Codling Wind Park

CWP-CWP-02-REP-00023-Offshore Scoping Report

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ABBREVIATIONS

Abbreviation	Term in Full
AA	Appropriate Assessment
ABP	An Bord Pleanála
AC	Alternating Current
ACC	Area Control Centre
ACI	Angling Council of Ireland
ADCP	Acoustic Doppler Current Profiler
AEZ	Archaeological Exclusion Zones
AIS	Automatic Identification System
AONB	Area of Outstanding Natural Beauty
ASAM	Aeronautical Services Advisory Memorandum
AToN	Aids to Navigation
ATS	Air Traffic Service
BAS	Burial Assessment Study
BERR	Department for Business, Enterprise and Regulatory Reform
BIM	Bord Iascaigh Mhara
CA	Competent Authority
CAA	Civil Aviation Authority
CAP	Civil Air Publication
CBRA	Cable Burial Risk Assessment
Cefas	Centre for Environment Fisheries and Aquaculture Sciences
CEMP	Construction Environmental Management Plan
CFT	Comhairle Fo-Thuinn or Irish Underwater Council
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CNS	Communication and Navigation Systems
cm	Centimetre
CO_2	Carbon dioxide
COLREGS	International Regulations for Preventing Collisions at Sea
COWRIE	Collaborative Offshore Wind Research Into the Environment
CPA	Coastal Protection Act
CRM	Collision risk model
cSAC	candidate Special Areas of Conservation
CWP	Codling Wind Park
CWPE	Codling Wind Park Extension
CWPL	Codling Wind Park Limited
DAERA	Department of Communications, Climate Action and Environment
DAFM	Department of Agriculture, Food and the Marine
dB	decibel
DCMNR	Department of Communications, Marine and Natural Resources

Abbreviation	Term in Full
DCCAE	Department of Communications, Climate Action and Environment
DDV	Drop Down Video
DHPLG	Department of Housing, Planning, and Local Government
DTI	Department of Trade and Industry (UK)
DTTAS	Department for Transport, Tourism and Sport
EC	European Commission
EcIA	Ecological Impact Assessment
EDF	Électricité de France
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report (Ireland)
EIS	Environmental Impact Statement (For CWP and CWPE)
EMF	Electromagnetic field
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ESAS	European Seabirds at Sea
ESB	Electricity Supply Board
EU	European Union
FEPA	Food and Environmental Protection Act
FIR	Flight Information Region
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FORL	Fred. Olsen Renewables Ltd.
FSA	Formal Safety Assessment
FWPM	Freshwater pearl mussel
GBF	Gravity Based Foundation
GHG	Green House Gas
GLVIA3	Guidelines for Landscape & Visual Impact Assessment, Third Edition
GPS	Global Positioning Systems
GW	Gigawatt
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drilling
hr	Hour
IAA	Irish Aviation Authority
IAC	Irish Air Corps
IAIP	Integrated Aeronautical Information Publication
IALA	International Association of Lighthouse Authorities
IBTS	International Bottom Trawl Survey
ICAO	International Civil Aviation Organisation
ICES	International Council for the Exploration of the Sea
ICPC	International Cable Protection Committee
IEEM	Institute of Ecology and Environmental Management

Abbreviation	Term in Full
IEMA	Institute of Environmental Management and Assessment
IEMP	Integrated Ecological Management Plan
IFI	Inland Fisheries Ireland
IFP	Instrument Flight Procedures
IFR	Instrument Flight Rules
IFSA	Irish Federation of Sea Anglers
IMDO	Irish Maritime Development Office
IMO	International Maritime Organisation
INNS	Invasive Non-Native Species
IOOA	Irish Offshore Operators' Association
IPAS	Integrated Petroleum Affairs System
iPCoD	Interim Population Consequences of Disturbance
IROPI	Imperative reasons of overriding public interest
ISA	Irish Sailing Association
IUCN	International Union for Conservation of Nature
IWeBs	Irish Wetland Bird Survey
JNAPC	Joint Nautical Archaeology Policy Committee
JNCC	Joint Nature Conservation Committee
Kg	Kilogram
kHz	KiloHertz
kJ	Kilojoule
km	Kilometres
kV	Kilovolt
LAT	Lowest Astronomical Tide
LCT	Landscape Character Type
LSE	Likely Significant Effects
LSU	Local Seascape Units
LSVIA	Landscape, Seascape and Visual Impact Assessment
m	metres
MAC	Maritime Area Consent
MaREI	Centre for Marine and Renewable Energy
MCA	Maritime and Coastguard Agency (UK)
MGN	Marine Guidance Note
MHWS	Mean High-Water Spring
MLWS	Mean Low-Water Spring
MMO	Marine Management Organisation
MMOs	Marine Mammal Observer
MoD	Ministry of Defence (UK)
MPDM	Marine Planning and Development
MSFD	Marine Strategy Framework Directive
MSL	Mean Sea Level
MSO	Marine Survey Office

Abbreviation	Term in Full
MSP	Marine Spatial Planning
MW	Megawatt
NATS	National Air Traffic Service
NHA	National Heritage Area
NIS	Natura Impact Statement
NISA	North Irish Sea Array
nm	Nautical miles
NMI	National Museum of Ireland
NMPF	National Marine Planning Framework
NMS	National Monuments Services
NOAA	National Oceanic and Atmospheric Administration
NOW Ireland	National Offshore Wind Association of Ireland
NPWS	National Parks and Wildlife Services
NRA	Navigation Risk Assessment
NSA	Nutrient Sensitive Area
NtMs	Notices to Mariners
OCT	Open Cut Trenching
OPERA	Operational Programme for the Exchange of weather Radar information
ORE	Offshore Renewable Energy
OREDP	Offshore Renewable Energy Development Plan
OREI	Offshore Renewable Energy Installation
OREP	Offshore Renewable Energy Project
ORJIP	Offshore Renewables Joint Industry Programme
OSP	Offshore Substation Platform
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
OWF	Offshore Wind Farm
PEMP	Project Environment Management Plan
pNHA	proposed National Heritage Area
pSAC	proposed Special Area of Conservation
pSPA	proposed Special Protection Area
PSR	Primary Surveillance Radar
PTA	Pilotless Target Aircraft
PTS	Permanent Threshold Shift
PVA	Population Viability Analysis
REZ	Renewable Energy Zone
RMPs	Records of Monuments and Places
ROI	Republic of Ireland
ROV	Remotely Operated Vehicle
s	second
SAC	Special Area of Conservation
SAR	Search and Rescue

Abbreviation	Term in Full
SCADA	Supervisory Control and Data Acquisitions
SCANS-III	Small Cetaceans in European Atlantic waters and the North Sea
SEAI	Sustainable Energy Authority of Ireland
SEL	Sound Exposure Level
SFPA	Sea Fisheries Protection Authority
SI	Statutory Instrument
SLVIA	Seascape, Landscape & Visual Impact Assessment
SMP	Seabird Monitoring Programme
SMRU	Sea Mammal Research Unit
SNCB	Statutory nature conservation body
SNH	Scottish Natural Heritage
SOLAS	International Convention for the Safety of Life at Sea
SOSS	Strategic Ornithological Support Services
SPA	Special Protection Areas
SSC	Suspended sediment concentration
SSR	Secondary Surveillance Radar
TBC	To be confirmed
TSS	Traffic Separation Schemes
UAU	Underwater Archaeological Unit
UKHO	United Kingdom Hydrographic Office
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UXO	Unexploded Ordnance
VER	Valued Ecological Receptor
VFR	Visual Flight Rules
VMS	Vessel monitoring system
VP	Viewpoints
VPs	Vantage Points
WFD	Water Framework Directive
WGS	World Geodetic Systems
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

GLOSSARY

Glossary	Meaning
Alternating Current (AC)	A flow of electrical current which reaches maximum in one direction, decreases to zero, then reverses itself and reaches maximum in the opposite direction. The cycle is repeated continuously and the number of cycles per second is equal to the frequency. The Irish electrical system is an AC network that uses a frequency of 50 Hz.
Baseline	Original status of the environment in the Development Area and Export Cable Corridor Search Area.
Bord Iascaigh Mhara (BIM)	Bord Iascaigh Mhara is the agency of the Irish state with responsibility for developing the Irish marine fishing and aquaculture industries.
Chartered Institute of Ecology and Environmental Management (CIEEM)	Chartered Institute of Ecology and Environmental Management. The professional membership body representing and supporting Ecologists and Environmental professionals in the UK, Ireland and abroad. Previously known as Institute of Ecology and Environmental Management (IEEM).
Codling Wind Park (CWP)	The Project as described in Chapter 4 of this document consisting of up to 140 wind turbines, up to 5 Offshore Substation Platforms and associated cabling.
Collision Risk Modelling	Method used to predict the number of bird collisions that might be caused by a wind farm development.
Department for Transport, Tourism and Sport (DTTAS)	Mission to shape the safe and sustainable development of transport, tourism, and sport, to support economic growth and social progress.
Department of Agriculture	The Irish government department responsible for agriculture, food and the marine. Also, the Department of Agriculture, Food and the Marine (DAFM).
Department of Communications, Climate Action and Environment (DCCAE)	The Irish government department responsible for communications, climate action, environment, broadcasting, energy, natural resources and postal services. The department must ensure that all of its policies are in line with EU and global obligations.
Department of Communications, Marine and Natural Resources (DCMNR)	Previous name of DCCAE from 2002 until 2016.
Department of Housing, Planning, and Local Government (DHPLG)	The Irish government department responsible for housing, planning and local government Ireland.
Design Parameters	Set of parameters by which the proposed CWP project is defined and which will be used to form the basis of future assessments that are not specific at the time of writing but are indicated with a range of potential values.
Development Area	Codling Wind Park Array Boundary

Glossary	Meaning
EirGrid	State-owned electric power transmission operator in Ireland.
ESB Networks	Licensed operator of the electricity distribution system in the Republic of Ireland, responsible for carrying out maintenance, repairs and construction on the grid.
Environmental Impact Assessment (EIA)	A systematic means of assessing a development project's likely significant Effects undertaken in accordance with The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.
Environmental Protection Agency (EPA)	National agency responsible for protecting and improving the environment of Ireland.
European Commission (EC)	The executive body of the European Union responsible for proposing legislation, enforcing European law, setting objectives and priorities for action, negotiating trade agreements and managing implementing European Union policies and the budget.
Exclusive Economic Zone (EEZ) Boundary	The boundary between the Irish Exclusive Economic Zone (EEZ) and the English Exclusive Economic Zone (EEZ).
Export Cable Corridor Search Area	The area currently under consideration for one or more export cables and associated landfall locations
Foreshore Lease	Leases are granted under the Foreshore Acts 1933 to 2014 for the erection of long-term structures (e.g. piers and marinas).
Foreshore Licence	Licences are granted for other works not requiring exclusive possession (e.g. laying of submarine pipelines and cables) and purposes (e.g. aquaculture).
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
High Voltage Direct Current (HVDC)	A high-voltage, direct current (HVDC) electric power transmission system (also called a power superhighway or an electrical superhighway) uses Direct Current for the bulk transmission of electrical power. For long-distance transmission, HVDC systems may be less expensive and suffer lower electrical losses. For underwater power cables, HVDC avoids the heavy currents required to charge and discharge the cable capacitance each cycle. HVDC uses voltages between 100 kV and 1,500 kV.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significant Effects of change resulting from development both on the Landscape as an environmental resource in its own right and on people's views and Visual Amenity.
Lease Area	Area covered by Foreshore Lease granted to CWP dated 15 November 2005.
Licence Area	Area in which the opportunity was awarded to explore the seabed to define the Development Area.
Lowest Astronomical Tide (LAT)	The lowest level which can be predicted to occur under average meteorological conditions and any combination of astronomical conditions.

Glossary	Meaning
Marine Strategy Framework Directive (MSFD)	Formally adopted by the European Commission (EC) in July 2008, the Marine Strategy Framework Directive (MSFD) outlines a transparent, legislative framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal of the Directive is to achieve 'Good Environmental Status' (GES) by 2020 across Europe's marine environment.
Mean High Water Springs (MHWS)	The highest-level which spring tides reach on average over a period of time above chart datum.
Mean Low Water Springs (MLWS)	The lowest level which spring tides reach on average over a period of time above chart datum.
National Parks and Wildlife Service	The National Parks and Wildlife Service manages the Irish State's nature conservation responsibilities. As well as managing the national parks, the activities of the NPWS include the designation and protection of Natural Heritage Areas, Special Areas of Conservation and Special Protection Areas.
Nutrient Sensitive Areas (NSAs)	Areas of protected habitats and species as defined in the Nitrates Directive.
Offshore Export Cable	The Offshore Export Cable(s) and all associated cable protection to landfall.
Offshore Export Cable Corridor	Offshore Export Cable Corridor is the area in which the subsea export cables and other related infrastructure i.e. cable protection, will be located in.
Onshore Export Cable Corridor	Onshore Export Cable Corridor is the area in in which the onshore export cables will be located
Onshore Grid Connection	This is the collective name for all grid connection works: •Onshore Export Cable Route; and •Onshore Electrical Infrastructure (including transition pits).
OSPAR Commission	The forum through which Contracting Parties cooperate underpinning the OPSAR Convention. The Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention is the current legislative instrument regulating international cooperation on environmental protection in the North-East Atlantic.
Population viability analysis	Population viability analysis is a species-specific method of risk assessment frequently used in conservation biology. It is traditionally defined as the process that determines the probability that a population will go extinct within a given number of years.
Ramsar site	A wetland site designated to be of international importance under the Ramsar Convention. The Convention on Wetlands, known as the Ramsar Convention.
Receptor	Environmental component that may be affected, adversely or beneficially, by the project.
Relevant Project	As defined in the Transition Protocol contained in Appendix 4 of the MPDM Frequently Asked Questions. On 19 of May 2020, the Government announced that seven offshore renewable energy projects had been

Glossary	Meaning
	designated as Relevant Projects, namely Oriel Wind Park, Dublin Array (2 projects - Bray and Kish Banks), Codling Wind Park (2 projects - Codling I and Codling II), Skerd Rocks Offshore Wind Farm and the North Irish Sea Array.
Remotely Operated Vehicle	A remotely operated underwater vehicle is a tethered underwater mobile device. ROVs are unoccupied, highly manoeuvrable, and operated by a crew either aboard a vessel/floating platform or on proximate land.
Special Area of Conservation (SAC)	Areas of protected habitats and species as defined in the Habitats Directive.
Special Protection Area (SPA)	Sites classified in accordance with Article 4 of the EC Birds Directive (79/409/EEC) which came into force in April 1979. They are classified for rare and vulnerable birds (as listed on Annex 1 of the Directive), and for regularly occurring migratory Species.
Species	A group of interbreeding organisms that seldom or never interbreed with individuals in other such groups, under natural conditions; most species are made up of subspecies or populations.
Study Area	Development Area and any survey boundary that is required.
Unexploded ordnance (UXO)	Unexploded ordnance, unexploded bombs (UXBs), or explosive remnants of war (ERW) are explosive weapons (bombs, shells, grenades, land mines, naval mines, cluster munition, etc.) that did not explode when they were employed and still pose a risk of detonation.
Water body	A discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, a transitional water or a stretch of coastal water, designated for the purposes of implementing the Water Framework Directive (WFD).
Zone of Influence (ZoI)	Spatial extent of potential impacts resulting from the project.
Zone of Theoretical Visibility (ZTV)	A map, digitally produced, showing areas of land within which, the Proposed Development is theoretically visible.

1 INTRODUCTION

1.1 The Developer

Codling Wind Park Limited (CWPL), a joint venture between Fred. Olsen Renewables Ltd. (FORL) and EDF Renewables was established to develop Codling Wind Park (CWP).

1.2 Historical Project Background

Codling Wind Park (as per 2005 Foreshore Lease)

CWPL was awarded a Foreshore Lease for Codling Wind Park on 15 November 2005. The project was granted its Lease for the construction of up to 220 turbines with a rotor diameter of up to 120 m and a tip height of up to 160 m above Mean Sea Level (MSL) and a generating capacity of up to 1100 MW.

The existing Foreshore Lease enables a grid connection route to the Irish coastline and currently includes permission for the following infrastructure:

- Anemometer mast;
- Offshore substation platforms (OSP);
- Transmission infrastructure; and
- 220 wind turbines and foundations.

Codling Wind Park Extension

In 2009, CWPL submitted an application for a Foreshore Lease for up to an additional 200 turbines with up to 1000 MW capacity within a similar sized area to the consented Codling Wind Park. Referred to as the Codling Wind Park Extension (CWPE), the proposed array of wind turbines adjoins the original Codling Wind Park array site and stretches to the south (Figure 1.1).

A Foreshore Lease application and accompanying Environmental Impact Statement (EIS) for CWPE was submitted to the Department of Agriculture, Fisheries and Food in March 2009.

The application requested permission for the installation of:

- 200 wind turbines and foundations;
- Subsea power cables; and
- Two OSPs and associated works.

6°0'W

5°42'W

5°24'W

53°6'N

52°48'N

IRELAND — EAST COAST

ARKLOW TO THE ERRIES ISLANDS

DEPTHS IN METRES

SCALE 1: 100 000 at lat 53°30'

Depths are in metres and are reduced to Chart Datum, which is approximately the level of Lowest Astronomical Tide.
Heights are in metres. Underlined figures are drying heights above Chart Datum. All other heights are above Mean High Water Springs.
Positions are referred to the WGS84 compatible datum, European Terrestrial Reference System 1989 Datum.
Navigational marks: IALA Maritime Buoyage System – Region A (Red to port).
Projection: Mercator.
Sources: The origin, scale, date and limits of the hydrographic information used to compile the chart are shown in the Source Diagram. The topography is derived chiefly from Ordnance Survey of Ireland maps.

Tidal Levels referred to Datum of Soundings

FIRING PRACTICE AREA (D201B) (see Note)

FIRING PRACTICE AREA (D201D) (see Note)

FIRING PRACTICE AREA (D201) (see Note)

CODLING BANK

GRAY BANK

ARKLOW BANK (see Note)

Arklow Bank 3d Wind Farm

WICKLOW

WICKLOW HEAD

1:4000000

0 50 100 150 200 km

Project:

Codling Wind Park

Title:

Figure 1.1: Location of Codling Wind Park (CWP)

Key

Codling Wind Park

Scale @ A3: 1:200000

Map projection: IRENET95/ Irish Transverse Mercator
Graticules: WGS 84

0 2.5 5 7.5 10 km

N

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codling wind park

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1.2.1 Recent Developments

Following the recent classification of Codling Wind Park as a "Relevant Project" (see Section 3.1 for further detail), in order to take advantage of significant advances in wind turbine technology in recent years, and to ensure the delivery of the lowest cost of energy to consumers, CWPL is looking to redesign the previous Codling Wind Park and CWPE projects as one project, known as Codling Wind Park (CWP), and to secure a Maritime Area Consent (MAC) under the new Marine Planning and Development Management Bill (2019; see 3.1). However, until the enactment of the Marine Planning and Development Management Bill there is no mechanism to receive a formal scoping opinion. Therefore, this Scoping Report has been produced in order to receive feedback on the scoping report including on the scope of the EIA and will be submitted to the DHPLG, ABP and the other stakeholders..

This Scoping Report is required to provide environmental and engineering information to inform the project design and the environmental assessments (i.e. Appropriate Assessment (AA) and Environmental Impact Assessment (EIA)) required for the consenting of CWP OWF.

For the purposes of this Scoping exercise, the CWP OWF encapsulates the areas previously covered by the Codling Wind Park Foreshore Lease (granted in 2005) and CWPE projects, and the whole project is referred to as the CWP OWF (as illustrated in Figure 1.1). The CWP Development Area covers an area of approximately 125 km² and is located ca.13 km from the east coast of Ireland between Greystones and Wicklow. The CWP project also includes the landfall location(s) required for the grid connection and this scoping exercise considers a number of potential landfall locations (see Chapter 4, Description of the Development).

1.3 Purpose of this Scoping Report

This Scoping Report covers the CWP Development Area and Offshore Export Cable Corridor up to the Mean High-Water Mark as defined in the Foreshore Act, 1933 to 2014. This Scoping Report does not consider the terrestrial elements of the project, (which will be covered by a separate onshore Scoping Report when onshore elements have been defined).

At the end of each topic section, a series of questions have been asked, which CWPL would be grateful for a response to. If CWPL does not receive a response to these questions, CWPL will proceed on the basis that the approach adopted/proposed is acceptable.

The purpose of the Scoping Report is to engage with regulators, statutory and non-statutory consultees as part of the EIA process, inviting them to provide relevant information and to comment on the proposed approach to the CWP EIA, in order to ensure that a robust EIAR is submitted in support of the eventual application for planning consent under the MPDM Bill. This Scoping Report therefore identifies:

- The main aspects of the offshore physical, biological and human environments likely to be significantly affected by the construction, operation and decommissioning of CWP; and
- The extent of relevant environmental studies that need to be undertaken as part of the CWP EIA.

The identification and subsequent assessment of potentially significant effects will be based upon an understanding of the environmental conditions likely to be encountered within the Development Area and Offshore Export Cable Corridors. This understanding has been developed utilising the information gathered and presented within the previous CWP and CWPE EIS and will be supplemented by new surveys where required.

1.4 Document Structure

This Scoping Report has been structured in order to comply with the most current and relevant guidance for EIA in the Republic of Ireland**.** Table 1.1 presents the structure of this Scoping Report and how it aligns with such guidance**.** The final EIAR will include additional sections for cumulative impacts including intra-project effects, consideration of reasonable alternatives etc.

Table 1.1: Layout of scoping document and compliance with EIA guidance

High level section	Chapters/sections in Scoping document	Compliance with DHPLG (2018) guidance for carrying our EIA	Compliance DCCAE (2017) guidance for offshore renewable EIA
Introductory Chapters	Introduction	-	-
	Approach to Scoping including Habitat Regulation Appraisal	Biodiversity	Biodiversity flora and fauna - Protected sites and species -
	Policy and Legislation	-	-
	Description of Development	-	-
	EIA Methodology	-	-
	Carbon Balance Assessment	Climate	Climate - Climatic factors
Physical environment	Marine Geology, Sediment and Coastal Processes	-	Water - Bathymetry and hydrography Soil and geology – Coastal erosion & Sedimentation processes, Seabed geology and morphology
	Offshore Water Quality	Water Quality	Water Quality
Biodiversity	Subtidal and Intertidal Ecology	Biodiversity	Biodiversity flora and fauna - Benthic and pelagic ecology
	Fish and Shellfish Ecology	Biodiversity	Biodiversity flora and fauna - Fish and shellfish
	Offshore Ornithology	Biodiversity	Biodiversity flora and fauna – Birds,
	Marine Mammals and Reptiles	Biodiversity	Biodiversity flora and fauna - Marine mammals and reptiles
Cultural Heritage	Marine Archaeology	Cultural Heritage	Cultural and archaeological Heritage – marine and coastal archaeology, shipwrecks
Population and Human Health	Commercial Fisheries	Human Health	Population and human health
	Shipping and Navigation	Human Health and material assets	Population and human health - Ports, shipping and navigation

High level section	Chapters/sections in Scoping document	Compliance with DHPLG (2018) guidance for carrying our EIA	Compliance DCCAE (2017) guidance for offshore renewable EIA
	Other Marine Users	Material Assets	Undersea Pipes and Cables Oil and gas infrastructure (incl. gas storage) Aggregates, dredging and other disposal sites Renewable energy
	Aviation, Military and Communications	Human Health	Population and human health – Aviation safety and military exercise
Landscape and Seascape	Seascape, Landscape and Visual Impacts	Landscape	Seascape and landscape – seascape, visual impacts

2 APPROACH TO SCOPING

2.1 Approach to Scoping of the EIA

This Scoping Report aims to outline the main potential impacts which may result in significant environmental effects due to the construction, operation and decommissioning of CWP and how CWPL propose to assess such impacts as part of the EIA process.

As outlined in Section 1.3.3, this scoping exercise will facilitate the production of an EIAR to support and application for planning permission and maritime area consent. Following receipt of feedback on this Scoping Report, CWPL will continue to engage with the DHPLG and other statutory and non-statutory consultees in order to refine and agree the approach to the EIA.

2.2 Approach to Scoping of Cumulative Impacts

Cumulative effects are considered to be those that result from incremental changes or effects caused by other plans and projects together with the proposed CWP.

The current EIA Regulations (European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018) (EIA Regulations 2018), implementing the European EIA Directives (Directive 2011/92/EU and Directive 2014/52/EU) and 2017 Department of Communications, Climate Action and Environment (DCCAE) Guidance require the likely significant environmental effects of a development to be considered cumulatively with effects to be experienced as consequence other existing or approved projects. It does not include the requirement to consider reasonably foreseeable projects including those in application. This Scoping Report aims to identify the scope of the Cumulative Impact Assessment (CIA) to be considered in the CWP EIA.

Fundamental to the scoping of the CIA is the agreement of the list of plans, projects and activities to be considered alongside CWP. The DCCAE (2017) guidance has been considered when identifying projects which may result in cumulative effects, and Section 5.7 of this document sets out the list of projects that have been identified as relevant to the CIA during this scoping exercise.

It should be noted that, whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the CIA, at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' (as defined in Section 3.1), are also under consideration where they may result in cumulative effects. This list will likely need to be updated and further agreed to ensure that the CIA takes account of all relevant plans and projects. This will be done through periodic review of the list and through consultation with the regulators and consultees during the pre-application process, but further advice and guidance is requested from DHPLG as part of their Scoping Response.

2.3 Approach to Scoping Consultation

Although the feedback received pursuant to this scoping process will form an important step in developing the EIAR for the CWP project, it is also recognised that the final scope of the assessments will require further development and discussion with regulators, and relevant statutory and non-statutory consultees. CWPL expect to engage with consultees and members of the public as part of the scoping process and throughout the pre-application period in order to ensure that a robust EIA process is followed, and all relevant issues have been adequately considered.

2.4 Approach to Transboundary Effects

Offshore renewable energy projects have the potential to impact in other jurisdictions in the European Union (EU). The EIA Directives requires consideration of any transboundary impacts that will be experienced as a consequence of a plan or project. Therefore, as part of this

Scoping Report any potential transboundary effects resulting from CWP will be identified, and relevant authorities in neighbouring states consulted where appropriate. This will include possible transboundary effects on European sites as part of the Appropriate Assessment. Furthermore, where the Competent Authority engaged in the EIA deems there to be potential for transboundary effects, they will notify, in writing, the relevant states of the submission of the CWP application.

2.5 Approach to Scoping of Appropriate Assessment

The Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) seek to maintain, and where appropriate restore, the favourable conservation status of designated natural habitats and species throughout member states.

The most important ecological sites are designated as European sites and include Special Areas of Conservation (SAC), Special Protection Areas (SPA), candidate Special Areas of Conservation (cSAC) and proposed Special Protection Areas (pSPA), and form part of the Natura 2000 network of comparable sites throughout Member States.

The Habitats Directive requires that where a Likely Significant Effect (LSE) of a plan or project, either alone or in combination with another plan or project, on a European site cannot be ruled out, then permission can only be granted where it is determined that there will be no adverse effects on the integrity of the site. In order to do this, the competent authority must undertake an Appropriate Assessment (AA) which must consider the sites qualifying features and conservation objectives including its conservation status.

If it cannot be demonstrated that a plan or project will not affect the integrity of any European site, despite proposed mitigation measures and, where it has been demonstrated that there are no *alternative solutions*, Article 6(4) of the Habitats Directive allows for derogation for *imperative reasons of overriding public interest* (IROPI).

The DCCAE (2017) guidance outlines a stepwise process for considering the requirements of the Habitat Directive. The first key step is undertaking an assessment of the likely significant effects of CWP. This step requires the production of an AA screening report to be submitted to the Competent Authority (CA) to allow them to determine whether there is a LSE on any European sites, and whether an AA is required. The screening report will identify possible European sites based upon the proposed project description and its Zone of Influence (ZoI) (i.e. spatial extent of potential impacts resulting from the project) and will include an assessment of LSE on the sites identified.

Should LSE be determined then a Natura Impact Statement (NIS) should be produced in order to allow a more detailed assessment on the possible effects of the proposed plan or project on the European site (either alone or in combination). The NIS is submitted to the CA to allow them to determine whether there will be an adverse effect on the integrity of any European sites.

The Scoping Report (see Table 11.6 (ornithology), Table 13.7 (Marine Mammals, Table 9.4 for Subtidal and Intertidal Ecology and Table 10.4 for Fish and Shellfish Ecology) has identified a list of possible European sites for consideration as part of the AA screening process.

CWPL will engage with the CA and relevant consultees during pre-application in order to produce an AA Screening Report. Following submission of the Screening Report, should the CA determine that an AA is required, then CWPL will produce a NIS for submission to the CA.

The requirement to consider the potential effects on European sites, applies not only to Irish sites. The possible transboundary effects from CWP on non-Irish European sites, must also be considered as part of the AA process. Based upon the current project description (See Chapter 4 of this Report), CWP may affect sites which have highly mobile qualifying features such as marine mammals and birds. Where non-Irish sites are identified, engagement with the relevant consultee (e.g. Natural England or Natural Resources Wales) will be undertaken as part of the AA process.

CWPL propose that European sites which are not fully designated (e.g. pSPAs, cSACs) will be treated as though they are fully designated sites. Ramsar sites, including proposed Ramsar sites, will also be considered.

3 POLICY AND LEGISLATION

The key drivers underpinning the need for renewable energy and the development of CWP are as follows:

- The need to reduce greenhouse gas emissions, including increasing energy generation from low carbon sources to replace high carbon energy sources such as burning coal, peat and oil;
- Assist the Irish Government's commitment to achieve 70% renewable energy by 2030;
- The need to secure safe, affordable and reliable local energy generation;
- The need to replace existing energy generation infrastructure; and
- The need to support expected electricity demand whilst meeting climate change commitments.

3.1 Recent Developments

There have been a significant number of policy developments in the last couple of years which build upon previous policy developments e.g. the 2014 Offshore Renewable Energy Development Plan (OREDP) which identified potential for approximately 3 GW of offshore wind in Irish territorial waters. These include:

- Irish Government Climate Action Plan (2019) which identifies the importance of renewable energy and targets an increased reliance on renewables by adding 12 GW of renewable energy capacity, inclusive of the 3.5 GW target specifically for offshore wind;
- The Marine Planning Policy Statement was finalised in November 2019 and identifies the vision for the future development of Ireland's marine planning system, overarching policies and principles for marine planning and other public bodies that engage with the marine planning system along with the high-level priorities for the delivery of a marine planning system;
- The publication of the Marine Planning and Development Management Bill (MPDM), General Scheme (January 2020) which covers requirements for forward marine planning and the Maritime Area Consent (MAC) which is the proposed single consenting system for future OWF developments; and
- The draft National Marine Planning Framework (NMPF) which covers a range of plan policies for the management of marine activities including offshore wind development. The NMPF is intended to be Ireland's first marine spatial plan, as required under the Maritime Spatial Planning Directive (2014/89/EU).Programme for Government 2020 – Our Shared Future, which creates a vision for reform and renewal that can help Ireland recover and thrive following issues and challenges inflicted by the pandemic. The Programme for Government was increased the target for offshore wind by 2030 from 3.5GW to 5GW.

The Transition Protocol contained in Appendix 4 of the MPDM Frequently Asked Questions sets out the criteria for projects to be designated as Relevant Projects, namely: (a) offshore wind projects which applied for (and substantially advanced) or were granted a lease under the Foreshore Act 1933, as amended (the Foreshore Act) in respect of which material changes are proposed to that which was originally applied for and assessed under the Foreshore Acts, which changes require further assessment; and/or (b) offshore wind projects which have a valid connection agreement from the TSO or are confirmed by the TSO as eligible to be processed to receive a valid connection offer. CWP is considered as having Relevant Project status under these transitional arrangements. Once the MPDM Bill is enacted CWP will be entitled to a Planning Interest which will allow it to apply to ABP for development consent. In the meantime, CWP is engaging in environmental scoping as a Relevant Protect under the Transition Protocol so that it can prepare and finalise the necessary environmental reports to accompany its planning application. In accordance with the timeline set out in the Programme for Government, it is anticipated that the MPDM (and secondary legislation) will be enacted by the end of Q1 2021.

3.2 Relevant Legislation and Policy

Key relevant legislation and policy includes:

- The Foreshore Act 1933 to 2014 and the Foreshore Regulation 2011 (S.I. No. 353/2011);
- The OREDP and OREDP Interim Review 2018;
- MPDM General Scheme;
- MPDM Transition Protocol
- Draft NMPF;
- Best Practice Guidelines for the Irish Wind Energy Industry (IWEA/SEI, 2008);
- Offshore Electricity Generating Stations – Note for Intending Developers (DCMNR);
- Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC). These Directives are transposed into law by the European Communities (Birds and Natural Habitats) Regulations) Regulations 2011 (as amended**)** and transposed into Irish law as Part XAB of the Planning and Development Acts, 2000 to 2020 and Part 20 of the Planning and Development Regulations 2001-2020;
- EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU and transposed into Irish law in the Planning and Development Act, 2000-2020 and the Planning and Development Regulations 2001-2020 as amended by S.I. No. 296 of 2018;
- Water Framework Directive (WFD) (2000/60/EC);
- Marine Strategy Framework Directive (MSFD) (2008/56/EC);
- Marine Planning Policy Statement (November 2019); and
- Maritime Spatial Planning (MSP) Directive (2014/89/EU);
- Climate Action Plan 2019.

3.2.1 Consents Required and Process to follow

The OREDP highlighted the need to update the consenting process for offshore renewables in order to:

- Align terrestrial and foreshore consenting regimes to avoid duplication;
- Provide mechanism to manage development in the marine environment; and
- Allow designation of offshore renewables energy zones (REZs) and allow granting of permits for offshore renewables energy projects.

The Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects (2017) identifies the possible consents required for offshore wind farms which include foreshore licences and leases, terrestrial planning permission and a licence to construct and generate electricity generation stations.

However, a new streamlined state and development consenting regime is proposed for ORE projects under the Marine Planning and Development Management Bill. In summary this will comprise the following steps[1]:

[1] These steps may be amended as the MPDM is finalised prior to enactment.


Apply to the relevant Minister for a Planning Interest in respect of the maritime area in question;
Carry out the necessary environmental studies and engage in EIA scoping with ABP and other relevant stakeholders;
Apply to ABP for a Planning Permission for both the onshore and offshore elements of the project
If and when the Planning Permission is granted, apply to the relevant Minister for a MAC.

4 DESCRIPTION OF THE DEVELOPMENT

4.1 Introduction

This chapter provides an overview of the likely key Design Parameters of CWP and includes a description of the project, a high-level indicative project programme, and potential construction methodologies.

The Design Parameters (as defined in Section 5.3), provided are indicative to inform the EIA scoping process and will be further refined as part of the pre-application process including through consultation with regulators and stakeholders. The final parameters will be presented in the EIAR and will form the basis for the EIA.

The key offshore components of CWP are likely to comprise of:

- Wind Turbine Generators (WTGs) and supporting foundations;
- OSPs and supporting foundations;
- Subsea array cables between WTGs and OSPs;
- Subsea export cables between OSPs / WTGs and the shore;
- Interconnector cables between OSPs (if required);
- Cable protection associated with array and export cables and cable crossings (if required); and
- Scour protection around WTG and OSP foundations (if required).

This Scoping Report does not cover onshore elements of the CWP. Additional studies are required to further define the onshore aspects of the project, and scoping will be undertaken with the relevant authorities once this has been done. However, to provide context, the onshore infrastructure is likely to include:

- Landfall site(s) with associated transition pits to connect the offshore and onshore cables;
- Onshore underground cables and associated works;
- Temporary construction areas, compounds and access roads;
- Onshore project substation(s), compound(s), statcoms (if required) and transformer stations (if required);
- Cables connecting the onshore project substation to an EirGrid substation;
- Port storage/loading areas and port improvement/enabling works (if necessary);
- Operations and maintenance buildings and storage to support the operations phase; and
- Other general works associated with the above or necessary for the construction, operation and final decommissioning of CWP, including consequential and ancillary development.

With regards to the Operation and Maintenance buildings and associated works, due to the uncertainty surrounding the location(s) and details of the potential works required for the facilities, these works have not been included as part of this Scoping Report. Once the location and further details of the proposals (both onshore and in the foreshore region) have been identified they will be scoped and assessed at the same time as part of the onshore Scoping Report to ensure there is adequate consideration of the whole project as part of the EIA process.

4.2 Site Selection

In 1999, FORL initiated a search around the coast of Ireland to identify potential offshore wind development sites in consultation with the Department of Communications, Marine and Natural Resources (DCMNR) (recently the DCCAE). After careful consideration of the technical,

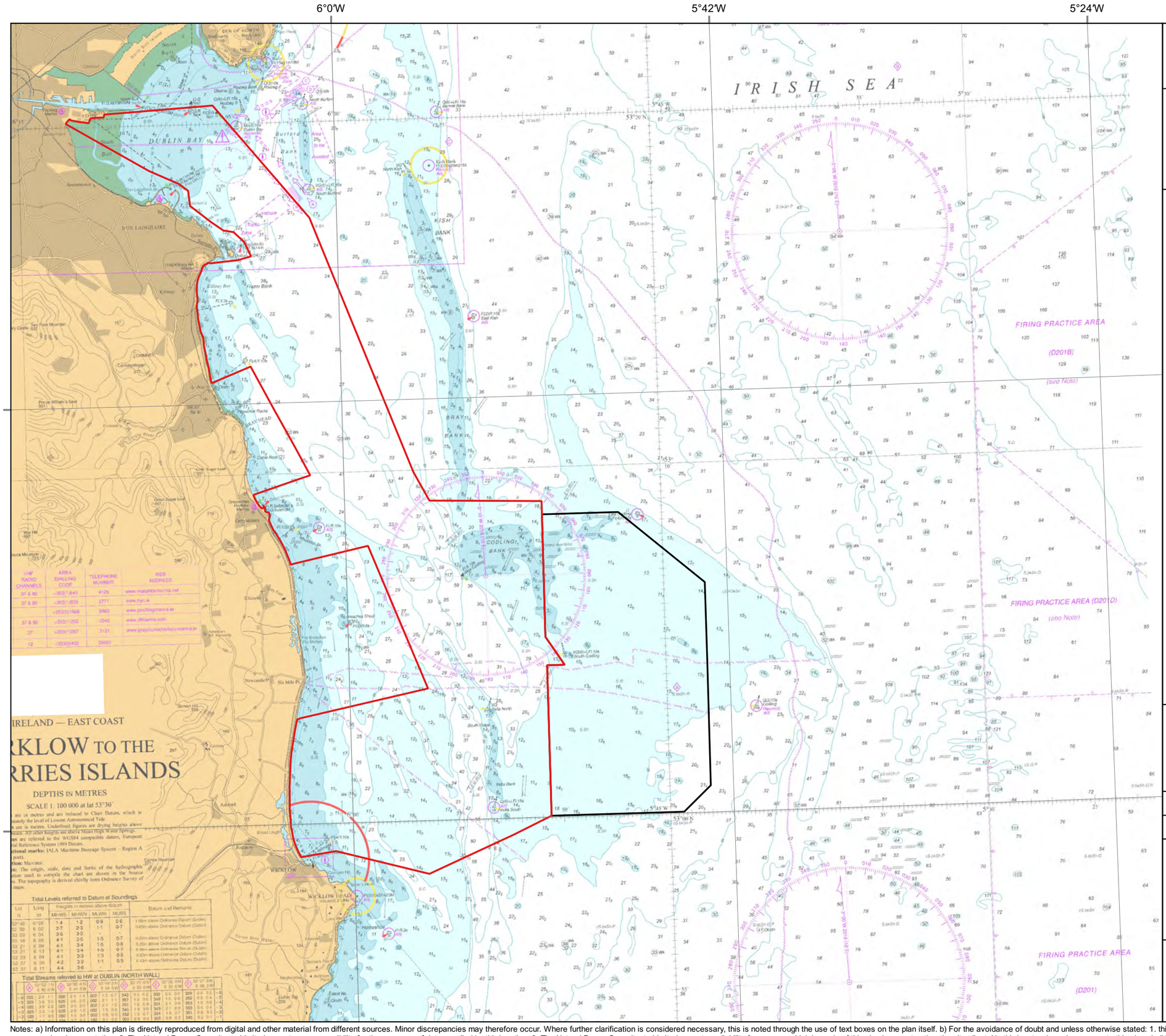
physical and environmental criteria, Codling Bank was identified as having several advantages when compared to other potential sites including the shape and stability of the sandbank on which the Offshore Wind Farm (OWF) array site is proposed to be located.

4.3 Development Boundary

The proposed CWP Development Area is located approximately 13 km off the east coast of Ireland (off Co. Wicklow) between Greystones and Wicklow and covers an area of over 125 km^2. Greystones is situated approximately 15 km to the northwest and Wicklow approximately 17 km to the southwest of the potential location of the nearest proposed WTG. The WTGs will be located on the Codling sand bank in water depths ranging between circa 9 and 33 m.

The Offshore Export Cable Corridor(s) and potential landfall locations for CWP have not yet been determined. As illustrated in Figure 4.1, an export cable search area within which the CWP Offshore Export Cable Corridor(s) will be located has been identified. The Export Cable Corridor search area runs from the northwest corner of the CWP array site to Poolbeg, and from the southwest edge of the CWP array to the coast near Wicklow. The Offshore Export Cable area of search has been designed to encompass realistic onshore grid connection opportunities identified in the Eirgrid 2019 East Coast Generation Opportunity Assessment report (Eirgrid, 2019).

The location of the Development Area and Export Cable Corridor Search Area of CWP is illustrated in Figure 4.1.



Project:

Codling Wind Park

Title:

Figure 4.1: Location of Codling Wind Park and Potential Export Cable Corridor Search Area

Key

- Codling Wind Park
- Potential export cable corridor search area

Scale @ A3: 1:200000

Map projection: IRENET95/ Irish Transverse Mercator
Graticules: WGS 84

N

0 2.5 5 7.5 10 km

Date: 21-07-20	Prepared by: SM	Checked by: SMc
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codling wind park

4.4 Offshore Wind Farm Infrastructure

In order to deliver a competitive project for a route to the electricity market and provide the lowest cost of electricity, the CWP project seeks to allow the deployment of more current WTG technology. The current indicative Offshore Design Parameters proposed for the current CWP site is outlined in Table 4.1.

The Design Parameters are indicative and will be further refined during pre-application. This includes for example, the possible capacity of the individual WTGs and the maximum CWP project capacity. It is proposed that the Design Parameters assessed as part of the EIA will represent the worst-case scenario (with justification of how this represents the worst-case scenario provided), but other potential design options, where required, will be included (e.g. numbers of different sized turbines).

Table 4.1: Indicative Offshore Design Parameters (indicative maximum values unless otherwise stated)

Design Parameter	Indicative Parameters
Capacity	Between 900 - 1500 MW
Estimated initial operational life	At least 35 years
Number of WTGs	Up to 140
Approximate CWP array site area	125 km^2
Distance of CWP array from shore (closest distance)	13 km
Water depths for turbines	9 – 33 m
Subsea export cable corridor length from site boundary	Up to 60km
Export cable voltage	Up to 400 kV
Maximum number of export cables	6
WTG capacity	Up to 20 MW
Maximum WTG rotor diameter	288 m
Maximum WTG tip height	320 m
Minimum rotor clearance above Highest Astronomical Tide (HAT))	22 m
Indicate separation distances between WTGs	Between 4.5 x 4.5 and 8 x 8 rotor diameters
OSPs	Up to 5
Maximum array cable length (and type)	Up to 270 km (up to 66 kV)

4.4.1 Wind Turbine Generators

There are a wide number of WTG technologies currently available and it is anticipated that there will be further significant developments between the time of scoping and the likely commencement of construction.

