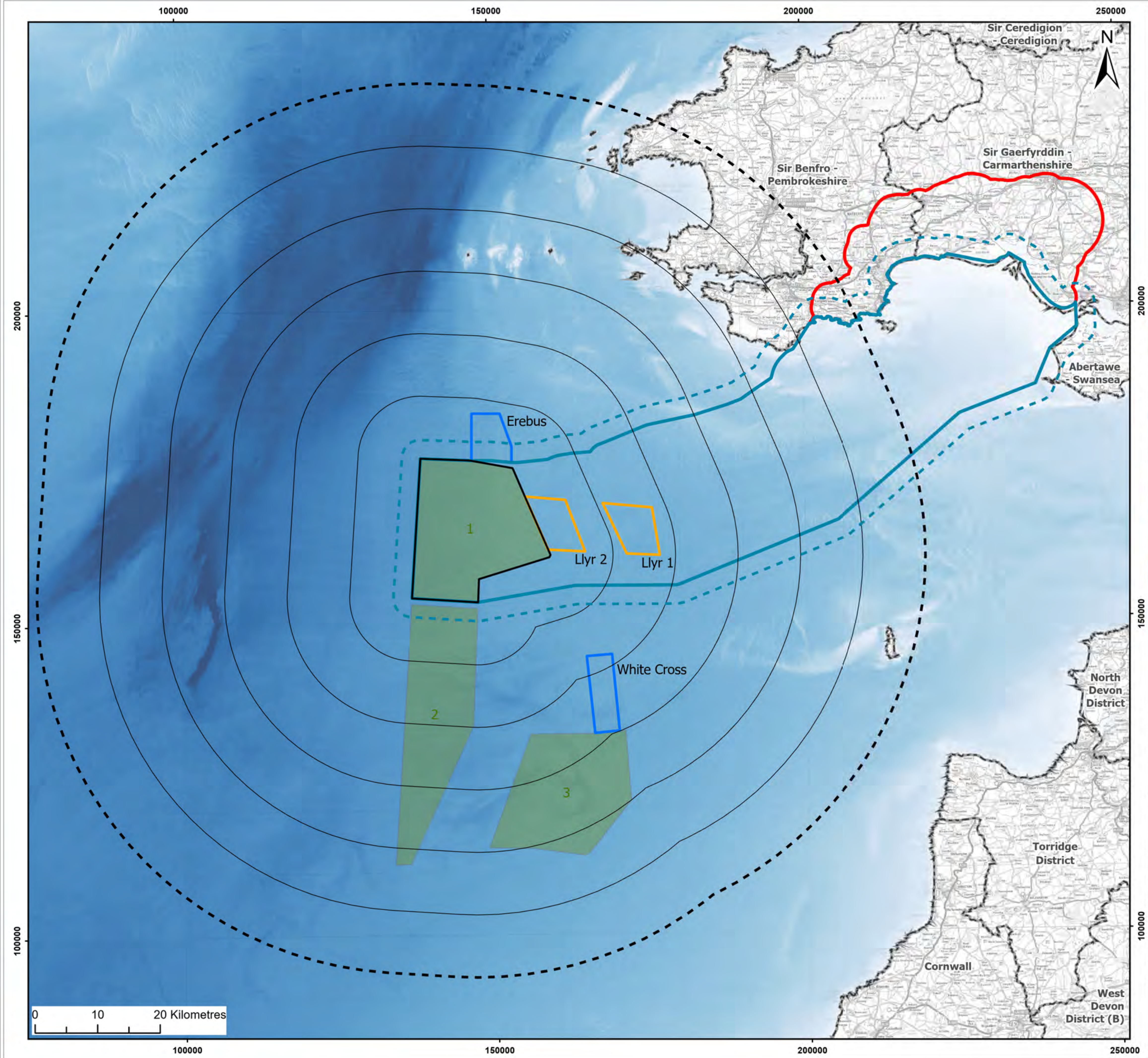
situation and does not take into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility and is therefore a theoretical worst case.

864. The ZTV informs the 60km radius SLVIA Study Area that is selected for the assessment in the EIA. Although wind turbines of the height proposed could theoretically be visible at distances beyond 60km, the EIA regulations require assessment of the ‘likely significant effects’. Therefore, the SLVIA Study Area should extend far enough to include all areas within which likely significant effects may occur. It need not cover all areas where there may be effects. In considering the Offshore SLVIA Study Area, the sensitivity of the receiving landscape and visual receptors has also been reviewed taking particular account of the Landscape Planning Designations and Defined Areas, as shown on **Figure 2.11.2**, and Visual Receptors within the Study Area (**Figure 2.11.4**).

865. The Blade Tip ZTV indicates that the visibility of the Development from the land would become very restricted and dispersed at distances beyond 60km. Furthermore, actual visibility from inland areas would be further fragmented by either landform, vegetation or built features / settlements that screen visibility of the Development. At distances over 60km, the lateral spread of the wind farm site would occupy a very small portion of available views. The vertical height of the wind turbines would appear relatively small, therefore significant visual effects are unlikely to arise at greater than this distance (even if the wind turbines are visible in excellent visibility conditions).

866. A ‘ready reckoner’ study was commissioned and carried out by WhiteMichaels and King (2019) which reviewed distance from shore, visibility, and likelihood of scale of visual effects. Based on White, Michaels and King(2019) Stage 1 Ready Reckoner, for turbines up to 301-350m tip height, visual magnitude of effects is likely to be low beyond ~44 km offshore.

867. Taking all of the above factors into account, it is considered that the Array is unlikely to result in significant effects at distances over 60km. Seascape, landscape and visual effects as a result of the array are therefore proposed to be scoped out beyond 60km from the Offshore Scoping Boundary.



Legend:

- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- 10 km Radii
- 60 km Offshore SLVIA Study Area
- Offshore Scoping Boundary 3km Buffer
- Local Authority Boundary
- The Crown Estate - Offshore Wind Leasing Round 5 Project Development Areas (PDAs)
- Cumulative Projects in Application
- Cumulative Projects in Scoping

EMODnet Bathymetry (Depth, m)

62.83

-144.76

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: SLVIA Study Area

Figure: 2.11.1 | Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RH	NJ	A3	1:600,000
02	25/03/2026	RH	NJ	A3	1:600,000
03	06/05/2026	BL	NJ	A3	1:600,000