CWPL requires a degree of flexibility with regards to WTG choice to ensure that anticipated changes in available technology can be accommodated within the project Design Parameters. The indicative Design Parameters for WTGs therefore includes parameters against which environmental effects can be assessed. For the purposes of assessment, WTG sizes are currently under consideration range from 11 MW to 16 MW. However, subject to final design it is possible that alternative, including larger capacity, WTGs (i.e. Up to 20 MW) may be selected. In this scenario the physical parameters such as blade tip height and rotor diameter will remain within the Design Parameters described and assessed within the EIAR. In any case, a worst-case scenario will be considered but a range of design options will be provided.

It should be noted that the Design Parameters indicated in Table 4.1 represent the maximum case or range for each aspect of the WTG design and do not present a scenario in which all maximum parameters will be utilised at the same time. The maximum number of turbines for example is based upon the use of the smallest WTG under consideration however, if larger capacity WTGs are chosen in the final design they will be deployed in significantly lower numbers.

4.4.2 Foundations

The design of foundations for WTGs and OSPs will be informed by an engineering feasibility study and further site investigation works, with the final proposed design expected to be confirmed post consent. The final design option will be influenced by several options including final WTGs chosen and detailed ground and metocean conditions. It is possible that more than one type of foundation will be used across the CWP site.

The options currently being considered include:

- Monopiles;
- Jacket foundations with pin piles (which include options for 3 and 4 legged jackets);
- Suction caissons with monopole; and
- Suction caissons with jacket foundations (3 and 4 legged jackets).

A description of each potential foundation type, and indicative Design Parameters are provided in Table 4.2. However, these parameters are subject to refinement during the EIA process.

Table 4.2: Indicative Design Parameters for foundations

Foundation Type	Indicative Design Parameters
Monopile	Commonly a steel cylindrical pile up to a diameter of approximately 11 m. Installation is generally undertaken using percussive piling or drilling with penetration depths of up to 70 m.
Jacket foundations with pin piles	The jackets may be configured to include 3 or 4 legs. There are several potential jacket designs including lattice structures comprising of tubular steel sections. Distance between the foundation legs are expected to be up to 60 m. Pins piles may be up to 4 - 5 m in diameter and are expected to penetrate the seabed by to up to 70 m.
Suction caissons with monopole	Steel suction caissons of diameter up to 40 m.

Foundation Type	Indicative Design Parameters
Suction caissons with jacket foundations	Steel suction caissons of diameter up to 20 m. Spacing between the jacket legs may be up to 60 m.

A range of possible options will be considered for scour protection around the turbine foundations including rock placement, frond mats, concrete mattressing, or the use of integrated skirts / aprons. Further investigation is required to understand if and what type of protection may be required (and this will be included in the final EIAR).

It should be noted that while the preceding information relates to the specifics of WTG and foundation design, there may be a requirement for seabed preparation including dredging activities, or the generation of drill arisings. Further details on potential construction activities will be developed during pre-application for inclusion and assessment included in the final EIAR.

4.5 Offshore Electrical Infrastructure

The offshore transmission infrastructure is likely to comprise of:

- Subsea export cables to transport electricity to shore;
- OSPs;
- Array cabling; and
- Interconnector cables between OSPs.

At the current stage of project design, the location of the subsea export cable corridor, landfall and the associated installation methodologies has not been determined. However, potential indicative cable routes and potential landfall options have been provided and are illustrated in Figure 4.1.

4.5.1 Electrical connection options

The following alternating current (AC) electrical export option is currently being considered:

- The use of up to 400 kV export cables, transformed offshore at OSPs, and exported to shore.

Irrespective of the final export solution, array cables will be installed to connect the WTGs within the CWP array site. Once determined, it will be assessed in the EIAR using a worst-case design scenario, or a range of design options if the former is not permissible

4.5.2 Export and Array Cables

An area of search for the Offshore Export Cable Corridor(s) has been identified for the CWP. The area of search extends from the CWP array to the east coast of Ireland and covers the coastline from Wicklow, County Wicklow, stretching northwards to Dublin, County Dublin.

Export and array cables will be AC and are likely to be installed using a combination of techniques including jetting, ploughing, trenching and cable injector.

Once the Offshore Export Cable Corridor(s) have been identified, the burial depths for the subsea cables will be subject to a detailed cable burial risk assessment (CBRA) and a burial assessment study (BAS). Standard trenching tools will be used where possible to bury/protect the cables. However, in areas of more challenging strata there is potential of employing alternative cable protection measures such as rock placement, bags, mattresses to achieve adequate cable protection.

It is likely that additional cable burial protection measures, in the form of rock placement, concrete and frond mattresses and rock bags will be required at certain locations including where cable burial depths are not sufficient to protect the cables.

Should any cable crossings be required cable protection measures will also be required at crossing locations. The design of which would need to be developed in consultation with the owner / operator of the asset to ensure integrity of the asset is maintained however, typically the measures involve a combination of grout mattresses and rock placement and would be designed with reference to the most up to date International Cable Protection Committee (ICPC) guidelines.

Fibre optic cables will also be required to allow for System Control and Data Acquisition (SCADA) and may be contained within the subsea export cables or laid alongside).

4.5.3 Offshore Substation Platforms

The design of foundations for up to five OSPs will be informed by further site investigations, feasibility studies and procurement. It is possible that more than one foundation type will be deployed across the site. The following foundations are currently under consideration:

- Monopiles;
- Jacket foundations (3 or 4 legged) with pins piles; and
- Jacket Foundations (3 or 4 legged) with suction caissons.

The need for OSPs and their final Design Parameters will be determined following further studies. The EIAR will assess the worst-case scenario and, where required will present a range of possible design options. It is possible that up to five OSPs may be needed. Should the project be constructed in phases, one or more OSPs may be needed per phase. This is dependent on the nature and methodology of the connection to the onshore transmission system. Indicative parameters for the OSP include topside infrastructure of dimensions of 100 m by 100 m, and 70 m above Highest Astronomical Tide (HAT).

4.5.4 Landfall

Cable landfall is where Offshore Export Cables are brought onshore. The exact landfall location(s) is not currently known however, as shown on Figure 4.1 there are currently 4 locations under consideration. These locations range from Wicklow in the south to Poolbeg in the north. Subject to further feasibility work and grid connection agreements, it maybe that landfall of subsea export cable occurs at one or multiple locations.

Until further feasibility studies and optioneering is undertaken to determine potential landfall locations, it is not possible to determine likely landfall construction methods at this stage. However, these methods are likely to include options of Horizontal Directional Drilling (HDD) or Open Cut Trenching (OCT).

4.5.5 Seabed Preparation

It should be noted that while the preceding information relates to the specifics of offshore electrical infrastructure design, there may be an element of seabed preparation required. Details of this will be included in the final EIAR.

4.6 Construction

4.6.1 Anticipated Programme

Flexibility for timings and the potential need for phasing of construction is required for the project. Due to grid capacity constraints in the Irish system, CWPL require the option to build out in multiple phases and each phase may require its own transmission infrastructure i.e. subsea export cables, and OSPs. It may also be necessary to link these offshore transmission infrastructures by linking the substations with additional cabling offshore. Further feasibility work is required to further refine possible construction options during pre-application but the final EIAR will adequality assess the range of construction options required for the flexibility to construct the CWP project.

CWPL intend to progress the CWP project to commercial operation at the earliest opportunity. Whilst it is not currently possibly to provide a definitive programme for the progression of the project, the currently anticipated programme is shown below:

- Scoping Feedback: 12/2020;
- Planning Interest (MPDM): 04/2021;
- Submit planning application: 11/2021;
- Planning/development consent received 06/2022;
- MAC received Q4 2023 (predecessors of planning/development consent and RESS CFD award required);
- Commencement of Construction Stage: 2024; and
- Construction Stage: 2-3 years depending on phasing and scale of each phase.

4.7 Operation & Maintenance and Decommissioning

It is currently proposed to apply for consent for an operational period of at least 35 years following completion of construction and commissioning of infrastructure.

During the operational lifetime of the project a number of operational and maintenance activities will be required. These will broadly include:

- Cable burial surveys and inspection of foundations etc.;
- Replacement of lubricants and oils, painting of turbines, etc;
- Replacement of WTG parts including gearboxes, generators, nacelles, transformers and blades;
- Reburial of export and array cables;
- Repair or replacement of export and array cables;
- 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; and
- Use of additional cable and scour protection measures.
- Structural surveys (NDT checks on welds etc)

At the end of the operational lifetime the wind farm is likely to be decommissioned or the project will be repowered. At this stage, the detail on what decommissioning work will be required is not currently known, nor is it likely to be until much closer to the time of decommissioning. However, the decommissioning activities will be determined by the relevant legislation and guidance available at the time.

It is currently anticipated that decommissioning would involve the removal of all structures above the seabed, while options for decommissioning of cables, at this point, include leaving them in situ, removal of the entire cables, or removal of sections of the marine cables Prior to decommissioning, options will be evaluated, and the final decommissioning plan will be determined, and necessary consents agreed with relevant stakeholders and the relevant authority.

5 EIA METHODOLOGY

5.1 Introduction

This chapter presents an outline of the methodology to be employed for the CWP EIA. It outlines the methodology for the identification and evaluation of potential likely significant environmental effects and, also presents the methodology for the identification and evaluation of potential cumulative and inter-related impacts.

5.2 Regulations and Guidance

The impact assessment methodology draws upon a number of EIA principles, regulations and guidance documents, including:

- Draft Guidelines on the Information to be contained in Environmental Impact Statements" (EPA, September 2015)**;**
- Draft Advice Notes on Preparing Environmental Impact Statements" (EPA, September 2015);
- DHPLG Marine Planning Policy Statement (November 2019);
- DCCAE (2014). Offshore Renewable Energy Development Plan - A Framework for the Sustainable Development of Ireland's Offshore Renewable Energy Resource;
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, August 2017);
- The EIA Directives and other relevant legislation defined in Section 3.2;
- Assessment of the environmental impact of offshore wind farms (OSPAR Commission 2008);
- Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (DCCAE, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018);
- Relevant guidance issued by other government and non-governmental organisations;
- DCCAE (2018b) Guidance on Marine Baseline Assessments and Monitoring Activities for Offshore Renewable Energy Projects Part 1 and 2. Department of Communications, Climate Action and Environment;
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment, (European Commission, 2013); and
- Receptor specific guidance documents (e.g. Ecological Impact Assessment (EcIA) guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM)).

5.3 Application of the Design Parameters Approach

The EIA for the CWP will utilise the Design Parameters approach. This approach, as described in the Description of the Development (Chapter 4), allows for a project to be assessed based on project Design Parameters that are not specific at the time of writing, but are indicated with a range of potential values.

It is not always possible to provide precise final details of the development, or the way it will be built, so far in advance of construction. Within the offshore wind industry, improvements in technology and construction methodologies occur frequently and information provided as part of the consent application may become rapidly outdated, resulting in an uneconomical and potential unbuildable project.

Under the Design Parameters approach, the worst-case scenario from within the range of potential options for each development parameter will be identified, the impact assessments will be undertaken on this basis. This approach is consistent with ORE developments which have been consented as part of The Crown Estates Round 3 and Scottish Territorial Water developments in the United Kingdom where the assessment is based on the information to be provided under Schedule 4 of the EIA Regulations 2018.

Chapter 4 of this Scoping Report sets out the Design Parameters and identifies, where known at this time, the range of potential project design values for all relevant components of the CWP that are known at this time. Each of the impacts for the EIA will be assessed against the Design Parameters which would give rise to the greatest potential effects. For example, if several WTGs and foundation types remain possible, then the assessment will be based on the type known to have the greatest impact on relevant receptors. This may be the foundation type with the largest footprint e.g. Subtidal and Intertidal ecology, or the WTG with the greatest tip height e.g. visual impacts, depending upon the topic under consideration. If, after undertaking the impact assessment it is shown that no significant effect is anticipated, it can be assumed that any project parameters equal to or less than those assessed in these Design Parameters will have environmental effects of the same level or less and will therefore also have no significant effect upon the receptors for the topic under consideration.

By employing the Design Parameters approach, CWPL seek to retain a reasonable level of flexibility in design with certain maximum extents and ranges, all of which will be fully assessed as part of the CWP EIA and AA. It is likely that the Design Parameters will be refined during the EIA process as further technical, environmental and design information becomes available, and following consultation with stakeholders.

5.4 Characterisation of the Existing Environment

A characterisation of the existing environment will be undertaken in order to determine the baseline conditions. This will involve the following steps:

- Study areas defined for each receptor based on the relevant characteristics of the receptors (mobility/range);
- Review available information;
- Review likely or potential impacts that might be expected to arise from the development;
- Determine if there is sufficient data to make the EIA judgments with sufficient confidence;
- If further data is required, ensure data gathered is targeted and directed at answering the key questions and filling key data gaps; and
- Review information gathered to ensure the environment can be characterised in sufficient detail.

5.5 Assessment of Potential Effects

The approach taken to make balanced assessments will be guided by both EIA and technical specialists using available data, new data, experience and expert judgment. In order to provide a consistent framework and system of common tools and terms, where appropriate, a matrix approach will be used to frame and present the judgments made. However, it should be noted that for each topic of the EIA the latest guidance or best practice will be used and therefore definitions of sensitivity and magnitude of impact will be tailored to each receptor. The impact assessment will consider the potential impacts during the construction, operation and decommissioning of the CWP.

The impact assessment methodology will follow that recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM) for marine and coastal developments (CIEEM, 2019). These guidelines set out the process for assessment through the following stages:

- Describing the baseline within the ZoI;

- Identifying potential receptors within the ZoI;
- Identifying activities associated with the project that may result in effects on these receptors during installation, operation, maintenance and decommissioning;
- Describing these activities in terms of whether the effect is likely to be positive or negative, along with its magnitude, extent, duration, reversibility, timing and frequency;
- Characterising the effect, including the likelihood of its occurrence;
- Assessing whether the likely (pre-mitigation [2]) effects are ecologically significant and the geographical scale at which they are predicted to occur, including an indication of certainty in the predictions made;
- Providing details of proposed mitigation (if applicable);
- Assessing whether the residual (with mitigation) effects are ecologically significant and the geographical scale at which they are predicted to occur, including an indication of certainty in the predictions made; and
- Assessing cumulative effects (with mitigation where applicable).

5.5.1 Identification of Potential Effects

This Scoping Report sets out the potential environmental impacts and identifies, utilising existing knowledge of the site, those which are proposed to be scoped in or scoped out of the EIA process. The final list of issues to be considered in the EIA process will be confirmed following receipt of feedback on this Scoping Report from the relevant stakeholders, and through further discussions with relevant stakeholders.

5.5.2 Defining Magnitude and Sensitivity

The EIA for those potential effects scoped in will describe the level of significance of the adverse and positive effects arising from the CWP using a standard EIA methodology. The assessment process will consider the potential magnitude of the change to the baseline conditions arising from the development and the sensitivity of the particular receptor under consideration[3].

Categorisation of magnitude of impact will vary for specific receptors/technical assessments but will broadly follow the principles set out in Table 5.1 below, in so far as is relevant.

Table 5.1: Magnitude of impact

Magnitude	Description
High	Total loss or major alteration to key elements/features of the baseline conditions
Moderate	Partial Loss or alteration to one or more key elements/features of the baseline conditions
Low	Minor shift away from the baseline conditions

In the case of assessing sensitivity, the specific scale of sensitivity is dependent on the discipline but in general it may be defined in terms of quality, value, rarity or importance of the receptor being assessed. The ability of a receptor to adapt to change, tolerate, and/or recover from potential impacts will be key in assessing its sensitivity to the impact under consideration.

The scale of sensitivity will be classed as 'Low', 'Moderate' or 'High'. In carrying out individual assessments, a more specific scale of increasing sensitivity will be defined where this is

[2] not including embedded mitigation which is considered to be part of Project design.

[3] For certain topics an alternative approach to assessment may be applied where this is consistent with relevant guidance or best practise. Where this is the case the approach will be described in the EIAR for that technical chapter.

appropriate. Guidance will also be taken from the value attributed to elements through designation or protection under law.

Expert judgement is particularly important when determining the sensitivity of receptors. For instance, an Annex II species (under the Habitats Directive) would have a high value, but if it was highly tolerant of an impact or had a high recoverability it would follow that the sensitivity in this instance should reflect the ecology rather than default to protected status taking precedence.

5.5.3 Evaluation of Significance

The consideration of magnitude of potential impact and sensitivity of the receptor will determine an expression, which may be quantitative or qualitative and often informed by expert judgement, for the significance of the residual positive and negative effects. Table 5.2 sets out how the interaction between magnitude (which is related to the extent of the physical change, its spatial extent, duration and frequency) and the value of the resource or the number and sensitivity of the receptor are combined to provide a judgment of significance.

Table 5.2: Significance of effect

Sensitivity of Resource / Receptor / Magnitude of Impact	Low	Moderate	High
Negligible	Negligible/Minor	Minor	Minor/Moderate
Low	Minor	Minor/Moderate	Moderate
Moderate	Minor/Moderate	Moderate	Moderate/Major
High	Moderate	Moderate/Major	Major

For the purposes of this assessment those residual positive and adverse effects indicated as Major and Moderate/Major are considered significant.

A description of the approach to impact assessment and the interpretation of significance levels will be provided within each chapter of the EIAR. This approach will ensure that the definition of impacts is transparent and relevant to each topic under consideration.

5.5.4 Mitigation

Where the impact assessment identifies that an aspect of the development is likely to give rise to significant environmental effects, mitigation measures, above and beyond any embedded mitigation incorporated into the assessment process, will be considered to avoid effects or reduce them to acceptable levels where possible.

Two types of mitigations have been defined and these will be identified within the EIAR:

- Embedded mitigation: measures that are identified and adopted as part of the evolution of the project design or measures otherwise incorporated as controls on the construction or operation of the project, will be included as considerations in assessing significance during the EIA process: and
- Additional mitigation: measures that are identified as a result of the EIA process to reduce or eliminate any effects that are predicted to be significant, which are subsequently adopted as project commitments.

5.5.5 Assessing Residual Effects

Following the identification of any necessary additional mitigation measures, impacts will be re-assessed, and any residual significance will be described. Where significant impacts remain, and no mitigation measure is proposed, a discussion will explain why the significance cannot be reduced. Monitoring measures will be proposed as part to of the EIAR where there is uncertainty regarding the significance of, or the predicted levels of residual effects.

5.6 Cumulative Impact Assessment

As part of the CWP EIA, consideration of the effects of CWP with other relevant projects is also required under EIA law. Therefore, each technical chapter of the EIA will include a cumulative assessment which will consider the impacts arising from the CWP alone and cumulatively with other relevant plans, projects and activities.

The current EIA Regulations (European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018) (EIA Regulations 2018) and DCCAE (2017) guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as consequence other existing or consented projects to be considered. The EIA Regulations 2018 and 2017 DCCAE guidance states that only projects that are existing or have already received consent need to be considered in the CIA.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the CIA, at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' are also under consideration where they may result in cumulative effects as they are likely to have similar construction programmes to CWP. This is due to uncertainty development timelines for other projects. A list of plans, projects and activities that may act cumulatively with the CWP has been developed for the purposes of this scoping exercise. This list will be re-affirmed during consultation with regulators and key consultees during the EIA process.

The list of plans, projects and activities identified in this Scoping Report as potentially resulting in cumulative effects has been updated from that presented in the previous CWP EIS and is set out below. Each topic chapter within this Scoping Report specifies (where possible) which plans, projects and activities are relevant with regards to potential cumulative effects.

- Dublin Array (3 km north);
- Arklow Bank Phase 1 (18 km south);
- Arklow Bank Phase 2 (22 .5km south);
- North Irish Sea Array (25 km north);
- Oriel Wind Farm OWF (61 km north);
- Gwynt y Môr Extension OWF (121 km east);
- Rhyl Flats OWF (138 km east);
- Gwynt y Môr OWF (140 km east);
- North Hoyle (153 km east);
- Burbo Bank Extension OWF (161 km east);
- Walney Phase 3 and 4 OWF (163 km east);
- Burbo Bank OWF (171 km east);
- Walney Phase 1 and 2 OWF (173 km east);
- West of Duddon Sands OWF (174 km east);
- Ormonde OWF (184 km east);

- Barrow OWF (186km east); and
- Robin Rigg OWF (222 km north east).

Note that, in relation to other proposed or consented OWF projects, the most up to date publicly available information will be applied when completing the CIA (e.g. turbine numbers, turbine tip heights etc.). However, developers will also be contacted to enquire as to whether any more recent information on project parameters is available and can be used in this CIA.

There is also likely to be a number of coastal projects such as harbour maintenance dredging and development works overlapping with the Export Cable Corridor Search Area at the time of CWP construction however, exact details of these programmes are unknown at this stage. The list of projects that will be considered in the EIAR will be refined during the EIA process and relevant authorities will be consulted to ensure this list is comprehensive and contains the most up to date programme and methodology information.

5.7 Inter-related Effects

The EIA will consider the inter-relationships between the aspects of the environment that are likely to be affected by the construction, operation and decommissioning of the CWP. To serve as an example, the separate impacts of noise and habitat loss may, in combination impact upon a single receptor, such as marine mammals. Such consideration of inter-related effects will also be undertaken as part of the cumulative impacts.

5.8 Scoping Questions

- Is the Design Parameters approach described in Section 5.3 above satisfactory for informing the EIA and for inclusion in the EIAR?

6 CARBON BALANCE ASSESSMENT

The application for CWP will contain a carbon balance assessment. The carbon balance assessment will be informed by the guidance produced by the Institute of Environmental Management and Assessment (IEMA), (2017b), EIA guide to Assessing GHG emissions and evaluating their significance.

The carbon balance assessment will be produced to give an indication of CWPs impact on carbon dioxide (CO_2) emissions against the total potential carbon savings attributed to the project. The assessment will aim to quantify the gains over the life of the project against the release of CO_2 as a result implementing the project.

This Scoping Report is for the marine elements of CWP; however, it is currently anticipated that the assessment will need to consider the whole of the project i.e. terrestrial and marine elements. Once further detail is known about the terrestrial elements of the project the approach to the assessment will be considered further. In any case, the scope of the assessment and will be produced in consultation with regulators and relevant consultees.

6.1 Scoping Questions

- Are there any more relevant guidance documents that should be used to inform the assessment?

7 MARINE GEOLOGY, SEDIMENTS AND COASTAL PROCESSES

7.1 Introduction

The following chapter sets out the scope of assessment in relation to the Physical Environment for the CWP EIA. This chapter includes:

- A review of existing data collected to date and those field survey data anticipated / planned for collection during the preparation for the EIA;
- Consideration of the validity of this data for the EIA;
- A consideration of the project Design Parameters relevant to the Physical Environment; and
- The scope of the EIA (including cumulative considerations).

The physical environment, for the purposes of this assessment, is referred to as the shallow geology (unconsolidated and hard rock), hydrodynamic and wave regime, seabed sediments, sediment transport, and geomorphology (bathymetry and shoreline processes).

7.2 Existing Environment

7.2.1 Geology, Geomorphology and Surficial Sedimentology

The Irish Sea basin is thought to contain strata from several geological systems, ranging from Precambrian schists and gneisses to Cretaceous chalk and Palaeogene basalts. These formations exist, or sub-crop, beneath a locally thick cover of Quaternary (< 2.6 million years old) sediments. The properties of Quaternary sediment are highly variable laterally, and with depth, due to repeated fluctuations of ice sheet margins during the last glacial period.

Across the Irish Sea the most common sediment type is sandy gravel. Pantin and Evans, (1984) hypothesised that these sediments form a gravelly lag deposit which blankets the entire area except in places of exposed (underlying) relic Quaternary sediment or bare rock. Areas of gravel are found to the north of Anglesey, offshore of St. David's Head, and to the north and west of Arklow Bank. These coarse deposits exist due to continuous reworking of the seabed sediments by tidal flows which acts to winnow away finer sediments. Overlying these gravel areas, particularly on the shallower platforms, irregular patches of nominally mobile gravelly sands, sandy gravels and sands are present. These are commonly < 0.3 m in thickness except in areas where they have coalesced into more extensive deposits and formed into bedforms.

The proposed site for the CWP Array is located on the western side of Codling Bank which forms part of a series of subtidal banks located approximately 13 km offshore on the east coast of the Republic of Ireland, in the Irish Sea. Codling Bank is part of a series of punctuated banks which sit immediately to the North and South of the proposed development and includes; Bennet Bank; Kish Bank; Bray Bank; and India Bank. Water depths generally range from 9 – 33 m (relative to Chart Datum) across the site, but on occasion shallow to within a few metres of the surface at low water. To the west of the bank features, toward the Irish coast, are the two notable seabed depressions of the Codling deep and Wicklow Trough. In these areas the water is as deep as 115 m in places. The morphology of the seabed largely the result of bathymetry sculpted by processes during the glacial and interglacial cycles of the Quaternary

Water depths in the proposed CWP Development Area range from 10 m to 18 m relative to Chart Datum with slightly shallower depths (in the range 6 m to 9 m) observed along the western edge where the Development Area fringes the eastern edge of Codling Bank. Water depths along the possible Export Cable Corridor Search Area range from 0m at the coastline (where the cable would come ashore) to in excess of 70 m deep where the area crosses the Wicklow Trough and Codling Deep.

A geophysical survey of the seabed in the proposed Development Area indicates that a generally flat seabed exists with sub-aqueous bedform features (e.g. ripples, megaripples and sandwaves) variously superimposed upon it. Seabed sediment data collected from across the proposed development site by Glover Site Investigations Ltd (2002) and around the edges of

the proposed Development Area by INFOMAR indicate that surficial sediments comprise sandy gravels and gravelly sands. This surficial layer varies from 0.2 m to 1.75 m in thickness and generally overlies fine to medium sands. The recent surveys by INFOMAR also indicate that the seabed sediments in the Export Cable Corridor(s) are predominantly sandy gravels and gravelly sands

7.2.2 Hydrodynamic Regime

Tidal Currents

The oceanic tidal wave propagates into the Irish Sea basin from the Atlantic Ocean through both the North Channel and the St. George's Channel. The tidal regime is characterised by a standing wave, which is a function of the proximity of the degraded amphidromic point (located at Courtown to the south of Arklow) and the interaction of the tidal waves propagating into the Irish Sea from the north and the south. The tidal cycle is semi-diurnal in the Irish Sea. Due to the complexity of the tidal regime the tidal range exhibits significant variations (e.g. during the spring – neap phase through to the nodal cycle [18.6 years]). Across the Irish Sea tidal elevation varies from <1 m up to 9 m.

Flow velocities vary significantly within the Irish Sea, though typically depth-averaged flows exceed 1 m s^{-1} during the spring tidal phase throughout the St. George's Channel, north-west of Anglesey, north of the Isle of Man and in the North Channel (Howarth, 2005). The seaboard of east/southeast Ireland is rather unusual in that it is an area of comparatively fast flows but with a small tidal range. The tidal regime in the vicinity of CWP is complex due to the degraded amphidromic point and the interaction of the two tidal waves, propagating from the North Channel and St Georges' Channel. This leads to a tidal range which progressively increases in a northward direction, varying from a micro-tidal in the south to a meso-tidal range to the north of the region. Fairly uniform tidal flows are observed across the site which are rectilinear in form with a principal tidal axis oriented broadly North to South, which strongly reflects the alignment of the shoreline. Tidal flow velocities range from 0.5 ms^{-1} to > 1.5 ms^{-1}, which is a function of the bathymetry and seabed topography of the region and the broader tidal regime, with greater flow magnitudes observed on the Spring tidal phase.

Waves

The present-day wave regime in the Irish Sea is judged to have operated under similar climatic conditions over the last 4,000 to 6,000 years with relatively little changes in sea level during that time (Tooley, 1985). The magnitude of locally generated wind and swell waves depends on the duration and fetch of the wind. Since the Irish Sea is sheltered with only two relatively narrow 'fetch windows', along the axes of the St. George's and North Channel, generally waves are locally wind-generated, and of fairly short period (< 8 seconds). Wave height is a factor naturally, but waves with periods up to 8 s possess only a moderate capacity to influence sediment transport, which is typically limited to water depths less than 30 m. Bigger, swell waves (> 8 s), which are more powerful drivers of sediment transport at the seabed, are generally observed near the entrances to the Irish Sea, at the southern end of the St. George's Channel (although these longer period waves can propagate as far up the southern Irish Sea basin as the Lleyn Peninsula in North Wales) and the northern end of the North Channel (Howarth, 2005). The southern Irish Sea (the area from St George Channel to the Isle of Man including Codling Bank) is in an area exposed to westerly gales and frequent winter storms, with a fetch of over 100 km. The most commonly occurring wave period in the Atlantic is circa 10 s in the winter (Hardisty, 1990), increasing to about 15 s during severe storms, but since energy is lost due to bed friction as waves propagate up the southern Irish Sea, this equates to peak values for wave period of no more than 9 – 11 s. In addition, wave energy propagation into the Irish Sea from Atlantic Storms is also further curtailed by headlands, such as Carnsnore Point which acts to shelter the western side of the Irish Sea from Atlantic Storms and swell.

Waves over the CWP area dominantly approach the site from the south with mean significant wave heights of > 1 m. Extreme heights of between 4 m and 8 m may occur during the largest winter storms.

7.3 Data Sources and Baseline Methodology

7.3.1 Baseline

In assessing the baseline scenario to date, a wide variety of sources have been consulted; including site specific geophysical, geotechnical, metocean measurement data, and seabed sediment grab samples (Table 7.1), supported through the inclusion of regional and site-specific information/data available from public sources and scientific literature.

Table 7.1: Sediment and coastal processes specific survey data that are available to date, undertaken during the characterisation surveys at the Codling Wind Park (CWP)

Site	Survey Method	dates
Metocean Data		
Codling Wind Park	On site Wave Data from a Valeport 730D wave meter	14 November 2001 to 13 January 2002
Codling Wind Park	Direct current measurement at three locations on the site	28 August 2001 to 4 November 2001
Morphology and Geology		
Infomar	Bathymetry and Seabed sediments distribution mapping	2019
Codling Wind Park	Bathymetry sounding data from across the site	2001
Codling Wind Park	Borehole investigations in 13 locations from a back-up barge	2002
Codling Wind Park	Geophysical surveys (sub-bottom profiling) on both the Codling development area and along the proposed cable route (at the time) to shore.	2002
Codling Wind Park	26 seabed sediment samples	2002
Codling Wind Park Extension	40 x 0.1 m^2 Hamon grab seabed sediment samples	2008
Codling Wind Park	Integrated geophysical survey, including side-scan sonar, magnetometer, multi-beam echo-sounder bathymetry and sub-bottom profiling throughout the entire area	2014

7.3.2 Numerical Modelling

In addition to the analyses of site-specific survey datasets, other information sources will be considered including previous assessments and publicly available information/data, and numerical modelling that has been performed. It is anticipated that a project specific coupled hydrodynamic / wave / sediment transport model will be developed during the EIA. The model will be utilised to provide an appreciation of the wider distribution and geospatial variation of tidal flows, waves and water levels to support the development of baseline understanding. The model may also be used to support inferences regarding the sediment transport regime, and where required, simulate directly sediment transport processes to inform the assessment of

potential impacts. Metocean, and other relevant measured data collected during field surveys (or from public sources) outlined in Section 7.3.1 will be utilised to validate and calibrate the model against CWP site specific measurement data in line with industry good practice (COWRIE, 2009; Pye *et al*., 2017).

7.3.3 Future Baseline Assessment

CWPL are committed to undertaking a variety of environmental surveys for the purposes of site characterisation and a survey strategy has been proposed. This strategy is currently under discussion with DHPLG. Any additional survey work undertaken, that is relevant to the physical environment impact assessment, will be a valuable aid to further ensure a robust characterisation of the physical environment across the CWP Development Area (including the proposed Offshore Export Cable Corridor).

Characterisation of the physical environment is best achieved through interrogation of a combination of site specific metocean measurement and modelled data, and vessel based geophysical and geotechnical survey/mapping of the seabed and sub-surface geology. Analysis of the data acquired to date, alongside new (relevant) data that are to be acquired, will provide an excellent data record from which to inform a conceptual understanding of the CWP Development Area that is being developed to characterise the baseline physical environment i.e. how physical processes function within the Offshore and Export Cable Corridor Search Area, and thus enable accurate assessment of potential effects/impacts of the proposed development.

New field survey data may be acquired (subject to discussion and agreement with DHPLG; surveys commencing in 2021). The acquisition of these data are detailed in a Foreshore Investigation Licence Application (FS007045) that has been submitted to DHPLG and covers the CWP Development Area and Export Cable Corridor Search Area.

The surveys that may be undertaken are:

- Geotechnical surveys
  - Boreholes
  - Vibrocores
  - Cone Penetration Tests
- Geophysical surveys
- Metocean surveys
  - Floating LiDAR
  - Waverider buoys
  - Acoustic Doppler Current Profilers (ACDP)
- Benthic Sampling

The above surveys will inform the characterisation of the physical and metocean environment across the CWP Project area and aid in the final design of the CWP Project.

Survey data will be acquired following guidance on marine, coastal and estuarine physical processes Environmental Impact Assessment (EIA) baseline survey for major developments (DCCAE, 2018a & 2018b; and Brooks *et al*., 2018).

7.4 Guidance

The basic proposed outline methodology for undertaking the assessment of impacts of the proposed development from the proposed development considers the following relevant guidance / regulations including:

- Irish Coastal Protection Strategy Study', OPW, 2013;
- 'Assessment of Impact of Offshore Wind Energy Structures on the Marine Environment', Marine Institute, 2000
- Guidance on Best Practice for Marine and Coastal Physical Processes Baseline Survey and Monitoring Requirements to inform EIA of Major Development Projects. (Brooks *et al*., 2018).
- International Cable Protection Committee Ltd ("ICPC") Recommendations, https://www.iscpc.org/publications/recommendations/
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management – 'CIEEM', 2019);
- Review of Cabling Techniques and Environmental Effects Applicable to the Offshore Wind Farm Industry – Technical Report (Department for Business, Enterprise and Regulatory Reform – 'BERR', 2008);
- Guidelines for data acquisition to support marine environmental assessment of offshore renewable energy projects (Centre for Environment, Fisheries and Aquaculture Science – 'Cefas', 2011);
- Coastal Process Modelling for Offshore Wind Farm Environmental Impact Assessment: Best Practice Guide (COWRIE, 2009);
- Offshore Wind Farms: Guidance Note for EIA in Respect to Food and Environmental Protection Act (FEPA) and Coastal Protection Act (CPA) Requirements (Cefas, 2004);
- Assessment of the environmental impacts of cables (The Convention for the Protection of the Marine Environment of the North-East Atlantic – (OSPAR', 2009).

7.5 Design Parameters

It is proposed to construct a maximum of 140 WTGs and up to five OSPs. The current foundation options under consideration for these structures are monopile either piled or with a suction caisson, jacket substructure with pile foundations or jackets with suction caissons. With regard to the physical environment, the structures with the greatest footprint are generally considered to have the potential to result in the greatest impact due to the area of seabed affected and a potential increased requirement for seabed preparation activities compared with other installation methods. Whilst this "greatest footprint" will be determined during the EIA, the current Design Parameters that are considered to be the worst-case scenario for each aspect of design is presented in Table 7.2. In addition, the installation of array and Offshore Export Cables (and any additional cable and scour protection) has the potential to affect the physical environment and will therefore also be considered within the assessment.

Table 7.2. Worst-case scenarios relative to marine geology, sediments and coastal processes

Design Parameters	Worst case
Number of WTGs	140
Indicative separation distances between WTGs	4.5 x 4.5 rotor diameter
Number of OSPs	5
Foundation type	Suction Caisson with jacket foundation*
Export Cabling	6 plus maximum allowance of additional rock protection

Design Parameters	Worst case
* Worst case considered to result from suction caisson with jacket foundations due to the large footprint covered. Further consideration of the worst-case scenario will be undertaken during pre-application and agreed with consultees.	

7.6 Embedded Mitigation

Any embedded mitigation in the form of iterative design will be identified as the Design Parameters is developed, and assessment progressed.

7.7 Scoping of CWP EIA

7.7.1 Potential Impacts

The potential impacts/effects of the proposed development during the construction, operational and decommissioning phases include:

- During installation
    - Temporary and localised disturbance of the seabed; and
    - temporary increases in suspended sediment concentrations (SSC), and associated redistribution and deposition of mobilised sediments.
- During operation
    - permanent loss of seabed under the footprint of foundations and other seabed infrastructure e.g. cable protection;
    - localised alteration of hydrodynamic and wave conditions across the site as a result of the presence of installed structures (e.g. GBFs, scour and cable protection etc) and seabed alterations (e.g. dredging, cable trenching and pre-sweeping). Far field effects on the wave and tidal regime are considered unlikely but will be examined during the above outlined modelling; and,
    - scour around installed structures and associated sediment transportation and deposition leading to changes in seabed and/or coastal morphology.
- During decommissioning
    - Temporary increases in SSC during removal of foundations and/or cables and associated deposition.

These items will be taken forward for further consideration as part of the EIA. Generally, with developments of this type the effects are expected to be limited to an area proximal to the proposed development and would arise primarily during the construction phase, and where maintenance operations are required during the operational phase (e.g. Installation of additional scour protection measures). Potential secondary effects on other environmental disciplines (e.g. on seabed features and designated sites) will be integrated as appropriate to receptor specific assessments.

The Construction of the CWP array and associated infrastructure is not anticipated to materially change the geology underlying the seabed of this area of the Irish Sea. It is therefore proposed that this aspect is scoped out of the environmental impact assessment process at this stage.

7.8 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other Relevant Projects are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Currently, there are several large-scale construction projects with Relevant Project status within the Irish Sea. Given their proximity to CWP and similarity of activities, there is a possibility that combined activities from these projects can alter the extent or magnitude of their effect on the environment, and therefore may need to be considered together as part of a cumulative assessment.

The projects that will be considered in the cumulative assessment are:

- Arklow Phase 2, Co. Wicklow (consented); and
- Dublin Array, Co. Dublin (Relevant Project).

The following projects are also located in the Irish Sea, however due to the distance from CWP, low likelihood of construction phase overlap, and no likelihood of operational impact, these projects are scoped out of the cumulative assessment:

- Oriel Wind Farm, Co. Louth (Relevant Project);
- North Irish Sea Array, Co. Louth/Dublin (Relevant Project);
- Arklow Phase 1, Co. Wicklow (Operational)

There is also likely to be a number of coastal projects such as harbour maintenance dredging and development works overlapping with the Export Cable Corridor Search Area at the time of CWP construction however, exact details of these programmes are unknown at this stage. The list of projects that will be considered in the EIAR will be refined during the EIA process and relevant authorities will be consulted to ensure this list is comprehensive and contains the most up to date programme and methodology information.

7.9 Approach to EIA

The assessment will encompass the following:

- An assessment and characterisation of the baseline conditions at the proposed development;
- Identification of the potential effects of the proposed development on the physical environment (with embedded mitigation) during the construction, operation and decommissioning phases;
- Identification of additional mitigation (if/where necessary); and;
- subsequent description of the residual effects, their magnitude and significance.

The proposed assessment methodology follows the guidance detailed by Cefas (2004) which states that it is necessary to assess the magnitude, and significance of change, caused directly to the following:

- Sediments (e.g. composition, particle size) ;
- Hydrodynamics (e.g. waves, tidal flows);
- Sedimentary environment (e.g. sediment re-suspension, transport pathways, patterns and rates and sediment deposition);
- Sedimentary structures (e.g. channels, banks, large scale bedforms); and,

- SSC.

Consideration of the above issues will be made with respect to the near-field and far-field (these spatial scales are still to be defined).

Subject to consultation and agreement with the statutory regulator and their advisors, it is proposed that the investigation and assessment of the nature and scale of potential impacts on the physical environment that arise as a result of the proposed development, will be supported, where considered necessary, by numerical modelling of hydrodynamics, waves and sediment transport processes.

At this preliminary stage, it is often impractical to provide full details of installation activities and the full specification of equipment as such detail is dependent on procurement of engineering options. Thus, the assessment of potential impacts on the physical environment will be based on a realistic worst-case scenario which will be updated as the Design Parameters evolve.

7.10 Scoping Questions

- Are you content with the scope of data for the baseline generation?
- Subject to consideration of baseline information and previous work undertaken at CWP, are you content with a computer/numerical modelling approach to support the assessment of baseline metocean conditions, and then the subsequent assessment of impacts on those conditions and the wider physical environment supported by modelling?
- Are there any other key data sources you are aware of that you wish to see included and considered?
- Are you content with the scope of the assessment?
- Are there any additional impacts that you believe could be significant and that you wish to see assessed?
- Are there any additional projects you would wish to see included in the CIA for this topic?

8 MARINE WATER QUALITY

8.1 Introduction

The following chapter sets out the scope of assessment in relation to Offshore Water Quality for the CWP EIA. This chapter includes:

- A review of existing data collected for the project to date;
- Consideration of the validity of this data for the EIA;
- New data sources that shall be consulted;
- Any required site or survey work;
- A consideration of the Design Parameters relevant to water quality; and
- The scope of the EIA (including cumulative considerations).

8.2 Existing Environment

CWP is located on the Codling Bank which forms part of a series of banks in the Irish Sea which run parallel to the coast approximately 10 km offshore, standing in 9 - 33 m of water and rise to within metres of the water's surface. The banks reflect the principal tidal currents in the region and the strong currents and sediment movements have resulted in a series of punctuated banks from north to south: Dundalk Bank; Bray Bank; Kish Bank; Codling & Greater Codling Banks; Arklow Bank; Rusk Bank; Glasgorman Bank; Blackwater & Lucifer Bank and Long Bank.

Full characterisation of Irish waters to one nautical mile (nm) has been undertaken as required by the Water Framework Directive (WFD) (2000/60/EC) and the Marine Strategy Framework Directive (MSFD) (2008/56/EC). With respect to CWP, 1 nm extends into the Export Cable Corridor Search Area which stretches from Wicklow in the south to Poolbeg in the north. This stretch of coastline covers multiple coastal and transitional waters (EPA, 2019) each with a different ecological status. The Water Quality in Ireland 2013 – 2018 report (EPA, 2019a) indicates that the Wicklow coast currently has high ecological status, the outer section of Dublin Bay has good ecological status and the inner section of Dublin Bay has moderate ecological status.

The WFD also extends to waters within certain protected areas such as Natura 2000 sites, designated shellfish areas, nutrient sensitive areas and bathing waters. In the vicinity of the CWP Export Cable Corridor Search Area there are a number of notable protected areas that are in waters protected by the WFD. There are ten bathing water areas on the stretch of coastline covered by the Export Cable Corridor Search Area with Bathing Water Quality Levels ranging from Good / Excellent in the south at Greystones South and Silver Strand to Sufficient / Poor in the north at Sandymount Strand and Merrion Strand (EPA, 2019b). There are a number of Special Protection Areas (SPAs) in the vicinity of the potential landfall locations including South Dublin Bay and River Tolka Estuary, Dalkey Island, The Murrough and Wicklow Head. Similarly, there are a number of Special Areas of Conservation (SACs) including Wicklow Reef, The Murrough Wetlands, Bray Head, South Dublin Bay and Rockabill to Dalkey Island. Designated Shellfish areas are also covered by the WFD and the closest designated to the CWP project is Malahide at approx. 9.5 km north of the Export Cable Corridor Search Area. The Poolbeg Landfall option is situated within close proximity to the Liffey Estuary which is currently designated as a Nutrient Sensitive Area.

8.3 Data Sources and Baseline Methodology

8.3.1 Baseline Data Sources

The following data sources in Table 8.1 will be used to develop the baseline for water quality for the CWP Project.

Table 8.1: Water quality baseline data sources and data availability

Source	Data
EPA	WFD water quality data, 2010 to 2015
EPA	Water quality reports 2008 to 2018
EPA	Bathing water quality 2019
Marine Institute	Initial characterisation of the marine environment for MSFD, 2012
Marine Institute	Contaminated sediments monitoring for WFD
Marine Institute	Ireland's Marine Atlas
National Parks and Wildlife Services (NPWS)	Natura 2000 conservation objectives
Marine Institute and Bord Iascaigh Mhara (BIM)	Status of shellfish areas and other species of economic importance

8.3.2 Future Baseline Assessment

CWPL are committed to undertaking a variety of environmental surveys for the purposes of site characterisation and a survey strategy has been proposed. This strategy is currently under discussion with DHPLG.