Co-ordinate system: ETRS 1989 ETRS 1989 UTM Zone 30N

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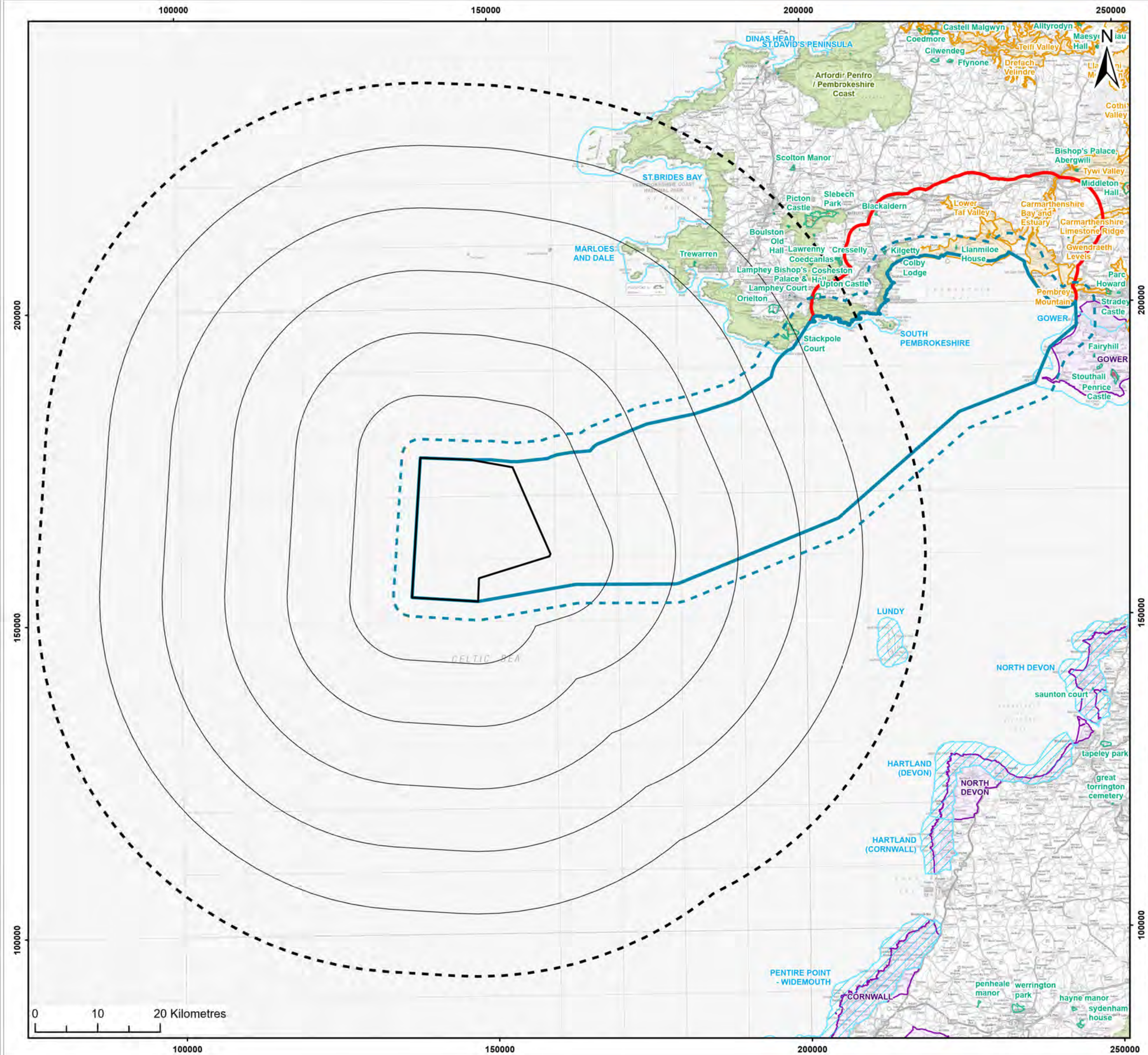

Legend:

- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- 10 km Radii
- 60 km Offshore SLVIA Study Area
- Offshore Scoping Boundary 3km Buffer
- National Park (Arfordir Penfro / Pembrokeshire Coast)
- National Landscapes
- Special Landscape Area
- Parks & Gardens
- Heritage Coast

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Landscape Designations

Figure: 2.11.2 | Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RH	NJ	A3	1:600,000
02	25/03/2026	RH	NJ	A3	1:600,000
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Co-ordinate system: ETRS 1989 ETRS 1989 UTM Zone 30N

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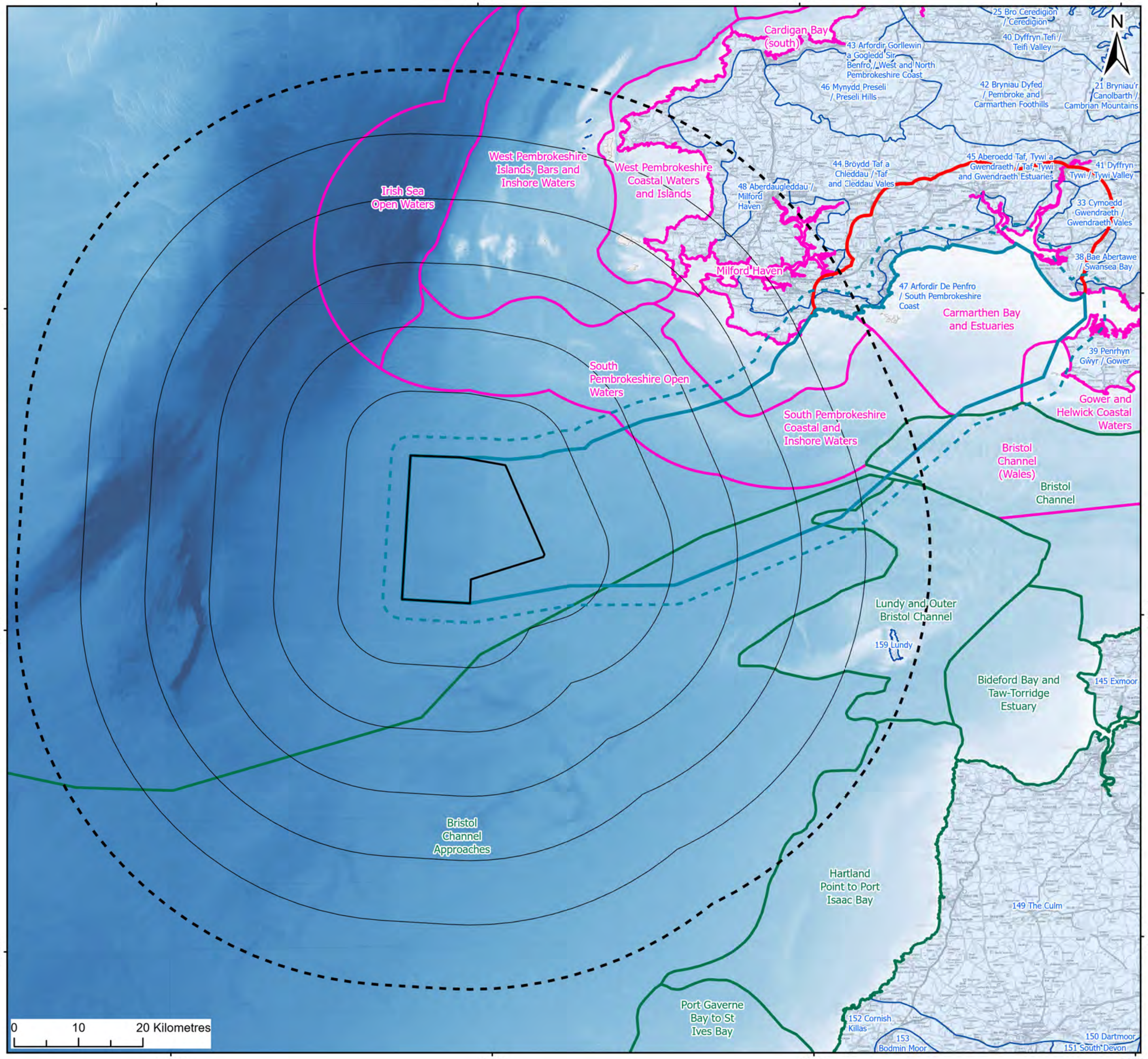

Legend:

- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- 10 km Radii
- 60 km Offshore SLVIA Study Area
- Offshore Scoping Boundary 3km Buffer
- National Landscape Character
- MMO Marine Character Areas
- Marine Character Areas Wales

EMODnet Bathymetry (Depth, m)

62.83

-144.76

Source: © Haskoning UK Ltd, 2026
Base map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Project:
Gwynt Glas Offshore Wind Farm Scoping Report

Title:
Seascape and Landscape Character

Figure: 2.11.3 | Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RH	NJ	A3	1:600,000
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03	06/05/2026	BL	NJ	A3	1:600,000