No water quality surveys have been undertaken for the project to date and given the breadth of data that is currently available; it is considered that sufficient information exists to inform the assessment without survey work being required. Should a contaminated sediment survey be required to inform the impact assessment for environmental receptors e.g. benthic habitats and species, the results from this survey will also be used to inform the assessment for potential impacts to water quality.

Sediment plume modelling will also be undertaken (see Chapter 7 – Marine Geology, Sediments and Coastal Process) these outputs will be used to help determine the potential zone of influence (ZoI) based on the worst-case scenario (Section 8.5 below).

8.4 Guidance

In addition to the general guidance and legislation presented in Sections 5.2 and 3.2 respectively, the EIAR will take into consideration relevant guidance and legislation including:

- The Water Framework Directive (WFD) (2000/60/EC);
- Marine Strategy Framework Directive (MSFD) (2008/56/EC);
- Bathing Water Quality Regulations 2008 (SI No. 79 of 2008), as amended;
- S.I. No. 464/2009 - European Communities (Quality of Shellfish Waters) (Amendment) (No 2) Regulations 2009; S.I. No. 268/2006 - European Communities (Quality of Shellfish Waters) Regulations 2006, as amended;
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended;
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019);

- Guidelines for data acquisition to support marine environmental assessment of offshore renewable energy projects (Cefas, 2011);
- Assessment of the environmental impacts of cables (Merk, 2009);
- Ireland's Environment – An Assessment 2016 (Wall *et al.*, 2016); and
- The Quality of Bathing Water in Ireland 2019 (EPA 2019).

At present, there is no specific guidance for water quality assessment in Ireland, therefore assessment will be undertaken with consideration for the requirements of the WFD and MSFD as these two directives are concerned with monitoring, preserving and improving water quality in Ireland.

8.5 Design Parameters

It is considered that the worst case for water quality is the installation of 140 WTGs on monopiles or suction caissons as they are likely to result in higher suspension of seabed sediments (Table 8.2).

The array and export cable installation including landfall will also be assessed due to its contribution to sediment disturbance, as well as direct interaction with coastal waters.

Table 8.2: Worst-case scenario relative to marine water quality

Design Parameters	Worst case
Number of WTGs	Up to 140
Number of OSPs	5
Foundation type	Worst case considered to result from the foundation type that would require the greatest level of seabed preparation
Export Cables	Up to 6

8.6 Embedded Mitigation

Embedded mitigation will be determined throughout the development of the Design Parameters and will be presented in the EIAR for CWP. These will evolve over the EIA progression, the development process and upon consultation reviews.

Post consent, a Project Environment Management Plan (PEMP) will be written to cover the construction and O&M phases of the CWP development. It will include a Marine Pollution Contingency Plan to cover accidental spills, potential contaminated sediment resuspension/release and emergency contact details.

8.7 Scoping of CWP EIA

The following potential impacts on water quality during construction (and decommissioning) and operation of CWP have been identified and are proposed for assessment within the EIAR:

- Impacts during Construction (and decommissioning):
- Direct temporary disturbance resulting in temporary increases in Suspended Sediment Concentrations (SSC); and
- Indirect disturbance resulting in resuspension of contaminated sediments.
- Impacts during operation:
- Direct temporary disturbance resulting in temporary increases in SSC as a result of maintenance and repair.

Based on the information available, the following receptors identified in Section 8.2 will be considered during the EIA process:

- WFD waterbodies;
- Bathing waters;
- Shellfish water (see Chapter 10 for assessment of Fish and Shellfish Ecology);
- Natura 2000 Protected Areas (see Chapters 9, 10, 11 and 13 for assessments of Natura 2000 sites);
- WFD receptors
- Hydromorphology (see Chapter 7 for assessment of Coastal Processes); and
- Biology (see Chapters 9 and 10 for assessments of habitats and Fish and Shellfish Ecology).

It is proposed that the potential impacts described in Table 8.3 below can be scoped out i.e. not taken forward for assessment with the CWP EIAR. This is because they are unlikely to result in significant effects on Marine Water Quality.

Table 8.3: Potential impacts proposed to be scoped out

Potential Impact	Project Phase	Justification for scoping out at this stage
Introduction of Invasive Non-Native Species (INNS)	Construction Operation	Application of best practice measures during construction and operation phases, secured through approved documentation (e.g. Project Biosecurity plan), will ensure introduction if INNS is minimised as far as is reasonably practicable and as such no significant effects are predicted to arise from this impact.
Pollution events	Construction Operation	Application of best practice measures during construction and operation phases, secured through approved documentation (e.g. Construction Environmental Management Plans and Pollution Prevention Plans), will ensure pollution events (incl. litter) are minimised as far as is reasonably practicable and as such no significant effects are predicted to arise from this impact.

8.8 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a "Relevant Project" are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Currently, there are several large-scale construction projects in various stages of planning within the region. Given their proximity to CWP and similarity of activities, there is a possibility that combined activities from these projects can alter the extent or magnitude of their effect on the environment, specifically overlap in terms of increases in suspended sediments, and therefore it may be appropriate to consider them as part of the CIA.

Based upon the information currently available, the offshore wind projects identified where there may be a possible cumulative effect include:

- Arklow Phase 2, Co. Wicklow (consented);
- North Irish Sea Array (Relevant Project); and
- Dublin Array, Co. Dublin (Relevant Project).

The following projects are also located in the Irish Sea, however due to the distance from CWP, low likelihood of construction phase overlap, and no likelihood of operational impact, these projects are scoped out of the cumulative assessment:

- Oriel Wind Farm, Co. Louth (Relevant Project);
- North Irish Sea Array, Co. Louth/Dublin (Relevant Project);
- Arklow Phase 1, Co. Wicklow (Operational

There is also likely to be a number of coastal projects such as harbour maintenance dredging and development works overlapping with the Export Cable Corridor Search Area at the time of CWP construction however, exact details of these programmes are unknown at this stage. The list of projects that will be considered in the EIAR will be refined during the EIA process and relevant authorities will be consulted to ensure this list is comprehensive and contains the most up to date programme and methodology information.

8.9 Approach to EIA

The potential impacts to water quality will be considered separately for onshore and marine elements of CWP. The marine elements of CWP and their effects on water quality are addressed here. Where there is a potential impact identified on the same receptor e.g. WFD waterbody, from both the marine and terrestrial parts of the project, the cumulative effects (i.e. intra-project) will also be considered.

For transitional waters and coastal waters to one nm, consideration to potential impacts to water quality will be considered in line with the requirements of the WFD. This includes protected areas listed in Annex IV of the WFD that have known sensitivity to potential changes in water quality or have water quality objectives included in their programme of measures. For marine waters lying outside of the remit of WFD, consideration will be made in line with the requirements of the MSFD.

8.10 Scoping Questions

In addition to the information provided above, the following information is required from the department which will help to inform the scope of the EIA:

- Are you content with the scope of data gathering proposed for the baseline generation?
- Are there any other key data sources you are aware of that you wish to see included?
- Are there any other guidance documents covering how to address water quality impacts, including how to consider WFD and MSFD requirements you would wish us to apply?
- Are you content with the scope of the assessment?
- Are there any additional impacts that you believe could be significant and that you wish to see assessed?
- Are there other projects you wish to see included in the CIA?

9 SUBTIDAL AND INTERTIDAL ECOLOGY

9.1 Introduction

The following chapter sets out the scope of assessment in relation to Subtidal and Intertidal Ecology for the CWP EIAR. This chapter includes:

- A review of existing data collected to date;
- Consideration of the validity of this data for the EIA;
- New data sources that shall be consulted;
- Any required site or survey work;
- A consideration of the Design Parameters relevant to benthic ecology; and
- The scope of the EIA (including cumulative considerations)

9.2 Existing Environment

Codling Bank forms part of a series of banks in the Irish Sea which runs approximately 10 km offshore parallel to the coast, standing in 20 – 30 m of water and rise to within metres of the water's surface. The banks reflect the principal tidal currents in the region and the strong currents and sediment movements have resulted in a series of punctuated banks from north to south: Dundalk Bank; Bray Bank; Kish Bank; Codling & Greater Codling Banks; Arklow Bank; Rusk Bank; Glasgorman Bank; Blackwater & Lucifer Bank and Long Bank.

Regional data (INFOMAR) suggests that the most likely substrate type at the Codling Bank is coarse gravels, shell material with some sand in a patchy distribution surrounding the proposed site. All of which are exposed to the strong hydrodynamic movements in the area. There is likely to be a low proportion of fine fractions within the sediment and low organic carbon content (Wheeler *et al*., 2009). Wheeler *et al.* (2001) reported the findings of survey work and seabed mapping around the Kish and Bray Banks immediately to the north of the Codling Bank. Sediments recorded at the southern end of the Bray Bank were reported as coarse sand and gravel with finer sand recorded north along the Kish Bank. Sediment was coarser on top of sand banks with finer sediments observed off the banks.

The Codling Bank marks the southern end of the Bray Bank and therefore may have similarly coarse sediments. Biotopes present in the general area include *Glycera lapidum* in impoverished infralittoral mobile gravel and sand (SS.SCS.ICS.Glap); *Abra prismatica*, *Bathyporeia elegans* and polychaetes in circalittoral fine sand (SS.SSA.CFiSa.ApriBatPo); *Nephtys cirrosa* and Bathyporeia sp. in infralittoral sand biotope (SS.SSA.IFiSa.NcirBat) and *Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment (SS.SSA.CMuSa.AalbNuc) although in some cases the species composition varied (Roche *et al*., 2007; Wheeler *et al.*, 2009).

The intertidal habitats within the Application Area include areas of rocky coastline interspersed with sections of sandy beaches. In more sheltered areas, vegetated intertidal habitats such as seagrass beds and salt meadows can be present, in addition to extensive mudflats and sandflats such as those present in Dublin Bay.

Notable habitats within the Application Area include areas of rocky and biogenic reef habitat (with associated epifaunal communities at Wicklow Reef SAC, though these are principally located inshore near to rocky promontories). Wicklow Reef is of particular importance as it is Irelands only known example of established biogenic reef in the subtidal. This is particularly unusual as this particular species *Sabellaria alveolate* normally constructs its sand tubes in the intertidal zone, in areas typically subject to sand scour. The reef is in 12-30m water depth and at a thickness of up to 0.5m in places. It supports a wide variety of flora and fauna including species that are rare to Ireland (the bryozoan *Phaeostachys spinifera,* a polychaete *Eulalia ornate* and amphipod *Unciola crenatipalma*).

North and south Dublin Bay SACs are designated for a number of coastal features, though the Annex I qualifying features of interest for the offshore area are the mudflats and sandflats not covered by sea water at low tide, annual vegetation of drift lines, Salicornia and other annuals colonising mud and sand, and Mediterranean salt meadows (*Juncetalia maritimi*). These SAC's have extensive areas of sand and mudflats with intertidal flats extending for almost 3 km at their widest. The sediments are predominantly sand but shifts in grade to sandy muds nearer the shore.

The southern end of the Rockabill to Dalkey Island SAC (designated for Reefs (Rocky) and the harbour porpoise (*Phocoena phocoena*)) is found within the Export Cable Corridor Search Area. This site also contains the northern segment of the Frazer Bank and the entire Burford Bank, a sedimentary seabed structure of fine sands located at the mouth of Dublin Bay, that on its north side is flanked by gravel and coarse sand deposits.

9.3 Data Sources and Baseline Methodology

9.3.1 Baseline

9.3.1.1 Data Validity

A number of different surveys have previously been used to generate the benthic baseline for CWP (Table 9.1). In addition to the survey data, a number of literature sources will be used to develop the baseline (Table 9.2).

Table 9.1: Benthic ecology related surveys undertaken during the characterisation surveys at the codling wind park

Site	Survey Method	Dates
Codling Wind Park	118 x Biological Dredge with 10 mm mesh size	2001-2002
Codling Wind Park	Integrated geophysical survey, including side-scan sonar, magnetometer, multi-beam echo-sounder bathymetry and sub-bottom profiling throughout the entire area	2014
Codling Wind Park Extension	40 x 0.1 m^2 Hamon grab samples.	2008

Table 9.2: Benthic ecology - baseline data sources

Data Source	Year
INFOMAR INSS (2019) Seabed mapping in Irish waters. Joint venture between the Geological Survey of Ireland and the Marine Institute. Available from: http://www.infomar.ie/data/	2019
Lieberknecht, L. M., Vincent, M.A. and Connor, D. W. (2004) The Irish Sea Pilot - Report on the identification of nationally important marine features in the Irish Sea. Available from: http://www.jncc.gov.uk/irishseapilot/ Peterborough: JNCC.	2004
Roche, C., Lyons, D.O., Fariñas Franco, J. & O'Connor, B. (2007) *Benthic surveys of sandbanks in the Irish Sea. Irish Wildlife Manuals*, No. 29. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.	2007
Marine Institute – Benthos Ecology Group (2017) *Benthos monitoring in the marine environment*.	2017
Theseus Project (2013) Biogenic reefs of Europe and temporal variability [online] Available from: http://www.theseusproject.eu/wiki/Biogenic_reefs_of_Europe_and_temporal_variability .	2013

Data Source	Year
National Parks and Wildlife Service (2014) *Wicklow Reef SAC site synopsis.* Version date 4.01.2014 [online]. Available from: https://www.npws.ie/protected-sites/sac/002274 .	2001
National Parks and Wildlife Service (2013): *North Dublin Bay SAC synopsis*. Version date 12.08.2013 [online]. Available from: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000206.pdf	2013
National Parks and Wildlife Service (2015): *South Dublin Bay SAC synopsis*. Version date 10.12.2015 [online]. Available from: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000210.pdf	2015
National Parks and Wildlife Service (2014): Rockabill to Dalkey Island SAC. Version date 10.02.2014 [online]. Available from: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY003000.pdf	2014
Department of the Environment, Trade and the Regions (2010) *Quality Status Report of the Marine and Coastal Areas of the Irish Sea 2010*. London: Department of the Environment Trade and the Regions.	2010
Wheeler A.J., Dorschel B. and shipboard party (2009). Irish Sea Marine Assessment (ISMA), RV Celtic Voyager – Survey CV0926 (Legs 1 & 2), 28th Sept. – 18th Oct. 2009	2009

9.3.2 Future Baseline Assessment

CWPL are committed to undertaking a number of environmental surveys. A survey strategy for including benthic and epibenthic surveys will be produced and agreement sought with NPWS and the Marine Institute. Below denotes a broad overview of the survey work proposed.

Benthic survey work will be conducted to ensure suitable assignment of habitats across the Development Area and Export Cable Search Area, though this area may be refined for the survey if cable routes are better defined.

Characterisation of benthic habitats is best achieved through a combination of acoustic mapping of seabed habitat features, followed by targeted (stratified) single sample station ground truthing (e.g. Ware and Kenny, 2011; Trendall *et al.,* 2011). Use of the INFOMAR data sets and analysis of any available geophysical data will enable the production of a well-designed survey program, whereby a predictive habitat map can be produced based on the distinct acoustic signatures. This will allow sampling stations to be placed to ground truth this predictive habitat map, with sufficient replication to allow robust characterisation. Sampling will be undertaken using a combination of Drop Down Video (DDV) where there is harder substrate unsuitable for benthic grab sampling, and a suitable grab sampler for softer substrates obtain a complete overview of the habitats in the surveyed area. Epibenthic beam trawl surveys may also be undertaken to characterise mobile epibenthic species if deemed to be required.

Following benthic sampling the geophysical and biological data will be integrated to produce a habitat map characterising the development area to allow accurate assessment of impacts.

The cable landfall locations will also be surveyed via an intertidal phase I habitat survey. The use of suitable resolution orthophotography is proposed to initially evaluate the areas, following which an intertidal walk over survey will be undertaken to determine and map habitats and communities present. These walkover surveys will be undertaken at low water of a spring tide.

Surveys will be undertaken in accordance with Handbook for marine Intertidal Phase 1 biotope mapping survey (Wyn *et al.,* 2006). All biotopes in the survey area (nominally 500m either side of the proposed cable landfall point) will be determined to as high a definition as possible. In areas of rocky shores this will require a walkover survey, ground truthing habitat extents and biotopes from those identified from the aerial imagery. In areas of sediment, samples for particle size analysis and fauna will be collected to inform biotope assessment of sedimentary habitats.

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9.4 Legislation and Guidance

In addition to the general guidance and legislation presented in Sections 5.2 and 3.2 respectively, the EIAR will take into consideration relevant guidance including:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management – 'CIEEM', 2019);
- Guidelines for data acquisition to support marine environmental assessment of offshore renewable energy projects (Centre for Environment, Fisheries and Aquaculture Science – 'Cefas', 2011);
- Picton, B. E. and Costello, M.J. BioMar Biotope Viewer: A Guide to Marine Habitats, Fauna and Flora of Britain and Ireland. Environmental Sciences Unit, Trinity College, Dublin (1998); and
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (EU 1992).
- Hiscock, K., 2001. Procedural Guideline No. 3-2 In situ survey of intertidal biotopes using abundance scales and checklists at exact locations (ACE surveys). JNCC Marine Monitoring Handbook.
- Wyn, G., P Brazier, k. Birch, A. Bunker, A.Cooke, M. Jones, N. Lough, A. McMath & S. Robberts (2006). Handbook for marine Intertidal Phase 1 biotope mapping survey (2006)

9.5 Design Parameters

Chapter 4 (Description of the Development) sets out the Design Parameters for the project as a whole. In relation to benthic ecology, the worst-case scenario to be assessed is typically assumed to be that with the greatest footprint and degree of disturbance to the seabed and intertidal area (Table 9.3).

Table 9.3: Benthic ecology – indicative worst-case scenario table

Design Parameters	Worst case
Number of WTGs	140
Number of OSPs	5
Foundation type	That resulting in maximum loss of seabed area, at this stage suction caissons on a jacket structure, however the need for scour protection on foundations may impact the actual worst-case foundation design that will be assessed.
Inter-array cabling	Maximum possible cable length with maximum possible amount of additional rock protection
Export cabling	Maximum number of cables (6) for maximum length with maximum allowance of additional rock protection

9.6 Embedded Mitigation

The approach to assessment in this chapter assumes that mitigation measures embedded into the design (e.g. burial of the cables, routing to avoid key constraints such as sensitive protected habitats, use of appropriate construction techniques, and pollution prevention measures) or which constitute industry standard environmental plans and best practice will be in place.

9.7 Scoping of CWP for EIA

The impact assessment methodology will follow that recommended by the CIEEM for marine and coastal developments (CIEEM, 2019).

The assessment will consider those benthic and intertidal habitats that have connectivity with the proposed project. It is noted that the baseline will be developed further through survey and additional desk-based literature, however at this stage the following types of habitat are considered to be present and will therefore require assessment:

- Offshore sedimentary habitats (e.g. offshore muds, sands, and gravels);
- Offshore hard substrate habitats (e.g. rocky reefs, stony or cobble reefs);
- Biogenic reef habitats (e.g. *Sabellaria* reef);
- Intertidal sedimentary habitats (e.g. mudflats and sandflats, seagrass beds, saltmarsh habitats); and
- Intertidal hard substrate habitats (e.g. rocky shores, stony shores).

The following potential impacts on benthic ecology during construction (and decommissioning) and operation of CWP have been identified and are proposed for assessment within the EIA:

- Impacts during installation (and decommissioning)
- Direct temporary disturbance or loss of seabed and intertidal habitats;
- Indirect impacts of temporary increases in Suspended Sediment Concentrations (SSC);
- Deposition of sediment and associated smothering of seabed and intertidal habitats: and
- Release of contaminants bound in sediments.
- Impacts during operation:
- Long term loss of original habitat;

It is proposed that the potential impacts described in Table 9.4 below can be scoped out i.e. not taken forward for assessment within the CWP EIAR. This is because they are unlikely to result in significant effects on benthic ecology features.

Table 9.4: Potential impacts which have been proposed to be scoped out

Potential impact	Project Phase	Justification for scoping out at this stage
Pollution events	Construction Operation	Application of best practice measures during construction and operation phases, secured through approved documentation (e.g. Construction Environmental Management Plans and Pollution Prevention Plans), will ensure pollution events (incl. litter) are minimised as far as is reasonable practicable and as such no significant effects are predicted to arise from this impact.
Introduction of Invasive Non-Native Species (INNS).	Construction Operation	Application of best practice measures during construction and operation phases, secured through approved documentation (e.g. Project Biosecurity plan), will ensure introduction if INNS is minimised as far as is reasonably practicable and as such no significant effects are predicted to arise from this impact.
Scour and associated seabed disturbance, incl. increased Suspended Sediment Concentrations (SSC)	Operation	If scour is predicted to be a significant issue at any location, then this would be addressed through placement of scour protection which would result in considerably reduced or negligible levels of scour and therefore any associated seabed disturbance or increased SSC is not considered possible to lead to significant effects on benthic ecology receptors.

Potential impact	Project Phase	Justification for scoping out at this stage
		The placement of scour protection will be assessed as part of the EIA under the impact categories of; direct temporary disturbance or loss of seabed and intertidal habitats, and long-term loss of original habitat.
Electromagnetic fields (EMF) and heat emissions from the cable	Operation	Shielding and burial of the cable will reduce EMF and heat emissions to as low as reasonably practicable. As such, effects are limited to within the very close proximity of the cable and will be of sufficiently low magnitude that it is considered that no significant effects are expected to arise from this impact.

9.8 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a "Relevant Projects" are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

It is considered that the extent of indirect impacts (e.g. resultant increases in SSC) during the construction phase will be used to define which projects will be considered for inclusion in the CIA. The exact extent will be developed through the project specific modelling described in Chapter 7, however at this time it is expected that the following projects will be due to their proximity, and likelihood of overlap in construction phases.

- Arklow Phase 2, Co. Wicklow (consented);
- Dublin Array, Co. Dublin (Relevant Project); and
- North Irish Sea Array (Relevant Project).

All impacts scoped in for CWP will be assessed cumulatively for all projects included in the CIA.

9.9 Scope of the Appropriate Assessment (AA)

SACs for the Annex I Habitats are proposed as being pre-screened in or out of the AA based on an assessment of their potential for connectivity with the Development Area and Offshore Export Cable Route.

All SAC's adjacent to or with direct overlap will be considered in the AA screening and AA. The exact extent of any secondary impacts will not be fully understood until completion of the sediment modelling (see Chapter 7), and as such the list presented below is subject to change if that exercise indicates that a larger or smaller area is likely to be affected. It is currently expected that sites within 25 km in a north-south direction (predominant direction of current) of the CWP Development Area or Offshore Export Cable Route may be considered in the screening assessment (Table 9.4).

These sites will be refined when further detail on the CWP project design is known. Following this a stepwise process will be undertaken in accordance with guidance as outlined in Sally *et al*., 2018 and DCCAE 2017, beginning with the undertaking of AA screening.

It should be noted that a number of the SAC's listed have onshore (i.e. above MHWS) components and features. These features will not be considered in the offshore assessment, however any connectivity to onshore works will be considered and assessed in the onshore assessment. Marine features which are part of the SAC's not listed in the table below such as marine mammals and birds are addressed fully in other chapters. As such, these features present above MHWS have not been included below.

Table 9.5: SACs designated for benthic features in proximity to CWP

SAC	Interest Features	Distance from CWP (km)
South Dublin Bay	Mudflats and sandflats not covered by seawater at low tide Annual vegetation of drift lines Salicornia and other annuals colonizing mud and sand	0
Wicklow Reef	Reefs	0
Rockabill to Dalkey Island	Reefs	0
The Murrough Wetlands	*All features, though marine in nature, are located landward of MHWS and occur due to seepage through a shingle barrier. Therefore, no connectivity with any feature exists.*	0
North Dublin Bay	Mudflats and sandflats not covered by seawater at low tide Annual vegetation of drift lines Salicornia and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Mediterranean salt meadows (*Juncetalia maritimi*)	0.5
Baldoyle Bay	Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Mediterranean salt meadows (*Juncetalia maritimi*)	9
Buckroney-Brittas Dunes and Fen	Annual vegetation of drift lines Mediterranean salt meadows (*Juncetalia maritimi*)	10.5
Malahide Estuary	Mudflats and sandflats not covered by seawater at low tide	14.5

SAC	Interest Features	Distance from CWP (km)
	Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Mediterranean salt meadows (*Juncetalia maritimi*)	
Codling Fault Zone	Submarine structures made by leaking gases	16
Lambay Island	Reefs	17
Rogerstown Estuary	Estuaries Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Mediterranean salt meadows (*Juncetalia maritimi*)	20

9.10 Scoping Questions

- Are you content with the scope of data gathering proposed for the baseline generation?
- Are there any other key data sources you are aware of that you wish to see included?
- Are you content with the scope of the assessment?
- Are there any additional impacts that you believe could be significant and that you wish to see assessed?
- Are there any additional projects which should be included in the CIA?
- Are you content with the proposed scope of the AA?

10 FISH AND SHELLFISH ECOLOGY

10.1 Introduction

The following chapter sets out the scope of assessment in relation to Fish and Shellfish for the CWP EIA. This chapter includes:

- A review of existing data collected to date;
- Consideration of the validity of this data for the EIA;
- New data sources that shall be consulted;
- Any required site or survey work;
- A consideration of the Design Parameters relevant to fish ecology;
- The scope of the EIA (including cumulative considerations); and
- The scope of the Appropriate Assessment.

10.2 Existing Environment

There are a range of fish and shellfish found in the vicinity of the Development Area and Export Cable Search Area, some of which use the area for spawning and nursery areas.

Marine fish present include; herring (*Clupea harengus*), plaice (*Pleuronectes platessa*), haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*), whiting (*Merlangius merlangus*), sole (*Solea solea*), ling (*Molva molva*), megrim (*Lepidorhombus whiffiagonis*) and monkfish (*Lophius piscatorius*) (Marine Institute, 2009). Several elasmobranch species are also present which includes both the blonde ray (*Raja brachyura*) and thornback ray (*Raja clavata*) which are known to aggregate in the area (SFPA pers com).

Commercially important shellfish species known to be present include whelk (*Buccinum undatum*), mussel (*Mytilus edulis*), razor clam (*Ensis* sp.), crab (*Cancer pagurus*) and lobster (*Homarus Gammarus*) (Ireland's Marine Atlas, 2016a). *Nephrops norvegicus* are also known to be present in the wider area (Marine Institute, 2009).

According to Ireland's Marine (2016b) cod and haddock have spawning and nursery areas which overlap the Development Area and Export Cable Search Areas (Figure 10.1), as do nursery areas for mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*). It is not known whether thornback and blonde rays use the area for spawning or nursery functions (SFPA, *pers. com.*).

There are a number of SAC rivers on the south and east coast of Ireland which have been designated for Annex II migratory fish (i.e. sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), Atlantic salmon (*Salmo salar*) and twaite shad (*Alosa fallax*)). Although these SAC rivers are not marine, the migratory fish for which they were designated have a marine phase of the lifecycle. These species rely on the sea to migrate to feeding grounds before returning to rivers to spawn. These species may be present within the Development Area and Export Cable Search Area at certain times of the year.

Although not annex II species, both the European eel (*Anguilla anguilla*) and seatrout (*Salmo trutta*), which are common in Irish rivers and lakes, also have a marine phase of their life cycle. The European eel spawns in the Sargasso Sea before returning as an elva to freshwater to grow. Conversely adult sea trout spawn in fresh water and juveniles, after several years, migrate to the marine environment to feed. Given the marine stage of both of these species, it is possible that they are present within the Development Area and Export Cable Search Area at certain times of the year.

10.3 Data Sources and Baseline Methodology

10.3.1 Baseline

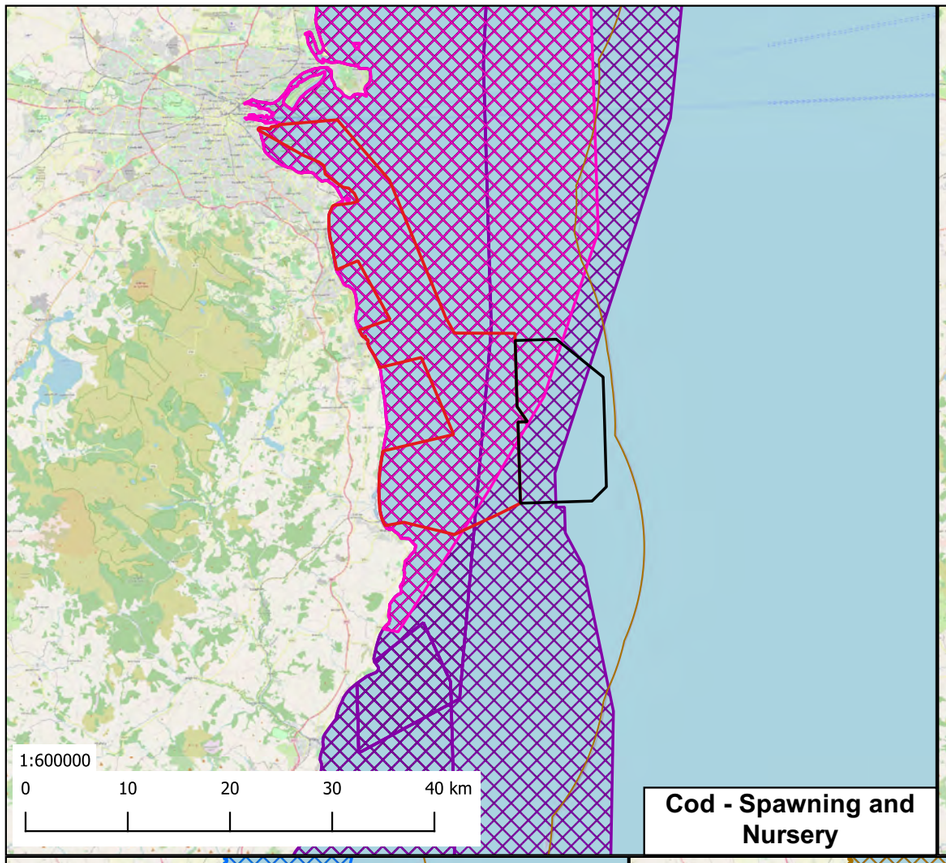
10.3.1.1 Data Validity

A project baseline was generated in 2008 using a number of data sources current at that time, however many of these data sources have now been superseded by more up to date information. The data sources which will be used in the assessment are shown below in Table 10.1. Where data allows, the date baseline will cover the last 10 years of available data (2008-2018).

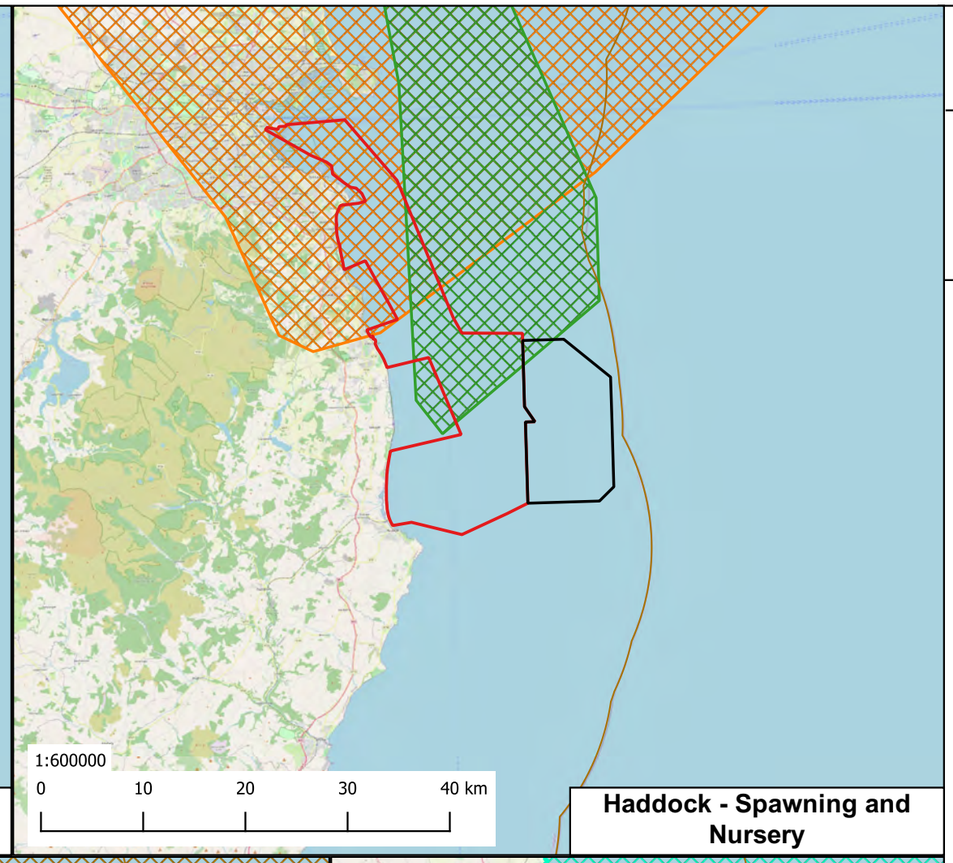
Table 10.1: Baseline data sources and data availability for fish and shellfish

Up to Date Data Sources and Publications	Year
International Council for the Exploration of the Sea (ICES) International Bottom Trawl Survey (IBTS) in ICES rectangle VIIa	2001 - to date
Marine Institute Biological Sampling Survey Stations Ireland	2004 - to date
Fish landings data (Sea Fisheries Protection Authority (SFPA)	2003 - to date
Irish Defence Forces Fisheries Monitoring Centre	Upon request
Analysis of fishing activity, stock characteristics and stock status (Marine Institute)	1990 - to date
Gerritsen, H.D. and Lordan, C. (2014) Atlas of Commercial Fisheries Around Ireland. Ireland. Marine Institute. ISBN 978-1-902895-56-7. 59 pp	2014
Irelands Marine Atlas- Key Fish Species Spawning and Nursery Areas	2016 – to date
Clarke, M. (2003) *Tope tagging in Irish Waters (1970-2002)*. Central Fisheries Board.	2003
Clements, A., Doyle, J., Lordan, C., Lundy, M., McCorriston, P., McArdle, J., McCausland, I., Burns, G. and Schön P.J. (2017) *Western Irish Sea Nephrops Grounds (FU15) 2017 UWTV Survey Report and catch options for 2018*. AFBI and Marine Institute UWTV Survey report.	2017
Irelands Marine Atlas, 2016a: Codling Key areas of Irish Dredge gear fishing activity-seed mussel & unspecified dredge by value	2014-2018
Irelands Marine Atlas, 2016a: Codling areas of key Irish static gear fishing activity-whelk pots & crab and lobster creels	2016
Irelands Marine Atlas, 2016a: Codling Irish trawl activity: bottom otter beam trawl, beam trawl and pelagic trawl	2016
Irelands Marine Atlas, 2016a: Codling Key fish species spawning and nursery areas	2016
Coull, K.A., Johnstone, R., and Rogers, S.I. (1998) *Fisheries Sensitivity Maps in British Waters*. UKOOA Ltd.	1998
Parker-Humphreys, M. (2004) Distribution and relative abundance of demersal fishes from beam trawl surveys in the Irish Sea (ICES Division VIIa) 1993-2001. *Science Series Technical Report*. 120. Lowestoft. Cefas. 68p.	2004
Doherty, D., O'Maoiléidigh M. and McCarthy, T.K. (2004) The Biology, Ecology and Future Conservation of Twaite Shad (*Alosa Fallax* Lacépède), Allis Shad (*Alosa Alosa* L.) and Killarney Shad (*Alosa Fallax Killarnensis* Tate Regan) in Ireland. *Biology and Environment: Proceedings of the Royal Irish Academy*. 104B (3). 93–102p.	2004
Massey, J., Gaughran, A., and Oliviera, E. (RPS Group and Ecofys) (2017) *Environmental baseline study for the development of renewable energy sources, energy storages and a meshed electricity grid in the Irish and North Seas* [Online]. WP3 Final Baseline Environmental report. Available from https://publications.europa.eu/s/c5qq. 10.2833/720927.	2017

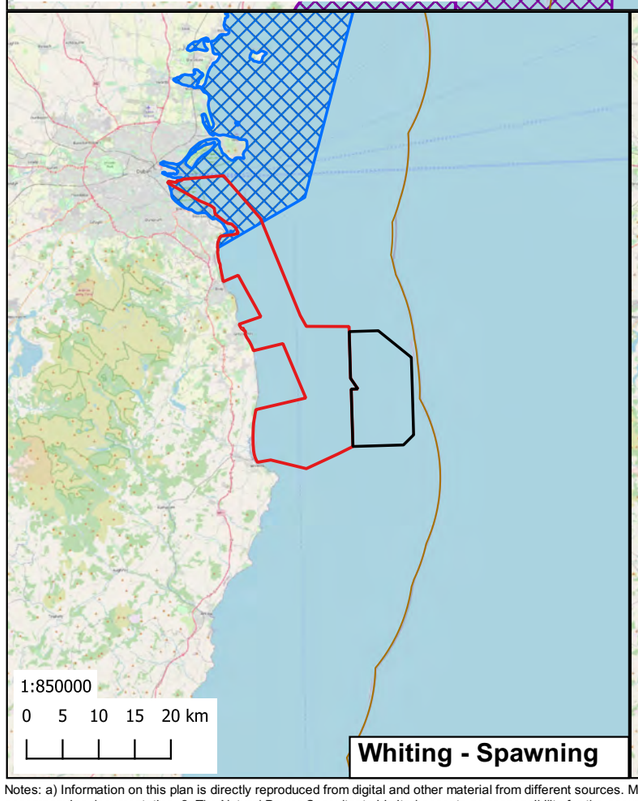
Up to Date Data Sources and Publications	Year
Ireland (2006) National strategic plan the fisheries sector, 2007-2013 In accordance with Article 15 of council regulations on EC no.1198/2006 of 27 July 2006.	2017
Beaulaton, L., Taverny, C. and Castelnaud, G. (2008) Fishing, abundance and life history traits of the anadromous sea lamprey (*Petromyzon marinus*) in Europe. *Fisheries Research*. 92 (1). 90-101 p.	2008
M. G. Pawson, M.G., Pickett, G.D., Leballeur, J., Brown, M. and Fritsch, M. (2007) Migrations, fishery interactions, and management units of sea bass (*Dicentrarchus labrax*) in Northwest Europe. *ICES Journal of Marine Science*. 64(2). 332–345 p.	2007
O'Neill, R. (2017). *The distribution of the European sea bass, Dicentrarchus labrax, in Irish waters*. PhD Thesis. University College Cork.	2017
Rooney S.M., O'Gorman, N.M., Greene, F. and James J. King, J.J. (2013) Aspects of Brook Lamprey (*Lampetra Planeri* Bloch) Spawning in Irish Waters. *Biology & Environment: Proceedings of the Royal Irish Academy*. 113 (-1). 1 – 13 p.	2008
Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. (2012) Spawning and nursery grounds of selected fish species in UK waters. *Science Series Technical Report 147*. Cefas.	2012
Bolle, L.J., de Jong, C.A.F., Blom, E., Wessels, P.W., Van Damme, C.J.G. & Winter, H.V. Effect of pile-driving sound on the survival of fish larvae. Report by IMARES - Wageningen UR and TNO. pp 33	2014
Magúnsdóttir, H. The common whelk (*Buccinum undatum* L.): Life history traits and population structure. Available from: https://www.researchgate.net/publication/266404038_The_common_whelk_Buccinum_undatum_L_Life_history_traits_and_population_structure	2010
Armstrong, M., Tingley, G., Beeching, T., Peach, D. and Pasco, G. (2008) Irish Sea Roundfish Surveys: Final Report. *Report to the UK Fisheries Science Partnership*. Lowestoft. Cefas.	2008



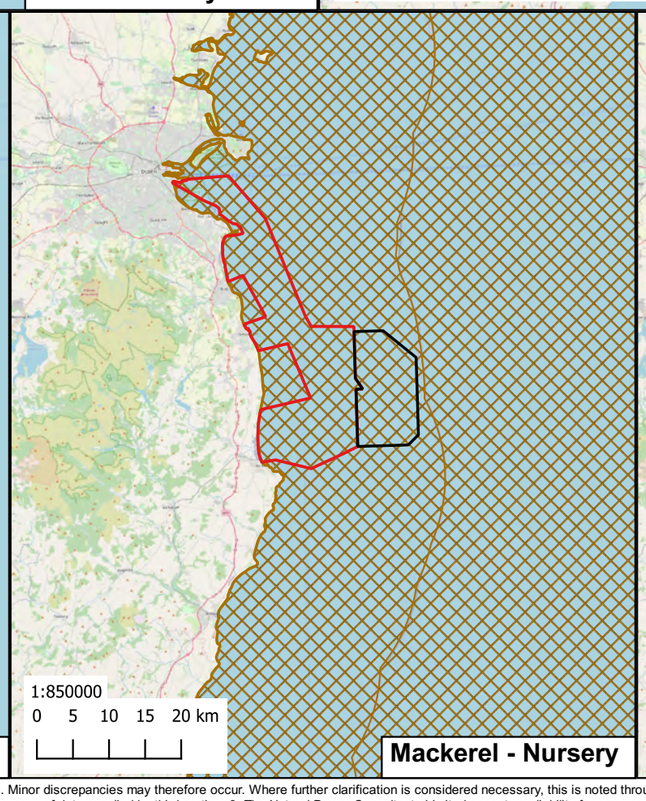
Cod - Spawning and Nursery



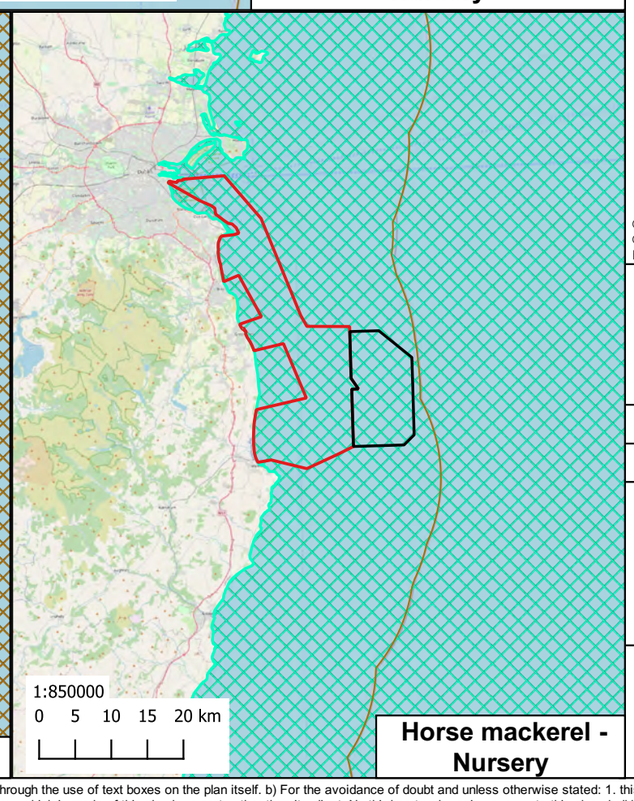
Haddock - Spawning and Nursery



Whiting - Spawning



Mackerel - Nursery



Horse mackerel - Nursery

Project:

Codling Wind Park

Title:

Figure 10.1: Key Fish Species Spawning and Nursery Areas (Ireland's Marine Atlas, 2016b)

Key

- Codling Wind Park
- Potential export cable corridor search area
- 12 nautical mile (NM) Irish limit

Spawning habitat

- Cod
- Haddock
- Whiting

Nursery habitat

- Cod
- Haddock
- Mackerel
- Horse mackerel

Scale @ A3:

Map projection: IRENET95/ Irish Transverse Mercator

N

Date: 14-07-20 | Prepared by: SM | Checked by: SMc

Ref: IE200091_M_289_C

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codling wind park

10.3.2 Future Baseline Assessment

It is considered that the sources outlined above are sufficient to develop a baseline for fish and shellfish which will allow a robust impact assessment to be undertaken. It is currently proposed that no fish or shellfish surveys are undertaken during the baseline site investigation survey campaign. Baseline surveys for fish seldom yield additional data on fish species that is not already available from fisheries landings data or existing survey data. Should licencing authorities deem it necessary, the effort would best be focused on pre and post- construction monitoring work to evaluate the impact on fish from construction activities. Any monitoring programme would be agreed post consent with the relevant statutory consultees, such as the Marine institute and Sea Fisheries Protection Authority (SFPA). This is line with advice regarding collection of data for fish (DCCAE 2018).