Co-ordinate system: ETRS 1989 ETRS 1989 UTM Zone 30N

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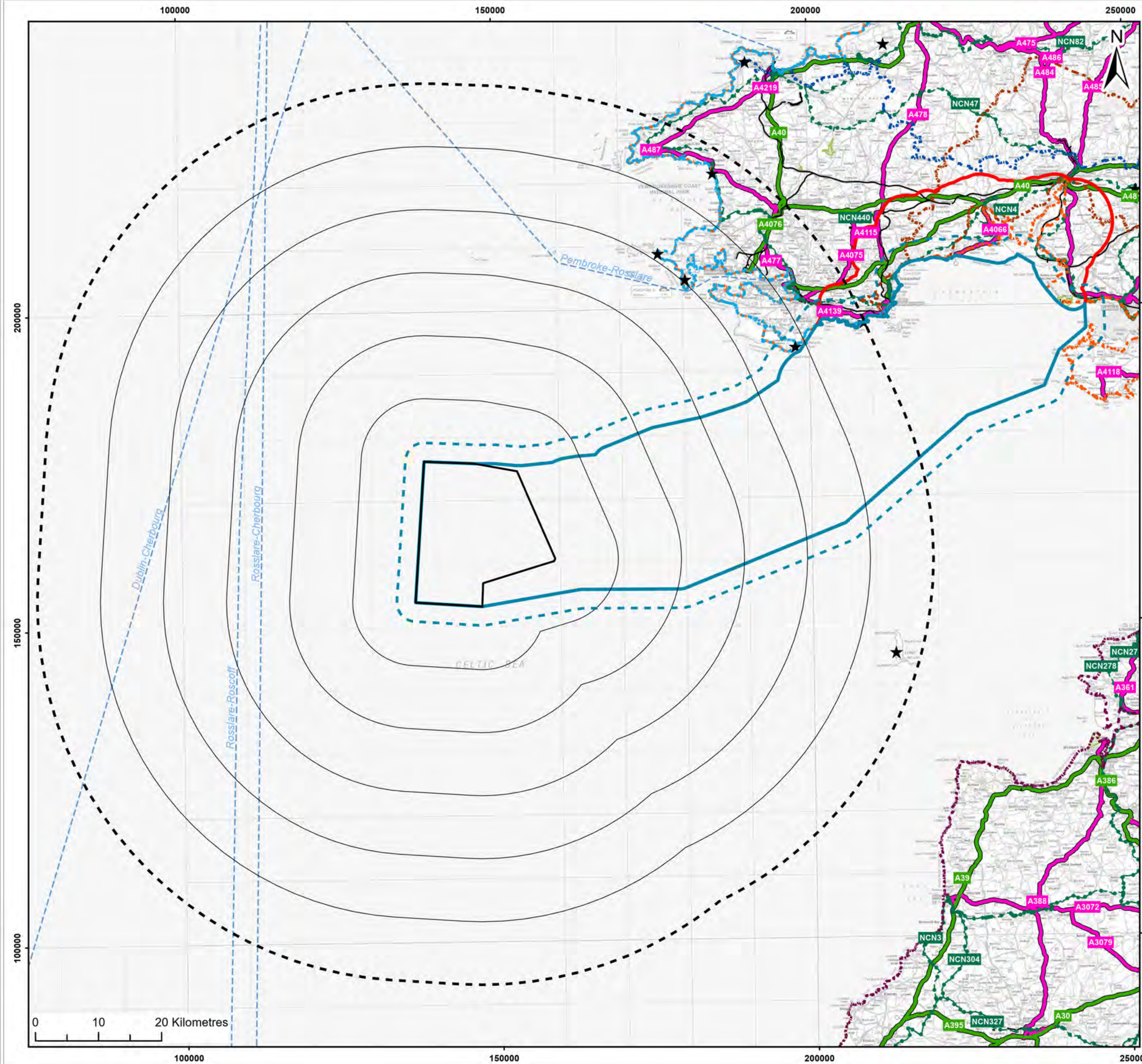

Legend:

- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- 10 km Radii
- 60 km Offshore SLVIA Study Area
- Offshore Scoping Boundary 3km Buffer
- Dark Sky Sites
- Ferry Route
- National Trail (South West Coast Path)
- Pembrokeshire (Wales Coastal Path)
- Wales Coastal Path
- Celtic Way
- Cistercian Way
- National Cycle Route
- Railway Track
- Country Parks
- Primary Road
- A Road

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Visual and Amenity Receptors

Figure: 2.11.4 | Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RH	NJ	A3	1:600,000
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03	06/05/2026	BL	NJ	A3	1:600,000

Co-ordinate system: ETRS 1989 ETRS 1989 UTM Zone 30N

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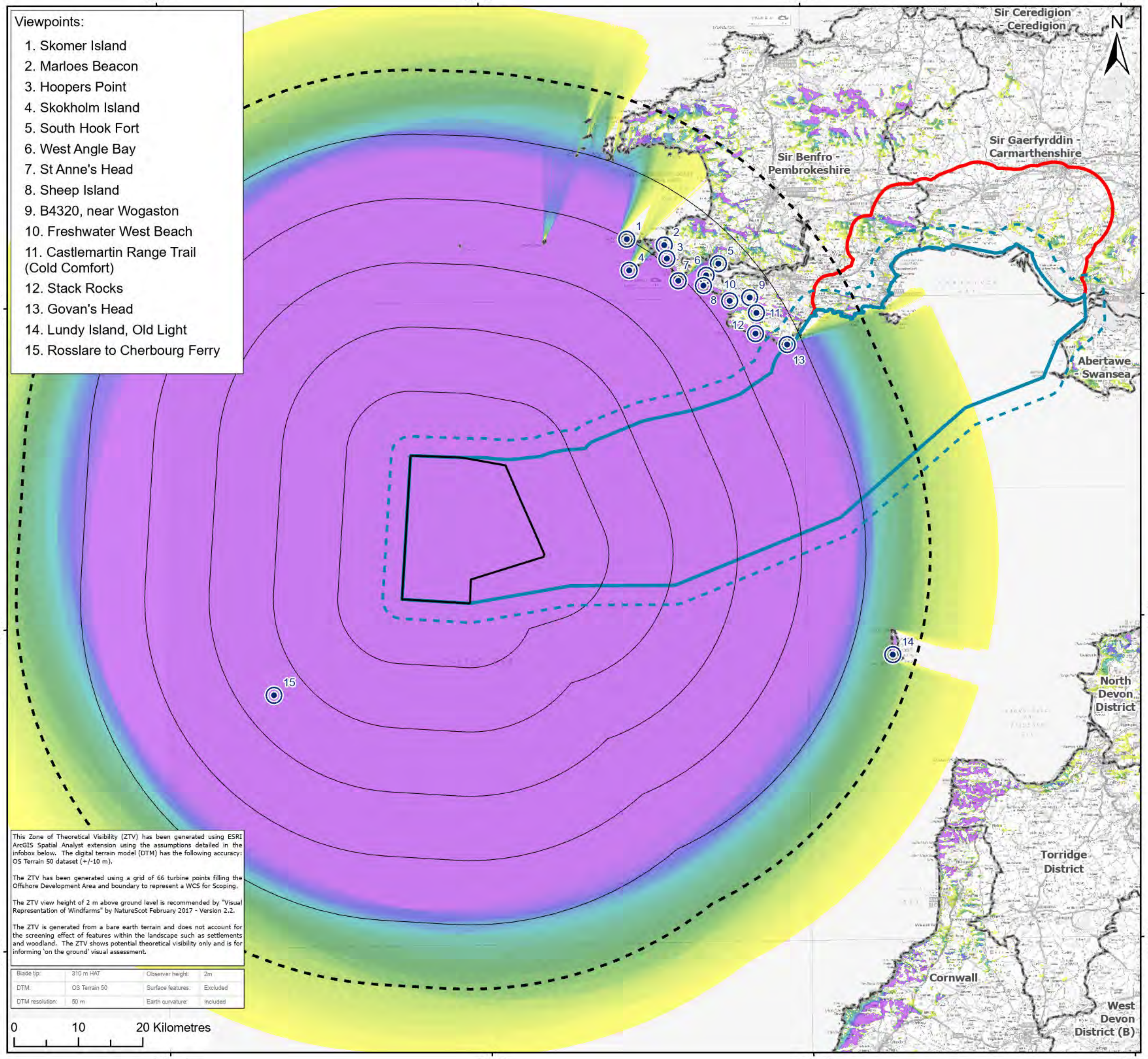

Viewpoints:

1. Skomer Island
2. Marloes Beacon
3. Hoopers Point
4. Skokholm Island
5. South Hook Fort
6. West Angle Bay
7. St Anne's Head
8. Sheep Island
9. B4320, near Wogaston
10. Freshwater West Beach
11. Castlemartin Range Trail (Cold Comfort)
12. Stack Rocks
13. Govan's Head
14. Lundy Island, Old Light
15. Rosslare to Cherbourg Ferry

This Zone of Theoretical Visibility (ZTV) has been generated using ESRI ArcGIS Spatial Analyst extension using the assumptions detailed in the infobox below. The digital terrain model (DTM) has the following accuracy: OS Terrain 50 dataset (+/-10 m).