10.4 Legislation and Guidance

In addition to the general guidance and legislation presented in Sections 5.2 and 3.2 respectively, the EIAR will take into consideration relevant guidance including:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019);
- Guidelines for data acquisition to support marine environmental assessment of offshore renewable energy projects (Cefas, 2011); and
- Assessment of the environmental impacts of cables (The Convention for the Protection of the Marine Environment of the North-East Atlantic – 'OSPAR', 2009).

10.5 Design Parameters

A full description of the Design Parameters has been provided in Chapter 4.

The (worst case) parameters presented in Table 10.2 are available at this stage and which are considered to be relevant to the fish and shellfish assessment.

Table 10.2: Relevant worst-case design parameters for fish and shellfish

Design Parameters	Worst case
Foundation type	That resulting in maximum loss of seabed area, at this stage suction caissons on a jacket structure, however the need for scour protection on foundations may impact the actual worst case foundation design that will be assessed, and that resulting in maximum underwater noise, at this stage piled foundations (monopiles and/or jacket foundations with pin piles).
Number of WTGs	Up to140
Pile diameter (m)	Monopiles: Up to 11 m Pin piles: 4-5 m
Number of OSPs	Up to 5
Inter-array cabling	Maximum possible cable length with maximum possible amount of additional rock protection
Export cabling	Maximum number of cables (6) for maximum length with maximum allowance of additional rock protection

10.6 Embedded Mitigation

Adoption of any mitigation measures will be subject to an assessment of technical and commercial feasibility.

The following embedded mitigation measures will be considered:

- Minimising the use of cable protection to reduce the effect of permanent habitat loss;
- The Construction Environmental Management Plan (CEMP) will adhere to current guidelines and follow industry best practice regarding prevention of pollution at sea; and
- Cables will be buried/protected where possible (thereby reducing the potential for impacts relating to Electromagnetic Fields (EMF)).

10.7 Scoping of CWP EIA

The impact assessment methodology will follow that recommended by the CIEEM for marine and coastal developments (CIEEM, 2019).

In line with DCCAE (2017) and CIEEM (2019) guidance, it is proposed that the EIAR focuses on the potential impacts which may result in significant effects due to the construction, operation and maintenance, and decommissioning of CWP.

As such, the following potential impacts on fish and shellfish are proposed to be scoped in for assessment in the CWP EIAR:

- Construction (and Decommissioning):
    - Temporary habitat disturbance/loss;
    - Temporary increase in suspended sediments and associated smothering; and
    - Noise and vibration.
- Operational and maintenance:
    - EMF; and
    - Permanent habitat loss.

Based on the previous work that has been done for the project, the number of fish and shellfish species likely to be present is extensive, and it is impractical to assess each individual species under these receptor groups, especially if there is no potential for significant effects to arise against a given species. To ensure the most important or appropriate species are assessed, a Valued Ecological Receptor (VER) approach to receptor selection will be adopted as outlined in the CIEEM (2019) guidance. To undertake this approach, a list of all fish recorded in the Development Area and Export Cable Corridor(s) will be compiled. Each species will then be assessed against a number of criteria (e.g. SAC feature species; species of local conservation importance, spawning area overlap, stock stability, commercial importance, etc). The species with significant ecological value will be those taken forward into the assessment as the Valued Ecological Receptors. While individual receptors (by species) will be identified through the VER's process, the following broader categories expected to be assessed are:

Those fish and shellfish receptor groups which will be assessed against these potential impacts are as follows:

- Marine fish;
- Hearing Specialists;
- Shellfish;
- Elasmobranches; and
- Migratory fish.

10.8 Scoping of Cumulative Assessment

The list of plans, projects and activities identified in Section 5.6 as being relevant for cumulative assessment was examined in order to assess which (plans, projects and activities) have the potential to contribute to cumulative effects on fish and shellfish. Those (plans, projects and activities) where there was potential for both temporal and spatial overlap with noise-emitting activities (piling) and construction activities which produce suspended sediment (and smothering) at CWP were scoped in for cumulative assessment.

Plans, projects and activities were considered to overlap temporally if there was potential for noise-emitting activities (piling) and construction activities which produce increases in suspended sediment to be conducted at the same time as that at CWP (considered to be 2025-2027). Plans, projects and activities were considered to overlap spatially if noise contours and sediment plumes interact with those potentially produced by the CWP.

On this basis, the following plans, projects and activities have been scoped in for cumulative assessment for fish and shellfish:

- Dublin Array OWF (Relevant Project);
- Arklow Bank Phase 2 (consented); and
- North Irish Sea Array (Relevant Project).

A review of noise propagation and suspended sediment models will be undertaken (when complete) and where no overlap exists with a specific project (s) it/they will be removed from the assessment. Alternatively, if it becomes evident that other projects will overlap in terms of noise propagation and/or increases in suspended sediment these will be included.

10.9 Scope of the Appropriate Assessment (AA) Screening

SACs for migratory fish species are proposed to be pre-screened in or out of the AA based on an assessment of their potential for connectivity with the Development Area and/or Export Cable Corridor(s).

There is considered to be potential for connectivity with the SAC if the Development Area and/or Export Cable Corridor(s) is adjacent to or overlaps with the SAC boundary or if the species designated as interest features are likely to migrate through the CWP Project. As such, any SACs on the west coast of Ireland have been scoped out given their distance from the Development Area and/or Export Cable Corridor(s) and low likelihood of interaction with the CWP Project. Therefore, the following sites located on the east and south coast of Ireland will be included.

- River Boyne and River Blackwater SAC;
- Slaney River Valley SAC;
- River Barrow and River Nore SAC;
- Lower River Suir SAC; and
- Blackwater River (Cork/Waterford) SAC.

Table 10.3 provides an overview of the SACs that have connectivity with the Development Area.

Table 10.3: SACs with potential connectivity to CWP with interest features that have been pre-screened in

SAC	Interest Features	Distance from CWP (km)
River Boyne and River Blackwater	[River lamprey; Atlantic salmon	75
Slaney River Valley	Sea lamprey; river lamprey; Atlantic salmon; twaite shad and freshwater pearl mussel (FWPM)	81
River Barrow and River Nore	Sea lamprey; river lamprey; Atlantic salmon; twaite shad and FWPM	149
Lower River Suir	Sea lamprey; river lamprey; Atlantic salmon; twaite shad and FWPM	158
Blackwater River (Cork /Waterford)	Atlantic salmon and FWPM	205

10.10 Scoping Questions

In addition to the information provided above, the following information is required from the department which will help to inform the scope of the EIA:

- Are you content with the scope of data gathering proposed for the baseline generation?
- Are there any other key data sources you are aware of that you wish to be included?
- Are you content with the scope of the assessment?
- Are there any additional impacts that you believe could be significant and that you wish to see assessed?

11 OFFSHORE ORNITHOLOGY

11.1 Introduction

The purpose of this chapter is to provide detailed information on offshore and migratory ornithological receptors of relevance to CWP. It considers potential effects on these receptors resulting from construction, operation, maintenance and decommissioning of the project including offshore infrastructure, cable routes and landfalls, and sets out the proposed scope of the offshore ornithology assessment for the CWP EIAR.

This chapter provides information relevant to impacts upon ornithological receptors seaward of the Mean Low-Water Spring (MLWS) in addition to migratory geese and swan species and intertidal species in the vicinity of proposed coastal landfall locations. Other information relevant to ornithological receptors landward of the MLWS will be provided in the Onshore Scoping Report.

11.2 Existing Environment

Ornithological surveys and desk studies to date have identified a number of seabird species as being present at all times of year within the Development Area. The most commonly occurring of these are auks, namely guillemot (*Uria aalge*) and razorbill (*Alca torda*). Both species have been identified as being more numerous during the breeding season (April to September) as they forage at sea from colonies along the east Irish coast.

Kittiwake (*Rissa tridactyla*) has been the most commonly recorded gull species to date, with most birds recorded as being in flight. Herring (*Larus argentatus*), common (*Larus canus*), lesser black-backed (*Larus fuscus*) and great black-backed (*Larus marinus*) gulls are also recorded regularly.

Other seabird species recorded include gannet (*Morus bassanus*), fulmar (*Fulmarus glacialis*), Manx shearwater (*Puffinus puffinus*), red-throated diver (*Gavia stellata*) and common scoter (*Melanitta nigra*).

Two SPAs lie within the cable export corridors of the Development Area; namely South Dublin Bay SPA and Dalkey Island SPA. South Dublin Bay is designated for a variety of wintering waders, gulls and wildfowl, including pale-bellied brent goose (*Branta bernicla hrota*), and Mediterranean gull (*Ichthyaetus melanocephalus*). South Dublin Bay SPA is also designated for post-breeding aggregations of terns, including common (*Sterna hirundo*), Arctic (*Sterna paradisea*) and roseate (*Strena dougallii*) terns. Dalkey Island SPA is designated for common, Arctic and roseate terns; these species are designated as breeding features of the SPA.

11.3 Embedded Mitigation

A range of embedded mitigation measures designed to minimise environmental effects will be captured within the project Design Parameters, and may include:

- Cables will be suitably buried or will be protected by other means when burial is not practicable. This will reduce the potential for impacts relating to the electromagnetic field (EMF) on some prey species;
- Defined vessel navigational routes to reduce the potential for impacts relating to disturbance; and
- Soft starts to pile driving operations will be implemented to reduce risk of exposing diving birds such as red-throated divers, gannets and auks to damaging levels of underwater noise. Soft starts will also act to reduce effects on prey species.

Adoption of any specific mitigation measures will be subject to an assessment of technical and commercial feasibility within the EIAR.

11.4 Data Sources and Baseline Methodology

11.4.1 Desk-based assessment

A wide range of published literature is available for informing the offshore ornithological assessment. These sources include information on seabird and migratory species ecology and distribution, and on the potential impacts of wind farms on birds. These data sources include, but are not limited to, those summarised in Table 11.1.

Table 11.1: Summary of existing data sources for offshore ornithology

Topic	Data Source	Description
Seabird foraging ranges and foraging behaviour and breeding ecology	Woodward *et al*. 2019	An updated review, with improved robustness of widely used foraging range estimates stated in Thaxter *et al*. 2012
	Wakefield *et al*. 2013	Demonstrating that gannets (*Morus bassanus*) from neighbouring colonies forage in largely mutually exclusive, colony specific home ranges
	Cleasby *et al*. 2015	Estimating range, density and altitudes of foraging gannets to estimate vulnerability to offshore wind farms
	Guilford *et al*. 2008	GPS tracking of the foraging movements of Manx shearwaters (*Puffius puffinus*) breeding on Skomer Island, Wales
	Furness *et al*. 2018	Nocturnal flight activity of northern gannets and implications for modelling collision risk at offshore wind farms
	Snow & Perrins 1998	Birds of the Western Palearctic: an account of the birds of Europe, the Middle East and North Africa
Seabird population sizes, distributions and seasonal movements	Seabird Monitoring Programme database	Most resent dataset summarising seabird colony counts for colonies around Ireland and UK. Most recent census Irish/UK census anticipated to be completed in 2021 breeding season.
	Jessopp *et al.* 2018	Seasonal distribution and abundance of seabirds in the western Irish Sea
	Rogan *et al.* 2018	Occurrence, distribution and abundance of seabirds (and cetaceans) in Irish waters using aerial surveys (obSERVE)
	Stone *et al*. 1995	An atlas of seabird distribution in north-west European waters
	Mitchell *et al*. 2004	Seabird populations of Britain and Ireland
	Wakefield *et al*. 2017	Regional distribution of shag (*Phalacrocorax aristotelis*), guillemot (*Uria aalge*), razorbill (*Alca torda*) and kittiwake (*Rissa tridactyla*) using fine-scale tracking, large-scale modelling and breeding density
	Waggitt *et al*. 2019	Distribution maps of cetacean and seabird populations in the North-East Atlantic.

Topic	Data Source	Description
Migratory species ecology	Warren *et al.* 1992	Wintering site interchange amongst Greenland white-fronted geese (*Anser albifrons flavirostris*) captured at Wexford Slobs, Ireland
	Glahder *et al*. 1999	Satellite tracking movements of Greenland white-fronted geese
	Wernham et al. 2002	The migration atlas: movements of the birds of Britain and Ireland
	Robinson *et al*. 2004	Information relating to the distribution and abundance of light-bellied brent geese (*Branta bernicla hrota*) wintering in Ireland
	Crowe 2005	Ireland's wetlands and their waterbirds: status and distribution
	Boland & Crowe 2012	Irish wetland bird survey: waterbird status and distribution
	Crow & Holt 2013	Estimates of waterbird numbers wintering at Irish sites
Landfall site species ecology	Burke & Crowe 2016, 2017	Birdwatch Ireland's post-breeding tern reports.
	Boland *et al.* (2014); Crowe *et al.* (2016); Lewis *et al.* (2016); Lewis *et al.* (2017); and Burke *et al.* (2018).	Irish Wetland Bird Survey: Results of Waterbird Monitoring in Ireland, years 2012/13, 2013/14, 2014/15, 2015/16 and 2016/17.
	Tierney *et al.* 2016	Dublin Bay Birds Project paper on post-breeding aggregations of roosting terns in South Dublin Bay in late summer.
	Tierney *et al.* 2017	A synthesis of the research carried out by the Dublin Bay Birds Project from the years 2013 to 2016.
Collision and Displacement	Althouse *et al.* 2019	Response distances of staging terns to inform buffer zone sizing.
	Band 2012	Avian collision risk modelling
	Cook *et al*. 2014	Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines
	Cutts et al. 2013	Waterbird disturbance mitigation toolkit for estuarine planning and construction projects.
	Dierschke *et al*. 2016	Avoidance and attraction of seabird species to offshore wind farms in European waters
	Dierschke *et al*. 2016	Possible behavioural, energetic and demographic effects of displacement of red-throated divers
	Drewitt & Langston 2006	Assessing the impacts of wind farms on birds
	Fleissbach *et al.* 2019	A ship traffic disturbance vulnerability index for northwest European seabirds
	Furness *et al*. 2013	Assessing vulnerability of marine bird populations to offshore wind farms

Topic	Data Source	Description
	Garthe & Hüppop 2004	Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index
	Johnston *et al*. 2014	Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines
	Masden *et al.* 2009	Impacts of wind farms on migrating birds
	Masden 2015; McGregor *et al*. 2018	Avian Collision Risk Model to incorporate variability and uncertainty
	SNCBs 2014, 2017	Advice on how to present assessment information on the extent and potential consequences of seabird displacement from offshore wind farm developments and Joint Response from the SNCBs to the Marine Scotland science avoidance rate review
	Skov *et al*. 2018	ORJIP Bird collision and avoidance study
	Vallejo *et al*. 2017	Responses of two marine top predators (common guillemot and harbour porpoise) to an offshore wind farm
Apportioning	Cook & Robinson 2015	Scientific validity of criticisms made by the RSPB of metrics used to assess population level impacts of offshore wind farms on seabirds
	SNH 2018	Interim guidance on apportioning impacts from marine renewable developments to breeding seabird populations in SPAs.
	Furness 2015	Biologically defined minimum population scales of non-breeding season seabird species in UK waters.
Population modelling	Horswill & Robinson 2015	Review of seabird demographic rates and density dependence

11.4.2 Existing site-specific data

Ecological data have previously been obtained for the CWP in 2001-2003 and 2008. These data were used to inform an Integrated Ecological Management Plan (IEMP) which was compiled by Natural Power in 2013 (Cook *et al*. 2013) in order to inform further baseline surveys undertaken between April 2013 and March 2014. Existing site-specific datasets are summarised in Table 11.2 with their spatial extent shown in Figures 11.1 and 11.2.

The IEMP identified the following seabird species as being particularly significant in relation to impacts potential impacts associated with CWP offshore infrastructure: fulmar (*Fulmarus glacialis*), Manx shearwater, gannet, shag, kittiwake, herring gull (*Larus argentatus*), little tern (*Sternula albifrons*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), guillemot and razorbill. Several migratory goose and swan species were also identified, namely: Greenland white-fronted goose, pale-bellied brent goose, greylag goose (*Anser anser*), Bewick's swan (*Cygnus columbianus*) and whooper swan (*Cygnus cygnus*).

Therefore, considerable site-specific baseline data are already available for CWP and the bird community in the vicinity of Offshore Development Area has already been characterised and discussed.

Contemporary surveys ongoing in spring and summer 2020 were impacted by restrictions related to the Covid-19 pandemic. As it was not possible to undertake boat based ESAS surveys during this period, digital aerial surveys were instead carried out over the same area between May and September 2020, inclusive.

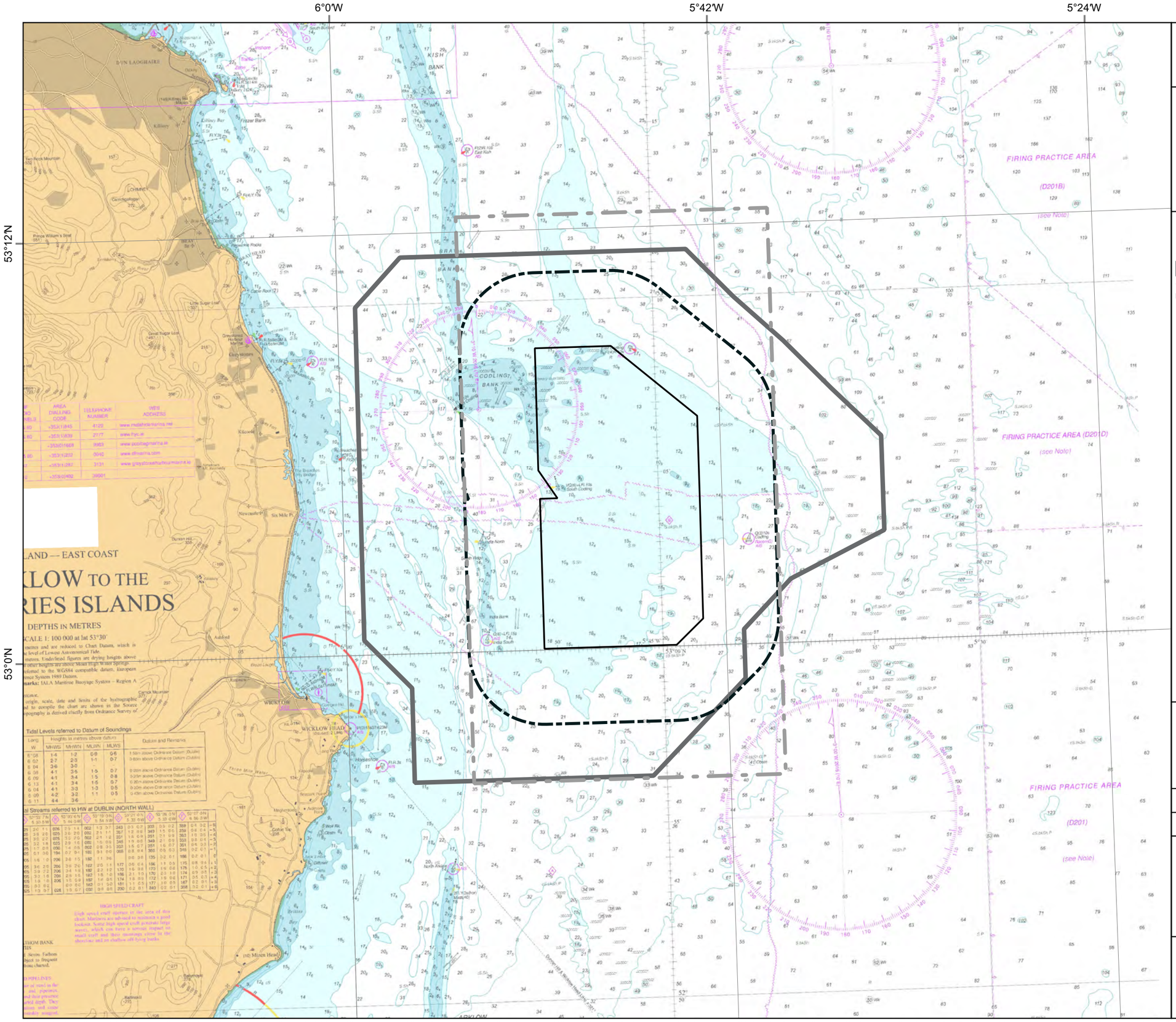
Surveys to characterise the bird communities of proposed cable landfall sites commenced in October 2019.

Table 11.2:Summary of existing site-specific baseline datasets for offshore ornithology

Dataset	Date	Coverage	Data use
Site-specific Boat Based Surveys	April 2001 to May 2003	The surveys covered the lease area for historic Codling Wind Park (see Section 1.2 and Figure 1.1)), plus a 5 km buffer. These surveys covered a more extensive area than the more targeted approach used in the contemporary surveys. Alternating transects between surveys, with 3-4 km separation.	To be used to provide contextual information for the purposes of EIA and Natura Impact Statement (NIS). To inform design of contemporary baseline surveys through an Integrated Ecological Management Plan (IEMP; Cook *et al.* 2013).
Site-specific Visual Aerial Surveys	March 2002 to April 2002	"Lease area" (see Site-specific Boat Based Surveys 2001 to 2003, above), plus a 5 km buffer, with 2 km separation between transects.	To be used to provide contextual information for the purposes of EIA and NIS.
Site-specific Boat Based Surveys	July and September 2008	"Lease area" (see Site-specific Boat Based Surveys 2001 to 2003, above), plus a 5 km buffer. Alternating transects between surveys, with 3-4 km separation. .	To be used to provide contextual information for the purposes of EIA and NIS. To inform design of contemporary baseline surveys through an IEMP (Cook *et al*. 2013).
Site-specific Boat Based ESAS Survey	April 2013 to March 2014	Development Area plus a 4 km buffer plus northern and southern reference areas.	To be used for site characterisation for the purposes of EIA and NIS.
Site-specific Boat Based Migration Surveys	March 2014, April and May 2013 (Spring) September, October and November 2013 (Autumn)	Development Area areas plus a 4 km buffer plus northern and southern reference areas.	To be used for site characterisation for the purposes of EIA and NIS.

Dataset	Date	Coverage	Data use
Site-specific Coastal Migration Surveys	March, April and May 2013 (Spring) September, October and November 2013 (Autumn)	3 x coastal Vantage Points (VPs): Bray Head, Wicklow Head and Kilmichael Point. A total of 36 hours of survey were completed at each VP during both the spring and autumn periods.	To be used for site characterisation for the purposes of EIA and NIS.
Contemporary surveys			
Site-specific Boat Based ESAS Survey	October 2018 to October 2020 [Suspended due to COVID-19 restrictions March to June 2020]	Development Area plus a 4 km buffer	To be used for site characterisation for the purposes of EIA and NIS.
Site-specific Boat Based Migration Surveys	Spring and autumn migration seasons between October 2018 and October 2020 [Suspended due to COVID-19 restrictions spring 2020]	Development Area plus a 4 km buffer	To be used for site characterisation for the purposes of EIA and NIS.
Site-specific Coastal Migration Surveys	Spring and autumn migration seasons between October 2018 and May 2020 [Suspended due to COVID-19 restrictions early- to mid-April 2020]	3 x coastal Vantage Points (VPs): Bray Head, Wicklow Head and Kilmichael Point. A total of 18-24 hours of survey effort were completed at each VP during both the spring and autumn periods.	To be used for site characterisation for the purposes of EIA and NIS.
Site-specific Cable Landfall Surveys	September 2019 to September 2021 [Suspended due to COVID-19 restrictions early April to mid May 2020]	Monthly surveys in varying tidal states of two proposed cable landfall search areas: Poolbeg (via South Dublin Bay) and Ballybrack Coast	To be used for site characterisation for the purposes of EIA and NIS.
	April 2020 to June 2020,	Two coastal walkover visits of the two proposed	

Dataset	Date	Coverage	Data use
	and again in April to June 2021. [April and May 2020 missed due to COVID-19 restrictions early April to mid-May 2020]	cable landfall search areas to check for breeding activity.	
	Mid-July to mid-September 2020, 2021.	Post-breeding tern surveys. To determine the location and scale of post-breeding tern aggregations in South Dublin Bay.	
Site specific Digital Aerial bird and marine mammal survey	May 2020 to September 2020 [Contingency for boat based ESAS surveys which were suspended March to June 2020, inclusive]	Development Area plus a 4 km buffer	To be used for site characterisation for the purposes of EIA and NIS.



Project:

Codling Wind Park

Title:

Figure 11.1: Historic and Contemporary Bird and Marine Mammal Survey Areas at Codling Wind Park (CWP)

Key

- Codling Wind Park
- Bird & marine mammal surveys 2001-2003
- Bird & marine mammal surveys 2013/2014
- Bird & marine mammal surveys 2018/2019

Scale @ A3: 1:200000

Map projection: IRENET95/ Irish Transverse Mercator
Graticlues: WGS 84

0 2.5 5 7.5 10 km

N

Date: 21-07-20	Prepared by: SM	Checked by: SMc
Ref: IE200091_M_220_B		

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6°24'W

6°0'W

5°36'W

5°12'W

53°12'N

52°48'N

Project:

Codling Wind Park

Title:

Figure 11.2: Coastal Landfall Locations and Potential Export Cable Corridor Search Area

Key

- Codling Wind Park
- Potential export cable corridor search area

Coastal migration vantage point location

- Bray Head
- Wicklow Head
- Kilmichael Point

Scale @ A3: 1:300000

Map projection: IRENET95/ Irish Transverse Mercator
Graticules: WGS 84

0 2.5 5 7.5 10 km

N

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11.4.2.1 Data validity

Boat-based Surveys (and Digital Aerial Surveys)

Guidance on marine baseline assessments and monitoring activities for offshore renewable energy projects (DCCAE, 2018) states that three years of ornithological baseline surveys is recommended where no data previously exist. Although more than three cumulative years of survey have been completed for CWP, it is acknowledged that much of the previous data collected are now of an age that they may not be considered reflective of current baseline conditions (i.e. those data collected in 2001-2003 and in 2008).

More recent surveys undertaken in 2013-2014 are considered to be valid for characterising the baseline conditions for CWPs. The survey methods used in 2013-2014 are compliant with present guidance and will be comparable with a repeat dataset. Therefore, it is proposed that these data, gathered using methods which were discussed and agreed with the Department of Culture, Heritage and the Gaeltacht, and BirdWatch Ireland, in April 2013, are used for informing the EIA and NIS.

Data collected prior to 2013 (2001-2003 and 2008) will be used for supplementary information and context, where appropriate.

As extensive historic baseline data already exist for CWP, including the 2013/14 dataset, it is considered that two years of contemporary baseline recording will be sufficient to inform the EIA and NIS in compliance with Scally *et al*. (2018). Therefore, it is proposed that, in addition to the 2013-2014 dataset, the two further years of contemporary baseline surveying undertaken between October 2018 and October 2020 are used for the basis of assessment.

These contemporary surveys shall, as a contingency measure to mitigate against the necessary Covid-19 restriction related cessation of boat-based activities, also include a five-month, 2020 breeding season digital aerial bird and marine mammal dataset. Measures shall be implemented to assess comparability, and integrate as fully as possible, digital aerial and boat-based ornithological datasets. Methodology followed during the digital aerial survey is outlined in Section 11.4.3.

These baseline survey (collected over a cumulative period of 36 months), in addition to desk-based review of seasonal site-specific species densities (i.e. from sources including, but not limited to, Rogan *et al*. 2018 and Waggitt *et al*. 2019) are considered appropriate to capturing any potential inter-annual variability in species diversity, abundance and distribution.

Coastal Migration Surveys

As for with boat-based survey datasets, coastal migration survey datasets from 2013/14 and 2018-20 are proposed to be used as a basis for assessment for migratory geese and swan receptors. These data, in addition to boat-based migration survey data collected over the same periods, are considered to be in accordance with guidance relating to baseline dataset collection (DCCAE, 2018) and appropriate to inform EIA and NIS. Assessment of any potential data gaps in this coastal migration data set shall be undertaken with a desk-based review of available relevant information relating to migration pathways, nocturnal migration activity and migration behaviours during poor visibility and periods of high wind speed.

Coastal Landfall Surveys

Coastal landfall baseline datasets for Ballybrack Coast or Poolbeg (via South Dublin Bay) [assuming either site is chosen as the intended landfall location] will comprise data collected between September 2019 and September 2021, plus additional I-WeBs (and other supplementary data – such as roosting tern counts, and tern breeding counts around South Dublin Bay or Dalkey Island) obtained from Birdwatch Ireland covering earlier seasons.

Breeding bird walkover surveys were scheduled to be carried out during May and June 2020 and May and June 2021. These surveys are considered to be appropriate for recording breeding bird activity in the immediate vicinity of any proposed landfall works. Due to lockdown restrictions imposed by the Irish Government in response to Covid-19, it was not possible to

survey during May 2020. Coastal breeding bird walkover surveys were instead carried out during June and July 2020. Data collected during these surveys are considered to remain valid as an indication of coastal breeding bird activity. It is currently anticipated that May and June 2021 coastal breeding bird surveys will take place as planned.

Staging tern surveys, currently underway (July to September 2020) within the Poolbeg (South Dublin Bay) landfall search area, shall aim to collect data on the numbers and distributions of roosting terns. These surveys shall supplement existing data relating to post-breeding tern aggregations which have already been obtained from NPWS.

Figure 11.2, above, shows the potential export cable corridor to meet the coast along four stretches of coastline. Coastal landfall surveys have been initiated along the northernmost two of these stretches of coastline. Should either of the southern stretches of coastline be considered in future as possible landfall locations, surveys would be commenced at these sites and would cover a minimum duration of 2 years.

11.4.3 Future Baseline Assessment

11.4.3.1 Boat-based Seabird Surveys

Boat-based ESAS surveys are the primary data collection method. The proposed surveys were designed to provide robust data to inform EIA and HRA, and to allow densities and distributions to be estimated for key species.

Twelve surveys were planned to have been conducted during each 12-month period. Surveys are timed to be spread over each key biological period, with the aim being for one survey to be undertaken per month (weather permitting). Lockdown restrictions imposed by the Irish and UK governments in response to the Covid-19 global pandemic resulted in some disruption to the original planned survey schedule. Boat-based bird and marine mammals are being supplemented by Digital Aerial Surveys (DAS), the methods of which are described below in Section 11.4.3.2: Digital Aerial Surveys. It should be noted that, as boat-based surveys are operating on a reduced team during the Covid-19 pandemic, boat-based marine mammal recording has been suspended, as DAS surveys detect and record marine mammals present within the survey area. Boat-based surveys recommenced in July 2020 and are subject to the implementation of guidelines introduced to mitigate against the risk of Covid-19. DAS will continue until March 2021.These include personal hygiene and social distancing measures.

Survey Area

The survey methodology follows that outlined by Camphuysen *et al*. (2004), taking account of the recommendations to improve this methodology outlined by MacLean *et al*. (2009). The characteristic of this approach is the use of a line-transect survey method covering the CWP site and a 4 km buffer.

The proposed survey area showing the survey transects.

The full lengths of the 16 transect lines, as shown in Figure 11.3, are followed on each survey, with the start and end points reversed between surveys to ensure coverage of different parts of the site at different times of day. Whilst following the transects, surveyors record all birds encountered onto survey forms.

Details of ESAS Methods

Three surveyors are used during each survey: one surveyor to act as observer, a second surveyor to act as a scribe and the third surveyor to aid the other two surveyors where necessary[4]. Surveyors alternate roles at the end of each transect line to prevent fatigue. All surveyors have been trained to ESAS standards on Joint Nature Conservation Committee

[4] A reduced team of two surveyors is currently being used in response to the Covid-19 pandemic. The implications of this in terms of data validity have been assessed and it is considered that data gathered will be comparable to the methodology used for all other survey visits.

(JNCC) accredited courses and are highly experienced in survey recording methods and bird identification, including familiarity with all relevant common and scarce marine species, some knowledge of rarities and a full understanding of plumages and moults.

Key components of the ESAS method used are as follows:

- Bird detection is undertaken by naked eye, but binoculars are used to confirm identity and to occasionally look ahead for easily flushed species, such as divers and sea ducks;
- The survey is based on a line transect method with a strip width of 300 m; these surveys survey this transect on one side of the survey vessel using a 90° viewing angle;
- The 300 m transect is sub-divided into the following five bands into which all birds on the water are allocated: 0-50 m (band A), 50-100 m (B), 100-200 m (C), 200-300 m (D), 300+ m (E). Distances are perpendicular to the survey vessel. Only birds within 300 m (bands A-D) are considered to be 'in transect';
- For each observation, time is recorded to the nearest minute. At a speed of 10 knots, this allows the position of birds to be determined to the nearest 300 m. The time piece used for recording sightings is matched to a hand-held GPS used for recording survey tracks;
- All birds in flight are recorded, but only those 'in snapshot' are considered to be 'in transect'. A snapshot is made every 300 m of distance travelled (estimated based on time and adjusted to take into account the speed of the vessel, where 60 seconds approximately equals 300 m distance covered at a speed of 10 knots). A timed repeat alarm (adjusted to the speed of the survey vessel) marks the location of snapshots. At the time of a snapshot all birds in flight within a 300 x 300 m 'box' extending 300 m to the front and 300 m perpendicular to the survey vessel are noted as being 'in transect';
- Birds in flight have their height estimated, at the time of first observation. The following approach to height recording is adopted for the current boat-based survey campaign:
    - to the nearest metre for birds below 5 m in height;
    - to the nearest five metres for birds 5 - 50 m in height;
    - to the nearest 10 m for birds 50 – 100 m in height; and
    - to the nearest 20 m for birds more than 100 m in height.

Additional flight height recording is also being undertaken:

- Birds in flight have their direction of flight recorded (using an eight-point compass); and
- Additional data are collected for each bird (where possible) including age, plumage type and behaviour.

For each observation made, the following information is recorded:

- Species (using BTO two letter codes);
- Number (count);
- Distance from vessel (see above);
- Height of flight (see above);
- Direction (where applicable); and
- Additional information regarding, age, sex, plumage and behaviour wherever possible.

Surveys are only undertaken when the weather forecast indicates suitable conditions for recording seabirds e.g. sea state 4 or less, and with good visibility (minimum of 300 m).

A number of environmental variables affecting visibility, and thus survey efficiency (e.g. rain, glare, wind speed and sea state), are also recorded. These abiotic factors are noted at the start of each transect and when any changes in weather/sea conditions are detected, as per MacLean *et al*. (2009).

Vessels

Vessels used comply with COWRIE guidance (Camphuysen *et al*., 2004; MacLean *et al*., 2009) in having:

- A forward viewing platform at least 5 m above sea level;
- The capability of travelling at a speed in the range of 5-15 knots (whilst usually surveying at approximately 10 knots); and
- Adequate and suitable space for the required number of surveyors.

One vessel (*AMS Panther*, a wind farm service catamaran) falls just short of the recommended length of 20 to 100 m, being 17 m in length. It is considered that the observer eye height of at least 5 m above sea level is key**,** and as such *AMS Panther* is still a valid platform from which to conduct ESAS surveys.

11.4.3.2 Digital Aerial Surveys

The digital aerial survey methodology, employed between May and March 2021 to supplement boat-based bird and marine mammal surveys during the 2020 Covid-19 global pandemic, comprises the following:

- Digital video aerial surveys undertaken by HiDef Aerial Surveying Ltd.;
- One survey per month;
- 16 transect lines flown, with a separation distance of 1.5 km and corresponding with transect lines used for boat-based surveys (as shown in Figure 11.3);
- Total coverage of study area 16.7%; and
- Flight altitude of 550 m above sea level.

11.4.3.3 Boat-based Migration Surveys

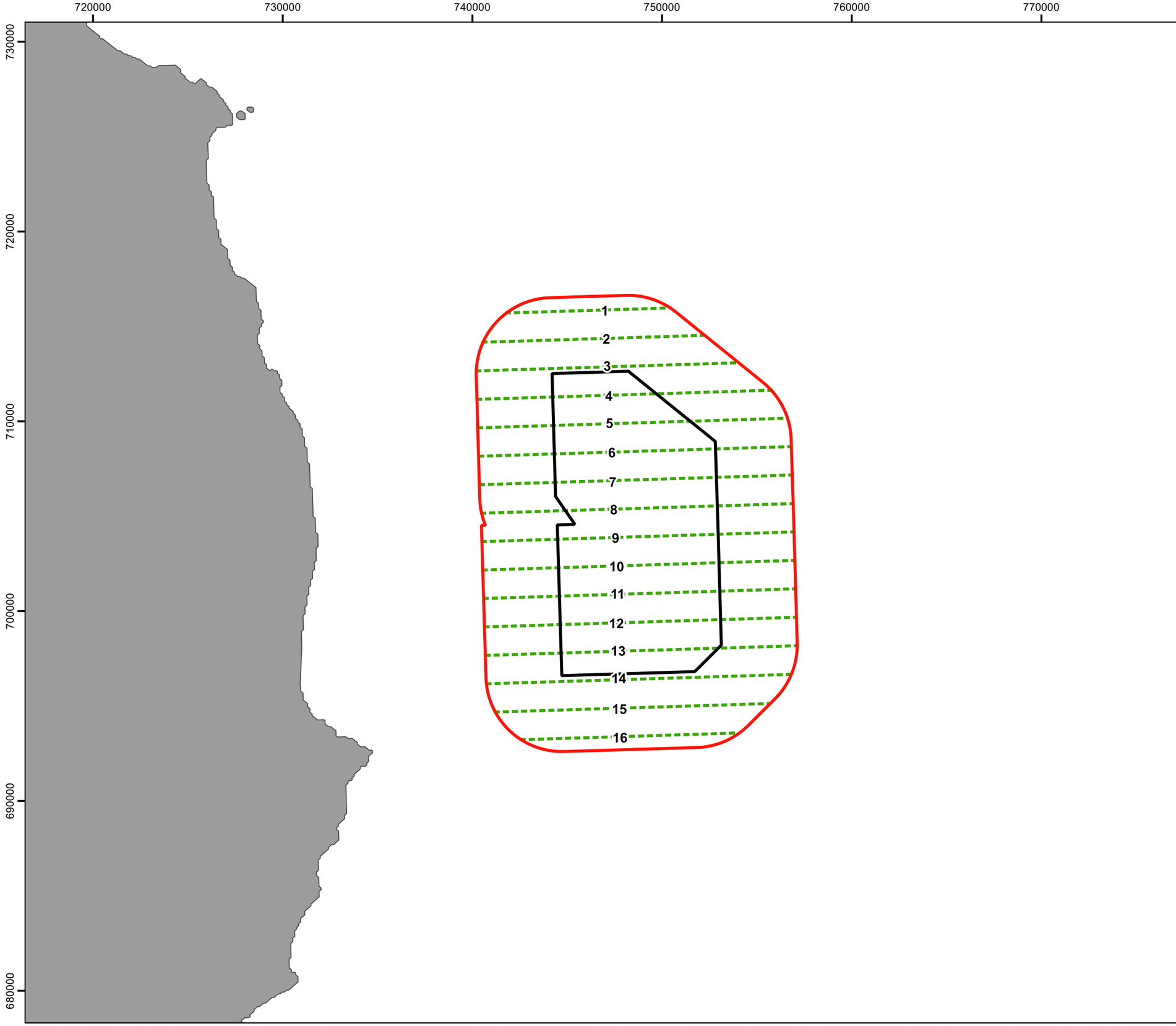
A dedicated boat-based Migration Observer is not currently employed during every visit of the current survey programme. This is due to the very low number of target species which were recorded as part of the ornithological surveys during 2013-2014. However, in addition to all species recorded as part of the standard ESAS survey, any 'off effort' sightings of geese and swans that would not normally be recorded (e.g. birds seen between transect lines or otherwise not 'in transect') are recorded, in the form of supplementary records.

11.4.3.4 Laser Rangefinder Flight Height Recording

A supplementary source of recording flight heights has been incorporated into the boat-based survey methods, through the use of a laser rangefinder. The rangefinder is used by a member of the survey team that is not undertaking ESAS recording. Rather than continuous monitoring of flight heights, a 'sample' of records is collected during the course of the survey[5]. Records made in this way are matched to those records made during the standard ESAS recording (where possible) in order to assess the possible under- or over-estimation of flight heights by observers and allow a correction to be made if this is necessary.

The sampling periods during which the laser rangefinder is used is recorded with start and end times, to provide a record of survey effort. During these sampling periods, all target species (those bird species which are considered to be at risk of collision due to their flight behaviour) are noted if they fly within 300 m of the survey vessel, either to port or starboard. The time of the observation is recorded, as well as recording whether the bird is within the ESAS survey transect and whether it is above or below 5 m in height. For birds above 5 m, the laser rangefinder is used to determine flight height (where possible), with the record being highlighted as such if a height was not obtained.

[5] This supplementary data collection is currently suspended during the Covid-19 pandemic



Project:

Codling Wind Park

Title:

Figure 11.3: Transects Surveyed during Boat-based Bird and Marine Mammal Survey

Key

- Survey area
- Codling Wind Park
- Boat-based transects (1.5 km spacing)

NOT TO BE USED FOR NAVIGATION

Scale @ A3: 1:200,000

Coordinate System: RENET95 / Irish Transverse Mercator

N

0 2.5 5 7.5 10 km

Date: 30-07-20	Prepared by: LG	Checked by: FM
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11.4.3.5 Coastal Bird Surveys

Coastal vantage point (VP) surveys

Coastal VP surveys are being undertaken during the spring and autumn migration periods, with the primary aim of obtaining data regarding the movements of migratory swans and geese from SPA populations, as they migrate along the Irish east coast in the wider vicinity around the Development Area. The surveys are undertaken from three onshore locations: Bray Head, Wicklow Head and Kilmichael Point.

The protocol for the coastal migration surveys is as follows:

- Systematic 180° scanning (including overhead) for birds in flight, for six hours per day (an hour break to be taken between each three-hour stint) as per Scottish Natural Heritage (SNH) onshore wind farm vantage point guidance (SNH, 2014);
- Target species are geese and swans;
- Secondary species are seaduck, waders, raptors and passerines;
- These surveys are not undertaken in weather conditions which are likely to preclude migration; and
- Data collected are:
    - Vantage point location;
    - Time of observation;
    - Species;
    - Flock size;
    - Flight height, using agreed bands;
    - Flight direction;
    - Distance from observer (to the nearest 500 m); and
    - Recording of flight-lines onto maps (for subsequent digitising).

During the autumn migration period, a total of seven surveys are undertaken at each VP, once in every 10-day period between early October and early December. During the spring migration period, a total of six surveys are undertaken at each VP, once in every 10-day period between early March and the end of April. These timings are based on data provided in Fox ***et al***. (2017); but these timings are also considered suitable for recording migrating brent geese.

Tidal Wader and Waterbird Surveys

Survey areas have been determined such that it is possible for an observer to count all birds present within a reasonable time (up to four hours). Consultation with local I-WeBS surveyors indicated that to cover each of the indicated survey areas (see Figure 11.4) within the specified time frames would require two surveyors working concurrently, each covering approximately half of the survey area[6].

Counts are conducted from suitable vantage points, taking care not to count the same area twice after moving between positions. The positions of birds that have moved during the count are noted, so that they are not counted more than once or missed altogether.

[6] As of May 2020, tidal bird surveys are being carried out by a single surveyor. Activity levels at the Ballybrack Coast survey area are such that the whole area can be covered by one surveyor in the given time period. At the Poolbeg/South Dublin Bay survey area, the surveyor works from north to south and records as many data as possible within the given time period. It is anticipated that the south end of the Poolbeg/South Dublin Bay search area is unlikely to be selected as a landfall location. Nevertheless, it is expected this area will be surveyed fully once the survey team of two is working together again after Covid-19 restrictions.

716000
720000
724000
728000
732000
736000
732000
728000
724000
720000

Poolbeg/South Dublin Bay

Ballybrack Coast

Project:
Codling Wind Park

Title:
Figure 11.4: Tidal Landfall Bird Survey Areas

Key

Survey area

Scale @ A3: 1:75,000

Coordinate System: IRENET95 / Irish Transverse Mercator

0 1 2 3 4 km

N

Date: 23-07-20	Prepared by: IW	Checked by: FM
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Surveyors search all areas, paying particular attention to places where birds may be hidden, such as at the water's edge, within reedbeds, channels or otherwise hidden in vegetation or amongst rocky coastline. Only birds seen are counted (i.e. birds heard only are not recorded); even if it is suspected that birds flying into land are joining a flock hidden in a channel, for example, only the birds observed are counted.

The species, numbers and behaviours of birds are noted, and the locations of flocks mapped on to high resolution field maps.

Surveyors record the accuracy of their counts, using 'OK' or 'low'. 'OK' is used to describe counts where the whole site was adequately covered, and numbers and locations of all species present were noted. 'Low' is used to describe a count that was compromised due to factors such as poor visibility, disturbance or other factors. 'Low' can be used to describe the accuracy of a single species if necessary (assuming other species present were considered to be counted as 'OK').

If it is not possible to count a species, its presence on site is still noted. In the event of there being no birds present on site, field forms are nevertheless completed, stating that no birds were recorded during the visit.

Surveyors estimate the numbers of birds in large and/or mixed/mobile flocks as accurately as possible and care is taken to keep disturbance to a minimum.

In addition, surveyors collect information relating to any disturbance events observed and complete a summary of the following weather conditions during each hour of survey time:

- Temperature;
- Wind speed (Beaufort scale);
- Wind direction;
- Cloud cover (in eighths);
- Cloud height;
- Precipitation; and
- Visibility.

Coastal breeding bird surveys

Coastal breeding bird surveys are being undertaken in accordance with the recommendations of Scally *et al*. (2018) and following the methodology outlined in Bibby *et al*. (2000). Two site visits are being undertaken at each survey area, each season, for two breeding seasons (2020 and 2021). Site visits occur in late-April/early-May and mid- to late-June each season[7]. All areas of suitable nesting habitat within specified survey areas are covered by means of walkover surveys (or are viewed from a nearby location where access is problematic, i.e. offshore nesting terns, etc.). Data are compiled to determine the numbers and distributions of species nesting within the survey areas.

Staging Tern Surveys

Staging tern surveys are underway to determine the numbers, distributions and species of post-breeding tern aggregations in South Dublin Bay. Visits are timed to begin 2 h before sunset and continue until approximately civil twilight or approximately 15 minutes after sunset. Visits take place on a high or rising tide, (high water occurring within one to two hours of sunset), so that any birds are more concentrated and easier to count. Data recorded include the locations of tern flocks. The presence and relative abundance of species within a flock are also recorded, as well as weather conditions at the time of the survey. Four visits are scheduled to take place; one in mid- to late-July, one in early- to mid-August, one in early- to mid-

[7] It was not possible to carry out a coastal breeding bird visit during April/May 2020, so visits took place during June and July 2020.

September and one in mid- to late-September. Landfall ornithology surveys will continue over winter period.

11.5 Legislation and Guidance

In addition to the legislation and guidance identified as relevant in Sections 2.5, 3.2 and 5.2, the following legislation and guidance will be considered as part of the ornithological assessment process:

- Ramsar Convention on Wetlands of International Importance (1971);
- Bonn Convention on the Conservation of Migratory Species of Wild Animals 1979, as amended;
- European Union (2011) EU guidance on wind energy development in accordance with the EU nature legislation. European Union, Luxembourg;
- CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Coastal and Marine;
- Burke, B. (2018) Trialling a Seabird Sensitivity Mapping Tool for Marine Renewable Energy Developments in Ireland. BirdWatch Ireland, Kilcoole, Co. Wicklow;
- Maclean *et al*. (2009) A review of assessment methodologies for offshore wind farms; and
- King *et al*. (2009) Developing guidance on ornithological cumulative impact assessment for offshore wind farm developers.

Specific advice and guidance on impacts or species, and on the approaches to undertaking and interpreting the assessment, are referenced and discussed in Section 11.8.

11.6 Design Parameters

The following provides an overview of the Design Parameters that will be applied for CWP.

The Design Parameters allow for a range of parameters to be consented and it is proposed that the EIA is to be carried out on an agreed 'worst-case' scenario i.e. the design that would likely to have the biggest impacts on each individual receptor. Providing a maximum within each design parameter allows for flexibility in the final overall design choice whilst providing sufficient information for the EIA (and NIS) to be carried out.

Table 11.3 below identifies the Design Parameters considered to be relevant to ornithological interests.

Table 11.3: Relevant worst-case design parameters for offshore ornithology

Design Parameters	Worst case
Number of WTGs	Up to 140
Blade tip height (above LAT)	Up to 320 m
Rotor diameter	Up to 288 m
Indicative separation distances between WTGs	Up to 8 x 8 rotor diameter
Number of OSPs	5
Foundation type	Pile*
* Worst case considered to result from piled foundations. This may include installation of monopiles or jacket foundations with pin piles. Further consideration of the worst-case scenario will be undertaken during pre-application and agreed with consultees.	

In addition to the worst-case Design Parameters outlined in Table 11.3, there will also be Offshore Export and array cables and associated installation and cable protection works. The landfall locations and export cable corridors remain to be confirmed. Similarly, predicted numbers of vessel movements during the construction, operation and decommissioning phases remain to be specified.

11.7 Scoping of CWP EIA

The impact assessment methodology will follow that recommended by the CIEEM for marine and coastal developments (CIEEM, 2019).

The potential impacts on offshore and migratory ornithological interests to be scoped in for assessment will arise from planned activities associated with construction, operation and decommissioning of CWP. These impacts are outlined in Table 11.4.

Potential impacts of non-planned events (where sufficient good practice measures are in place to render the chance of such events occurring minimal) are proposed to be scoped out. As such possible spills and pollution incidents are scoped out.

Table 11.4: Scope of CWP EIA migratory and offshore ornithology assessment

Potential Impact	Reason
Landfall site	
Construction and Decommissioning Phase	
Direct disturbance • Increased above water noise • Increased underwater noise • Visual effects	Disturbance effects can manifest through the deterrence of birds from using suitable or preferred habitat (e.g. effective habitat loss). Noise (above and below water) and visual disturbance have the potential to arise as a result of the presence of vessels, installation (e.g. directional drilling, trenching or cable laying) and decommissioning activities.
Indirect effects as a consequence of impacts on prey species	Potential effects on habitats, benthic/intertidal organisms and fish species through the installation and decommissioning of infrastructure and changes to physical processes that may affect the availability of prey species.
Operation and Maintenance Phase	

Potential Impact	Reason
Disturbance and Displacement	Deterrence of birds from using suitable or preferred habitat (e.g. effective habitat loss) through maintenance works and/or as a result of the presence of vessels. Reduced number of birds occurring within or immediately adjacent to landfall infrastructure
Direct habitat loss	This impact is considered for the operational phase only, as habitat loss during construction is considered as part of disturbance and indirect effects on prey during installation activities. Loss of habitat may have population level impacts through reductions in carrying capacities, and increased foraging energetic costs.
Indirect effects as a consequence of impacts on prey species	Potential effects on habitats, benthic/intertidal organisms and fish species through the operational phase and changes to physical processes that may affect the availability of prey species.
Cable route	
Construction and Decommissioning Phase	
Direct disturbance • Increased above water noise • Increased underwater noise • Visual effects	Disturbance effects can manifest through the deterrence of birds from using suitable or preferred habitat (e.g. effective habitat loss). Noise (above and below water) and visual disturbance have the potential to arise as a result of the presence of vessels, installation (e.g. directional drilling, trenching or cable laying) and decommissioning activities.
Indirect effects as a consequence of impacts on prey species	Potential effects on habitats, benthic organisms and fish species through the installation and decommissioning of cable infrastructure and changes to physical processes that may affect the availability of prey species.
Operation and Maintenance Phase	
Disturbance and Displacement	Deterrence of birds from using suitable or preferred habitat (e.g. effective habitat loss) through maintenance works and/or as a result of the presence of vessels. Reduced number of birds occurring within or immediately adjacent to cable infrastructure
Direct habitat loss	This impact is considered for the operational phase only, as habitat loss during construction is considered as part of disturbance and indirect effects on prey during installation activities. Loss of habitat may have population level impacts through reductions in carrying capacities, and increased foraging energetic costs.
Indirect effects as a consequence of impacts on prey species	Potential effects on habitats, benthic organisms and fish species through the operational phase and changes to physical processes that may affect the availability of prey species.
Wind Farm	
Construction and Decommissioning Phase	
Direct disturbance	Disturbance effects can manifest through the deterrence of birds from using suitable or preferred habitat (e.g. effective habitat loss). Noise

Potential Impact	Reason
• Increased above water noise • Increased underwater noise • Visual effects	Above and below water) and visual disturbance have the potential to arise as a result of the presence of vessels, installation (e.g. piling) and decommissioning activities.
Indirect effects as a consequence of impacts on prey species	Potential effects on habitats, benthic organisms and fish species through the installation and decommissioning of infrastructure and changes to physical processes may affect the availability of prey species.
Operation and Maintenance Phase	
Collision	Collisions with rotating turbine blades are a potential source of direct mortality, with the potential to give rise to population-level impacts.
Displacement	Displacement is defined as 'a reduced number of birds occurring within or immediately adjacent to an offshore wind farm' (Furness *et al*. 2013) and involves birds present in the air and on the water (SNCBs 2017). Displacement has the potential to result in detrimental effects on seabird foraging success and/or impose increased energetic costs to seabirds. As such, there is the potential for population-level impacts.
Barrier effects	Birds that do not intend to utilise a wind farm area but would have previously flown through the area en route to a feeding, resting or nesting area, and which either stop short or detour around a development, are subject to barrier effects (SNCBs 2017). For the purposes of assessment, however, it is usually not possible to distinguish between displacement and barrier effects (for example to define where individual birds may have intended to travel to, or beyond an offshore wind farm, even when tracking data are available). Therefore, in this assessment the effects of displacement and barrier effects on the key seabird species are considered together.
Indirect effects as a consequence of impacts on prey species	Potential effects on habitats, benthic organisms and fish species through the operation and maintenance of infrastructure and changes to physical processes may affect the availability of prey species.
Direct habitat loss	This impact is considered for the operational phase only, as habitat loss during construction is considered as part of disturbance and indirect effects on prey during installation activities. Loss of habitat may have population level impacts through reductions in carrying capacities, and increased foraging energetic costs.

11.8 Assessment Methodology

The approach to EIA is outlined in Section 5.5: Assessment of Potential Effects, above.

The specific approaches and methods to be used in the offshore, migratory and coastal landfall ornithology assessment will follow available industry guidance and will include:

- **Determination of regional reference populations for breeding seabirds**: Breeding colonies within foraging range of the CWP will be identified based on available foraging range information, notably the estimated mean-maximum foraging range as defined by Woodward *et al*. (2019), in combination with other detailed information on ranges where this is available. Having identified colonies which contribute to the regional reference population for each species, Seabird Monitoring Programme (SMP) colony count data will be used to derive population estimates, together with any information provided by BirdWatch Ireland.

- **Combination of boat-based and digital aerial datasets:** Data from both aerial and boat-based survey techniques are currently being collected at the site. The best approach for combining these datasets into a single analysis is currently a key topic in the wind industry and it is understood that Scottish Natural Heritage (SNH) have commissioned a study to examine this. Given the absence of Irish guidance on this subject, the outcomes of this study would inform our approach if the timescales fitted in with the current project. In lieu of that study being published we would seek to follow existing work that has done so e.g. Winiarski *et al*. 2014.
- **Apportioning:** Apportioning of the effects according to breeding colonies will be undertaken following the interim approach outlined by SNH (2018), based on the distance to and size of each colony.
- **Collision risk modelling**: This will be undertaken using the Strategic Ornithological Support Services (SOSS) offshore collision risk model (CRM) (Band 2012). Where possible, CRMs will be run using the most recent adaptation of the offshore model (Masden 2015; McGregor *et al*. 2018). Model options and avoidance rates will be selected on a species-specific basis following SNCB recommendations (SNCBs 2014). Given that there is increasing recognition of the high level of between-site and between-season variation in seabird flight heights (Johnston & Cook 2016) it is likely that site-specific flight height data may be more appropriate for use within the CRMs than generic flight height data (Johnston *et al*. 2014a, b). The exact approach used will be agreed with the relevant consultees.
- **Displacement/barrier effects**: The SNCB matrix approach will be used in predicting impacts from displacement and barrier effects (SNCBs, 2017). This method assumes a reduction in the reproductive or survival rates of the displaced 'population' (where the displaced 'population' is estimated by applying a species-specific displacement rate to the estimated breeding season population size in CWP). Species-specific displacement rates will be determined from a review of the available information for each of the relevant species (e.g. Cook *et al*. 2014; Dierschke *et al*. 2016; MMO 2018) and will be agreed with relevant consultees.
- **Population-level impacts**: These will be determined for the key seabird species by applying Population Viability Analyses (PVAs) to compare predicted population trajectories and population sizes after 25 years of operation between the impacted and un-impacted scenarios. Outputs from the PVAs will be interpreted taking note of the findings of Cook & Robinson (2015) on the sensitivity of different metrics.

11.9 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018)) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Cumulative assessment methods will broadly follow those outlined in Collaborative Offshore Wind Research into the Environment (COWRIE) guidance (King *et al*. 2009). Cumulative impacts will be considered for the different components of CWP as well as the CWP with other proposed projects.

Table 11.5 below, identifies other offshore wind farms considered in the scoping of the CIA. This list is derived by considering other offshore wind farm developments within the Irish and Celtic Seas and other works within the Export Cable Search.

Other plans and projects in addition to OWF may also be scoped in for CIA following discussion and agreement with relevant consultees. Other plans and projects may include (but would not be limited to) terrestrial developments including terrestrial wind farms (in the case of migratory geese and swans), tidal and wave energy developments, port works, dredging activities and works associated with interconnector cables.

Table 11.5: Distances from the Development Area and operational/application statuses of developments considered in the scoping of the cumulative impact assessment for offshore ornithology

Project Name	Distance from CWP study area (km)	Status
Offshore Wind Farms		
Dublin Array	3	Relevant Project
Arklow Bank Phase 2	22.5	Consented
Arklow Bank Phase 1	18	Operational
North Irish Sea Array	25	Relevant Project
Oriel Wind Farm	61	Relevant Project
Gwynt y Mor Extension (Wales)	121	Planning
Rhyl Flats (Wales)	138	Operational
Gwynt y Mor (Wales)	140	Operational
North Hoyle (Wales)	153	Operational
Burbo Bank Extension (England)	161	Operational
Walney Phase 3 and 4 (England)	163	Operational
Burbo Bank (England)	171	Operational
Walney Phase 1 and 2 (England)	173	Operational
West of Duddon Sands (England)	174	Operational
Ormonde (England)	184	Operational
Barrow (England)	186	Operational
Robin Rigg (Scotland)	222	Operational

11.10 Scope of the Appropriate Assessment (AA)

The AA (and NIS) will be undertaken by following available and relevant guidance in assessing impacts on Natura 2000 sites (Special Protection Areas (SPAs) in the case of birds) and Ramsar sites, which may arise during the construction, operation and decommissioning of the CWP Development Area and Offshore Export Cable Route. This will involve:

- Identifying relevant Natura 2000 and Ramsar sites which include Annex I or regularly occurring migratory bird species as qualifying features and for which there is potential connectivity with an

impact associated with the construction, operation and decommissioning activities for the CWP offshore infrastructure, cable route and/or landfall; and

- Screening for site/receptor combinations where there may be Likely Significant Effects (LSE), and if appropriate, assessing whether impacts may have an adverse effect on site integrity.

In order to define the scope of the AA screening, internationally designated breeding seabird populations in Ireland and the UK which are conservatively considered to have potential connectivity with the CWP OWF have been identified, using the mean max. foraging ranges plus one standard deviation stated in Woodward *et al*. 2019, up to a range of 500 km (by sea). For some species with very large foraging ranges, primarily Manx shearwater and fulmar (but also potentially great skua and Leach's storm petrel), additional Natura 2000 sites beyond 500 km fall within the Woodward *et al.* (2019) mean max foraging range (plus one standard deviation). These distant SPAs are not listed in Table 11.6, below, and further consultation with the NPWS will be undertaken in relation to the inclusion of such sites during in-combination assessment. It is considered unlikely that such birds would occur in sufficient concentrations that would result in any significant impact at the source population from the CWP OWF alone, however consideration should be given to any potential impacts that may contribute towards in-combination effects at these distant designated sites.

Woodward *et al*. 2019 mean max. foraging ranges plus one standard deviation were also used to identify staging tern populations with potential connectivity to CWP OWF.

Natura 2000 sites designated for one or more breeding (or staging) seabird species, which are within foraging ranges as given by Woodward *et al*. 2019 (plus one standard deviation) of proposed offshore infrastructure, out to a distance of 500 km will therefore be included in the AA screening. These sites, and their distances from CWP are listed in Table 11.6. The assessment of these individual sites will use the mean max. foraging ranges of each respective designated species to determine their qualification for being carried through to the LSE stage of the Appropriate Assessment. It should be noted that a site may qualify for inclusion based on connectivity of only one of its designated features.

Breeding (and staging) species which are designated in Section 3.2 (but not Section 3.3) of the Standard Data Form at any of these sites and which have forging ranges which overlap with CWP are listed in Table 11.7. These species listed in Table 11.7 are considered to be those relevant to the Appropriate Assessment screening (and Appropriate Assessment if required), and no other features that may be designated are proposed for inclusion in the assessment due to the lack of potential connectivity with the CWP Project.

Table 11.6: Internationally designated sites for breeding seabird and staging tern species identified as having potential connectivity with CWP (Development Area and proposed cable routes), within a maximum of 500 km

SPA	Ramsar?	Shortest distance by sea to site (km)
The Murrough		0.0
Wicklow Head		0.0
South Dublin Bay and River Tolka Estuary	✓	0.0
Dalkey Islands		0.1
Howth Head Coast		3.7
Ireland's Eye		8.0
Lambay Island		17.1
Rockabill		26.8
Skerries Islands		27.1
Aberdaron Coast & Bardsey Island (Wales)		54.1

SPA	Ramsar?	Shortest distance by sea to site (km)
Saltee Islands		108.1
Skomer, Skokholm and Seas off Pembrokeshire (Wales)		138.0
Grassholm (Wales)		138.6
Copeland Islands (Northern Ireland)		160.3
Helvick Head to Ballyquin		177.7
Morecambe Bay and Duddon Estuary		188.4
The Bull and The Cow Rocks		387.8
Deenish Island and Scariff Island		403.1
Puffin Island		416.2
Skelligs		417.8
Ailsa Craig (Scotland)		430.1
Mers Celtiques - Talus du golfe de Gascogne (France)		430.7
Blasket Islands		443.2
Nord Bretagne DO		450.4

Table 11.7: Seabird and staging tern species listed as designated receptors at Natura 2000 sites considered as having potential connectivity with CWP (within a maximum of 500 km)

Species	Latin Name	Conservation designations
Manx shearwater	*Puffinus puffinus*	
Storm petrel	*Hydrobates pelagicus*	Annex I
Gannet	*Morus bassanus*	
Fulmar	*Fulmarus glacialis*	
Cormorant	*Phalacrocorax carbo*	
Shag	*Phalacrocorax aristotelis*	
Little tern	*Sternula albifrons*	Annex I
Common tern	*Sterna hirundo*	Annex I
Arctic tern	*Sterna paradisaea*	Annex I
Roseate tern	*Sterna dougallii*	Annex I
Lesser black-backed gull	*Larus fuscus*	
Herring gull	*Larus argentatus*	
Great black-backed gull	*Larus marinus*	
Kittiwake	*Rissa tridactyla*	
Guillemot	*Uria aalge*	
Razorbill	*Alca torda*	Near threatened
Puffin	*Fratercula arctica*	Vulnerable

Internationally designated wintering bird populations (excluding migratory geese and swans) considered to have potential connectivity with the CWP OWF have been identified within a search area of 50 km from the proposed offshore windfarm boundary. A 50 km search area

was considered appropriate for assessing potential connectivity with sites designated for wintering birds. Wintering seabirds disperse widely and occur in lower concentrations than during the breeding season. In contrast to the breeding season, wintering seabirds are not bound to a fixed point (i.e. breeding colony) from which they must commute. As such, their presence within a designated site during the non-breeding season is less certain. Conversely, waders and wildfowl concentrate into large wintering flocks which may occur within designated sites. They do not travel widely to forage as seabirds do, however they will make daily local movements between foraging and roosting locations within and around their wintering grounds. Some designated sites have very long lists of species which make up less than 2% of national population included in Section 3.2 of the standard data form. Information relating to internationally designated wintering bird populations only (excluding migratory geese and swans), that will therefore be assessed as part of the AA screening, is provided in Table 11.8.

Table 11.8: Internationally designated sites for wintering bird species (excluding geese and swans) identified as having potential connectivity with CWP (Development Area and proposed cable routes)

SPA	Ramsar?	Distance to site (km)	Species	Designated wintering population
The Murrough		0.0	Red-throated diver	32 ind
South Dublin Bay and River Tolka Estuary	✓	0.0	Mediterranean gull	10-20 ind
			Sanderling	312 ind
			Knot	548 ind
			Bar-tailed godwit	766 ind
North Bull Island	✓	0.3	Pintail	233 ind
			Shoveler	141 ind
			Sanderling	141 ind
			Dunlin	3,926 ind
			Knot	2,623 ind
			Oystercatcher	1,784 ind
			Bar-tailed godwit	1,529 ind
			Black-tailed godwit	367 ind
			Grey plover	517 ind
			Shelduck	1,259 ind
			Redshank	1,431 ind
Baldoyle Bay	✓	5.7	Shelduck	147 ind
Malahide Estuary		11.0	Great crested grebe	64 ind
			Shelduck	439 ind

SPA	Ramsar?	Distance to site (km)	Species	Designated wintering population
			Pintail	58 ind
			Goldeneye	215 ind
			Red-breasted merganser	105 ind
Rogerstown estuary	✓	16.5	Shelduck	781 ind
			Shoveler	72 ind

All of the geese and swan species which are designated features for SPAs around CWP are winter visitors. Assessing potential connectivity between the proposed OWF development and these SPA populations primarily concerns determining the likelihood of birds passing through CWP during their autumn and spring migrations to and from their wintering grounds. The designated sites listed in Table 11.9 will be considered in the Appropriate Assessment screening due to the fact that they are designated for migratory wildfowl which travel north and south along the east Irish coast as they migrate between their breeding grounds in Iceland, Greenland and Scandinavia and their wintering grounds in western Europe.

Table 11.9: Internationally designated sites for migratory swan and goose species identified as having potential connectivity with CWP

SPA	Ramsar?	Distance to site (km)	Species	Designated wintering population	Updated population estimate
The Murrough		0.0	Greenland white-fronted goose	14 ind	
			Greylag goose	300 ind	
			Light-bellied brent goose	859 ind	
			Whooper swan	58 ind	
South Dublin Bay and River Tolka Estuary	✓	0.0	Light-bellied brent goose	368 ind	
North Bull Island	✓	0.3	Light-bellied brent goose	1,548 ind	
Baldoyle Bay	✓	5.7	Light-bellied brent goose	726 ind	342 ind (2015/16)
Malahide Estuary		11.0	Light-bellied brent goose	956 ind	824 ind (2015/16)
Rogerstown Estuary	✓	16.5	Light-bellied brent goose	1,194 ind	2,662 ind (2015/16)
			Greylag goose	87 ind	95 ind (2015/16)

SPA	Ramsar?	Distance to site (km)	Species	Designated wintering population	Updated population estimate
Lambay Island		17.1	Greylag goose	311 ind	0 (2015/16)
			Light-bellied brent goose	55 ind	400 ind (2015/16)
Poulaphouca Reservoir		27.2	Greylag goose	701 ind	824 ind (2014/15)
			Whooper swan	22 ind	44 ind (2014/15)
Cahore Marshes		47.6	Greenland white-fronted goose	634 ind	80 ind (2008/09)
			Whooper swan	23 ind	123 ind (2008/09)
			Bewick's swan	12 ind	0 (2008/09)
The Raven (night roost for birds from nearby Wexford Harbour and Slobs SPA)		63.2	Greenland white-fronted goose		-
Wexford harbour and Slobs	✓	64.8	Whooper swan	120 ind	535 ind (2015/16)
			Bewick's swan	213 ind	11 ind (2015/16)
			Light-bellied brent goose	1,380 ind	1,010 ind (2015/16)
			Greenland white-fronted goose	9,353 ind	7,565 ind (2015/16)

11.11 Scoping Questions

- Do you agree that for boat-based surveys (and digital aerial surveys in 2020) two years of contemporary baseline data collection (October 2018 – October 2020) is suitable for informing the EIA, together with existing information available for CWP?
- During contemporary surveys, as a result of consistent adverse conditions in February and early March 2020 and Covid-19 restrictions between mid-March and June 2020, no boat-based surveys were undertaken during this period. Digital aerial surveys commenced in late May 2020. As such there is a gap in baseline ESAS (or equivalent) datasets between mid-January and late May 2020. Do you consider that this gap necessitates additional survey effort in 2020/2021?
- Do you agree that for coastal landfall surveys two years of baseline data collection (October 2019 – September 2021), in addition to the I-WeBs and breeding and staging tern data requested from BWI referenced in Table 11.1, Section 11.4.1, is suitable for informing the EIA?
- Due to the implementation of Covid-19 related travel and work restrictions no coastal landfall adapted I-WeBS surveys were undertaken in April or early May 2020. Do you agree that this does

not impact the validity of resultant datasets for informing the EIA, and that no additional survey work (beyond that already planned up to September 2021) is required as a consequence?

- Due to the implementation of Covid-19 related travel and work restrictions no coastal landfall breeding bird surveys were undertaken in April or May 2020, Instead, these surveys were undertaken in June and July 2020. Do you agree that this does not impact the validity of resultant datasets for informing the EIA, and that no additional survey work (beyond breeding bird surveys in 2021) is required as a consequence?
- Are there any baseline data sources not among those listed in Table 11.2 which consultees wish included to inform assessment?
- Are you satisfied that Woodward *et al.* 2019 mean-maximum foraging ranges (plus one standard deviation) are used to determine connectivity between SPA seabird colonies and CWP? Are colony-specific tracking data available which could further inform this process?
- For the purposes of the NIS, CWPL would seek advice on the status that should be afforded to species that are listed as named components of SPA assemblage features and how these named components should be treated in the assessment? Should they have the same status as qualifying features?
- Are you able to provide the most recent colony count data in order to determine the regional reference population for each species?
- In relation to predicting impacts from displacement and barrier effects, what advice is available on the appropriate displacement rates to be applied to the breeding populations of key species?
- Are you content with the assessment methodologies outlined in Section 11.8?
- Are you satisfied that CRM options and avoidance rates should be selected on a species-specific basis following SNCB recommendations (SNCBs 2014)?
- Do you agree that population-level impacts should be determined for the key seabird species using PVAs? Do you have any advice regarding the development of suitable population models?
- Can confirmation be provided that the proposed list of development to be considered in the CIA includes all of those expected? Are there any omissions from this list such as port, tidal or onshore wind farm developments?
- Is it expected that the list of developments to be included in the NIS in-combination assessment should be based on the list for the cumulative assessment? Can you confirm if this approach is acceptable?
- Are you content with the proposed scope of the AA screening?

12 BATS

This Scoping Report is for the marine elements of the CWP project only. However, it is currently anticipated that the EIA will need to consider the whole of the project i.e. terrestrial and marine elements. Once further detail is known regarding the terrestrial elements of the project the approach to the assessment will be considered further. In any case, the scope of the assessment will be produced in consultation with regulators and relevant consultees.

CWP have committed to undertaking bat detection surveys, the data collected from this survey will inform the EIA and both on and offshore bats will be assessed together in the EIAR.

13 MARINE MAMMALS AND REPTILES

13.1 Introduction

This chapter provides marine mammal, basking shark and marine turtle information relevant to the proposed CWP. It considers potential effects resulting from the construction, operation and maintenance, and decommissioning of the Development Area and Offshore Export Cable Corridor and sets out the proposed scope of the assessment for both the EIAR and the AA.

13.2 Existing Environment

13.2.1 Marine Mammals

More than 26 species of marine mammal are known to use the waters around Ireland (Wall *et al*., 2013, O'Brien *et al*., 2009). Although many of these species are found primarily off the west coast and towards the edge of the continental shelf, seven species are considered to occur regularly within the Irish Sea:

- Harbour porpoise (*Phocoena phocoena*);
- Minke whale (Balaenoptera acutorostrata);
- Risso's dolphin (*Grampus griseus*);
- Bottlenose dolphin (*Tursiops truncatus*);
- Common dolphin (*Delphinus delphis*);
- Grey seal (Halichoerus grypus); and
- Harbour or common seal (*Phoca vitulina*).

Further details for these species (currently available reference populations and density estimates proposed for use in the assessment) are presented in Table 13.1 (cetaceans) and Table 13.2 (seals).

No Irish Sea density estimates are available for common dolphin, grey seal or harbour seal (or reference populations for grey seal and harbour seal). However, it may be possible to infer grey and harbour seal density across the Development Area using the data behind Russell *et al*. (2017)'s seal usage maps.

Killer whale (*Orcinus orca*), fin whale (*Balaenoptera physalus*) and humpback whale (*Megaptera* novaeangliae) also occur in the Irish Sea as occasional visitors (Wall *et al*., 2013; Garner *et al*., 2014; Morton *et al*., 2020).

Table 13.1: Main cetacean species recorded in and around the proposed CWP. Proposed reference population information taken from IAMMWG (2015) and information on density taken from Hammond *et al*. (2017) and Rogan *et al*. (2018).

Common name	Proposed reference population			Information on density (animals per km^2)	
	Management Unit	Abundance	95% CI	SCANS III (Block E)	ObSERVE (Stratum 5)
Minke whale	Celtic and Greater North Seas	23,528	13,989-39,572	0.017	0.014
Bottlenose dolphin	Irish Sea	397	362-414	0.008	0.036
Common dolphin	Celtic and Greater North Seas	56,556	33,014-96,920	No current estimate available	
Risso's dolphin	Celtic and Greater North Seas	No current estimate available		0.031	0.0032

Common name	Proposed reference population			Information on density (animals per km²)	
	Management Unit	Abundance	95% CI	SCANS III (Block E)	ObSERVE (Stratum 5)
Harbour porpoise	Celtic and Irish Seas	104,695	56,774-193,065	0.239	0.295

Table 13.2: Seal species recorded in and around the proposed CWP

Common name	2017-2018 count for east Ireland[8]	Reference	Minimum pup production estimate[9]	All-age population size[11]	Reference
Grey seal	968	Morris and Duck (2019)	228	779-1,027	Ó Cadhla *et al*. (2013)
Harbour seal	164		-	-	-

13.2.2 Basking Sharks and Marine Turtles

The waters around Great Britain contain several "hotspots" for basking sharks (*Cetorhinus maximus*). These are areas where sharks can be seen regularly at the surface - notably around the Hebrides and the Isle of Man, and close inshore around the coasts of Devon and Cornwall (Southall *et al*., 2005; Witt *et al*., 2012; Austin *et al*., 2019). Whilst their distribution patterns are relatively well studied around Ireland and the UK, it should be noted that there are no density or abundance estimates for populations of basking sharks anywhere in the world (Sims, 2008). The International Union for Conservation of Nature (IUCN) Red List lists the basking shark as Vulnerable worldwide, with the Northeast Atlantic population listed as Endangered (Fowler, 2005).

Distribution of basking sharks is largely determined by the distribution of their prey. The foraging strategy employed by the basking shark dominates the key aspects of the life history of the species (Sims, 2008). There is evidence that basking sharks show fine scale surface foraging, choosing the most energetically profitable plankton patches in which to forage, and they have been shown to respond to gradients in zooplankton density. Peaks in plankton density are associated with peaks in basking shark abundance (Sims and Quayle, 1998). Telemetry studies around the UK and Ireland show that tracked sharks were more likely to be found in association with seasonally persistent frontal zones (chlorophyll-a and thermal fronts) than in other regions (Miller *et al*., 2015).

Whilst individual sharks may remain in one place for many days, telemetry data have shown that sharks are also capable of long-range movements, moving rapidly between regions over periods of a few weeks (Sims *et al*., 2003), movements which were shown to be driven principally by foraging to locate areas with the most abundant zooplankton (Sims *et al*., 2006).

The peak of basking shark sightings occurs in the summer when they can be observed feeding almost continuously and in large, loose aggregations (Sims, 2008). Although not a "hotspot", the Irish Sea regularly shows up as an area used by basking sharks (e.g. Berrow and Heardman, 1994; Southall *et al*., 2005; Witt *et al*., 2012; Doherty *et al*., 2017).

[8] Includes Counties Louth, Meath, Dublin, Wicklow and Wexford.

[9] Includes Counties Wexford (Saltee Islands) and Dublin (Lambay Island and Ireland's Eye).

Although leatherback turtles (*Dermochelys coriacea*) are occasional visitors to the Irish Sea, they are more likely to occur off the south and west coasts of Ireland (Doyle, 2007).

13.2.3 Legislation and Site Designations

Marine mammals in the Irish Sea are protected by several European Directives and National Regulations, primarily the Habitats Directive 92/43/EEC. This has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) which consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010 and which have inserted Part XAB of the Planning and Development Act, 2000-2020 and Part 20 of the Planning and Development Regulations 2001-2020..

The principal national legislation for the protection of wildlife in Ireland is The Wildlife Act, 1976 and the Wildlife (amendment) Act, 2000 which aim to provide protection to and conservation of wild flora and fauna, conserve a representative sample of important ecosystems, and provide the services necessary to accomplish such aims.

All Irish waters were declared a whale and dolphin sanctuary in 1991, including a ban on hunting in Irish waters, although no legislation was enacted to support this declaration.

Basking sharks are protected from fishing in EU waters and by EU registered vessels, and are protected from disturbance in British waters and the territorial waters of the Isle of Man. However, they are not afforded any protection from disturbance under Irish law.

Marine turtles are listed on Annex IV of the EC Habitats Directive ('*species in need of strict protection*').

The following marine mammal species[10] are listed under Annex II of the Habitats Directive (Council Directive 92/43/EEC) which means that they are '*animal and plant species of community interest whose conservation requires the designation of special areas of conservation (SACs)*':

- Bottlenose dolphin (*Tursiops truncatus*) [1349];
- Harbour porpoise (*Phocoena phocoena*) [1351];
- Grey seal (*Halichoerus grypus*) [1364]; and
- Harbour or common seal (*Phoca vitulina*) [1365].

Each of these species has been recorded within the proposed CWP.

Neither basking sharks nor marine turtles are Annex II species.

Although no marine mammal SACs are located within the CWP Development Area or Offshore Export Cable Corridor, there is potential for connectivity between animals from SACs and the proposed CWP (see Section 13.10).

13.3 Data Sources and Baseline Methodology

For the purposes of the marine mammal assessment, the most useful baseline data is a density surface/estimate for each of the most common species, ideally estimated using data collected in the local area (this is the aim of the further site-specific surveys which commenced in late 2019; see Section 13.2.1**).** Density surfaces/estimates are required to estimate the number of individuals of each species which have the potential to be affected by different potential impacts i.e. the number of individuals within the different potential zones of impact. Where site-specific

[10] Feature/species codes are given in square brackets in the bulleted list.

density surfaces/estimates are not available, it is proposed that information from the wider area (e.g. Irish Sea) is used (e.g. SCANS III, ObSERVE, SMRU seal usage maps).

In addition to the site-specific surveys conducted in 2013-2014 (Garner *et al*., 2014) and 2018-2019 (Morton *et al*., 2020) (see Section 13.2.1), several different initiatives to quantify the distribution and abundance of marine mammals have been carried out in the waters of the Irish Exclusive Economic Zone (EEZ) during the last 10 years (e.g. Berrow *et al*., 2013; Wall *et al*., 2013; Hammond *et al*., 2013; Hammond *et al*., 2017; Rogan *et al*., 2018; see Table 13.3 for a summary of the data sources examined).

Table 13.3: Marine mammal data sources examined

Data source	Year(s) data were collected	Data collection method	Main species	Reference
Site-specific surveys	2013-2014 2018-present	Line transect survey	Minke whale Killer whale Risso's dolphin Common dolphin Harbour porpoise Harbour seal Grey seal	Garner *et al*., 2014 Morton *et al.,* 2020
Inshore Irish Sea cetacean surveys	2011	Visual line transect survey	Harbour porpoise Minke whale Grey seal Harbour seal	Berrow *et al*., 2011
Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters	2005-2011	Ship surveys and opportunistic sightings	All species	Wall *et al*., 2013
Harbour porpoise surveys conducted to the north and south of Codling Bank	2008, 2013, 2016	Visual line transect survey	Harbour porpoise Minke whale Bottlenose dolphin Common dolphin	Berrow *et al*., 2008 Berrow *et al*., 2013 O'Brien and Berrow, 2016
SCANS II (Block O)	2005	Visual line transect survey	Harbour porpoise Minke whale White-beaked dolphin Common dolphin Bottlenose dolphin	Hammond *et al*., 2013
SCANS III (Block E)	2016	Visual line transect survey	Harbour porpoise Bottlenose dolphin Risso's dolphin Minke whale	Hammond *et al*., 2017
ObSERVE (Stratum 5)	2015-17	Aerial line transect survey	Harbour porpoise Minke whale Pinnipeds	Rogan *et al*., 2018
The status of EU protected habitats and species in Ireland	2013-2018	Review	All species	NPWS, 2019
SMRU seal usage maps	1991-2016 inclusive	Telemetry and count data	Grey seal Harbour seal	Russell *et al*., 2017
Aerial thermal imaging survey of seals in Ireland	2017-2018	August/September counts	Grey seal Harbour seal	Morris and Duck, 2019

Data source	Year(s) data were collected	Data collection method	Main species	Reference
Grey seal breeding season data	2009-2012	Grey seal breeding season counts/pup production estimates	Grey seal	Ó Cadhla *et al.*, 2013
NPWS surveys for harbour and grey seals	1978-2003	Counts	Grey seal Harbour seal	Lyons, 2004

13.3.1 Future Baseline Assessment

As stated in Section 13.2, the most useful baseline data for the EIA is a density surface for each of the most common species (in order to be able to estimate the number of individuals of each species which have the potential to be affected by different potential impacts; see Section 13.8). This is the aim of the site-specific surveys.

Two years of monthly site-specific visual boat-based surveys have been completed from April 2013 to March 2014 and October 2018 to October 2019 (Section 11.4.2). During the 2013/2014 surveys, 542 individuals of seven species of marine mammal were recorded. During the 2018/2019 surveys, 309 individuals of five species of marine mammals were recorded. During both survey years harbour porpoises were the most common species. A second year of contemporary data (2019/2020) are currently being collected. Visual line transect methodology (surveying along pre-determined track lines using distance sampling methodology) is being used (Section 11.4.3). The position of the vessel is being recorded automatically every few seconds via a hand-held Global Positioning System (GPS). Environmental variables including sea state is being recorded every 15 minutes (or sooner if they change). Continuous watches are being conducted by two marine mammal surveyors who each scan an area of sea spanning 90° to the side of the vessel's bow using the naked eye and binoculars. Effort is being recorded in case of breaks. Whenever a marine mammal (or basking shark or marine turtle) is sighted the following information is being recorded:

- Date and time (hh:mm:ss);
- Position of vessel;
- Distance and bearing of sighting from vessel;
- Which surveyor (port or starboard) sighted the animal(s);
- Species;
- An estimate of group size and composition (e.g. the number of calves); and
- Any additional information e.g. behaviour, cue for sighting.

During the coronavirus pandemic, boat-based surveys were no longer feasible (in April – June 2020). Instead, digital aerial surveys were conducted by HiDef during this period (Section 11.4.3.2). Both types of (line transect survey) data will be analysed in the same way although different correction factors may be used due to differences in detection probability between the two approaches.

Passive acoustic methods (e.g. data collection using PODs) have not been proposed for baseline data collection. This is because (a) the most useful baseline data for EIA purposes are species densities, which PODs cannot provide, and (2) there is no framework with which to integrate these data with, for example, noise impact contours and be able to estimate the number of individuals which have the potential to be impacted. Passive acoustic methods will, however, be considered for pre-construction and construction phase monitoring (to assess changes in site usage by harbour porpoise, for example).

13.3.1.1 Data Validity

Data from the previous (Garner *et al*., 2014) and current (Morton *et al*., 2020) site-specific surveys are considered to be valid and, along with information from the other sources described, will be utilised to support the marine mammal assessment. It is likely that site-specific density surfaces will be able to be derived for at least harbour porpoise and grey seal. There are not considered to be any significant baseline data gaps.

13.4 Legislation and Guidance

In addition to the general EIA guidance and legislation listed in Sections 5.2 and 3.2 respectively, the following receptor-specific guidance and key references will be used to conduct the EIAR for marine mammals, basking sharks and marine turtles:

- Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters (2014). Department of Arts, Heritage and the Gaeltacht;
- Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene Jr, C.R., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. and Tyack, P.L. (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33(4);
- Southall, B.L., Finneran, J.J., Reichmuth, C., Nachtigall, P.E., Ketten, D.R., Bowles, A.E., Ellison, W.T., Nowacek, D.P. and Tyack, P.L. (2019). Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. Aquatic Mammals 45(2);
- The protection of marine European Protected Species (EPS) from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area (2010). JNCC, Natural England and Countryside Council for Wales;
- JNCC (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales and Northern Ireland). JNCC Report No. 654;
- National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NMFS-OPR-59 – 2018 revision to: Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (version 2.0); and
- CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Coastal and Marine.

13.5 Design Parameters

A full description of the Design Parameters has been provided in Chapter 4 of this Scoping Report.

The (worst case) parameters presented in Table 13.4 are available at this stage and which are considered to be relevant to the marine mammal assessment. For example, information on gravity base foundations has not been presented in Table 13.4 because piled foundations are considered to represent the worst case for marine mammals.

Table 13.4: Worst-case Design Parameters which are available at this stage for marine mammals

Design Parameters	Worst case
Foundation type	Piled foundations (monopiles and/or jacket foundations with pin piles)
Number of WTGs	Up to 140
Pile diameter (m)	Monopiles: Up to 11 m Pin piles: 4-5 m
Number of OSPs	Up to 5

13.6 Scoping of CWP EIAR

The impact assessment methodology will follow that recommended by the CIEEM for marine and coastal developments (CIEEM, 2019).

In line with DCCAE (2017) and CIEEM (2019) guidance, it is proposed that the EIAR focuses on the main potential impacts which may result in significant effects due to the construction, operation and maintenance, and decommissioning of CWP.

As such, the following potential effects/impacts on marine mammals are proposed to be scoped in for assessment in the CWP EIAR:

- Displacement/auditory injury as a result of:
- Noise from geophysical survey and positioning equipment which emits sound; and
- Pile driving noise.

These potential impacts are relevant to the pre-construction/construction phase.

It is proposed that the potential impacts described in Table 13.5 below can be scoped out i.e. not taken forward for assessment within the CWP EIAR. This is because they are unlikely to result in significant effects on marine mammals. In addition, due to their low likelihood of occurrence in the vicinity of CWP, it is proposed that neither basking sharks nor marine turtles be considered further within the assessment. However, any mitigation proposed for marine mammals will also be applied to basking sharks and marine turtles.