The ZTV has been generated using a grid of 66 turbine points filling the Offshore Development Area and boundary to represent a WCS for Scoping.

The ZTV view height of 2 m above ground level is recommended by "Visual Representation of Windfarms" by NatureScot February 2017 - Version 2.2.

The ZTV is generated from a bare earth terrain and does not account for the screening effect of features within the landscape such as settlements and woodland. The ZTV shows potential theoretical visibility only and is for informing 'on the ground' visual assessment.

Blade tip:	310 m HAT	Observer height:	2m
DTM:	OS Terrain 50	Surface features:	Excluded
DTM resolution:	50 m	Earth curvature:	Included

Legend:

- Array Scoping Boundary
- Offshore Scoping Boundary
- Onshore Scoping Boundary
- 10 km Radii
- 60 km Offshore SLVIA Study Area
- Offshore Scoping Boundary 3km Buffer
- Initial Viewpoints
- Local Authority Boundary

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Theoretical Visibility of Development

- Higher Theoretical Visibility
- Lower Theoretical Visibility

Source: © Haskoning UK Ltd, 2026
Base map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Project: Gwynt Glas Offshore Wind Farm Scoping Report

Title: Blade Tip Zone of Theoretical Visibility (ZTV) With Viewpoints

Figure: 2.11.5 | Drawing No: PC6850-HAS-ZZ-ZZ-DR-GS-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	12/03/2026	RH	NJ	A3	1:600,000
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03	06/05/2026	BL	NJ	A3	1:600,000

Co-ordinate system: ETRS 1989 ETRS 1989 UTM Zone 30N

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2.11.2 Baseline Environment

2.11.2.1 Introduction

868. A study of the baseline environment has been undertaken through desk-based research to establish the existing conditions of the seascape, landscape and visual resources in the initial SLVIA Study Area. This has involved a review of mapping and aerial photography, planning and policy documents, seascape/landscape character assessments and other sources of relevant information. Data would continue to be updated throughout the assessment process.

869. Key sources of information for the baseline environment studies include:

- Ordnance Survey (OS) mapping and aerial photography;
- OS Digital Terrain Model (DTM);
- National, regional and local planning policy;
- Published seascape and landscape character assessments at national, regional and local levels;
- Management plans for National Landscapes; and
- LANDMAP.

870. The description of the baseline environment within the EIA would provide a description of the identified seascape, landscape and visual receptors, indicating their key characteristics and value, against which the potential change arising from the onshore transmission infrastructure would be assessed.

2.11.2.2 Offshore National Seascape Character

871. The Offshore SLVIA Study Area is located off the Pembrokeshire, Carmarthenshire and Swansea coastline in the Celtic Sea. The majority of the Offshore SLVIA Study Area is covered by the sea and consists of mostly Welsh National Marine Character Areas (as shown on **Figure 2.11.4**). However, the southern section of the Offshore SLVIA Study Area also falls within the English National Marine Character Areas. The Array Scoping Boundary is outside of the Marine Character Areas, with the 'South Pembrokeshire Open Waters' and 'Bristol Channel Approaches' being the closest to the Array Scoping Boundary (within 10-20km).

872. At a national scale, the Offshore SLVIA Study Area is covered by the National Seascape Assessment for Wales, Evidence Report No: 80 (NRW, November 2015). In addition, NRW has published the Seascape and Visual Sensitivity to Offshore Wind Farms in Wales: Strategic Assessment and Guidance (White, Michaels and King, 2019).

873. A national level seascape character assessment for the English sector of the Offshore SLVIA Study Area has been prepared for the MMO, namely MMO 1134: Seascape Character Assessment for the South West Inshore and Offshore marine plan areas (Land Use Consultants, 2018).

874. Following the approach set out by NRW, the National Marine Character Areas for Wales are defined in inshore waters and extend 12nm from the high-water mark.

875. The National Marine Character Areas in Wales in the SLVIA Study Area are:

- South Pembrokeshire Coastal and Inshore Waters;
- South Pembrokeshire Open Waters;
- Carmarthen Bay and Estuaries;
- Gower and Helwick Coastal Waters; and
- Bristol Channel (Wales)

876. The MMO National Marine Character Areas in England in the Offshore SLVIA Study Area are:

- Lundy and Outer Bristol Channel (43); and
- Bristol Channel Approaches (51).

877. The Array Scoping Boundary is located in the open seascape of the Celtic Sea beyond these defined National Marine Character Areas, in between the South Pembrokeshire Open Waters in Wales and the Bristol Channel Approaches in England.

878. The key characteristics for the South Pembrokeshire Open Waters Marine Character Areas (23) are described as:

"Open sea area with a simple, consistent and unified marine character at a vast scale and a significant sense of openness, remoteness and exposure…The outer open waters forms part of the busy sea route of the Bristol Channel linking south Wales with the English south west coast".

879. The overall character for the Bristol Channel Approaches (England) Marine Character Area (51) is described as:

"Large area of open water with distant empty horizons west to the open Atlantic, contrasting to important views back to the shore including Lundy... 'Recreational sailing routes connecting English harbours with Cork, Ireland and Milford Haven and Anglesey, Wales…. Westerly gales and the Atlantic swell creating strong feelings of exposure. These perceptual qualities increase further offshore, increasing a sense of true isolation when sight of land ceases".

880. The English and Welsh National Marine Character Areas are complemented in terrestrial areas of the Offshore SLVIA Study Area by the existing National Landscape Character Areas (NLCA), which extend to the mean low water to provide seamless character assessment coverage between land and sea.

881. In order to ensure consistency with this approach, the baseline characterisation would assess seascape effects on seascape character areas (SCAs) that are seaward of the high water mark, which include beaches and intertidal areas. Landscape effects would be assessed on landscape character areas (LCAs) lying to the landward side of the low water mark and coastlines within LCAs covering the coast and those LCAs covering inland terrestrial areas with views of the Development that may materially alter its character (see **Section 3.6**).

2.11.2.3 National Landscape Character

882. The Offshore SLVIA Study Area includes a number of NLCA that incorporate the coastline (**Figure 2.11.4**). These include (from west to east) the South Pembrokeshire Coast (47), Taf, Tywi and Gwendraeth Estuaries (45), Swansea Bay (38) and Gower (39). The NLCAs incorporate numerous popular beaches, villages and seaside towns. The coastline is generally described as

'containing rugged cliffs and vast expanses of sweeping sands which stretches along the coast, backed by extensive sand dunes'.

883. The key characteristics for the South Pembrokeshire Coast (47) are described as:

"Rugged coastal landscape – harder rocks stand out as coastal headlands with softer rocks eroded to form bays... Sandy beaches and coves – with wind-blown dunes or shingle storm beaches… varied and spectacular coastline (including Heritage Coast) with the greater extent being within the PCNP. But some tourism related developments are out of character".