Table 13.5: Potential impacts which have been proposed to be scoped out

Potential impact	Relevant phase	Potential effects	Justification for scoping out at this stage
Noise from other construction activities e.g. geotechnical investigations, drilling, seabed preparation/clearance, cable lay and burial	Construction	Auditory injury Temporary behavioural response/displacement	Auditory injury: Sound exposure level (SEL) modelling indicates that maximum impact ranges are likely to be < 1 m (ICOL, 2013). Therefore, it is unlikely that marine mammals will receive a level of noise sufficient to induce the onset of auditory injury. Behavioural response: Noise modelling for these activities indicates that the maximum impact ranges are likely to be small (<30 m for drilling, suction dredging and cable laying; ≤140 m for trenching; <100 m for rock placement; ICOL (2013)). Given the small maximum impact ranges and the short duration of these activities (weeks or months), the potential for animals to encounter and therefore have the potential to be impacted by sound from these installation-related activities is considered to be very low. Furthermore, sound from these activities is unlikely to significantly add to existing noise levels in the western Irish Sea. Further assessment of this potential impact is therefore scoped out of the EIAR.

Potential impact	Relevant phase	Potential effects	Justification for scoping out at this stage
Operational noise	Operation and maintenance	Auditory injury Displacement	The reported noise levels from operating wind turbines are low and are unlikely to impair hearing in marine mammals (Madsen ***et al***., 2006). Furthermore, animals are not displaced from operational wind farms. Indeed, tagged harbour seals have been found to show striking grid-like patterns of movements within operational wind farms as they concentrate their foraging activity at individual turbines (Russell ***et al***., 2014). These animals also foraged elsewhere. Harbour porpoises have also been found to display an apparent preference for wind farm areas with acoustic activity (detected using PODs) within operational wind farms being significantly higher than in reference areas (Scheidat ***et al***., 2011). Further assessment of this potential impact is therefore scoped out of the EIAR.
Increased vessel noise	Construction Operation and maintenance	Behavioural response Masking Indirect effects due to potential impacts on prey	Maximum impact ranges are likely to be very small even for large vessels (<1-22 m; ICOL (2013). Sound from vessels associated with the CWP is unlikely to significantly add to existing noise levels from vessels in the western Irish Sea. Further assessment of this potential impact is therefore scoped out of the EIAR.
Collision with vessels	Construction Operation and maintenance	Lethal effects Physical injury (and subsequent risk of infection)	Vessels will be following pre-defined linear routes when working. Working speeds will be low to moderate. It is considered that the additional vessels associated with the CWP will not significantly increase the amount of vessel traffic which uses the western Irish Sea, and therefore not present a more significant risk of collision than animals experience daily. Further assessment of this potential impact is therefore scoped out of the EIAR.
Presence of electromagnetic fields (EMF)	Operation and maintenance	Temporary behavioural response	Although behavioural responses by electro-sensitive species such as basking sharks to the presence of EMF have been demonstrated, it is

Potential impact	Relevant phase	Potential effects	Justification for scoping out at this stage
			very unlikely that basking sharks or marine turtles will be impacted by the presence of EMF around the export and inter-array cables. This is because the potential zones of impact are likely to be very small (i.e. within a small number of metres from the cables' surface), , and basking sharks and marine turtles are pelagic species and therefore generally distant from the seabed where the cables will be located. No evidence for electro-sensitivity in marine mammals has been reported (Tricas and Gill, 2011). In terms of sensitivity to magnetic fields from buried cables, theoretical results suggest that any changes to swimming behaviour are likely to be corrected within a few metres and therefore have minimal effect (Tricas and Gill, 2011). Further assessment of this potential impact is therefore scoped out of the EIAR.
Barrier to movement/loss of habitat	Operation and maintenance	Once built, presence of turbines may prevent marine mammals from passing through/using an area which was previously accessible to them	Evidence now exists that marine animals quickly habituate to the presence of turbine foundations in the water, that there is sufficient distance between turbines to allow movement between foundations, and that usage of the wider area may increase compared to prior to wind farm development (Russell ***et al***., 2016). Furthermore, GPS-tagged seals have been shown to exhibit striking grid-like patterns as the concentrate their (foraging) activity at individual turbines (Russell ***et al***., 2014). Further assessment of this potential impact is therefore scoped out of the EIAR.
Accidental pollution events/contamination	Construction Operation and maintenance	Water quality may be affected should pollutants be inadvertently released	CWP's Construction Environmental Management Plan (CEMP) will adhere to current guidelines and follow industry best practice regarding prevention of pollution at sea. Further assessment of this potential impact is therefore scoped out of the EIAR.

Potential impact	Relevant phase	Potential effects	Justification for scoping out at this stage
Indirect effects	Construction Operation and maintenance	Potential effects may include reduction in fitness and reduction in breeding success as a result of altered foraging behaviour/success.	Indirect effects, such as changes in prey availability, may occur as a result of increased noise and/or habitat disturbance. These changes generally have the potential to occur at a local level, and usually in the short term (construction phase). Because marine megafauna range and forage widely, short term local level changes are unlikely to result in large scale impacts because animals are likely to use suitable alternative habitat. Further assessment of this potential impact is therefore scoped out of the EIAR.

13.7 Embedded Mitigation

Adoption of any mitigation measures will be subject to an assessment of technical and commercial feasibility.

The following embedded mitigation measures will be considered:

- A marine mammal mitigation plan (MMMP) for pile driving[11] (to reduce the risk of auditory injury) will be finalised prior to construction. This plan will reflect:
- Current guidance at the time of construction e.g. DAHG (2014) and/or
- The outcome(s) of discussions on the feasibility of alternative approaches, e.g. advances in technology and knowledge may provide more effective mitigation methods than use of Marine Mammal Observers (MMOs);
- Defined vessel navigational routes;
- A vessel code of conduct to reduce collision risk and minimise disturbance;
- Identification and avoidance of sensitive sites/areas where possible;
- The CEMP will adhere to current guidelines and follow industry best practice regarding prevention of pollution at sea; and
- Cables will be buried/protected where possible (thereby reducing the potential for impacts relating to EMF).

13.8 Approach to EIA

The EIA methodology for marine mammals, basking sharks and marine turtles will be based on that outlined in the DCCAE (2017) and CIEEM (2019) guidance (see Section 5.2).

Where possible, assessment work will be quantitative. As such, the proposed approach to assessment of the potential impact of pile driving noise on marine mammals will involve the following four stages (notwithstanding changes following consultation):

- Description of the spatial distribution of key species (data-based or inferred density surfaces);

[11] And also, potentially, for use of geophysical survey and positioning equipment which emits sound and UXO clearance work.

- Assessment of the spatial distribution of piling noise under different scenarios (using underwater noise modelling);
- Integration of the key species and piling noise spatial distributions in order to estimate the number of animals which have the potential to be exposed to noise levels sufficient to induce the onset of auditory injury and/or a behavioural response (using an appropriate noise dose-behavioural response curve); and
- Assessment of the potential for population level effects using the interim Population Consequences of Disturbance (iPCoD) or a similar framework.

13.9 Scoping of Cumulative Assessment

The list of plans, projects and activities identified in Section 5.6 as being relevant for cumulative assessment was examined in order to assess which (plans, projects and activities) have the potential to contribute to cumulative effects on marine mammals. Those (plans, projects and activities) where there was potential for both temporal and spatial overlap with noise-emitting work at CWP were scoped in for cumulative assessment.

Plans, projects and activities were considered to overlap temporally if there was potential for noise-emitting work to be being conducted at the same time as that at CWP (considered to be 2025-2027.

In order to assess the potential for spatial overlap, a 5 km buffer around the Offshore Export Cable Corridor and a 26 km buffer around the Development Area were created. These buffers were considered to represent the effective deterrence ranges for noise from geophysical surveys and pile driving being conducted at CWP, respectively (JNCC, 2020). These effective deterrence ranges (recommended for England, Wales and NI) have been used in the absence of an equivalent recommendation for Ireland. Equivalent buffers around the plans, projects and activities identified in Section 5.6 were also created. If these buffers overlapped, the plan, project or activity was scoped in for cumulative assessment.

On this basis, the following plans, projects and activities have been scoped in for cumulative assessment for marine mammals:

- Dublin Array (Relevant Project);
- Arklow Bank Phase 2 (consented); and
- North Irish Sea Array (Relevant Project).

The cumulative assessment work will also be quantitative where possible.

13.10 Scope of the Appropriate Assessment (AA)

SACs for the Annex II species identified in Section 13.2.3 have been pre-screened in or out of the AA screening based on an assessment of their potential for connectivity with the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers (see previous section).

There was considered to be potential for connectivity with the SAC if the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers fell within the ‘likely foraging range’ of the seal species for which it was designated. Equivalent information (on the ‘likely foraging range’ of cetaceans) is not available because no telemetry studies have been conducted for cetaceans around the British Isles. Instead, there was considered to be potential for connectivity with the SAC if the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers fell within the ‘likely population range’ of the cetacean species for which it was designated.

SACs for which marine mammal species are either qualifying or non-qualifying features scoring either an ‘A’, ‘B’ or ‘C’ under the ‘site assessment (population)’ category have been included.

An assessment of the potential for connectivity has been conducted for each receptor as follows.

13.10.1 Bottlenose Dolphin

Likely population range information for bottlenose dolphins was derived using findings from individual identification (photo-ID) data.

Given the recent (2019) sightings off the east and west coasts of Ireland of individual bottlenose dolphins which use the Moray Firth SAC (the furthest bottlenose dolphin SAC from the proposed CWP), all British Isles' bottlenose dolphin SACs have been pre-screened in for consideration at the AA screening stage, namely:

- Lleyn Peninsula and the Sarnau SAC;
- Cardigan Bay SAC;
- Lower River Shannon SAC;
- West Connacht Coast SAC;
- Duvillaun Islands SAC;
- Slyne Head Islands SAC;
- Slyne Head Peninsula SAC; and
- Moray Firth SAC.

13.10.2 Harbour Porpoise

For harbour porpoises, the SCANS II model-based density surface (Hammond *et al*., 2013) was used to assess whether there was potential for connectivity between SACs and the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers. The SCANS II data indicate a relatively high porpoise density area to the south of Ireland/off west Wales, south west England and the north of the Irish Sea[12]. It should be noted that the location, size, shape and scale of this relatively high porpoise density area is similar to that of the Celtic and Irish Seas Management Unit for harbour porpoise (IAMMWG, 2015). It is considered likely that the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers fall within the range of the population/populations of harbour porpoises which are a feature of the SACs in this area – namely:

- Rockabill to Dalkey Island SAC;
- North Anglesey Marine SAC;
- West Wales Marine SAC; and
- Bristol Channel Approaches SAC.

These SACs have therefore been pre-screened in for consideration at the AA screening stage.

13.10.3 Grey Seal

Although grey seals are known to undertake long distance travel, the majority of their trips to sea are much shorter foraging trips (taking a small number of days), with seals generally returning to the same haul out sites from which they departed (McConnell *et al*., 1999; Cronin *et al*., 2011). For UK seals the range of these foraging trips is generally in the region of 20-60 km from the haul out site (mean return-trip maximum extent = 39.8 km; McConnell *et al*., 1999). The mean distance travelled by seals tagged off southwest Ireland was 50.85 km (Cronin *et al*., 2011).

[12] High density has been defined as 0.3 to 0.4 or more animals/km^2.

In the absence of telemetry information from grey seals tagged off the east coast of Ireland, the maximum foraging trip extent for UK grey seals (60 km) has been used. Grey seal SACs which lie within 60 km of the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers have therefore been pre-screened in for consideration at the AA screening stage, namely:

- Lambay Island SAC; and
- Lleyn Peninsula and the Sarnau SAC.

13.10.4 Harbour Seal

Regional differences are apparent in the distances harbour seals travel from haul-out sites to likely foraging areas (Table 13.6). For example, seals off southwest Ireland, the Outer Hebrides and the Northern Isles (Orkney and Shetland) generally make short distance trips whereas animals off the east coast of the UK (Moray Firth, St Andrews Bay and The Wash) make more wide-ranging trips.

Table 13.6: Harbour seal foraging trip distance

Location	Mean foraging trip distance (km)	Reference
Southwest Ireland	Foraging trips generally extended no further than 20 km from haul out sites; over half of these trips were less than 5 km	Cronin (2011)
Outer Hebrides	50% of trips were within 25 km of a haul out site	Cunningham *et al.* (2009)
Shetland, Orkney, The Thames	Between 11 and 21	Sharples *et al.* (2012)
The Wash	86	
Moray Firth	100.6	

In the absence of information on the likely foraging range of harbour seals off the east coast of Ireland[13], information from seals tagged off southwest Ireland has been used. Harbour seal SACs which lie within 20 km of the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers have therefore been pre-screened in for consideration at the AA screening stage, namely:

- Lambay Island SAC.

Table 13.7 summarises the SACs which have been proposed for consideration in the AA screening for marine mammals.

[13] Although a number of harbour seals have been tagged in Strangford Lough (Sparling *et al.*, 2017), these data were analysed in relation to behaviour around an operating tidal turbine and, as such, information on foraging range is not readily available.

Table 13.7: SACs proposed for consideration in the AA screening for marine mammals (where there is considered to be potential for connectivity)

SAC	Country	Species	Distance from the Development Area and Offshore Export Cable Corridor plus their relevant effective deterrence range buffers (km)
Rockabill to Dalkey Island	Ireland	Harbour porpoise	Within buffers (15 km from Development Area)
Lambay Island	Ireland	Grey seal	12
		Harbour seal	
North Anglesey Marine	Wales	Harbour porpoise	13
West Wales Marine	Wales	Harbour porpoise	33
Lleyn Peninsula and the Sarnau	Wales	Bottlenose dolphin	37
		Grey seal	
Cardigan Bay	Wales	Bottlenose dolphin	76
Bristol Channel Approaches	Wales/England	Harbour porpoise	156
Lower River Shannon	Ireland	Bottlenose dolphin	493
West Connacht Coast	Ireland	Bottlenose dolphin	528
Duvillaun Islands SAC	Ireland	Bottlenose dolphin	553
Slyne Head Islands SAC	Ireland	Bottlenose dolphin	575
Slyne Head Peninsula SAC	Ireland	Bottlenose dolphin	584
Moray Firth	Scotland	Bottlenose dolphin	880

13.11 Scoping Questions

- Are you content that the list of data sources examined is comprehensive with no notable omissions? Do you know of any upcoming information which we should include when writing the EIA baseline?
- Are you content that the type, amount and timing of the site-specific survey work being conducted (boat-based and aerial line transect surveys) is sufficient to support the assessment?
- In the absence of Management Units for seals (comparable to those described in the IAMMWG (2015) report for cetaceans), are you content that the August 2017/2018 counts of grey and harbour seals for east Ireland are corrected for the proportion of animals likely to have been in the water at the time the count was made (using correction factors derived by SMRU using their tag data) and used as reference populations for the seal species?
- Are you content that the assessment focuses on the most common species occurring in the area, e.g. harbour porpoise, on the understanding that any mitigation proposed is also applied to the less common species occurring in the area, e.g. basking shark and marine turtles?

- It is proposed that the EIAR focuses on the potentially significant effects as a result of the project (as per Sections 2.3 and 4.5 of the DCCAE (2017) guidance). For marine mammals, impacts of the project which may have potentially significant effects are noise from (a) pile driving and (b) geophysical survey and positioning equipment which emits sound. It is therefore proposed that the EIAR focuses on these items. Do you consider this approach to be acceptable?
- It is proposed that the cumulative assessment focuses on those plans, projects and activities with which there is potential for both temporal and spatial overlap with noise-emitting work at CWP. Do you agree with the list of projects which have been scoped in for cumulative assessment for marine mammals?
- Are you content with the approach used to assess the potential for connectivity between marine mammals for which SACs have been designated and the proposed CWP Project (with its effective deterrence range buffers)?
- Are you content with the list of marine mammal SACs pre-screened in and proposed for consideration in the AA screening for each species?

14 MARINE ARCHAEOLOGY

14.1 Introduction

This chapter of the Scoping Report confirms the archaeology and cultural heritage receptors of relevance to the proposed CWP located in Irish Territorial Waters. CWP is located off the County Wicklow coast between Greystones and Wicklow Town, and the Offshore Export Cable Corridors will potentially make landfall at a currently undefined location(s) somewhere between Poolbeg, Co. Dublin in the north and Wicklow Town, Co. Wicklow in the south.

Previous surveys and assessment work have been carried out for CWP. These were undertaken to inform the EIA for the consented CWP and the submitted CWPE. Whilst this work may not provide a contemporary understanding of marine archaeology in and around CWP, it does provide a comprehensive understanding to inform the scope of the assessment. Archaeological features were identified through a combination of site-specific surveys and studies commissioned by CWPL and from a desktop review of publicly available information.

Marine archaeological and cultural heritage assets located within the CWP can be characterised as comprising four fundamental categories:

- seabed prehistory;
- maritime archaeology;
- aviation archaeology; and
- intertidal heritage assets.

Other themes relevant to the marine archaeological baseline of CWP include the setting of known marine heritage assets and the historic seascape character in and around the area.

The baseline data has been supplemented by records of charted wrecks and obstructions held by the United Kingdom Hydrographic Office (UKHO) and from the Irish National Monuments Services' (NMS) Underwater Archaeological Unit (UAU) online database for other maritime archaeological receptors located within the Development Area and Export Cable Corridor Search Area. Records of Monuments and Places (RMPs) held by Dublin and Wicklow county councils were also consulted to inform intertidal and other maritime archaeological receptors, up to Mean High Water Springs (MHWS).

14.2 Assessment Area

The archaeological study area that has been assessed within this Scoping Report chapter is defined by the extent of the Development Area, including the Export Cable Corridor Search Area.

CWP is located approximately 13 km off the east coast of Ireland between Greystones and Wicklow Town, with the Offshore Export Cable Corridor(s) making landfall somewhere between Poolbeg in the north and Wicklow Town in the south. At the time of writing, four broad potential landfall locations have been identified (Figure 4.1).

The CWP array is located on the Codling Bank, an area of sandbank with a high potential for underwater archaeology, particularly in the form of shipwrecks, as the banks have presented natural navigation hazards for several centuries.

14.3 Legislation, Guidance and Protection

Under the EU Environmental Impact Directive, Directive 2011/92/EU as amended by Directive 2014 2014/52/EU, pre-development archaeological assessment in the marine environment is required. The following legislation applies to archaeological and cultural heritage located within Irish Territorial Waters (up to 12 nautical miles (nm) from the coast):

- National Monuments (Amendment) Acts 1930 to 2004, as amended

This provides a specific legislative basis for the protection of archaeological monuments, areas and archaeological objects. The Minister of Arts, Heritage, Gaeltacht and the Islands is required to establish and maintain both a 'Record of Monuments and Places' and 'Register of Historic Monuments' under the terms of the 1987 and 1994 Amendments Acts respectively.

Under Section 1 of the 1987 Act, all monuments dating to before AD 1700 and any monument meeting specific criteria of interest are automatically defined as 'historic monuments'.

Under Section 3 of the 1987 Act, wrecks greater than 100 years old and any other object (being an archaeological object) found underwater are to be reported and protected. The Act also allows the imposition of an Underwater Heritage Order to protect sites of historical, archaeological or artistic importance. This can include wrecks less than 100 years old.

- Merchant Shipping (Salvage and Wreck) Act 1993

The Director of the National Museum of Ireland (NMI) has a statutory role regarding dealing with notifications from receivers of unclaimed wreck and the retention on behalf of the state of unclaimed wreck if it is of archaeological interest. Under Section 2 (1), 'wreck' includes *jetsam, flotsam, lagan and derelict found in or on the shores of the sea or any tidal water or harbour.*

- Heritage Council Acts 1995 and 2018

These Acts established a statutory 'Heritage Council', the functions of which include proposing policies and priorities for the identification, protection and preservation of the national heritage.

14.3.1 International Conventions

The United Nations Educational Scientific and Cultural Organisation (UNESCO) Convention on the Protection of Underwater Cultural Heritage was concluded in 2001 and is a comprehensive attempt to codify the law internationally, with regards to underwater cultural heritage. The Republic of Ireland abstained in the vote on the final draft of the Convention, however, it has stated that it has adopted the Annex of the Convention, which governs the conduct of archaeological investigations, as best practice for archaeology. Although the Republic of Ireland is not a signatory, the Convention entered into force on 2nd January 2009 having been signed or ratified by 20 member states. It has since been ratified or accepted by an additional 40 states.

The European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (also referred to as the Valletta Convention) tackle various aspects such as: Article 2 deals with the inventorying and protection of sites and areas and with the mandatory reporting of chance finds and providing for 'archaeological reserves' on land or underwater; Article 3 promotes high standards for all archaeological work undertaken by suitably qualified people; Article 4 requires the conservation of excavated sites and the safe-keeping of finds; and Article 5 is concerned with consultation that should take place between planning authorities and developers to avoid damage to archaeological remains.

The Valletta Convention was ratified by the Republic of Ireland in 1997. The convention binds the State to implement protective measures for the archaeological heritage within the jurisdiction of each party, including sea areas.

14.3.2 Marine Guidance

This assessment was carried out in a manner consistent with available guidance as described below in chronological order of issue. Any future archaeological work will be undertaken in accordance with this guidance:

- Framework and Principles for the Protection of the Archaeological Heritage (Department of Arts, Heritage, Gaeltacht and the Islands, 1999);
- Architectural Heritage Protection; Guidelines for Planning Authorities (Department of Arts, Heritage and the Gaeltacht, 2004);
- The Code of Practice for Seabed Developers (The Joint Nautical Archaeology Policy Committee (JNAPC), 2006);

- Conserving Ireland's Maritime Heritage, Proposing Policies and Priorities for the National Heritage (The Heritage Council, 2006);
- Collaborative Offshore Wind Research into the Environment (COWRIE), Historic Environment Guidance for the Renewable Energy Sector (Wessex Archaeology, 2007);
- Guidance for Assessment of Cumulative Impact on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008);
- Our Seas - A shared resource: High level marine objectives (DEFRA, 2009);
- Military Aircraft Cash Sites: Archaeological guidance on their significance and future management (English Heritage (now Historic England), 2002);
- Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (English Heritage (now Historic England), 2011);
- Ships and Boats: Prehistory to Present: Designation Selection Guide (English Heritage (now Historic England), 2012);
- Marine Geophysical Data Acquisition, Processing and Interpretation Guidance Notes (English Heritage (now Historic England), 2013);
- Geoarchaeology: Using earth sciences to understand the archaeological record (Historic England, 2015); and
- Standard and Guidance for Desk Based Assessment (Chartered Institute for Archaeologists, revised 2017).

14.4 Data Sources and Baseline Methodology

14.4.1 Baseline

For this Scoping Report, the baseline of known archaeological and cultural heritage assets within the Development Area and Export Cable Corridor Search Area refers to data obtained from the UKHO archives, which contains records relating to charted wrecks and other seabed obstructions that are considered navigational hazards. The UKHO data obtained covers the extent of the Development Area and Export Cable Corridor Search Area.

Data for the location of assets has also been downloaded from the Wreck Viewer webpage (https://www.archaeology.ie/underwater-archaeology/wreck-viewer, accessed June 2020). The Wreck Viewer and Wreck Inventory of Ireland Database, which holds records of known and potential wreck sites, is maintained by the UAU as part of NMS for Ireland. The NMS is responsible for implementing legislation in relation to the protection of monuments and sites, including historic wrecks and underwater archaeological sites.

County Council RMPs, including those of Dublin and Wicklow were also consulted. These comprise a database of all recorded terrestrial and marine archaeological sites, findspots and archaeological events within the county and offshore.

This data collection has been completed in line with the Chartered Institute for Archaeologists' (CIfA) *Standard and guidance for historic environment desk-based assessment* (CIfA 2017). This information has fed into the initial stages of the cable route selection and will be supplemented by a full desk-based assessment undertaken as part of the impact assessment process.

14.4.1 Future Baseline Assessment

Both geophysical and geotechnical surveys were carried out in 2013. Sidescan sonar data were assessed to inform the baseline for both the original CWP (2005 Foreshore Lease) and the extent of the previous Offshore Export Cable Corridor; therefore, the full extent of the current Development Area and Export Cable Corridor Search Area was not covered by these surveys. Further geotechnical and geophysical data are required to inform the submerged prehistory and seabed features in order to effectively characterise the current archaeology and cultural heritage baseline conditions within the Development Area and Export Cable Corridor Search Area. Data collection will cover the finalised Offshore Export Cable Corridor(s) for CWP once

this is refined following identification of onshore grid connections, landfall locations, and offshore export cable routes.

The location and extent of CWP will cover the same portion of seabed assessed within the original EIS. It is therefore considered that the spatial coverage of the original data describing the physical environment, and the potential changes to the environment, remain valid for CWP in terms of spatial coverage. However, due to an increase in the overall height of the blade tip, a setting analysis on any potentially effected cultural heritage would need to be incorporated in the revised CWP.

It is known that updates, additions and edits to the data held by the UKHO, NMS and local RMP offices have also occurred and therefore review of these data sources will be carried out to inform the baseline data.

14.5 Archaeological Assessment

Marine archaeology receptors will be considered against the following categories:

- Seabed Prehistory: for example, palaeochannels and other features that contain prehistoric sediment, and derived Palaeolithic artefacts e.g. handaxes;
- Maritime Archaeology: maritime archaeological sites consist broadly of vessel remains, wreckage and submerged vessel/cargo debris; and
- Aviation Archaeology: this comprises all military and civilian aircraft crash sites and related wreckage.

There is currently no data available to assess seabed prehistory. Further surveys are being proposed in order to inform the EIA, as explained in Section 14.9.

Intertidal heritage assets located within the proposed Development Area and Export Cable Corridor Search Area up to MHWS between Dublin and Wicklow have been assessed for this Scoping Report. All spatial points and polygons that relate to records of an archaeological nature have been included within the assessment. The datasets used in this assessment have been presented in World Geodetic Systems (WGS) 1984 datum.

14.6 Maritime Archaeology

Maritime archaeological sites can be considered to comprise two broad categories; the remains of vessels that have been lost as a result of stranding, foundering, collision, enemy action and other causes, and those sites that consist of vessel-related material. Wreck related debris includes (but is not limited to) equipment lost overboard or deliberately jettisoned such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound. Shipwrecks on the seabed provide an insight on the types of vessels used in the past, the nature of shipping activity in the wider area and the changing usage of the marine environment through different periods. Such remains are considered more likely in sediments which promote the preservation of wreck sites (e.g. finer grained sediments that are not subject to high levels of mobility), particularly where such sediments have seen limited, recent disturbance.

There are 28 records consisting of reported wrecks or obstructions charted by the UKHO and NMS within the Development Area and Export Cable Corridor Search Area, summarised in Appendix A (UKHO and NMS charted sites) and illustrated in Figure 14.1. No records are located within CWP.

Only two of the 28 records are located within one kilometre of CWP, consisting of **2001** (*Lanarkshire*) and **2006**. The majority of the remaining 26 records are located closer to the coastline, with five records protected under Section 3 of the 1987 National Monuments Act, being over 100 years old. These are summarised in Table 14.1.

Table 14.1: UKHO and NMS charted sites protected under the 1987 Act

WA ID	Name	Type	Date Lost	Sources
2001	*Lanarkshire*	Steam ship	15/01/1882	UKHO_7140
2002	*County of Lancaster*	Sailing vessel	12/11/1901	UKHO_79518
2007	*Aid*	Brig	10/01/1804	NMS_2303
2011	*Loch Fergus*	Barque	06/02/1898	UKHO_6968; NMS_1820
2012	*Guide Me II* (HMS)	Anti-submarine Drifter	28/08/1918	UKHO_6943; NMS_1474

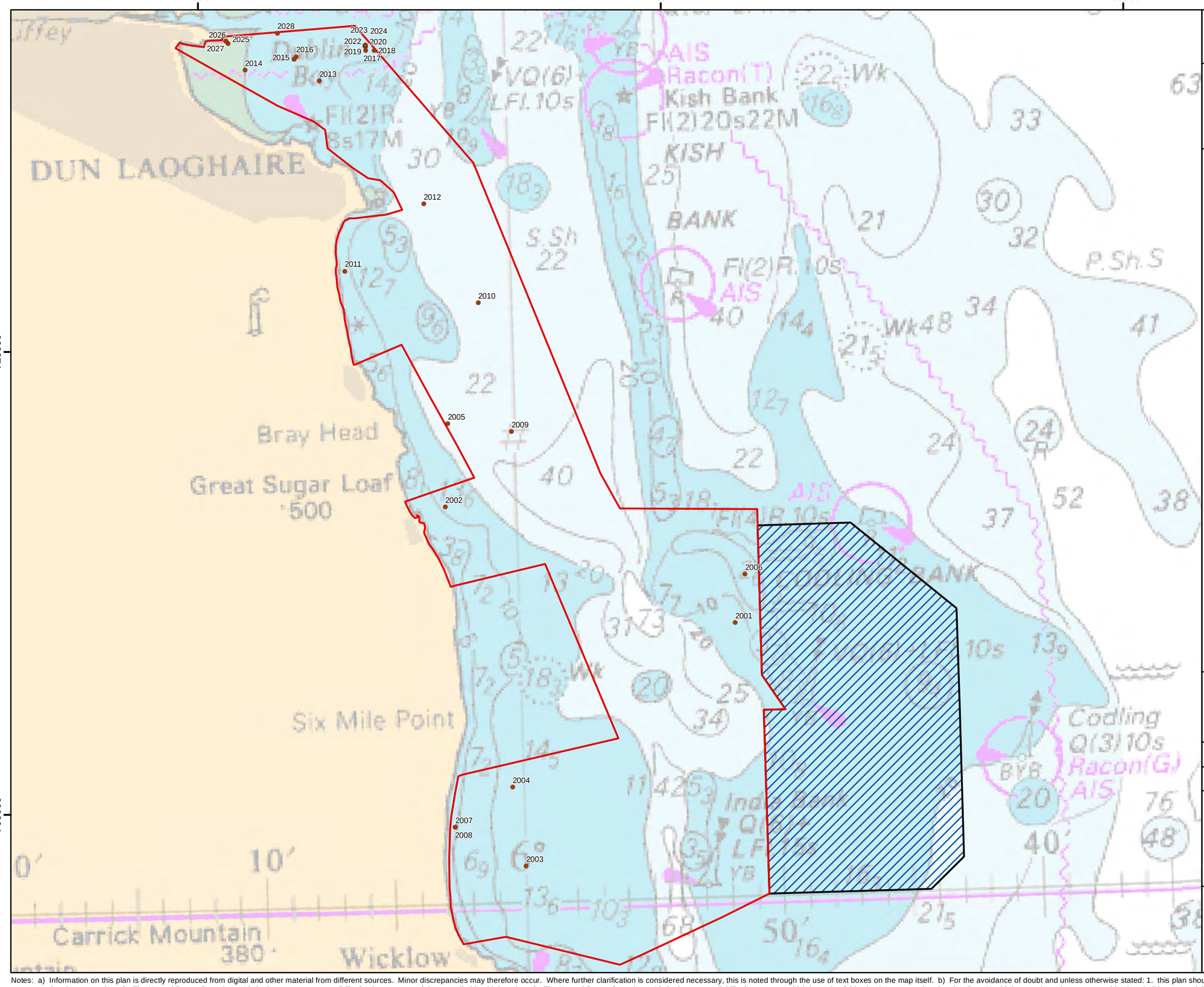
The charted losses consist of a variety of vessel types, including three fishing vessels dating to the 20th century, highlighting the prominence of the local and regional fishing industry within this part of the Irish Sea. The Codling area is an active whelk fishery landing whelk into Wicklow and Arklow. Further north, the port of Dublin has been a hub of maritime activity since at least the medieval period, clearly shown by the concentration of wrecks around this part of the coastline.

There is also the potential for the presence of archaeological material of a maritime nature, currently uncharted, to exist within the Development Area and Export Cable Corridor Search Area. This is signified by the records of 32 Documented Losses within the NMS Wreck database (Appendix B). Documented Losses are records for ships or aircraft that are known to have wrecked or crashed offshore, but their remains on the seafloor have yet to be located. Recorded Losses are often grouped together by their general area of loss into Maritime Named Locations, and often relate to vessels reportedly lost or for which no physical wreck remains have ever been identified.

A further five targets were identified within the original Offshore Export Cable Corridor area from the geophysical survey carried out in 2002 (please note that the current export cable has been extended significantly as part of this scoping exercise and wasn't entirely covered by the 2002 study). These anomalies have been classified as being of low to medium potential, and where possible should be avoided during construction phase.

720000 740000 760000

720000 700000



Project:

Codling Wind Park

Title:

Figure 14.1: Known Wrecks and Obstructions

Key

- Export Cable Corridor Search Area
- Codling Wind Park (current)
- Known Wrecks & Obstructions

Scale @ A3: 1:160,000

Coordinate System: IRENET95 Irish Transverse Mercator

0 2 4 8 km

N

Date: 15-07-20	Prepared by: KJF	Checked by: SS

Ref: 205891_Scoping_14.1

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14.7 Aviation Archaeology

Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence is divided into three primary time periods based on major technological advances in aircraft design: Pre-1939; 1939-1945; and post-1945.

There are no known aircraft remains charted within the archaeological study area. However, there is potential for the discovery of previously unknown aircraft material dating from the early 1900s to the present day. Aircraft crash sites that are 100 years old will be protected under the National Monuments (Amended) Act 1987. Under the Protection of Military Remains Act 1986, all British aircraft that crashed while in military service are automatically protected. It is also possible that aircraft crash sites may be represented within the 32 Documented Losses within the NMS Wreck database, mentioned in Section 14.6 above.

14.8 Intertidal Heritage Assets

There is a total of 27 records relating to archaeological sites, artefacts, material and standing remains within the intertidal zone (to MHWS) at the landfall search area between Dublin and Wicklow (**1001** to **1027**). These records have been derived from the County Council archives (RMPs) and are presented in Appendix C and illustrated in Figure 14.2.

720000 730000 740000

730000

720000

Project:

Codling Wind Park

Title:

Figure 14.2: Location of Intertidal Heritage Assets

Key

- Export Cable Corridor Search Area
- Codling Wind Park (current)

Intertidal Heritage Assets

- Burial
- Earthworks
- Ritual Site
- Coastal Defence
- Military Defence
- Inscribed Stone
- Midden
- Quay
- Structure
- Well

1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1015 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027

0 25 50 100 m

Main figure

licence
Charts from MarineFIND.co.uk. © Crown Copyright 2020. All rights reserved.
Licence No. EK001-0582-MF0050.
Irish coastline data © OpenStreetMap contributors.
NOT TO BE USED FOR NAVIGATION

Scale @ A3: 1:100,000

Coordinate System: IRENET95 Irish Transverse Mercator

0 1 2 4 km

N

Date: 15-07-20	Prepared by: KJF	Checked by: SS
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14.9 Additional Surveys

Further primary data will be obtained from geophysical and geotechnical surveys covering the proposed Development Area and Export Cable Corridor Search Area. The data will be archaeologically assessed to provide a full assessment of the known and potential underwater heritage assets within CWP. The results will be incorporated into a full desk-based assessment, which will be undertaken using data from the UKHO, the NMS and relevant RMPs.

14.10 Design Parameters

The Design Parameters for the CWP means consideration of wind turbine generators (WTGs) of up to 140 turbines with a tip height of up to 320 m. As advised previously, further work is required to refine the Offshore Export Cable Corridor(s) and landfall locations.

14.11 Embedded Mitigation

The primary method of mitigation when dealing with the unknown archaeological resource is the precautionary principle, based on the prevention of damage to receptors by proactively putting in place protective measures rather than attempting to repair damage after it has occurred. Therefore, the original EIS included provision for a series of mitigation measures to ensure that significant direct physical impacts would not occur during the construction, operation or decommissioning of the wind farm and associated infrastructure. Future applications would build these measures into the application and would thus ensure impacts are minimised. The following measures are expected, subject to further assessment as part of the EIA, to be included as embedded mitigation in the application:

- Direct physical impact on all sites of cultural heritage interest identified will be avoided where possible through micrositing of both turbines and installation equipment (e.g. jack-ups);
- Where cultural heritage assets may potentially be subject to direct or indirect impacts, Archaeological Exclusion Zones (AEZ) will be implemented to prevent potential impacts from anchoring or installation of jack-up vessels;
- AEZs of at least 100 m will be established around the full extent of sites identified as being of high vulnerability, while an AEZ of a minimum 50 m will be established around those considered as being of medium vulnerability. In addition to the construction phase it is also anticipated that the implementation of AEZs will ensure cultural heritage assets are protected from potential impacts during the operation and decommissioning phases;
- Should further survey or investigation confirm the nature and characteristics of an identified asset then an AEZ can be maintained or removed as appropriate and in consultation and agreement with National Monuments Service;
- The implementation and monitoring of the AEZs will be maintained through the Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries, highlighted below;
- In order to mitigate the risk of damage to any previously unrecorded archaeological remains a WSI and Protocol will be prepared to mitigate impacts in the event of any unexpected archaeological discoveries during pre-construction surveys and construction activities. The Protocol will also include appropriate archaeological briefings for all personnel involved during the construction, operation and decommissioning phases associated with the proposed development. The Protocol will be in place for the life of the proposed development and will be updated as required should details within the document change, for example contact details for key stakeholders; and
- Should it not be possible to avoid sites of cultural heritage interest, a full programme of archaeological investigation, which may include diver survey or Remotely Operated Vehicle (ROV) investigation, will be undertaken to identify the nature and extent of these sites. Subject to these investigations an appropriate mitigation strategy will be agreed with NMS.

No embedded mitigation was proposed for indirect physical impacts. Further details of the mitigation of indirect physical impacts are presented in Section 14.12.2 below.

14.12 Scoping of CWP EIA

14.12.1 Potential Impacts

Impacts upon archaeological assets are by their nature different from those upon ecological or other human environmental receptors. Assets would either be damaged or destroyed during construction if there is a pathway for impact. This impact will be permanent and there will be no way to replace the resource, and as such the impact would be of major significance.

Therefore, for this topic, impacts will largely be prevented through appropriate layout of the wind farm infrastructure. Wherever possible, infrastructure will be sited such that it avoids possible conflict with archaeological assets. In any case, from the perspective of ensuring safe functioning plant, it is necessary to avoid archaeological assets (particularly those made of metal) that could damage equipment.

14.12.2 Potential Impacts during Construction

Direct physical disturbance: The installation of the foundations for the WTGs and cables; potential scour protection; non-burial protection measures; and trenching installation at landfall, have the potential to cause direct disturbance and damage to known and undiscovered artefacts of marine archaeological significance. Dependent upon the design of installed features, there may be a requirement for seabed preparation prior to installation which also has the potential to cause direct disturbance. Similar impacts may occur on surficial and shallow archaeology as a result of anchoring and jack-up activities associated with the construction works. Archaeological review of site specific geophysical and geotechnical datasets will ensure that known archaeological assets are avoided as part of the design process, with the potential for AEZs within the development area.

Regarding unknown assets (for example those discovered during pre-construction or construction activity), procedures will be developed in conjunction with stakeholders to produce suitable mitigation measures. Implementation of these standard mitigation measures should reduce impacts so that they are not significant.

Indirect physical disturbance: As marine archaeological assets have often survived as a result of a stable environment, changes to hydrodynamic and sedimentary process could trigger renewed degradation as a result of changes in physical, biological or chemical processes. Thus, changes in sediment transport or localised scour could have indirect impacts upon marine archaeological assets. The archaeological assessment will therefore need to consider the results of physical processes modelling and assessment to determine the likelihood and significance of indirect impacts occurring.

Indirect disturbance of setting: In assessing impacts to the historic environment it is also necessary to consider the setting of heritage structure, site or area is defined as ‘ the immediate and extended environment that is part of, or contributes to, its significance and distinctive character’ (ICOMOS, 2005). Setting includes visual considerations and other environmental factors such as noise, dust and vibration, spatial associations, and consideration of the historic relationship between places.

The proposed project is located an approximate distance of 13 km from the coast, within the 35 km limit of visual significance identified in the Department of Trade and Industry guidance (DTI, 2005). It is therefore proposed that impacts to the setting of onshore heritage assets from the OWF be scoped in. There would be potential temporary impacts relating to the presence of vessels associated with the installation of Offshore Export Cable(s) close to the coast and activities at the landfall. These potential impacts would be assessed in respect of the setting of onshore heritage assets along the coast.

14.12.3 Potential Impacts during Operation

Direct physical disturbance: Direct impacts during operation could occur as a result of routine maintenance activities if these disturb the seabed, however as areas will already have been disturbed during construction there will be limited scope for impact and any impacts are likely

to be of lower magnitude than during construction. Exceptional maintenance activities have the potential to have a more significant impact on archaeological assets (for example if a cable needs to be replaced). However, given that known assets will have been avoided in the original layout, there will be limited potential for impacts from this source. Any such impacts will be assessed on a case-by-case basis.

Indirect physical disturbance: Changes to hydrodynamic and sedimentary process during the operational phase could trigger renewed degradation as a result of changes in physical, biological or chemical processes. Thus, changes in sediment transport or localised scour could have indirect impacts upon marine archaeological assets. The archaeological assessment will therefore need to consider the results of physical processes modelling and assessment to determine the likelihood and significance of indirect impacts occurring during operation of CWP.

Indirect disturbance of setting: It is proposed that the potential impacts of the offshore wind farm on the setting of onshore and offshore heritage assets should be scoped in. The distance from the shore to the offshore wind farm and the change in blade tip height, permits visibility from coastal heritage assets and therefore potentially effecting the setting of these assets. A possible increase in vessel traffic associated with any maintenance works will also need to be factored into the assessment.

14.12.4 Potential Impacts during Decommissioning

Impacts arising during the decommissioning phase are expected to be similar to those experienced during the construction phase. There would be a temporary impact from the activities on site to remove structures, but this would be of relatively short duration, however any impact could still be potentially destructive to archaeological remains The establishment of the archaeological environment baseline and subsequent assessment of impacts will result in the production of a detailed map of features of archaeological significance. This will facilitate the decommissioning works while minimising any impacts upon features of archaeological significance.

14.13 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other Relevant Projects are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Individual known archaeological receptors within the Development Area and Export Cable Corridor Search Area will not be subject to direct impacts from other known plans or projects as they are discrete and there will be no physical overlap of different infrastructure. Given that indirect impacts are likely to be highly localised and small scale, it is not considered likely that there are pathways for cumulative indirect impacts.

There is potential though for cumulative impacts through the additive effect of small impacts across many projects. However, implementation of mitigation on each project should reduce the impacts upon unknown assets. Each project will have an agreed WSI which will cover the approach to unknown assets.

Although individual assets are discrete, taken together they could have collective heritage value, therefore multiple impacts upon similar assets could have a cumulative additive impact. In addition, there is potential for multiple developments to affect the larger-scale archaeological features such as palaeolandscapes and to affect the setting of heritage assets and historic landscapes/seascapes.

14.13.1 CWP with other schemes

The EISwill consider the potential cumulative effects arising from Arklow Bank OWF Phase 1 and 2 and Dublin Array offshore project, and any other nominated projects determined through consultation.

Arklow Bank is located south of the current Development Area and Export Cable Corridor Search Area, 13 km east of Arklow and has been given consent to construct a 200-turbine wind farm. To date seven turbines have been installed with a blade height of 125.5 m.

At the time of writing, the Dublin Array project was not yet consented. Site investigation works at Kish and Bray Banks were due to commence in 2020. The application was for 145 WTGs with a blade height of 165 m. This array is located north of the current Development Area and Export Cable Corridor Search Area, 8 km from east Bray.

Preliminary observations indicate minor cumulative effects will result on the cultural heritage baseline, based on the distance from Arklow Bank and Dublin Array to CWP. However, this will need to be explored in more detail in the EIS and potentially include any changes in setting for cultural heritage assets due to the proposed increase in maximum blade tip height for CWP. Consideration will also be made to the status of Dublin Array, as according to current EIA Regulations 2018 and DCCAE 2017 guidance, only constructed and approved projects need to be considered as part of the CIA.

14.14 Approach to EIA

Based on the evidence summarised from the original EIS and considering the changes in scale of CWP by comparison to the originally consented project, it is concluded that an update of the UKHO, NMS and relevant datasets does not require a full re-assessment of the archaeological baseline and should be scoped out.

With regards to the Development Area and Export Cable Corridor Search Area, further geophysical and geotechnical surveys are to be carried out to inform the submerged prehistory and seabed features, including magnetometer and sub-bottom profiler surveys.

14.15 Scoping Questions

The following are questions which will help to inform the scope of the EIAR:

- Do you agree that the existing data available to describe the archaeology and cultural heritage baseline requires updating?
- Do you agree that, in all cases, the assessment scenario previously applied in conducting the Original Project EIS represents the worst-case scenario when compared to the Project?
- Do you agree that the changes in turbine number and increase in blade tip height require a Settings analysis?
- Do you agree that the cumulative effects on archaeology and cultural heritage receptors should be scoped in to the EIAR for the Project based on the increase in turbine size in this Revised Project?

15 COMMERCIAL FISHERIES

15.1 Introduction

The following chapter sets out the scope of assessment in relation to Commercial Fish for the CWP EIA. This chapter includes:

- A review of existing data collected for CWP to date;
- Consideration of the validity of this data for the EIA;
- New data sources that shall be collected and consulted;
- A consideration of the Design Parameters relevant to commercial fisheries; and
- The scope of the EIA (including cumulative considerations)

15.2 Existing Environment

CWP is located on the Codling Bank, which forms part of a series of banks in the western Irish Sea which runs approximately 10 km offshore parallel to the coast, standing in 20 – 30 m of water and rise to within metres of the water's surface.

The Codling Bank supports a whelk fishery, targeted by smaller inshore vessels from nearby ports who deploy baited pots to the seafloor. Crab and lobster fisheries also operate in the vicinity but are generally restricted to nearshore areas. Seed mussel grounds are also located inshore of the Codling Bank, which are fished by dredge to supply juveniles to seafloor aquaculture grounds, where they are grown on to a marketable size. Very little trawling occurs in this area, with effort focusing more on deeper waters to the North and East of Codling Bank.

15.3 Data Sources and Baseline Methodology

Previous assessment work has been carried out at CWP and whilst this work may not provide a contemporary understanding of commercial fisheries interests surrounding CWP it has provided for a comprehensive understanding of the type of fishing that is likely to be encountered. This information has therefore helped inform the scope of assessment requirements for the commercial fish assessment.

In order to provide a robust fisheries baseline, data will be collected from a combination of publicly available sources as well as consultation with fishermen. The baseline will be based on the last five years' worth of available fisheries data for Ireland, and any other nationality that may fish within the area, for all species and commercial fishing methods. The following data sets will be collated:

- Landings (tonnage and value);
- Location of fishing activities and effort where available; and
- Operating patterns and practices.

The following information provides a summary of the data sources and methodology which will be used to inform the EIA.

15.3.1 Baseline

15.3.1.1 Data Validity

In 2008 a comprehensive desk-based study using available data was undertaken, however many of the data sets have since been updated or there are more recent data sources available from which a comprehensive baseline will be generated for the CWP EIA (Table 15.1, Table 15.2).

Table 15.1: Initial and updated data sources available for the assessment

2008 Baseline Data Sources	Year	Current Data Sources	Year
Fish landings data (Sea Fisheries Protection Authority (SFPA))	2003-2007	Fish landings data (SFPA)	2013-2018
Aquaculture production figures for bottom grown mussel industry (Bord Iascaigh Mhara (BIM))	1980-2007	Aquaculture production figures for bottom grown mussel industry (BIM)	2013-2019
Analysis of fishing activity, stock characteristics and stock status (Marine Institute)	1990-2007	Analysis of fishing activity, stock characteristics and stock status (Marine Institute)	2013-2018
Seed mussel removals from SW Irish Sea, (BIM)	1995-2007	Seed mussel removals from SW Irish Sea, (BIM)	1995-2019

Table 15.2: Additional (current) baseline data sources

Source	Data
Ireland's Marine Atlas	Fishery effort data and defined fishing grounds (inshore and offshore fisheries)
Marine Institute	Vessel Monitoring System (VMS) data for fishing vessels
Bord Iascaigh Mhara	Data on locations of fishing activity
Department of Communications, Climate Action and Environment (DCCAE) (Ireland)	Data on locations of fishing activity
Department of Agriculture, Environment and Rural Affairs (DAERA- Northern Ireland).	Data on locations of fishing activity
Marine Management Organisation (UK)	UK vessel and port landings and effort (VMS) data
The Irish Governments Commercial Sea Fishing Network Portal.	Status of mussel seed beds in the area
Atlas of Commercial Fisheries Around Ireland	Data on locations of fishing activity
Sea Fisheries Protection Authority	Irish and foreign vessel landings statistics (available by request)
Irish Defence Forces Fisheries Monitoring Centre	Data on locations of fishing activity

A preliminary review of available data provided the following information regarding commercial fishing activity in the vicinity of CWP.

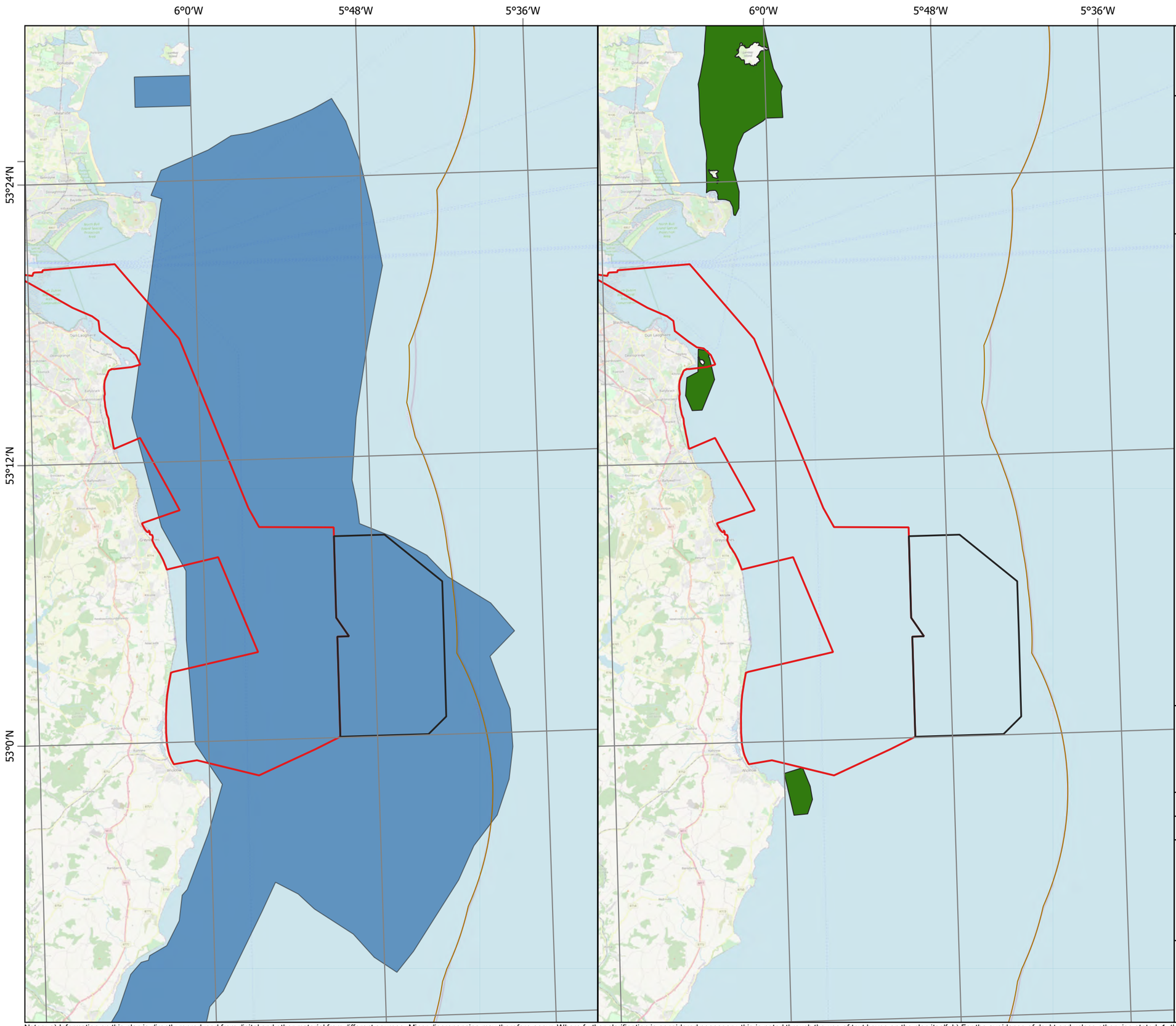
The main commercial fishing activity on the Codling Bank is associated with smaller vessels from the inshore fleet targeting whelk (*Buccinum undatum*) with pots. This activity occurs across the whole of Codling Bank and extends approximately 30 km to the north, and down to Wexford in the south (Figure 15.1).

Creel fishing for crab (*Cancer pagurus*) and lobster (*Homarus Gammarus*) is also undertaken within the vicinity of Codling Bank. According to Ireland's Marine Atlas this occurs to a lesser extent than whelk fishing, being restricted to a few discrete inshore areas in the immediate vicinity (Figure 15.1). More extensive creel fishing activity is seen to the north of Howth and along the South coast into and beyond Kilturk Bank.

Seed mussel (*Mytilus edulis*) grounds are located inshore between the Development Area and the coastline around Wexford bay and Wicklow (Figure 15.2). These areas are typically targeted by dredge and used to supply aquaculture, where the juvenile mussels are redistributed on the seafloor to be grown on to a marketable size. Nearby Wexford harbour contains extensive areas where mussel aquaculture is undertaken.

A dredge fishery for razor clams (*Ensis sp.*) operates along the nearshore to the north of Howth up to Dundalk Bay as well as to the south in Wexford Bay.

Little to no demersal trawling activity is reported on the Codling bank, being focused more towards deeper waters to the North and East where *Nephrops* and whitefish are key target species. Low levels of pelagic trawling are reported in nearshore areas (Figure 15.3).



Project:

Codling Wind Park

Title:

Figure 15.1: Key Areas of Irish Static Gear Fishing Activity - Whelk Pots & Crab and Lobster Creels (Ireland's Marine Atlas, 2016a)

Key

- Codling Wind Park
- Potential export cable corridor search area
- 12 nautical mile (NM) Irish Limit

Static gear

- Whelk pot
- Crab/lobster creel

Scale @ A3: 1:300000

Coordinate System: IRENET95/ Irish Transverse Mercator
Graticules: WGS 84

0 4 8 12 16 km

N

Date: 21-07-20	Prepared by: SM	Checked by: SMc
Ref: IE200091_M_291_C		

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6°12′W
6°0′W
5°48′W
53°12′N
53°0′N

Project:

Codling Wind Park

Title:

Figure 15.2: Key Areas of Irish Dredge Gear Fishing Activity - Seed Mussel & Unspecified Dredge by Value (2014 - 2018) (Ireland's Marine Atlas, 2016a)

Key

- Codling Wind Park
- Potential export cable corridor search area
- 12 nautical mile (NM) Irish limit

Irish dredge gear

- Seed mussel

Unspecified dredge (effort 2014-2018) - units not provided)

- 0 - 2
- 2 - 5
- 5 - 10
- 10 - 100
- 100 - 263

Scale @ A3: 1:250000

Map projection: IRENET95/ Irish Transverse Mercator
Graticules: WGS 84

0 2 4 6 8 km

N

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6°0′W
5°30′W
53°30′N
53°0′N
52°30′N

Project:

Codling Wind Park

Title:

Figure 15.3: Irish Trawl Activity: Bottom Otter Trawl, Beam Trawl & Pelagic Trawl (Ireland's Marine Atlas, 2016a)

Key

- Codling Wind Park
- Potential export cable corridor search area
- 12 nautical mile (NM) Irish limit

Beam trawls (effort 2014-2018 - units not provided)

- 0 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 100
- 100 - 200
- 200 - 405

Bottom otter trawls (effort 2014-2018 - units not provided)

- 0 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 10
- 10 - 100
- 100 - 1000

Pelagic trawls (effort 2014-2018 - units not provided)

- 0 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 10
- 10 - 150

Scale @ A3: 1:600000

Map projection: IRENET95/Irish Transverse Mercator

Graticules: WGS 84

0 5 10 15 20 km

N

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15.3.2 Future Baseline Assessment

No specific site surveys are deemed necessary for the collection of commercial fisheries data.

To validate the data sources, as identified in Tables 15.1 and 15.2, a number of fisheries consultation events will be undertaken in order to gather and validate information on fishing activity, particularly for the under 15 m fleet where fishing distribution data tends to be limited. The fisheries consultation strategy will be agreed with the SFPA and the Marine Institute prior to commencement.

15.4 Guidance

There is no specific legislation which covers the scope of an impact assessment on commercial fisheries. There is however guidance which provides information on how to assess impacts to fisheries from offshore wind farms.

In addition to the list in Section 3.2 and Section 5.2, to provide a detailed and robust baseline description of fisheries operating within the site and the wider region surrounding the area, the following guidance has been considered:

- Guidance note for Environmental Impact Assessment In respect of FEPA[14] and Coastal Protection Act (CPA)[15] requirements, Version 2 (Cefas, 2004);
- Recommendations for Fisheries Liaison: FLOWW (Fishing Liaison with Offshore Wind and Wet Renewables Group) (BERR, 2008);
- Best practice guidance for fishing industry financial and economic impact assessments Sea Fish Industry Authority and UK Fisheries Economic Network (UKFEN 2012);
- Economic Impact Assessments of Spatial Interventions on Commercial Fishing: Guidance for Practitioners. Second Edition (Seafish and UKFEN, 2013);
- Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (FLOWW, 2014);
- Fisheries Liaison with Offshore Wind and Wet Renewables group FLOWW (2015). FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Disruption Settlements and Community Funds (FLOWW 2015);
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Cefas contract report: ME5403 – Module 15 submitted to Defra and the MMO (Cefas, 2011); and
- Guidance on Environmental Considerations for Offshore Wind Farm Development. Reference Number: 2008-3 (OSPAR, 2008).

15.5 Design Parameters

As a Design Parameters approach is being applied, the worst-case design scenario for commercial fisheries needs to be assessed within the EIA. It is proposed to construct a maximum of 140 WTGs and up to five OSPs. These will be installed either with monopiles, jacket substructure with pile foundations or suction caissons. The impacts to commercial fishing are considered to be greatest at the maximum number of turbines or where those turbines are spaced over the greatest area, depending on the impact under assessment. The required inter-array and export cabling, including possible cable protection requirement will also be considered.

[14] Food and Environmental Protection Act 1985 (FEPA)

[15] Coast Protection Act 1949 (CPA).

15.6 Embedded Mitigation

Embedded mitigation specific to commercial fisheries will be determined through the development of the Design Parameters and will be presented in the EIAR when it is submitted this will is likely include;

- Appointment of Fisheries Liaison Officer (FLO) for commercial fisheries engagement and consultation;
- Appointment of Fishing Industry Representatives (FIRs);
- Ongoing Liaison with commercial fisheries;
- Issuing of Notices to Mariners (NtMs);
- Disruption settlements, for demonstrable loss of fishery access or economic disadvantage caused by disruption or displacement following FLOWW (2015) guidance and;
- Guard vessel(s) as required by risk assessment.

15.7 Scoping of CWP EIA

The following potential impacts on commercial fishery receptors during construction (and decommissioning) and operation of CWP have been identified and are proposed for assessment within the EIA:

- Installation (and decommissioning):
- Temporary loss or restricted access to established fishing grounds;
- Temporary displacement of fishing activity into other areas;
- Snagging damage to static gear by Project vessels;
- Navigational safety issues for fishing vessels;
- Temporary increases in steaming times; and
- Obstacles on the seabed after installation;
- Operation:
- Permanent or temporary loss or restricted access to established fishing grounds;
- Permanent or temporary displacement of fishing activity into other areas;
- Interference to normal fishing activities;
- Safety issues for fishing vessels;
- Increased steaming times; and
- Obstacles on the seabed after installation;

Impacts to fish and shellfish receptors that may result in displacement or disruption of commercially important fish and shellfish resources will be assessed in the Fish and Shellfish ecology.

Receptors (i.e. fisheries) to be assessed will be determined once the baseline has been established. Previous work identified the following fisheries as relevant, however the inclusion of these fisheries will be determined through the generation of an up to date baseline, which will also identify any new fisheries that have arisen in the time since the previous assessment.

- Fin fish fishery;
- Shellfish fishery;
- Whelk fishery;
- Seed mussel fishery; and

- Recreational fishing (if required).

There is the potential for the installation and operation phases of the proposed development to have effects on commercially harvested fish and shellfish populations. This may result in behavioural changes or declines in abundance, which could indirectly affect the productivity of the fishery. While this is acknowledged in the commercial fish chapter of this document, the potential for such effects will be assessed, together with non-commercially harvested species, in the fish and shellfish ecology chapter and any significant impacts discussed in the commercial fish chapter of the EIAR.

Additionally, it is acknowledged that there is particular concern from commercial fisheries stakeholders regarding the long-term impact of survey, construction and operational noise on commercially important shellfish stocks, specifically whelk.

15.8 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 DCCAE guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Currently, there are several large-scale construction projects in various stages of planning within the region. Given their proximity to CWP and similarity of activities, there is a possibility that combined activities from these projects can alter the extent or magnitude of their effect on the environment, and therefore it may be appropriate to consider them as part of the CIA.

Due to the varying spatial extent of each fishery, cumulative projects will be identified on a per-fishery basis with all relevant projects in the Irish Sea considered. It is however, understood that due to a restriction on Irish vessels working within the UK 12 nm limit (unless historical rights exist permitting access between 12 and 6 nm), limited interaction with UK projects is expected.

15.9 Scoping Questions

- Are you content with the scope of data gathering and validation with the fishing industry proposed for the baseline generation?
- Are there any other key data sources you are aware of that you wish to see included?
- Are you content with the scope of the impact assessment?
- Are there any additional impacts that you believe could be significant and that you wish to see assessed?

16 NAVIGATION AND SHIPPING

16.1 Introduction

This chapter of the Scoping Report seeks to outline and confirm the navigational impacts and receptors of relevance to the proposed CWP project located in Irish Territorial Waters. CWP is located off the County Wicklow coast between Greystones and Wicklow Town, and the Offshore Export Cable Corridors will potentially make landfall at a currently undefined location(s) somewhere between Poolbeg, Co. Dublin in the north and Wicklow Town, Co. Wicklow in the south.

On this basis, this chapter presents the initial EIA scoping undertaken for impacts to marine navigation receptors which may arise from the construction, operation, and decommissioning of the CWP. As per Section 16.7, the output of the scoping process will feed into the Navigation Risk Assessment (NRA) which will be produced in support of the EIA undertaken as part of the Environmental Impact Assessment Report (EIAR).

16.2 Existing Environment

The Development Area is located within the Saint George's Channel, approximately seven nautical miles (nm) off the Irish Coast, as shown in Figure 16.1. The study area used within this Scoping Report for marine navigation is illustrated in Figure 16.1 and is discussed further in Section 16.3.

Vessel routeing inshore of the CWP is primarily dictated by the presence of shallow banks in the area, namely the Codling Bank, India Bank, Arklow Bank, and Kish Bank each of which intersects the CWP Project area.

There are various other navigational features within the vicinity of the CWP project area notably, markers buoys to depict the navigational hazard of the shallow banks; the United Kingdom's Ministry of Defence (MoD) practice areas intersect the eastern extent of the CWP project area and the nearby Arklow Bank phase 1 offshore wind farm is located south of the CWP project area.

The CWP project details under consideration are outlined within Section 16.5, which details those aspects of the Design Parameters that are considered relevant to marine navigation, with further details are provided in Chapter 4 (Description of the Development).

-700000 -680000 -660000 -640000 -620000 -600000

7000000

6980000

6960000

6940000

6920000

SOURCES

British Government Surveys

a	2004-2013	Full sea floor coverage
b	2004-2012	Partial sea floor coverage
c	1982-2004	1:10 000-1:25 000
d	1972-1983	1:50 000
e	1953-1965	1:10 000-1:25 000
f	1954-1969	1:72 000-1:75 000

British Government Surveys (leadline)

g	1836-1911	1:5000-1:75 000
h	1843	1:91 000

Irish Government Surveys

i	2011-2013	Partial sea floor coverage

Commercial Surveys

j	2007-2009	Partial sea floor coverage
k	1989	1:37 000

Refer to larger scales

Refer to larger scales

Refer to larger scales

Project:

Codling Wind Park

Title:

Figure 16.1

Location of CWP

Key

- Develpment Area
- Offshore Export Cable Corridor
- Study Area

Notes:

a) Information on this map is directly reproduced from digital and other material from different sources. Minor discrepancies may therefore occur. Where further clarification is considered necessary, this is noted through the use of text boxes on the map itself.

b) For the avoidance of doubt and unless otherwise stated:

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2. The Natural Power Consultants Limited accepts no responsibility for the accuracy of data supplied by third parties.

Scale @ A3: 1:400,000

Coordinate System: WGS 1984 World Mercator

NOT TO BE USED FOR NAVIGATION

Licence

N

0 5 10 km

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Commercial Surveys

j	2007-2009	Partial sea floor coverage
k	1989	1:37 000

Refer to larger scales

Project:

Codling Wind Park

Title:

Figure 16.2

Navigational Features

Key

- Develpment Area
- Offshore Export Cable Corridor
- Study Area

Navigational Features

- Arklow Bank
- Bray Bank
- Codling Bank
- India Bank
- Anchorage
- Aids to Navigation
- Firing and PTA Exercises
- Manoeuvring and PTA Exercises

Arklow Bank Wind Farm

- Phase 1 Turbines

Notes:

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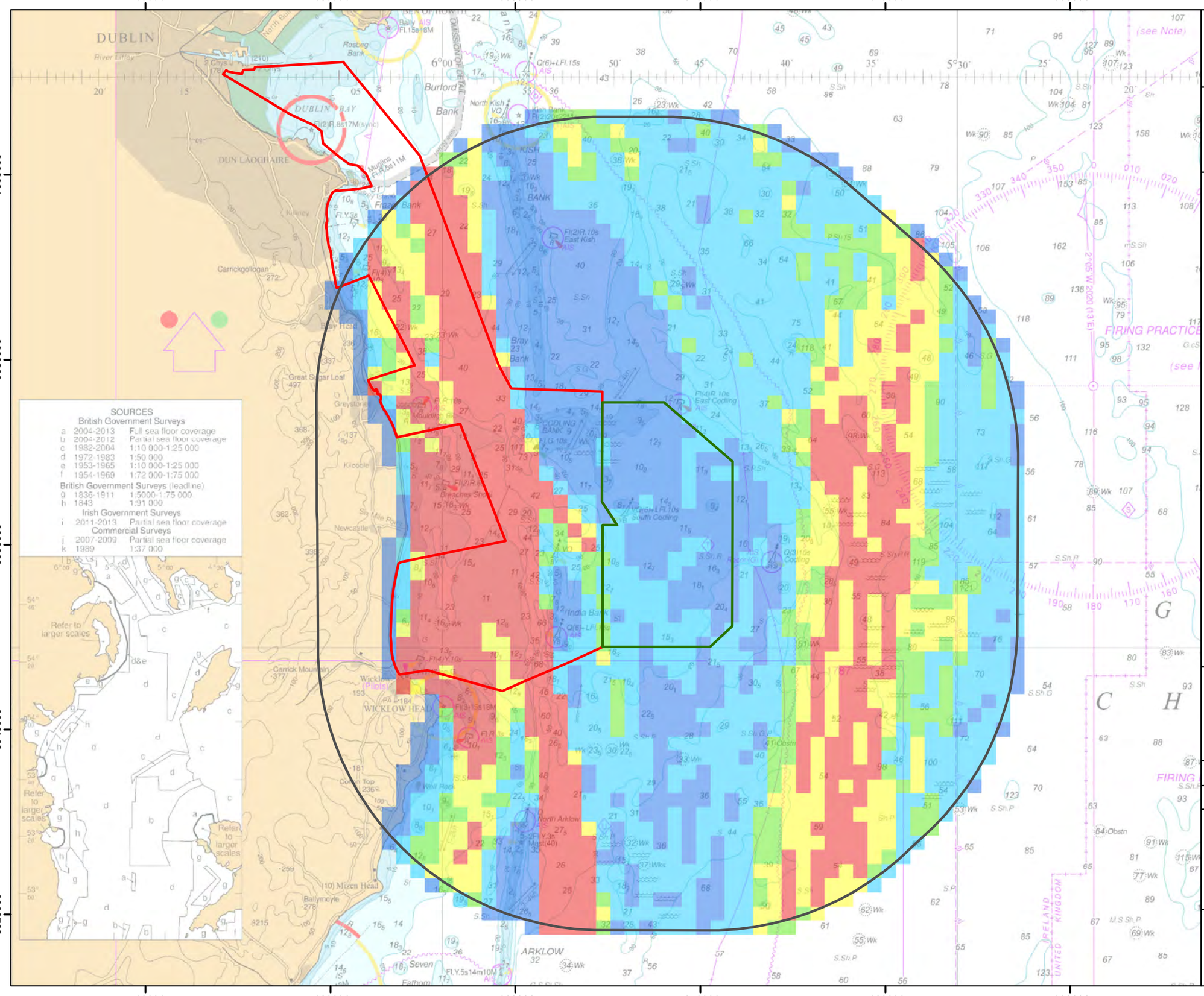

Project:

Codling Wind Park

Title:

Figure 16.3

Vessel Density (Summer)

Key

- Develpment Area
- Offshore Export Cable Corridor
- Study Area

Vessel Density*

- >30
- 20-30
- 15-20
- 5-15
- 0-5

* Number of vessels intersecting a cell over the 28 day study period

Notes:

a) Information on this map is directly reproduced from digital and other material from different sources. Minor discrepancies may therefore occur. Where further clarification is considered necessary, this is noted through the use of text boxes on the map itself.

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Coordinate System: WGS 1984 World Mercator
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Licence

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0 5 10 km

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7000000 6980000 6960000 6940000 6920000

SOURCES

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a	2004-2013	Full sea floor coverage
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e	1953-1965	1:10 000-1:25 000
f	1954-1969	1:72 000-1:75 000

British Government Surveys (leadline)

g	1836-1911	1:5000-1:75 000
h	1843	1:91 000

Irish Government Surveys

i	2011-2013	Partial sea floor coverage

Commercial Surveys

j	2007-2009	Partial sea floor coverage
k	1989	1:37 000

Project:

Codling Wind Park

Title:

Figure 16.4

Vessel Density (Winter)

Key

- Development Area
- Offshore Export Cable Corridor
- Study Area

Vessel Density*

- >30
- 20-30
- 15-20
- 5-15
- 0-5

* Number of vessels intersecting a cell over the 28 day study period

Notes:

a) Information on this map is directly reproduced from digital and other material from different sources. Minor discrepancies may therefore occur. Where further clarification is considered necessary, this is noted through the use of text boxes on the map itself.

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16.3 Data Sources and Baseline Methodology

16.3.1 Available Data

The following data sources have been used to inform the preliminary marine navigation baseline assessment undertaken for this scoping exercise:

- 28 days of Automatic Identification System (AIS) data collected from onshore and satellite receivers during January 2018;
- 28 days of AIS data collected from onshore and satellite receivers during July 2018;
- Admiralty Charts 1121,1410, and 1411; and
- United Kingdom Hydrographic Office (UKHO) Admiralty Sailing Directions – Irish Coast Pilot NP40 (UKHO, 2013).

It is noted that these represent new data sources over those considered in the original submissions for the initial Codling Wind Park (2005) and Codling Wind Park Extension (CWPE) (2009), which established the marine navigation baseline solely via consultation with statutory and non-statutory stakeholders. These prior consultation assessments have also been considered within this scoping process, but the primary assessment sources are those listed above.

In the main, data has been considered within a 10 nm buffer of the Development Area (the 'study area'), as shown in Figure 16.1.

The 10 nm buffer is standard for marine navigation assessments as it is large enough to encompass vessel routeing which may be impacted, while still remaining site specific to the project being studied.

High level assessment of each data source listed has also been undertaken within the Offshore Export Cable Corridor. Detailed marine traffic analysis will be undertaken for the Offshore Export Cable Corridor as part of the NRA process, once the landfall option(s) has been defined.

16.3.1 Navigational Features

Vessel routeing inshore of the CWP is primarily dictated by the presence of shallow banks in the area, namely the Codling Bank, India Bank, Arklow Bank, and Kish Bank each of which intersects the study area. The shallowest charted contours (less than 10 m) of these banks are shown in Figure 16.2.

The banks are marked by buoys to warn passing traffic of the navigational hazard created by the shallow depths. The positions of these, and any other Aids to Navigation (AtoN) identified within the study area are included in Figure 16.2.

The United Kingdom's Ministry of Defence (MoD) practice areas intersect the eastern extent of the study area, as shown in Figure 16.2. These areas are used for firing, Pilotless Target Aircraft (PTA), and manoeuvring exercises, and are in excess of 7.5 nm from the eastern boundary of CWP.

Phase 1 of the Arklow Bank wind farm, which comprises seven turbines, is located approximately 12 nm southwest of the Development Area and has been operational since 2003. The positions of the installed Phase 1 turbines are shown in Figure 16.2.

Whilst not within or in proximity to the study area (and hence not shown in Figure 16.2), the Traffic Separation Schemes (TSSs) associated with the Irish Sea are still considered relevant navigational features given vessels will tend to position themselves on course in advance with the correct lanes. On this basis the TSS which dictate vessel routeing in the area most prominently are considered to be off Skerries (34 nm to the north east), off Tuskar Rock (46 nm to the south), and off Smalls (69 nm to the south).

A review of Admiralty Sailing Directions (UKHO, 2013) and navigational charts has identified anchorage areas associated with the following locations within the Offshore Export Cable Corridor:

- Dublin Bay;
- Killiney Bay;
- Scotman's Bay; and
- Wicklow Harbour.

A high-level review of the AIS data has been undertaken to identify any associated anchoring activity.

16.3.2 Marine Traffic

The marine traffic data collected was used to estimate vessel densities within the study area, relative to the Development Area. To demonstrate seasonal variations in shipping, the density assessment has been undertaken for the summer and winter AIS data separately. The density outputs are presented in grid form in Figure 16.3 (summer) Figure 16.4 (winter). The same density range brackets have been used in both figures, allowing direct seasonal comparison.

Commercial vessel routes were recorded both inshore and offshore of the Development Area. The majority of inshore commercial traffic was observed to maintain a separation of at least 2 nm from the Development Area (likely due to the shallow banks); however, a limited number of vessels were observed to transit a route that passes between the India and Codling Banks, and hence intersects the southern section of the Development Area.

Offshore of the Development Area, routeing was observed to be largely dictated by vessel preference to align in advance with the Off Tuskar Rock and Off Smalls TSS (see Section 16.3.3.1 for further details). Similarly, to the inshore commercial traffic, the majority of vessels maintained a 2 nm separation from the Development Area (noting shallow sand banks prevent most vessels passing in close proximity), with only limited levels of vessels intersecting, Those commercial vessels that did intersect avoided the shallow banks.

Summer traffic was observed to be generally much denser than during winter, particularly in coastal areas. This was largely due to notable levels of coastal recreational activity observed during summer that was not reflected within the winter data (which is the expected pattern given winter conditions are usually unfavourable to recreational users). It is noted that while considered notable in terms of traffic levels, the majority of the recreational activity recorded during summer remained coastal, with only limited numbers of recreational vessels recorded further offshore, including within the Development Area.

Based on a high-level assessment, the majority of fishing vessels recorded within the study area were inshore of the Development Area and in transit, rather than actively engaged in fishing. No clear active fishing was observed during winter (i.e., vessels appeared to be in transit to place/retrieve pots or without gear deployed); however, some active fishing was observed in the summer data, most prominently to the east of the Development Area. The majority of vessels within the Development Area itself were in transit, including from Wicklow, with some limited active fishing within the very north western extent of the Development Area observed during summer. Further details on fishing are provided in Chapter 15: Commercial Fisheries.

A preliminary assessment of anchoring activity indicated that anchoring within the Export Cable Corridor was most predominately associated with the Wicklow and Dublin anchorages (see Section 16.3.3.1), and as such is in proximity to the northernmost and southernmost landfall options. The majority of anchoring recorded was from cargo vessels and tankers awaiting orders outside Dublin. A tanker was also observed at anchor near Bray Head. It should be considered that some of the anchorages identified in Section 16.3.3.1 would only be used by smaller vessels (i.e. recreation and fishing), and the associated vessel activity may therefore not have been recorded via AIS.

16.3.3 Data Validity

AIS carriage and broadcast is not compulsory for fishing vessels of less than 15 metres (m) or recreational vessels. It should therefore be considered that such traffic is likely to be

underrepresented within the assessment undertaken to inform this chapter; however, it is noted that smaller vessels are increasingly observed to utilise AIS voluntarily given the associated safety benefits. On this basis and noting that AIS is accepted as being comprehensive for other larger vessel types, the available data is considered fit for the purpose of providing the high-level baseline assessment presented in this scoping exercise. Engagement with the commercial fishing industry and recreational sea users will be undertaken during the EIA process, and Section 16.3.4 provides discussion on how fishing and recreational traffic will be assessed further within the NRA.

16.3.4 Surveys

The AIS data considered within this Scoping Report provides coverage of the study area and is considered as providing a comprehensive picture of commercial traffic. However, as discussed in Section 16.3.3.2, assessment based purely on AIS is likely to underrepresent fishing vessels under 15 m and recreational vessels, given that AIS carriage and broadcast is not mandatory for such vessels.

Therefore, it is considered necessary to undertake an updated consultation process with local fishing and recreational stakeholders, to ensure such traffic is suitably accounted for within the NRA. The original consultations undertaken for the historic Codling Wind Park and CWPE projects will concurrently be considered, given that they gathered information from fishing and recreational consultees.

Any additional work undertaken as part of the Commercial Fisheries and Other Marine Users chapters will also be considered (see Chapter 15 and 17 of this Scoping Report respectively for further information on these topics).

Taking these existing sources into account, consultation will be undertaken with the Department of Transport, Tourism and Sport (DTTAS), Marine Survey Office (MSO) and the Commissioner of Irish Lights to determine marine traffic data requirements, and if a dedicated survey to record non-AIS traffic is required. The age of the existing AIS data will also be discussed with consultees with regard to its validity in underpinning the EIA and NRA, and whether additional survey or data collection is needed with this regard.

It is also noted that the NRA will provide more in-depth marine traffic assessment within the Export Cable Corridor. Most notably, detailed assessment of vessel anchoring to identify where snagging may be a risk, and vessel draught to identify any areas where there may concerns around under keel clearance.

16.4 Guidance

The public consultation period of the Offshore Renewable Energy Development Plan (OREDP) (Department of Communications, Climate Action and Environment (DCCAE), 2014) was closed in December of 2017. The OREDP sets out key principles and policy actions for Ireland's renewable energy potential, and given it is now ratified the CWP application will need to be in line with the associated requirements therein. It is also noted that the Republic of Ireland (ROI) Statutory Instrument (SI) Number 296 of 2018 was implemented in September 2018 by the Department of Housing, Planning and Local Government (DHPLG) (2018). SI 296 transposes into Irish law the provisions of European Union (EU) Directive 2014/52/EU (EU, 2014) with regards to EU EIA requirements**.** The EIAR included within the new application will therefore comply with SI 296 and more generally the EIA Directive as transposed into the planning process by the PDA and PDR.

The overarching scoping exercise has primarily been informed by the Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (DCCAE, 2017). This DCCAE guidance specifically references the following additional guidance documents relevant to marine navigation, and hence these have been considered within this chapter, and will inform the NRA:

- Maritime and Coastguard Agency (MCA) Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms (MCA, 2005); and
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2013).

As good practice within the offshore renewable energy installation development process the assessment will consider Marine Guidance Note (MGN) 543[16] - Safety of Navigation: Offshore Renewable Energy Installations (OREIs) Guidance on United Kingdom (UK) Navigational Practice, Safety and Emergency Response (MCA, 2016). This is the primary guidance document from the MCA for UK OREI developers when considering marine navigation issues.

Given no such corresponding comprehensive guidance from the ROI specific to marine navigation is available at the time of writing; it is proposed that MGN 543 is used as the primary guidance document to support the development of the NRA and subsequent assessment of marine navigation impacts in the EIS. This is considered an acceptable approach given that the overarching ROI guidance (DCCAE, 2017) references MCA guidance as relevant for marine navigation issues.

The international standard for marine navigation risk assessment is to use the International Maritime Organization (IMO) Formal Safety Assessment (FSA) Approach (IMO, 2018). The methodology in this IMO guidance will therefore be used to undertake the EIA for marine navigation impacts, noting that this approach is required under the MCA guidance. Further details on the FSA methodology are provided in Section 17.9.

16.5 Design Parameters

This section summarises those aspects of the Design Parameters that are relevant to assessment of impacts to marine navigation receptors. Details of the turbines to be installed within the CWP site are summarised in Table 16.1.

Table 16.1: Design Parameters (Turbines)

Design Parameter	Worst Case
Maximum number of turbines	140
Minimum Blade Clearance (above Highest Astronomical Tide (HAT))	22 m
Maximum Wind Turbine Generator (WTG) tip height	320 m
Maximum WTG rotor diameter	288 m
Indicate separation distances between WTGs	Up to 4.5 x 4.5 rotor diameters
Foundation types under consideration	• Monopile • Jacket substructures on pin piles • Suction caissons with monopole • Suction caisson with jackets

There will also be up to five Offshore Substation Platforms (OSPs), with the foundations listed for WTGs also under consideration for the OSPs. It is currently anticipated that there could be

[16] Note that an updated version of MGN 543 is currently out for consultation. Should MGN 543 be superseded prior to drafting of the NRA, the up to date version will be considered.

up to six export cables. As highlighted in Chapter 4 (Project Description) further work is required to refine the Design Parameters of the export (up to six) and array cables. It is intended that cable installation methods will include trenching, ploughing, with the potential for open cut trenching at landfalls. Cables will be buried where possible, however additional external protection may be required where target depths cannot be met.

16.6 Embedded Mitigation

Embedded mitigation measures relevant to marine navigation under consideration for CWP at this stage are listed below. The need for any additional mitigation required beyond those considered embedded will be identified and defined as part of the EIA process.

- Appropriate marking on nautical charts;
- Promulgation of information as required (local and national requirements);
- Buoyed construction area in agreement with the Commissioner of Irish Lights;
- Implementation of safety zones[17] during construction and periods of major maintenance, and promulgation of advisory safe passing distances around structures and works;
- Marine Coordination and communication to manage project vessel movements;
- Suitable implementation and monitoring of cable protection (via burial, or external protection where burial to a suitable burial depth as identified via risk assessment is not feasible);
- Marking and lighting the site in agreement with the Commissioner of Irish Lights and in line with IALA Recommendation O-139 (IALA, 2013);
- 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);
- Blade clearance of at least 22 m above HAT (in line with industry good practice);
- Liaison with Search and Rescue (SAR) resources to ensure suitable emergency response plans and procedures are in place;
- Consideration of navigation safety and SAR in turbine design and layouts, including acceptable levels of Supervisory Control and Data Acquisitions (SCADA) systems; and
- Guard vessel(s) as required by risk assessment.

The requirement and feasibility of any additional measures will be dependent on the significance of the effects on shipping and navigation and will be consulted upon with relevant statutory consultees throughout the EIA process (see Section 16.7).

16.7 Scoping of CWP EIA

The DCCAE (2017) Guidance provides an indicative list of impacts that should be considered for marine navigation when producing an EIAR. These are:

- Allision risk (surface)[18];
- Displacement of shipping; and
- Collision risk caused by reduced visibility of other vessels.

[17] Noting this will require authorisation by the appropriate authority.

[18] The guidance refers to this as “collision risk”. It is assumed that this refers to vessel to structure contacts given it mentions surface and subsurface scenarios. For the purposes of clarity in this scoping exercise and subsequent impact assessment vessel to structure contacts are referred to as “allisions” and vessel to vessel contacts as “collisions”, as per the recognised marine navigation terminology.

The guidance also requires consideration of reduced trade supply however the focus of this assessment is marine navigation and safety; not potential commercial impacts which will be considered separately as required.

Following the results of the baseline assessment, which is presented in Section 16.2, and based on experience of other wind farm marine navigation assessments, the following impacts have been identified as requiring inclusion in the EIA process:

- Increased vessel to vessel collision risk between third party vessels resulting from displacement;
- Increased vessel to vessel collision risk between a third-party vessel and a project vessel;
- Reduction of under keel clearance resultant of cable protection;
- Anchor interaction with subsea cables;
- Interference with communications and position fixing equipment from the structures within the Development Area;
- Reduction of SAR capacity due to increased incident rates.

This scoping exercise seeks to scope in only those impacts which are deemed to require further assessment at the NRA stage. It is proposed that the potential impacts described in Table 16.2 below can be scoped out i.e. not taken forward for assessment within the CWP EIAR. This is because they are unlikely to result in significant effects on Navigation receptors. It should be noted that the main purpose of the NRA is to scope impacts in or out of the EIA. Given that a more complete understanding of the details of CWP is likely to be available at the time of writing of the NRA and noting that an updated and more detailed baseline assessment will be undertaken, impacts scoped in at this stage may still be scoped out prior to the EIA.

Table 16.2: Justification of impacts scoped out

Impact	Justification for Scoping out at this stage
Reduced access to local ports	The only port likely to be affected by the project is Wicklow, and the baseline assessment output indicates that most routeing to or from Wicklow does not interact with the CWP site. While certain commercial vessel routes will be required to deviate, this will not be to a degree as to affect port operations.
Electromagnetic interference with magnetic compasses from subsea cables	Electromagnetic interference has been determined to only have impact on magnetic compasses when water depths are very shallow, when not suitably buried and only when the vessel is directly over the cables. Therefore, no significant impact is anticipated.
Reduced access to local ports	The only port likely to be affected by the project is Wicklow, and the baseline assessment output indicates that most routeing to or from Wicklow does not interact with the CWP site. While certain commercial vessel routes will be required to deviate, this will not be to a degree as to affect port operations.
Electromagnetic interference with magnetic compasses from subsea cables	Electromagnetic interference has been determined to only have impact on magnetic compasses when water depths are very shallow, when not suitably buried and only when the vessel is directly over the cables. Therefore, no significant impact is anticipated.

16.8 Scoping of Cumulative Assessment

16.8.1 Projects considered in Scoping

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to

be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other Relevant Projects are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information including project detail and development timelines. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Other projects which may result in increased impacts when considered with CWP on a cumulative basis have been identified, and subsequently scoped into the cumulative assessment. Scoping of potential cumulative projects is based upon their stage in development including Relevant Project Status, their proximity to the Development Area and the Offshore Export Cable Corridor, and position relative to vessel routeing as identified on a preliminary basis within the baseline assessment.

A precautionary approach to potential cumulative effects has been followed and the following planned wind farm projects have been scoped in for further consideration on the basis that they may impact upon vessel routeing when considered with the CWP on a cumulative basis::

- Dublin Array (Relevant Project);
- Arklow Bank Phase 1 (operational)
- Arklow Bank Phase 2 (consented);
- North Irish Sea Array (Relevant Project);
- Oriel Wind Farm (Relevant Project); and
- Gwynt y Môr Extension (In development).

16.8.2 Cumulative Impact's Scoped in for further assessment

As part of the scoping exercise each impact identified for CWP in isolation (see Section 16.7) has also been scoped for the potential to have cumulative impact when other projects are considered (see Section 16.8.1 for the projects that will be considered cumulatively).

The cumulative scoping process is summarised in Table 16.3.

Table 16.3. Cumulative impact scoping summary

Impact	Scoped In?	Rationale
Cumulative		
Allision (vessel to structure) risk	Yes	Potential increase in allision risk has been identified given proximity to nearest sites.
Displacement of shipping	Yes	Vessel displacement when considered on a cumulative basis is likely to result in larger or at least more significant deviations than for CWP in isolation.
Reduced access to local ports	No	The only port likely to be affected by the project is Wicklow, and the baseline assessment output indicates that while certain commercial vessel routes will be required to deviate, this will not be to a degree as to affect port operations.