884. The key characteristics for the Taf, Tywi and Gwendraeth Estuaries (45) are described as:

"an area that is dominated by the ebb and flow of the tides. When out, a vast expanse of mud and sweeping sands stretches along the coast westwards, eastwards and inland along each of the three large, sinuous estuaries. The open coast is backed by extensive sand dunes… Pembrey sands is likewise popular with visitors, with its land behind including a country park and extensive forestry".

885. The key characteristics for Swansea Bay (38) are described as:

"An Extensive sandy coast is backed by dunes, with lagoons and important coastal heath. Major river estuaries issue within the area, including those of rivers Loughor, Neath and Tawe".

886. The key characteristics for Gower (39) are described as:

"A coastal peninsula starting at the western edge of greater urban Swansea… The outstanding scenery and golden sandy beaches backed by cliffs led to the area becoming an extremely popular tourist destination…hosts a number of iconic, 'voted best' views, including Rhossili Bay, Three Cliffs Bay and Worms Head".

2.11.2.4 Regional / Local Landscape Character

887. The coastline sits in a number of regional and local LCAs which have been identified in characterisation studies in the Offshore SLVIA Study Area:

- PCC 'Landscape Character Assessment', Consultation Draft (July 2019);
- PCNP Authority: Landscape Character Assessment - Supplementary Planning Guidance (Working Draft, Adopted 22 June 2011);
- CCC Supplementary Planning Guidance Landscape Character Assessment for Carmarthenshire (Awaiting publication – Draft approved on 31st March 2025) (2025a);
- Gower Landscape Character Assessment, City and County of Swansea (2013); and
- Gower National LMP 2017, City and County of Swansea (2017)

888. The western section of the Offshore SLVIA Study Area lies in two coastal LCAs as identified in PCC Landscape Character Assessment (2019). These include the following:

- LCA21: Penally; and
- LCA25: Hundleton and Lamphey

2.11.2.5 LANDMAP

889. LANDMAP, also referred to by NRW as the 'Welsh landscape baseline', is a GIS based landscape resource and dataset. The SLVIA will provide an assessment of relevant LANDMAP aspect areas following LANDMAP Guidance Note 46 (GN46). LANDMAP would also be referred to in the SLVIA baseline assessment. The guidance in GN46 would be followed to ascertain the aspect areas that are required to be assessed in the SLVIA, within two distinct groups that are relevant to the assessment:

- Geological Landscape, Landscape Habitats and Cultural Landscape Services; and
- Visual and Sensory and Historic Landscape.

890. The descriptions within the Visual and Sensory LANDMAP aspect areas provide further baseline context for the SLVIA Study Area. This is summarised below.

891. The coastline of the SLVIA Study Area, falling within the Pembrokeshire Coast is generally described as an 'area that is made up of an extensive series of rocky cliffs & steep slopes with some small sheltered coves on the south coast of Pembrokeshire. Panoramic coastal views are available out to the east and west'. The Visual and Sensory Aspect Area has been given an overall ''outstanding'' evaluation which reflects the ''outstanding'' values given to the area for its scenic quality, integrity and character as well as a ''high'' value given to the rarity of the area. Further eastwards in the Scoping Boundary, the area is generally described as 'steep coastal slopes rising above the mouth of the Tywi estuary. Very exposed, with wind clipped trees, with extensive coastal views south and west over the estuary. Areas of bracken and scrub as well as farmed land make the area feel fairly remote'. The Visual and Sensory Aspect Area for the coastal LCA has been given an overall 'high'' evaluation which reflects the character description of 'quiet and largely un-spoilt. It has spectacular coastal views, overlooking the Tywi estuary as well as distant views to the Gower'. Further eastwards, the beach abuts the coastal grazing levels inland and Pembrey Country Park and Forest (Nature Reserve). The Visual and Sensory Aspect Area for the coastal LCA has been given an overall 'Outstanding'' evaluation on account of the quality of the landscape, and it being unspoilt, together with the sensory experience it offers of the Carmarthenshire coast.

2.11.2.6 National Landscape Designations

892. The Offshore SLVIA Study area includes part of the national level designation of the PCNP, which covers the majority of the coastline in the Offshore SLVIA Study Area (**Figure 2.11.3**). The PCNP was formally designated in 1952 and is described in the Partnership Plan for 2025 to 2029 as being the only UK National Park which is primarily designated for its coastal landscape (covering the whole of the Pembrokeshire coast, all within 16km of the sea). The Special Qualities of the PCNP are described in the PCNP Management Plan, Background Paper (Special Qualities of the PCNP) (PCNP, 2018) as its:

"Coastal Splendour; Diverse Geology; Diversity of Landscape; Distinctive Settlement Character; Rich Archaeology; Cultural Heritage; Richness of Habitats and Biodiversity; Islands; Accessing the Park; Space to Breathe; Remoteness, Tranquillity & Wildness; Diversity; and Combination of Special Qualities".

893. The Offshore Scoping Boundary also lies close to the Gower National Landscape (formerly Are of Outstanding Natural Beauty (AONB)) (**Figure 2.11.3**)**.** This coastal designated landscape lies within approximately 1km of the western most boundary of the designation (at its nearest

point along the eastern boundary of the Offshore SLVIA Study Area). The Gower National Landscape is described within the Gower AONB LMP 2017 as being *"chosen for its classic coastline and outstanding natural environment, Gower became the first AONB in the UK in 1956*." The Gower National Landscape covers an area of 188km^2, with 59km of its coastline also designated as Heritage Coast. The Gower National Landscape is defined by its dramatic limestone coast, sweeping sandy bays (like Rhossili), and varied habitats including salt marshes and heather-clad moors. The Special Qualities of the Gower National Landscape are described in the Gower AONB Management Plan (Swansea Council, 2017) with the two special qualities of most relevance being those relating to landscape and seascape:

- '**Landscape** - The quality and variety of Gower's landscape, contained in such a small area, is the essence and original reason for its designation as an AONB - the highest UK designation in terms of landscape and scenic beauty (being of equivalent status to National Parks in this regard). The coastline is also designated as Heritage Coast – recognised as one of the most outstanding stretches of undeveloped coastline in England and Wales; and
- **Seascape** - With 70km of coastline, seascape is an important aspect of the AONB character. Most of the coastline is also designated as Heritage Coast. Many of the classic views of Gower – such as Rhossili, Worm's Head, and Three Cliffs Bay - feature the coastline and the sea beyond. Less well known are the views of the coast from the sea. All these components make significant contributions to the special qualities of the AONB'.

894. The SLVIA would provide an assessment of the effects of the offshore infrastructure located outside the PCNP and Gower National Landscape against the special qualities experienced within the PCNP and Gower National Landscape, including an assessment of the relevant planning policy tests and/or statutory duties applicable to these designated landscapes.

2.11.2.7 Local Planning Designations

895. CCC has identified the Carmarthenshire Bay and Estuary as a Special Landscape Area (SLA(s)) (**Figure 2.11.3**). SLAs represent a non-statutory designation reflecting the LANDMAP aspect areas classified as 'outstanding' and supported where appropriate by those classified as 'high'. The Carmarthenshire Bay and Estuary SLA encompasses the estuaries of the Rivers Loughor, Taf, Tywi and the Gwendraeth which are all within the Scoping Boundary. SLAs will be mapped in the SLVIA and the associated value of the landscape within these areas will be considered in the assessment of sensitivity. The LANDMAP visual and sensory landscape evaluation categories will also be considered.

896. There is an area of Heritage Coast (South Pembrokeshire) covering the western most edge of the coastline within the Offshore SLVIA Study Area, which is coincident with part of the PCNP. Similarly, an area of Heritage Coast (Gower) is also coincident with the coastal parts of the Gower National Landscape close to the eastern most edge of the Scoping Boundary.

2.11.3 Data Sources

897. The data sources that would be used to inform the SLVIA are presented in **Table 2.11.1**.

898. Data to inform the SLVIA would be collected using both desk-based study and analysis and field work within the SLVIA Study Area. Photography would be used to prepare visualisations and

inform impact assessment, using the visualisations as an aid to define seascape, landscape and visual effects.

899. Baseline data would be used to define and describe the seascape, landscape and visual receptors that will be considered in the SLVIA. Data will be gathered from official, reliable and up-to-date sources. These will include OS map-based data, as well as data on seascape and landscape characterisation, landscape designations and other Governmental and local authority data of relevance.

Table 2.11.1 Data sources to inform the SLVIA

DATASET	SPATIAL COVERAGE	SURVEY YEAR/TIMINGS
National Landscape Character of Wales	SLVIA Study Area	2023 (last updated)
NRW LANDMAP	SLVIA Study Area	2021
PCC Local Development Plan	SLVIA Study Area	2013 (Adoption of new Local Plan scheduled for May 2026)
PCNP Local Development Plan 2	SLVIA Study Area	2020
CCC Local Development Plan (2020)	SLVIA Study Area	2014
Swansea Council Local Development Plan	SLVIA Study Area	2019
OS mapping and DTMs	SLVIA Study Area	2022
Aerial and street-level photography available from Bluesky aerial survey	SLVIA Study Area	Various

2.11.4 Approach to Impact Assessment

2.11.4.1 Guidance

900. The approach to impact assessment would be based on the 'Guidelines for LVIA: Third Edition' ('GLVIA3') (including 2024 clarifications), the key source of guidance for LVIA. Other sources of guidance that would be used and referenced in the SLVIA include the following:

- Design Commission for Wales (2023). Designing for Renewable Energy in Wales;
- Landscape Institute (2019a). Technical Guidance Note 2/19 Residential Visual Amenity Assessment;

- Landscape Institute (2019b). Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19;
- Landscape Institute (2021). Technical Guidance Note 2/21 Assessing landscape value outside of national designations;
- Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance (White, Michaels and King, 2019);
- NE (2012). An Approach to Seascape Character Assessment;
- NE (2018). An Approach to Landscape Character Assessment;
- NRW (2021b) GN46: Guidance for Wales, Using LANDMAP in LVIAs;
- NRW (no date (a)). LANDMAP the Welsh landscape baseline;
- Design Commission for Wales (2023). Designing for Renewable Energy in Wales;
- CAA (2016) CAP 764: Policy and Guidelines on Wind Turbines;
- NatureScot (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- NatureScot (2017). Siting and Designing Windfarms in the Landscape (Version 3);
- NatureScot (2024). Guidance on Aviation Lighting Impact Assessment;
- NatureScot (2025). Guidance for Assessing the Effects on Special Landscape Qualities;
- NatureScot (2017). Visual Representation of Wind Farms, Version 2.2; and
- Offshore Wind Evidence & Knowledge Hub (OWEKH) (2026). ERN: SLVIA.

901. Although some of this guidance has been derived from publications by bodies located in other UK nations it is commonly drawn on for work carried out in Wales where no equivalent guidance exists.

2.11.4.2 Overview of SLVIA Methodology

902. The methodology used in the SLVIA would reflect the ‘Guidelines for LVIA: Third Edition’ (Landscape Institute, 2013), which constitutes best practice guidance for LVIA. In accordance with this and with the EIA Regulations, the effects arising from the onshore transmission infrastructure on the landscape and visual resource would be assessed as either significant or not significant.

903. The approach to the SLVIA is summarised as follows:

- Those features of the offshore wind turbines and offshore transmission infrastructure that may result in seascape, landscape and visual effects would be described and a MDS would be defined to represent the basis for assessment of the offshore wind turbines and transmission infrastructure.
- The overall scope of the SLVIA would be defined, including the SLVIA Study Area and range of possible landscape and visual effects.

- The landscape baseline would be established, using landscape character assessment and the ZTV of the onshore transmission infrastructure to identify landscape receptors that may be affected and their key characteristics and value.
- The visual baseline would be established by defining the ZTV, identifying the people who may be affected and identifying visual receptors and selecting representative viewpoints.
- A preliminary assessment would be undertaken with reference to ZTVs and wirelines, in order to identify landscape and visual receptors with the potential to be significantly affected by the offshore wind turbines and transmission infrastructure, which would then be subject to detailed assessment. Those receptors which are considered unlikely to experience significant effects would not be subject to the detailed assessment.
- Assessments of the sensitivity of each receptor, and the magnitude of change experienced, would be carried out. Judgements of the susceptibility of each receptor to change of the type proposed would be combined with judgements of the value of the receptor to determine the sensitivity of receptors to the offshore wind turbines and transmission infrastructure. This includes:
    - An assessment of the size and scale of seascape and landscape impact; and
    - the degree to which seascape and landscape elements are altered and the extent to which the impacts change the key characteristics of the seascape and landscape would be undertaken.
- These judgements would then be combined to assess the magnitude of change on each seascape and landscape receptor.
- An assessment of the size and scale of visual impact, the extent to which the change would affect views, whether this is unique or representative of a wider area, and the position of the onshore transmission infrastructure in relation to the principal orientation of the view and activity of the receptor would be undertaken. These judgements are combined to assess the magnitude of change on the visual receptor.
- The judgements relating to sensitivity and magnitude of change would then be combined to determine the significance of each seascape, landscape or visual effect. In accordance with GLVIA3 (Landscape Institute, 2013), professional judgement would be applied in the determination of significant effects, but in general, the higher the sensitivity and higher the magnitude of change, the more likely that a significant effect would arise as a result of the offshore wind turbines and transmission infrastructure.
- If required, primary mitigation would be defined and included as an inherent part of the Development design to avoid, prevent, reduce or offset significance adverse effects through an iterative process.

2.11.4.3 Assessment of Impacts

904. The methodology for the assessment of impacts would be as outlined in **Section 1.8 EIA Methodology**.

905. For the purposes of the assessment, any effects with a significance level of Major and Major-Moderate are deemed significant in EIA terms. Moderate levels of effect have the potential, subject to the assessor's professional judgement, to be considered as significant or not

significant, depending on the sensitivity and magnitude of change factors evaluated. GLVIA3 clarification note 3(5) supports this approach and states that “moderate effects may or may not be significant and justification would be needed in the methodology or receptor assessment as to whether a moderate effect is significant or not.” The assessments of significance for Moderate levels of effect would therefore be explained as part of the assessment, where they occur.

906. The 'nature of effects' arising from the offshore infrastructure relates to whether the effects of the Development are adverse, neutral, or beneficial. Guidance provided in GLVIA3 states that “thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity” but does not provide an indication as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and reasoned professional opinion. A precautionary approach would be adopted which assumes that significant landscape and visual effects would be weighed on the negative side of the planning balance, although positive or neutral effects may arise in certain situations.

2.11.4.4 Visual Receptors

907. The visual assessment would determine the degree of anticipated change to visual amenity experienced by people (visual receptors) that would occur as a result of the offshore infrastructure. The visual assessment considers static and sequential effects through analysis of visual receptors and individual viewpoints, considered representative of the range of views in the SLVIA Study Area.

908. The principal visual receptors in the SLVIA Study Area are likely to be found along the closest sections of the Welsh coastline. These include people engaged in activities offshore as well as onshore receptors such as people in settlements, driving on roads, visitors to tourist facilities or historic environment assets and people engaged in recreational activity, such as those using walking and cycle routes as well as coast and beach users. A detailed assessment would be undertaken in the SLVIA for those visual receptors that are most susceptible to changes, which may experience significant visual effects as a result of the Development. The assessment would focus on visual receptors on the land where the sea is a strong influence in the baseline view, along the Welsh coastline and immediate hinterland.

909. There is limited passenger vessel transits through the Offshore Scoping Boundary and is limited to occasional cruise ships on passage. The main route is a ferry route from Pembroke Dock to Rosslare Harbour in Ireland and parts of the SLVIA Study Area are also used by recreational vessels such as recreational angling and wildlife tours. Further detail is provided in **Section 2.7 Shipping and Navigation** and **Section 4.3 Tourism and Recreation**. The effects on the views of people in vessels using these routes and areas would be considered in the SLVIA.

910. The analysis of key receptors in this Scoping Report has been carried out based on a good working knowledge of the SLVIA Study Area and detailed desk study and GIS analysis. To inform the SLVIA and layout design process, field surveys will be undertaken throughout the SLVIA Offshore Study Area and in the Scoping Boundary. The field survey work will include visits to viewpoints as well as extensive travel around the SLVIA Study Area to consider potential effects (including cumulative) on seascape and landscape character and on the experience of views seen from travel routes through the landscape. These visits will allow the seascape, landscape

character and the visual amenity of the Study Area to be experienced in a range of different conditions and across seasonal variations.

911. Visual receptors have been identified in the SLVIA Study Area as shown on **Figure 2.11.5**. A preliminary ZTV analysis has been conducted to understand the main area in which the Development would theoretically be visible, highlighting the different groups of people who may experience views of the wind turbines and Offshore Transmission Station(s) in the Array Scoping Boundary and inform the identification of viewpoints where they may be affected. For the EIA, a further ZTV will be developed to show the theoretical visibility for any Midpoint Compensation Reactor(s) (if required) to define the appropriate Study Area and receptors that may be affected by the Midpoint Compensation Reactor(s).

912. The SLVIA would assess the PDE which has the maximum effect on seascape, landscape and visual receptors and this would be agreed with relevant consultees.

913. The ZTV would be overlaid on OS mapping to show that the main areas of theoretical visibility of the offshore infrastructure would be across open sea and extending to the Pembrokeshire coast, albeit at very long range. The closest point to the Array Scoping Boundary on the Pembrokeshire coastline in PCNP is Skokholm Island, approximately 35.7km from the Array Scoping Boundary. Skomer Island is approximately 38.9km from the Array Scoping Boundary. The closest point of the Welsh mainland (also in PCNP) is at St Ann's Head, approximately 39.1km from the Array Scoping Boundary.

914. In the east of the SLVIA Study Area the ZTV extends inland towards a more industrialised landscape and reaching as far as the towns of Milford Haven, Pembroke Dock and Haverfordwest. Actual visibility of the Offshore Array from these areas would be reviewed in the field, however, much of it is likely to be locally screened by intervening vegetation and built form. Where visible out to sea, the Offshore Array would be viewed in a relatively open area of the seascape with peripheral views of industrial and dockland type developments.

915. Further north, along the Pembrokeshire coast there is long range theoretical visibility of the Development including as far north as the city of St Davids (approximately 60km), however views over 50km are likely to be very infrequent in periods of 'excellent' visibility. Visibility frequency data would be reviewed as part of the assessment in the assessment to understand the likely frequency of visibility at long range. The SLVIA is likely to focus on the effects of the Offshore Array and Midpoint Compensation Reactor(s) on the PCNP coastline between 36km - 50km from the Array Scoping Boundary. Views from Lundy Island would also be considered in the SLVIA, which is located approximately 55km to the east / south-east of the Array Scoping Boundary.

916. Visual receptors that have potential to experience views of either the construction, decommissioning or O&M of the offshore infrastructure are identified in the preliminary receptor list is shown in **Table 2.11.2** below. These represent the range of visual receptors in the offshore SLVIA Study Area based on an initial review of the Offshore Scoping Boundaries and surrounding seascape and visual resource. In compiling the preliminary list of viewpoints presented on **Figure 2.11.5,** reference has been made to the Blade Tip ZTV (**Figure 2.11.5**) and viewpoints assessed in the SLVIA for Erebus OWF as a nearby precedent.

917. The following type of receptors may be sensitive to change from views towards proposed permanent infrastructure such as the wind turbines, Offshore Transmission Station(s) and

Midpoint Compensation Reactor(s) (location to be confirmed) within the SLVIA Study Area as well as any temporary construction works.

918. An assessment of the relevant visual receptors in the SLVIA Study Area would be undertaken at the preliminary stage of the SLVIA when the locations of the offshore infrastructure are more defined.

Table 2.11.2 Relevant seascape, landscape and visual receptors within the Offshore SLVIA Study Area

RECEPTOR	RECEPTOR TYPES / DESCRIPTION
Landscape Designations	National designations such as PCNP and Gower National Landscape. Regional and Local designations such as the Carmarthenshire Bay and Estuary SLA, South Pembrokeshire Heritage Coast and Gower Heritage Coast.
Seascape / Landscape Character Areas (LCAs)	National Marine Character Areas such as South Pembrokeshire Coastal and Inshore Waters, South Pembrokeshire Open Waters, Carmarthen Bay and Estuaries, Gower and Helwick Coastal Waters and Bristol Channel (Wales) (National Marine Character Areas Wales – NRW); and Bristol Channel Approaches and Lundy & Outer Bristol Channel, (National Marine Character Areas England – MMO). NLCA such as South Pembrokeshire Coast, Milford Haven, Taf and Cleddau Vales, Taf, Tywi and Gwendraeth Estuaries, Gwendraeth Vales, Swansea Bay, and Gower. Regional and Local Character Areas such as Penally and Hundleton & Lamphey (PCC Landscape Character Assessment, Consultation Draft, July 2019); and LANDMAP Aspect Areas.
Settlements	Coastal settlements such as Freshwater East, Jameston, Lydstep, Marloes, Dale, Pembroke and Milford Haven.
Key transport routes	Primary roads near the coast such as the A40 and A4076. 'A' roads near the coast such as the A477 and A4139. Ferry routes such as Rosslare to Pembroke Dock.
Recreational routes	Several important recreational routes such as the Pembrokeshire Coast Path along the coastline of the PCNP. The Wales Coast Path and National Cycle Network (NCN4) along the coastline of the SLVIA Study Area.
Tourist movements	Several tourist related activities in relation to the coastline such as recreational angling and wildlife tour boat trips (including to and around islands such as Skomer Island and Skokholm Island). Activities and facilities close to the coastline such as camp sites, caravan parks and other accommodation providers as well as beaches, historic environment assets and nature reserves visited by the public.

2.11.4.5 Viewpoints

919. The visual assessment would be based on a series of viewpoints representing the visual receptors (**Table 2.11.2**) within the ZTV. These viewpoints are listed in **Table 2.11.3** and shown on **Figure 2.11.5**. Viewpoints for the SLVIA would be refined further during the EIA, following refinement of infrastructure, cable route and landfall). Potential viewpoints provide a representative cross section of receptor types and locations in the SLVIA Study Area, focused

on those with the potential for likely significant effects within the ZTV. The final list of viewpoints for the SLVIA would be agreed in consultation with stakeholders. Viewpoint photography would be taken at the agreed viewpoints to illustrate existing views showing the baseline conditions in the Offshore SLVIA Study Area.

Table 2.11.3 Viewpoints included in the SLVIA

VIEWPOINT	NAME	EASTING	NORTHING
1	Skomer Island	172692	209460
2	Marloes Beacon	178501	208460
3	Hoopers Point	178887	206354
4	Skokholm Island	173001	204598
5	South Hook Fort	186884	205454
6	West Angle Bay	184949	203655
7	St Anne’s Head	180608	202880
8	Sheep Island	184507	202078
9	B4320, near Wogaston	191686	200120
10	Freshwater West Beach	188561	199649
11	Castlemartin Range Trail	192688	197722
12	Stack Rocks	192511	194494
13	Govan’s Head	197405	192730
14	Lundy Island, Old Light	213178	144276
15	Rosslare to Cherbourg Ferry	116826	139316

2.11.5 Potential Impacts

920. The purpose of the SLVIA is to identify and record the potential impacts and effects that the offshore infrastructure may have on seascape character; areas that have been designated for their scenic or seascape-related qualities; and views from various locations such as ferry and pleasure boat crossing routes, coastal settlements, coastal travel routes and other sensitive locations. The potential cumulative effects that may arise from the incremental effects of the offshore infrastructure with other projects is also considered.

921. A summary of the potential impacts for each development stage of the offshore infrastructure is described as follows and shown in **Table 2.11.4**.

2.11.5.1 Potential Impacts During the Construction Stage

922. During the construction stage, the presence of construction activity and partially completed structures has the potential to locally impact designated seascapes and landscapes, seascape and landscape character and visual receptors.

923. Potential impacts on seascape, landscape and visual amenity arising during the construction stage that are **scoped in** to the EIA include:

- Impact (daytime) of the offshore (above sea surface) infrastructure on seascape/landscape character;
- Impact of daytime visibility of the offshore infrastructure on seascape/landscape character and seascape/landscape planning designations;
- Impact of daytime visibility of the offshore infrastructure on visual receptors; and
- Impact of night-time visibility of the offshore infrastructure on visual receptors.

924. There may be impacts on seascape character through the construction of the offshore infrastructure. In addition, impacts may arise as a result of views of this construction from surrounding areas of the seascape, landscape and visual resource. Impacts on the seascape, landscape and visual resource would result only from above sea elements of the construction with the main impacts arising from a concentration of construction vessels as well as the offshore infrastructure as they are constructed.

925. The construction of the offshore infrastructure has the potential to alter the seascape character of the Array Scoping Boundary itself and the wider area through visibility of these changes.

926. The construction of the offshore infrastructure may be visible from the coast during very good to excellent visibility conditions and may therefore affect the character of the landscape as part of its context.

2.11.5.2 Potential impacts during the O&M stage

927. Following installation, below sea level cables would not significantly impact seascape, landscape or visual receptors. Operation and maintenance impacts resulting from the activities located within the Offshore Export Cable Scoping Boundary are therefore **scoped out** of the SLVIA.

928. The potential for the O&M of the offshore infrastructure in the Offshore Scoping Boundary to significantly impact designated landscapes, landscape character and visual amenity varies dependent their location and design. Due to the maximum height and number of wind turbines, as well as the Offshore Transmission Station(s) and potential Midpoint Compensation reactor(s), there is potential for significant impacts on seascape, landscape and visual receptors and these effects are **scoped in** to the EIA.

929. Potential impacts on seascape, landscape and visual amenity arising during the O&M stage that are **scoped in** to the EIA include:

- Impact (daytime) of the offshore infrastructure on seascape/landscape character;
- Impact of daytime visibility of the offshore infrastructure on seascape/landscape character and landscape planning designations;
- Impact of daytime visibility of the offshore infrastructure on visual receptors; and
- Impact of night-time visibility of the offshore infrastructure on visual receptors.

930. There may be impacts on seascape character through the operation of the offshore infrastructure. In addition, impacts may arise as a result of views of the operation of the offshore infrastructure from surrounding areas of the seascape, landscape and visual resource. Impacts would result only from above sea elements of the operation including aspects of the Development's maintenance and management.

931. Lighting impacts may also arise due to operational aviation light markers and activity and safety lighting due to maintenance of the offshore infrastructure, which may affect nighttime views.

932. The O&M of the offshore infrastructure would alter the seascape character of the Array Scoping Boundary itself and the wider area through visibility of these changes.

933. The O&M of the offshore infrastructure is expected to be visible from the coast during very good to excellent visibility conditions and may therefore affect the character of the landscape as part of its context.

2.11.5.3 Potential impacts during the decommissioning stage

934. There may be impacts on seascape and landscape character through the decommissioning of the offshore infrastructure. In addition, impacts may arise because of views of decommissioning activity from surrounding areas of the seascape, landscape and visual resource. Impacts on the seascape, landscape and visual resource would result only from above sea elements of the decommissioning. The main impacts would arise from a concentration of decommissioning vessels as well as the Offshore Transmission Station(s), potential Midpoint Compensation reactor(s) and wind turbines as they are decommissioned.

935. Impacts during the decommissioning stage are expected to be similar in nature to those anticipated during construction, but of smaller magnitude.

936. The same potential impacts noted for construction are therefore expected to be **scoped in** (and **out**) for decommissioning.

2.11.5.4 Potential Inter-relationship Impacts

937. The impact assessment would consider the inter-relationship of impacts on individual receptors in accordance with the methodology outlined in **Section 1.8 EIA Methodology**. The objective would be to identify where the accumulation of residual impacts on a single receptor and the relationship between those impacts, gives rise to a need for additional mitigation. It is therefore proposed that inter-relationship impacts on SLVIA assets are **scoped in** to the EIA.

2.11.5.5 Potential cumulative impacts

938. There is potential for cumulative impacts to arise in relation to the offshore infrastructure, with other similar types of projects such as offshore and onshore wind projects. The potential for other projects to give rise to cumulative effects has therefore been **scoped in**. The final list of projects to be considered within the detailed cumulative assessment would be determined during the preparation of the ES closer to the application submission date, taking account of changes to the cumulative situation and would take account of consultation feedback from key consultees.

939. Offshore wind projects and other activities relevant to the assessment of cumulative impacts on SLVIA would be identified through a screening exercise. The potential impacts considered in the cumulative assessment as part of EIA would be in line with those described for the Development-alone assessment, though it is possible that some would be screened out on the basis that the impacts are highly localised (i.e. they occur only within the wind farm site) or where management measures in place for the Development and other projects would reduce the risk of impacts occurring.

940. The construction, O&M and decommissioning of the offshore infrastructure would alter the seascape character of the wind farm site itself. This may result in cumulative effects on seascape character through the addition of the Development to a seascape affected by other cumulative offshore developments. In addition, visibility of the addition of the Development to other cumulative development may result in cumulative impacts on seascape/landscape character and visual receptors.

2.11.5.6 Potential transboundary impacts (offshore only)

941. There are unlikely to be any transboundary SLVIA impacts due to the distance of the offshore infrastructure from other jurisdictions therefore transboundary effects on seascape, landscape and visual receptors are **scoped out** of the EIA.

2.11.5.7 Summary of Potential Impacts

942. A summary of the impacts Scoped in and out of the SLVIA are set out in **Table 2.11.4**.

Table 2.11.4 Summary of impacts Scoped In and Scoped Out of the SLVIA

Potential Impact	Construction	O&M	Decommissioning
Potential impact on landscape character resulting from the Offshore Export Cable Scoping Boundary	✓	x	✓

Potential Impact	Construction	O&M	Decommissioning
Potential impact on landscape character resulting from the offshore wind turbines and Offshore Transmission Station(s) and Midpoint Compensation Reactor(s)	✓	✓	✓
Potential impact on the special qualities of landscape designations resulting from the offshore cable corridor	✓	x	✓
Potential impact on the special qualities of landscape designations resulting from the offshore wind turbines and Offshore Transmission Station(s) and Midpoint Compensation Reactor (s)	✓	✓	✓
Potential impact on views experienced by visual receptors resulting from the offshore cable corridor	✓	x	✓
Potential impact on views experienced by visual receptors resulting from the offshore wind turbines, Offshore Transmission Station(s) and Midpoint Compensation Reactor(s)	✓	✓	✓
Inter-relationship Impacts	✓	✓	✓
Cumulative Impacts	✓	✓	✓
Transboundary Impacts	x	x	x

2.11.6 Potential Mitigation Measures

943. Embedded mitigation measures relating to SLVIA impacts are detailed in **Table 1.8.2** (**Section 1.8 EIA Methodology**). Mitigation of the effects of civil aviation lighting may also be possible through agreement with the CAA (see also **Section 2.8 Aviation and Radar**).

944. Requirements for any additional mitigation measures would be determined through the EIA.

945. Mitigation measures, if required, would evolve as the EIA progresses and in response to consultation with the relevant stakeholders and would be fed iteratively into the design and assessment process. All of the proposed mitigation measures would comply with regulatory requirements and good practice.