Impact	Scoped In?	Rationale
Increased vessel to vessel collision risk (third party vessel with third party vessel)	Yes	This impact is dependent on vessel displacement on a cumulative basis, which will not be assessed until the NRA stage. Further assessment is therefore required.
Increased vessel to vessel collision risk (third party vessel with project vessel)	No	Project vessels are likely to be (in the majority) stationed within their own sites. Distances between projects are large enough that no cumulative collision risk has been identified.
Anchor interaction or reduced under keel clearance with subsea cables	No	Given that any impacts associated with export cables will be mitigated by the relevant project.
Interference with communications and position fixing equipment from turbines	No	Distances between projects are large enough that no cumulative impact has been identified.
Reduction of SAR capability due to increased incident rates	Yes	Multiple projects may raise incident rates to a greater degree than for CWP in isolation.

16.9 Approach to EIA

The output of this scoping exercise will feed into the NRA, which will be drafted in support of the EIAR. This is in line with the DCCAE 2017 guidance which recommends an NRA be produced as the method of assessment for marine navigation impacts. The primary purpose of the NRA is to identify scoped in impacts that require further assessment within the EIAR.

As discussed in Section 16.4, the use of the IMO FSA Methodology (IMO, 2018) is the internationally recognised approach for assessing impacts to marine navigation receptors. The methodology is centred on risk control and assesses each impact in terms of its frequency and consequence in order that its significance can be determined as either “broadly acceptable”, “tolerable”, or “unacceptable”. Any impact assessed as “unacceptable” will require additional measures implemented beyond those considered embedded (see Section 16.6) in order that the impact is reduced to within “tolerable” or “broadly acceptable” parameters.

Impact significance is determined via a risk matrix dependent on its assessed frequency and consequence, as illustrated in Table 16.4. The frequency and consequence rankings per impact will be determined using a number of inputs, notably:

- Quantitative modelling undertaken in the NRA;
- Output of the baseline assessment;
- Consideration of embedded mitigation in place;
- Lessons learnt from other wind farm projects;
- Level of stakeholder concern; and
- Consultation output.

Table 16.4: Significance ranking risk matrix

Consequence						
	Major	Tolerable	Tolerable	Unacceptable	Unacceptable	Unacceptable
	Serious	Broadly Acceptable	Tolerable	Tolerable	Unacceptable	Unacceptable

	Moderate	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable	Unacceptable
	Minor	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable	Tolerable
	Negligible	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	Tolerable
		Negligible	**Extremely Unlikely**	**Remote**	**Reasonably Probable**	**Frequency**

16.10 Scoping Questions

- Is consideration of MGN 543 (MCA, 2016) (or the most up to date version if MGN 543 is superseded prior to the NRA process) as the primary guidance for the NRA considered an acceptable approach?
- Is the use of satellite and shore based AIS data sufficient for the purposes of the NRA and EIA noting that consultation would be undertaken (further to that previously undertaken for the CWP consent submissions) with fishing and recreational stakeholders and local port authorities to ensure a full picture of non-AIS marine traffic in the area? Is the AIS already collected sufficiently recent to support the EIAR and NRA?
- Are there any impacts proposed to be scoped out of the NRA or that have not been identified at this stage that are considered as requiring further assessment (both for the in isolation and cumulative scenarios)?
- Are there any mitigation measures not listed in Section 16.6that should be considered embedded?

17 OTHER MARINE USERS

17.1 Introduction

The following chapter sets out the scope of assessment in relation to Other Marine Users for the offshore elements of the CWP EIA. This chapter includes:

- A review of existing data available for the project to date;
- Consideration of the validity of this data for the EIA;
- New data sources that shall be consulted;
- Any required consultation; and
- A consideration of the Design Parameters relevant to other marine users.

17.2 Existing Environment

CWP Development Area is located on the Codling Bank which forms part of a series of banks in the Irish Sea which runs approximately 10 km offshore parallel to the coast, standing in 20 to 30 m of water and rise to within metres of the water's surface.

17.2.1 Material Assets

Subsea pipes and cables

A number of subsea cables and pipelines have been identified in the vicinity of CWP (Figure 17.1). The majority of these overlap with the Development Area and/or the Export Cable Corridor Search Area. These will be considered in greater detail during the EIA and when further information regarding export cable corridors and landfalls is known.

Oil and Gas infrastructure

There have been several licences issued for oil and gas exploration and production off the coast of Dublin and Wicklow, however only one is currently active (Figure 17.1). It was issued to Providence Resources Plc in 2011 and overlaps CWP at the north east section of the CWP area. Other exploration wells are also located around Dublin and Wicklow however none overlap the wind park area or Export Cable Corridor Search Area.

Aggregates, dredging and other disposal sites

Significant marine aggregate deposits have been identified in the Irish Sea, some of which overlap the Export Cable Corridor Search Area (Figure 17.1). Based upon the information currently available, these resources are not currently exploited, however there is potential for exploitation in the future.

Dredging activities are undertaken in some ports along the coast of Dublin and Wicklow, however as the location of the Export Cable Corridor and landfall are still under consideration, the relevance of these dredging sites will be considered when more information is available.

Similarly, a number of marine disposal sites have also been identified within the Export Cable Corridor Search Area (Figure 17.1). These will be considered when more detail is available for Export Cable and landfall options.

Renewable energy (other wind farms and submitted applications)

There is currently only one operational offshore wind farm in Ireland, Arklow Bank Phase 1, and it is located south (18 km) of CWP. Several applications have been submitted or have been consented for the east coast of Ireland, the development of which have the potential to coincide with CWP. The closest planned offshore wind farms are Dublin Array (3 km North) and Arklow Bank Phase 2 (6 km south), and currently have a potentially overlapping construction timeline with CWP. These sites are presented in Figure 17.1.

6°40'0"W 6°0'0"W 5°20'0"W

53°20'0"N 53°0'0"N

Project:
Codling Wind Park

Title: **Figure 17.1**
Material Assets in the Vicinity of Codling Wind Park

Key

- Codling Wind Park
- Potential export cable corridor search area
- Proposed offshore wind development (1)
- Operational offshore wind development (Arklow Bank Phase 1) (1)
- Aggregate resource area (4)
- Aggregate study area (4)
- Exploration well
- Authorised oil and gas exploration area
- Pile (2)
- Submarine cable (telephone/power) (2)
- Pipeline (2)
- Disposal at sea (3)
- Military practice area (2)

Notes:
a) Information on this map is directly reproduced from digital and other material from different sources. Minor discrepancies may therefore occur. Where further clarification is considered necessary, this is noted through the use of text boxes on the map itself.
b) For the avoidance of doubt and unless otherwise stated:
1. this plan should be used for identification purposes only, unless specifically stated above or in accompanying documentation.
2. The Natural Power Consultants Limited accepts no responsibility for the accuracy of data supplied by third parties.

Scale @ A3: 1:300,000
Map projection: IRENET95 Irish Transverse Mercator Graticules: WGS 84
NOT TO BE USED FOR NAVIGATION
Source: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors.

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0 2.5 5 10 km

Date: 09-07-2020	Prepared by: LG	Checked by: SMc
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17.2.2 Marine Users

Recreational Users

Recreational users undertake a range of activities at sea in the Wicklow area, including sea angling, diving, sailing, and a variety of other sea sports. There is also the potential for social events, such as annual competitions and festivals, to occur within and around CWP Development Area and Export Cable Corridor Search Area.

Military operation areas

Based on the information currently available there are no designated military operation areas off the coast of Wicklow overlapping with CWP or the Export Cable Corridor Search Area, however further consultation will be required to identify sea utilisation by the Irish Defence Forces. The UK MoD has designated a military practice area approximately 12 km to the east of CWP (Figure 17.1).

17.3 Data Sources and Baseline Methodology

17.3.1 Baseline

This section identifies the baseline data sources that can be used to characterise other marine users within the vicinity of CWP. It should be noted that this approach has the potential for overlap with other chapters, particularly navigation, shipping and aviation, and these chapters will be referenced as appropriate. It may be the case that the content of this chapter will be revised after scoping to best assess the receptors identified.

The final approach will be agreed with the DPHLG or An Board Pleanála (depending on the timings and appropriate consenting regime) prior to submission of the EIAR.

Potential receptors can broadly be described under two subheadings, Material Assets and Marine Users.

A number of data sources have been identified for describing the baseline and are listed in Table 17.1.

Table17.1: Baseline data sources

Source	Data
Ireland's Marine Atlas	Location of marine aggregates, cabling and disposal sites in the Irish Sea
4C Offshore	Location of proposed offshore wind development
Department of Communications, Climate Action and Environment (DCCAE)	Information on licensed projects for oil and gas via the Integrated Petroleum Affairs System (IPAS)
Department of Housing, Planning and Local Government (DHPLG)	Information on renewable energy projects
Crown Estate (UK)	UK military practice areas

17.3.2 Future Baseline Assessment

Consultation will be undertaken to gather and validate information on the use of the area by marine users. An engagement plan leading to an impact assessment will be developed, in consultation with the DHPLG and other relevant consultees.

Following further work to identify the Offshore Export Cable Corridor(s) within the current search area, a more detailed investigation into the possible interactions with, and effects on, existing material assets will be undertaken and presented in the EIAR.

17.3.2.1 Material Assets

Data collection will include publicly available information including licensing information, but also consultation with relevant industry stakeholders and associations in the areas of energy production and transmission, materials and mining, telecommunications and ports maintenance.

Parties relevant to consultation for material assets will include:

- DCCAE;
- Department for Transport, Tourism and Sport (DTTAS)
- Gas Networks Ireland;
- Electricity Supply Board (ESB) - Networks;
- Relevant port authorities;
- Chamber of Commerce – Wicklow;
- Irish Offshore Operators' Association (IOOA);
- Marine Institute;
- National Offshore Wind Association of Ireland (NOW Ireland);
- Centre for Marine and Renewable Energy (MaREI); and
- Sustainable Energy Authority of Ireland (SEAI).

17.3.2.2 Marine Users

Data collection will be coordinated were relevant with other chapters including navigation and shipping, socioeconomics and commercial fisheries chapters (Chapters 17, 15 and 16 of this Scoping Report). This includes the consideration of AIS data, production of an NRA, consultation with local fishermen and recreational stakeholders and consideration of non-AIS traffic. Further to the above, stakeholders likely to be part of the consultation process for marine users will include:

- Irish Defence Forces;
- Irish Coast Guard;
- Commissioners of Irish Lights;
- Sea Fisheries Protection Authority (SFPA);
- Irish Maritime Development Office (IMDO);
- Irish Chamber of Shipping;
- Inland Fisheries Ireland (IFI);
- Irish Federation of Sea Anglers (IFSA);
- Angling Council of Ireland (ACI);
- Comhairle Fo-Thuinn (CFT) (Irish Underwater Council);
- Irish Sailing Association (ISA);
- Local leisure clubs; and
- Federation of Irish Sport.

Given the nature of the CWP and its proximity to the UK marine area, the following UK parties may also be consulted:

- MCA;
- MoD;

- Trinity House;
- Chamber of Shipping; and
- Royal Yachting Association.

Additional data and information sources that will be reviewed include:

- Up to date hydrographic charts for the area;
- Maritime incident data in the area (20 years); and
- Coastal atlas for sailing and motorboats, and reference materials such as sailing almanacs.

17.4 Guidance

In addition to the list in Section 3.2 and Section 5.2, the proposed outline methodology for assessing the impacts of the Project takes into consideration relevant guidance/regulations including:

- Methodology for Assessing Marine Navigational Safety Risks of Offshore Wind Farms (MCA, 2015);
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 on the Marking of Man-Made Offshore Structures (IALA, 2013);
- Maritime and Coastguard Agency (MCA) Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms (MCA, 2005);
- MGN543 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2016);
- Cumulative Impact Assessment Guidelines - Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms (Renewable UK, 2013);
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (EC, 1999) ;
- Offshore Electricity Generating Stations Note for Intending Developers (SEI, 2001); and

17.5 Design Parameters

As a Design Parameters approach is being applied, the worst-case design scenario for Other Marine Users needs to be assessed within the EIAR. It is proposed to construct a maximum of 140 WTGs, up to five OSPs and six export cables. These will be installed either with monopiles, jacket substructure with piled foundations and suction caissons. The impacts to Other Marine Users are considered to be greatest at the maximum number of turbines or where those turbines are spaced over the greatest area, depending on the impact under assessment. The potential impacts resulting from the installation and protection of inter-array and export cabling will also be considered as part of the EIA process.

17.6 Embedded Mitigation

Embedded mitigation will be determined throughout the development of the Design Parameters and will be presented in the EIAR. At present, embedded mitigation measures relevant to other marine users at this stage are listed below.

- Appropriate marking on nautical charts;
- Promulgation of information as required by local and national requirements;
- Buoyed construction area in agreement with the Commissioner of Irish Lights;
- Marine Coordination and communication to manage project vessel movements;
- Suitable implementation and monitoring of cable protection (via burial, or external protection where burial to a suitable burial depth as identified via risk assessment is not feasible);

- Marking and lighting the site in agreement with the Commissioner of Irish Lights and in line with IALA O-139 (IALA, 2013);
- Compliance of all project vessels with international marine regulations as adopted by the Flag State, notably COLREGS (IMO, 1972) SOLAS (IMO, 1974);
- Blade clearance of at least 22 m above HAT (in line with industry good practice);
- Liaison with SAR resources to ensure suitable emergency response plans and procedures are in place;
- Consideration of navigation safety and SAR in turbine design and layouts;
- Guard vessel(s) as required following conducting of NRA; and
- Issuing of Marine Notices at agreed intervals.

17.7 Scoping of CWP EIA

The DCCAE (2017) Guidance provides an indicative list of impacts that should be considered for marine navigation when producing an EIAR. This list will be refined when further details of the project are available.

17.7.1 Material Assets

The following potential impacts on Material Assets during construction (and decommissioning) and operation of CWP have been scoped in:

- Impacts during installation (and decommissioning):
- Temporary loss or restricted access to natural deposits/material assets; and
- Increased pressure on local resources (e.g. labour, port space and grid connection services);
- Impacts during operation:
- Loss or restricted access to natural deposits/material assets (sterilisation of area);
- Reduction in value of material assets;
- Crossings of pipelines and cables; and
- Direct damage to material assets

Navigational impacts will be assessed as part of the navigation and shipping chapter.

17.7.2 Marine Users

The following potential impacts on Marine Users during construction (and decommissioning) and operation of CWP have been scoped in:

- Impacts during installation (and decommissioning):
- Interference to normal marine activities; and
- Displacement of normal marine activities
- Impacts during operation:
- Interference to normal marine activities; and
- Displacement of normal marine activities

Navigational impacts and socioeconomics effects will be assessed their respective chapters.

The following potential impacts on Marine Users during construction (and decommissioning) and operation of CWP have been scoped out:

- Impacts operation:

- Interference to normal marine activities;
- Displacement of normal marine activities;
- Loss or restricted access to natural deposits/material assets (sterilisation of area);
- Reduction in value of material assets; and
- Crossing of pipelines and cables.

17.8 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Currently, there are several large-scale construction projects in various stages of planning within the region. Given their proximity to CWP and similarity of activities, there is a possibility that combined activities from these projects can alter the extent or magnitude of their effect on the environment, and therefore it may be appropriate to consider them as part of the CIA.

Based upon the information currently available, the projects identified where there may be a possible cumulative effect include:

- Arklow Phase 2, Co. Wicklow (consented); and
- Dublin Array, Co. Dublin (Relevant Project).

The following projects are also located in the region (Irish Sea), however due to the distance from CWP,low likelihood of construction phase overlap and no likelihood of operational impact, these projects are scoped out of the cumulative assessment:

- Arklow Bank Phase 1, Co. Wicklow (Operational);
- Oriel Wind Farm, Co. Louth (Relevant Project); and
- North Irish Sea Array, Co. Louth/Dublin (Relevant Project).

There is also likely to be a number of coastal projects such as harbour maintenance dredging and development works overlapping with the Export Cable Corridor Search Area at the time of CWP construction however, exact details of these programmes are unknown at this stage. The list of projects that will be considered in the EIAR will be refined during the EIA process and relevant authorities will be consulted to ensure this list is comprehensive and contains the most up to date programme and methodology information.

17.9 Approach to EIA

The impact assessment methodology will follow the EIA methodology outlined in Chapter 5 of the Scoping Report. However, all or parts of this section (i.e. Other Marine Users) may be merged with the Navigation and Shipping assessment, and therefore it may be more appropriate to use the FSA methodology (IMO, 2002).

17.10 Scoping Questions

In addition to the information provided above, the following information is required from the department which will help to inform the scope of the EIA:

- Are you content with the scope of data gathering proposed for the baseline generation?
- Are there any other key data sources or guidance you are aware of that you wish to be included?
- Are you content with the scope of the assessment?
- Are there any additional impacts that you believe could be significant and that you wish to see assessed?
- Are there any other stakeholders who CWPL should engage with during pre-application?
- Are you content with our approach to CIA? Are there any other plans or projects we should be considering at this stage, bearing in mind refinement of the export cable corridor / landfall options may identify other projects which are relevant.

18 AVIATION, MILITARY AND COMMUNICATIONS

18.1 Introduction

This chapter provides detail on the potential effects on civil and military aviation receptors and communications resulting from the construction, operation (and maintenance) and decommissioning of CWP.

This Scoping Report provides confirmation of potential aviation and radar stakeholders via a desk-top assessment which has included possible trans-boundary division of airspace implications between the Irish Aviation Authority (IAA) and UK National Air Traffic Service (NATS). The consideration of the proximity to and operations of civil airports, the types of radar operating over CWP, civil aviation agencies including the IAA, UK NATS (who are the main en-route air navigation provider in the UK), helicopter operations offshore and the Irish Defence Forces operations of relevance is included.

The detail provided will therefore allow consultees to be clear about what it considers the likely significant effects associated with the CWP to be and, therefore, whether the impacts may influence its decision and thus whether they need to be subject to an EIA.

18.2 Existing Environment

CWP will be located to the east of the shallow sand bank known as Codling Bank, approximately 13 km off the east coast of the ROI, between Greystones and Wicklow. The wind park area is located close to airspace where delegation of Air Traffic Service (ATS) responsibilities within specified lateral and vertical portions of airspace is delegated to the Dublin Area Control Centre (ACC) and therefore trans-boundary considerations of UK and ROI airspace division has been considered. It is currently proposed that WTGs of up to 320 m blade tip height might be used. For full details of the Design Parameters please refer to Chapter 4.

18.3 Data Sources and Baseline Methodology

18.3.1 Baseline

This section identifies the baseline data sources that can be used to characterise the aviation and communications processes within and around CWP. In order to provide sufficient information to consultees, reference will be made to the baseline data gathered and to the outcomes of the impact assessment presented to inform the consented CWP. Design, construction and operational changes for CWP that are likely to have further or additional impacts to civil and military aviation receptors have been considered and commented on in the Scoping Report. Cross referencing to current regulations and aviation publications of the existing application documentation will be completed and shortfalls will be addressed in the EIA.

18.3.2 Overview of the Baseline Environment

The airspace above CWP is used by civil and military aircraft, which can be tracked by radar systems operated by the IAA, civil airports, the Irish Air Corps (IAC) and UK NATS; airspace and air traffic surveillance, communication and management infrastructure is comprised of the following systems, which may be affected:

- Primary Surveillance Radar (PSR);
- Secondary Surveillance Radar (SSR);
- Meteorological Radar: and
- Other aeronautical Communication and Navigation Systems (CNS).

The analysis of the potential impact on these systems is based on an aviation operational risk assessment referencing all relevant operational and safety regulations. Radar performance

and propagation modelling will be carried out to determine the potential detection of proposed WTGs associated with CWP from civil and military radar infrastructure for inclusion in the EIA.

The potential impact on these systems will be fully considered in the analysis process. It should be noted however that even if a clear radar line-of-sight is found between WTGs within the CWP and a radar system, this does not necessarily mean that the offshore wind farm will cause interference to the provision of the service the radar operator provides. Consultation with the radar operator and aviation stakeholder will be undertaken on this issue where required.

The desk-based study will identify any potential impact on the following aviation and radar stakeholders:

- Civil and Military Radar based aviation operations and the provision of an ATS;
- Physical Obstruction: SAR and IAC flight operations;
- Meteorological radar systems; and
- Trans-boundary Impacts.

18.3.2.1 Civil and Military En-route operations

Radar systems operated by the Dublin and Shannon ACC may be impacted by radar detectability of the WTGs in the CWP Development Area. Any identified effect of WTG induced radar clutter on these PSR systems that serve the airspace above the Development Area would potentially reduce the radar operators' capability. Engagement with the IAA and the Department of Defence would establish what effects CWP could have on radar systems and if applicable what technical and operational mitigation capability is applicable and available.

18.3.2.2 Data Validity

For the assessment carried out for the historical CWP application (as referenced in Section 1.2 of this Report), it is understood that identification of receptors was based upon a study of publicly available aeronautical documentation and aviation charts. Although the guidance documents have been updated since the previous analysis undertaken, the data collected as part of the previous application should be considered sufficient to meet the requirements needed to effectively characterise the current baseline conditions and airspace users once any significant changes have been considered. There may be increased radar detectability of WTGs due to an increase in blade tip height; regional aviation radar systems will be assessed within a radar line of sight analysis across the CWP Development Area in order to establish theoretical radar detectability of the WTGs to applicable radar systems located in the ROI and the UK. It is not expected that the existing baseline airspace environment and operational usage with regard to civil and military aviation has changed since analysis was completed for CWP. Commentary is provided on the sufficiency of the baseline data as a basis for agreeing scoping of the CWP EIA. The location and extent of the project design for CWP will be assessed.

18.3.3 Future Baseline Assessment

The work for CWP will be completed as a desk-based study and no physical surveying visits to development areas have or will be required. Regional and national aviation systems and infrastructure of relevance that has the potential to be impacted by the WTGs will be considered and assessed through a radar line of sight analysis. This will provide results of theoretical radar detectability to radar systems and a predictability of radar impact potentially created by the WTGs to provide information on the assessment.

18.4 Guidance

A variety of aviation publications contain information and guidance relating to the potential impacts of an offshore wind development on aviation. The following documents will inform the desk-based assessment study of potential impacts:

- IAA Policy Land Use and Planning and Offshore Development 2014 which details its functions in accordance with standards provided by the International Civil Aviation Organisation (ICAO), European Union legislative requirements and national regulations;
- IAA Aerodrome Licensing Manual provides guidance on the procedure for issue, continuation or variation to an aerodrome license and reflects the standards and recommended practices of ICAO Annex 14 Volume 1 Aerodrome Design and Operations;
- IAA Statutory Instruments SI 215 of 2005 - Obstacles to Aircraft in Flight Order which applies to existing and proposed manmade objects of permanent or temporary construction;
- IAA Statutory Instruments SI 423 of 1999 – En-route Obstacles to Air Navigation Order applies to objects that may constitute obstacles to the navigation of aircraft, but which lie outside the airspace defined by aerodrome obstacle limitation surfaces or obstacle protection surfaces;
- The Irish Integrated Aeronautical Information Publication (IAIP) is published by the IAA on behalf of the Civil Aviation Authority (CAA) of Ireland and provides information on rules, regulations and restrictions in Irish airspace and is the main resource for information and flight procedures at all Irish airports as well as information on airspace, en-route procedures, charts and other air navigation information;
- IAA Statutory Instruments SI 266 of 2019Standardised Rules of the Air Order applies to all aircraft flying over the State and to aircraft registered in the State wherever they may be; and
- The IAA Aeronautical Services Advisory Memorandum (ASAM), 2015, sets out the minimum requirements for the lighting, marking, radar enhancing and supply of information for promulgation to ensure the consp icuity of offshore wind farm machines and associated structures.
- Irish Aviation Authority (IAA) (Air Traffic Control Standards) Order, SI 856) of 2004;
- IAA (Eurocontrol Safety Regulatory Requirements) Order, SI 387) of 2003;
- International Civil Aviation Organization (ICAO) Eurocontrol Document 015: European Guidance Material on Managing Building Restricted Areas;
- IAA Visual Flight Rules (VFR) Aviation Chart 1:500,000;
- Dublin Array Main Environmental Impact Statement (EIS) 2012

A number of UK documents will be applicable if trans-boundary impacts are expected and these may include but not limited to the following:

- The UK CAA Civil Air Publication (CAP) 764 Policy and Guidelines on Wind Turbines contains consultation guidance which is typically applied in the UK; and
- The UK NATS Aeronautical Information Service provides the UK IAIP and is published by the authority of the UK CAA and provides similar information headings to that contained in the Irish IAIP applicable to UK airspace.

18.5 Design Parameters and Worst-case Scenario for Assessment

The general principle of the aviation assessment is that for each receptor and potential impact, the EIA will be based on assessing a range of project Design Parameters and deciding on the worst-case scenario, which for aviation is a combination of the individual impact of physical obstruction to flight and/or radar detectability of the Development Area WTGs creating interference to CNS systems. For aviation this will be carried out on the tallest WTG blade tip being proposed and on the greatest number and extent of WTGs within the CWP Development Area.

18.6 Embedded Mitigation

A number of embedded measures are identified that have been utilised on offshore wind farms to reduce the potential for impacts on aviation, radar and military operations. Notification of CWP to aviation authorities and the lighting and marking of WTGs are measures considered standard industry practice for this type of development, and consultation with the Department

of Defence, IAA, Garda, Coastguard and other interested parties is expected to inform of specific requirements and light intensity prerequisites. Embedded mitigation solutions include:

- To ensure flight safety, the fitting of aviation obstruction lighting to the WTGs is recommended which confirms to industry standards. It is likely the IAA and the Department of Defence will require that WTGs are fitted with aviation lights in accordance with OAM 09/02 Offshore Wind Farms Conspicuity Requirements.
- As required under statutory instructions, notification and pilot familiarisation of the erection of WTGs will be required to be provided to the IAA. Notification is recommended in accordance with the IAA publications; S.I 215 Obstacles to Aircraft in Flight and S.I 423 En-route Obstacles to Air Navigation to military and civilian organisations.
- Aviation Obstruction Lighting: To ensure flight safety, consultation with the Department of Defence and the IAA is expected to inform of specific requirements and light intensity prerequisites and will be determined by the Commissioner of Irish Lights.

18.7 Scoping of CWP EIA

Section 18.3.2 provides those aviation stakeholders and receptors that may be impacted by CWP and each of these are considered individually below.

18.7.1 Civil and Military Radar based aviation operations and the provision of an ATS

An object that is higher than 90 metres in height is considered to have significance for the en-route operations of aircraft in Irish airspace. The IAA has in place CNS infrastructure consisting of radar stations, navigation aids and technical facilities located at Cork, Dublin and Shannon airports, Ballygirreen (near New-Market-on-Fergus, Co. Clare) and at various remote sites throughout the State. Any identified effect of WTG induced interference to CNS equipment that serves the airspace above the CWP Development Area would potentially reduce IAA capability in the provision of en-route[19] ATS services to aircraft as WTGs could shield the radar from genuine targets of interest in clutter and a degree of 'shadowing' could be created behind detectable WTGs.

As well as IAA controllers whom operate at airports and control centres, military controllers of the IAC operate radar systems at Baldonnel and at the Dublin ACC; these controllers provide an ATS to aircraft (military and civil) operating in the wider military airspace in the State. An offshore development and associated distribution network onshore which creates an obstacle to air navigation close to an aerodrome or affects the facilities that provide CNS systems, can affect the safe operation of aircraft.

An aircraft flying to a licensed aerodrome are likely to follow published Instrument Flight Procedures[20] (IFPs) which are designed to achieve and maintain safety of operations in Instrument Flight Rules (IFR). These IFPs will include standard approach and departure procedures, planned instrument departure and arrival routes, holding points and areas, minimum radar vectoring and en-route altitudes. WTGs placed within the vicinity of IFPs have the potential to affect the procedures as they may present a physical obstruction to the height clearance parameters in use.

Engagement with the IAA and Department of Defence would establish what effects CWP could have on the IAA and IAC operated CNS and IFPs and if required, the understanding of what technical and operational mitigation capability is available will be confirmed.

Other operators of unlicensed aerodromes (e.g. airstrips and heliports), privately licensed aerodromes and other sites used by aviation may be impacted by the development, although

[19] En-Route applies to the provision of an ATS in airspace away from the immediate vicinity of an aerodrome.

[20] Including Area Navigation (RNAV) routes

these impacts are normally restricted to an area close to the operating area of the aerodrome environment dependent on specific operation, types of CNS in use and types of aircraft using the facility. Consultation with any potentially impacted aerodrome operators will be completed, especially with those located on the east coast of the State.

18.7.2 Physical Obstruction: SAR, Garda and IAC Flight Operations

WTGs and their commissioning/decommissioning infrastructure may present a physical obstruction and affect SAR helicopter flight operations and other users completing important roles such as fishery protection, pollution surveillance and other airborne missions offshore. The development will lead to a change of the operating environment should airborne operations be required, or military low flying operations are completed within or close to the Development Area. Consultation will be initiated with potentially affected stakeholders.

18.7.3 Meteorological Radar Systems

Met Eireann operates weather radar system facilities at Dublin, Shannon and other meteorological stations throughout ROI. In general terms, the blockage of a weather radar beam by any obstruction could result in a weather radar not being able to perform its intended purpose, namely, to monitor rain (or snow) fall and wind. Even partial blockages have the potential to result in errors in the estimated precipitation.

The Statement of the European Union Meteorological Network OPERA Group (Operational Programme for the Exchange of weather Radar information), on the cohabitation between weather radars and wind turbines states that the deployment of WTGs within 5 km of weather radar be prohibited. In addition, an impact study should be completed on WTGs planned between 5 km and 20 km from Met Office radar. Consultation with Met Eireann will be completed to establish if impact to their systems are predicted.

18.7.4 Transboundary Impacts

The division of airspace between the London Flight Information Region[21] (FIR) and the Shannon FIR is located close to airspace where delegation of ATS responsibilities within specified lateral and vertical portions of airspace is delegated to the Dublin ACC and therefore trans-boundary considerations of UK and ROI airspace division will be assessed.

18.7.5 Offshore Export Cables

The Offshore Export Cables will be subsea and will not impact aviation or communications stakeholders; therefore, this element will not be considered within the EIA for the aviation as there is no route to impact. However, the possible effects of OSPs, should they be required, will be considered where appropriate as part of EIA.

18.8 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information.

[21] Flight Information Region is a specified region of airspace in which a flight information and alerting service are provided.

It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

Currently, there are several large-scale construction projects in various stages of planning within the region. Given their proximity to CWP and similarity of activities, there is a possibility that combined activities from these projects can alter the extent or magnitude of their effect on the environment, and therefore it may be appropriate to consider them as part of the CIA.

In assessing the potential cumulative impact(s) for CWP, it is important to bear in mind that for some projects, predominantly those 'proposed' or identified in development plans etc. may or may not actually be taken forward. There is thus a need to build in some consideration of certainty (or uncertainty) with respect to the potential impacts which might arise from such proposals. For example, relevant projects/plans that are already under construction are likely to contribute to cumulative impact with CWP whereas projects/plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors.

The potential for cumulative effect of physical obstruction or created by the radar detection of the CWP project alone also exists to those radar systems that will similarly detect other offshore wind farm developments, and these will be considered as part of the EIA. Other developments (i.e. not wind farm projects) with comparable effects also need to be considered as part of the CIA.

Based upon the information currently available, the projects identified where there may be a possible cumulative effect include:

- Arklow Phase 2, Co. Wicklow (consented); and
- Dublin Array, Co. Dublin (Relevant Project).

The following projects are also located in the region (Irish Sea), however due to the distance from CWP , low likelihood of construction phase overlap, and no likelihood of operational impact, these projects are scoped out of the cumulative assessment:

- Arklow Bank Phase 1, Co. Wicklow (operational);
- Oriel Wind Farm, Co. Louth (Relevant Project); and

North Irish Sea Array, Co. Louth/Dublin (Relevant Project).

There is also likely to be a number of coastal projects such as harbour maintenance dredging and development works overlapping with the Export Cable Corridor Search Area at the time of CWP construction however, exact details of these programmes are unknown at this stage. The list of projects that will be considered in the EIAR will be refined during the EIA process and relevant authorities will be consulted to ensure this list is comprehensive and contains the most up to date programme and methodology information.

18.9 Scoping Questions

- Do the relevant statutory aviation consultees agree with the baseline and the identification of infrastructure and operations for assessment?
- Is there an impact pathway from CWP to your infrastructure or operations?
- Is your infrastructure or operations sensitive to the potential impact that could arise from CWP?
- Are the potential impacts likely to be on a scale that may result in significant effects to your infrastructure or operations?
- Could the potential impacts contribute cumulatively with the impacts of other wind energy developments resulting in significant effects to your infrastructure or operations?

- Is there a method of avoidance of impact or development of mitigation capability that would reduce the impacts on your infrastructure or operations to a level where significant effects would not occur?

19 SEASCAPE, LANDSCAPE AND VISUAL IMPACTS

19.1 Introduction

The Seascape, Landscape and Visual Impact Assessment (SLVIA) will be prepared by Chartered Landscape Architects in accordance with current guidance. The SLVIA will identify and assess the potential impacts during the construction, operational and decommissioning stages that the proposed CWP project may have on the seascape, landscape and visual resources within the study area. It will focus on the potentially significant effects and accordingly, non-significant effects which it is proposed to scope out of the detailed SLVIA are identified in this report. The SLVIA will also outline the approach taken to the design of the proposed development as well as mitigation measures that will be implemented to prevent, reduce, or offset potential adverse seascape, landscape and visual effects.

Previous surveys and assessment work have been undertaken at CWP. These were carried out to inform the EIA for the previously consented Codling Wind Park (see Section 1.2 for more detail). Whilst this work may not provide a contemporary understanding of the potential impacts on seascape, landscape and visual receptors, due to the proposed changes in the development and the time lag from when the original assessments were carried out. The information carried out in these assessments has helped inform the scope of assessment requirements for the SLVIA.

The following information provides a summary of the data sources and methodology which will be used to inform the EIA.

19.2 Wind Farm Design Development and Worst-case Scenario Assessment

The wind farm is at an early stage of design with environmental baseline data being gathered and assessed which will help inform the final layout, which it is proposed will be finalised post consent. Factors that will feed into the final layout include further environmental considerations such as avoidance of any wrecks, seabed conditions, engineering consideration such as final foundation type and specific wind turbine manufacturer's requirements.

It is envisaged that seascape, landscape and visual considerations will be one of the many inputs to the design development process. Analysis of the seascape and landscape will be undertaken to identify key seascape, landscape and visual characteristics and sensitivities.

Following completion of the main baseline landscape and visual assessment, design objectives will be developed taking into account other key parameters and constraints. These layouts will be examined from key design viewpoints to assess and optimise the number, size and layout of the proposed WTGs in relation to the seascape and landscape to the west as well as adjacent wind farm development. The design iteration process will take account of other environmental and technical factors to establish the final layout for the proposed wind farm. The design optimisation process will be reported and illustrated in the EIAR.

19.3 Potential Sources of Impact

The SLVIA will be carried out for the construction, operational and decommissioning stages of CWP.

The main source of operational stage seascape, landscape and visual impacts from the proposed development will be the appearance of the WTGs and associated night-time lighting, as well as the OSPs from the surrounding landscape and seascape resource and in views obtained by people in the surrounding area.

The SLVIA will consider the following potential effects on:

- Seascape character caused by changes in the key characteristics and qualities of the seascape as a result of the proposed WTGs and OSPs
- Landscape character caused by changes in the key characteristics and qualities of the landscape as a result of the proposed WTGs and OSPs;
- Visual amenity caused by changes in the appearance of the seascape and/or landscape as a result of the proposed WTGs and OSPs including consideration of aviation lighting; and.
- Potential seascape, landscape and visual amenity effects resulting from the construction of the Offshore Export Cable.

19.3.1 Study Area

The currently proposed WTGs are up to a maximum of 320 m to blade tip height. There is no Irish guidance in respect of visualisations or Zone of Theoretical Visibility (ZTV) study areas. Consequently, following best practice guidance from Scottish Natural Heritage[22] (SNH) (2017), the study area will be 45 km radius from the outer edges of the proposed turbines. The study area for the cumulative assessment will also be 45 km.

The assessment would also take cognisance of relevant national and local landscape planning policy and other such material that may be published during the preparation of the LVIA.

19.3.2 Zones of Theoretical Visibility

Computer generated ZTVs form a starting point for the SLVIA as they will identify the parts of the study area which will have potential visibility of the proposed development in terms of Landscape Character Types (LCTs), Local Seascape Units (LSUs), landscape designations and visual receptors.

In addition to blade and hub height ZTVs, cumulative ZTVs for wind farm developments agreed to be included in the assessment will be prepared. It is currently proposed that cumulative assessments will include a range of operational and consented projects, as well as certain projects which may not consented at the time of application submission stage e.g. other Relevant Projects, due to uncertainty about timings of submission and determination of planning applications. Analysis of the cumulative ZTVs will inform the selection of sequential routes through the landscape and seascape to be assessed.

19.4 Consultation

Following a review of the ZTVs the following County Councils are likely to experience some form of visibility associated with the project. Therefore, consultations will be held with the following County Council's to identify and agree the key matters likely to be of concern which should be addressed in the SLVIA:

- Fingal County Council;
- Meath County Council;
- Dublin City Council;
- South Dublin Council;
- Dun Laoghaire / Rathdown County Council; and
- Wicklow County Council.

Agreement will also be sought on the proposed methodology, study areas and preliminary list of viewpoint locations issued with this Scoping Report.

Further consultations will be carried out to agree the scope of the cumulative assessment and identify wind farms that are relevant to the identification of significant cumulative effects from

[22] Visual Representation of Wind Farms, Guidance, Version 2.2(SNH, 2017)

appropriate plans and projects, as well as the final selection of representative viewpoints and related visualisation requirements.

19.5 Method of Assessment and Reporting

19.5.1 SLVIA Methodology

The SLVIA will be undertaken to assess the potential effects of the proposed wind farm on the seascape, landscape and visual amenity within a 45 km radius study area and to identify significant effects. The assessment will also address potential cumulative seascape, landscape and visual effects in relation to both onshore and offshore wind farm developments.

Wherever possible, identified effects are quantified, but the nature of seascape, landscape and visual assessment requires interpretation by professional judgement. In order to provide a level of consistency to the assessment, landscape, seascape sensitivity to change, the prediction of magnitude of impact and assessment of significance of the residual effects has been based on pre-defined criteria which are based on guidance provided in the *Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)*, as refined for the purposes of wind farm assessment and taking account of good practice guidance.

Seascape/landscape sensitivity will be assessed by combining the value of the landscape character type or local seascape units as recognised through designation or by consideration of a range of other criteria (seascape/landscape quality, scenic quality, rarity, representativeness, conservation interest, recreational value, perceptual aspects and associations), with its susceptibility to change of the nature envisaged from wind farm development. Seascape/landscape susceptibility can be defined by consideration of the quality or condition, aesthetic and perceptual aspects as well as planning policies and strategies.

Sensitivity will be defined as high, medium or low based on professional interpretation of a combination of parameters.

Viewpoint sensitivity will be assessed by combining the value of a particular view with susceptibility of the visual receptor which is a function of the occupation or activity of people at any particular location. Sensitivity will be defined as high, medium or low based on interpretation of a combination of parameters.

The magnitude of change arising from the proposed development will be described as substantial, moderate, slight or negligible based on the interpretation of a number of largely quantifiable parameters, such as size of scale of change, geographical extent as well as duration and reversibility.

Landscape, seascape and visual effects will be assessed as major, major / moderate, moderate, moderate / minor, minor and negligible with effects identified as **major** and **major / moderate** being considered **significant** effects in terms of the EIA Regulations.

19.5.2 Standard Guidance

The SLVIA will be prepared in accordance with the GLVIA3, the assessment will also take account of the following:

- An approach to seascape character assessment. NECR 105. (Natural England, 2014);
- Assessing the cumulative impact of onshore wind energy developments. (SNH, 2012);
- GLVIA3 Statement of Clarification 1/13 10-06-13. (Landscape Institute, 2013);
- Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report. (Department for Trade and Industry, 2005);
- Guidance on Landscape/Seascape Capacity for Aquaculture. (SNH, 2008);
- Guide to Best Practice in Seascape Assessment. (Countryside Council for Wales (CCW), Brady Shipman Martin, University College Dublin, 2001);

- Landscape Character Assessment Guidance of England and Scotland (The Countryside Agency and SNH, 2002);
- Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape. (SNH, 2012b);
- Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance. Distance away versus turbine height – research into the relationship to magnitude of visual effects. (Natural Resources Wales, 2019);
- Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance. Stage 2 – Guidance on siting offshore windfarms. (Natural Resource Wales, 2019);
- Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance. Stage 3 – Seascape and visual sensitivity assessments for offshore wind farms. (Natural Resources Wales, 2019);
- Siting and Designing windfarms in the landscape - Version 3. (SNH, 2017a);
- Using the Rochdale Envelope, Advice Note Nine: Rochdale Envelope. (The Planning Inspectorate, July 2018); and
- Visual Representation of Windfarms - Good Practice Guidance. (SNH, Version 2.2, 2017b).

The assessment will also take cognisance of relevant national and local landscape planning policy as and when it becomes available. This may include Seascape Character Assessments, and Marine Spatial Plans and supporting guidance.

19.6 Baseline Conditions

The establishment of baseline conditions relating to the seascape, landscape and visual resource will involve a combination of desk study, preparation and review of ZTV maps and visualisations as well as field work. A baseline description of the existing landscape and seascape character types or units, landscape designations and visual amenity receptors within the proposed 45 km radius study area anticipated to incur significant effects will be assembled in the Baseline Assessment.

19.6.1 Landscape Character

Landscape Character information will be informed by the following publications and verified on site:

- Fingal County Council Development Plan 2017 – 2023 Landscape Character Assessment;
- Meath County Development Plan 2007 – 2013 Landscape Character Assessment;
- South Dublin Council Development Plan 2016 – 2022;
- Landscape Character Assessment of South Dublin County 2015;
- Kildare County Development Plan 2011 – 2017 – Appendix 3 Landscape Character Areas in County Kildare;
- Dún Laoghaire-Rathdown County Development Plan, 2016-2022 and intend to prepare a new County Development Plan (CDP) that will shape the future growth of the County for the period of 2022 – 2028;
- Dun Laoghaire – Rathdown County Development plan 2016 - 2022 – Appendix 7: Landscape Character Areas; and
- Wicklow County Development Plan 2016-2022 and currently preparing a new County Development Plan for the period 2021-2027;
- Wicklow County Development Plan Appendix 5 – Landscape Assessment 2016 – 2022.

Development plans will continuously be reviewed as they are updated throughout the assessment process.

19.6.2 Local Seascape Units

Local seascape units identified in the previous SLVIA (2002) will be verified by desk-based assessment and a field assessment. The local seascape units will consist of the following:

- Howth Head to Sorrento Point;
- Bray Head to The Greystones;
- The Grey Stones to Six Mile Point;
- Six Mile Point to Wicklow Head;
- Wicklow Head to Mizen Head; and
- Mizon Head to Arklow Head.

The local seascape units will take into account any Seascape Character Assessments for Ireland as and when they become available. The SLVIA will focus on assessment for the LCTs and LSUs predicted to receive theoretical visibility and potentially incur significant effects. It will include a description of their value, susceptibility to change culminating in their overall sensitivity to change.

19.6.3 Landscape Designations

No international, national or regional landscape and seascape designations occur within the proposed development site.

Five Areas of Outstanding Natural Beauty (AONB) are located within the 45 km study area as follows (see Figure 19.1):

- Coastal Area AONB;
- Glencree/Glencullen AONB;
- Mountain Uplands AONB;
- Poulaphuca Reservoir AONB; and
- The Northern Hills AONB.

The qualifying elements of the designated landscapes which are within the ZTV and anticipated to incur potentially significant effects will be identified where possible from published sources and the SLVIA will assess the effects of the proposed development against their key qualities. This will have regard to likely actual visibility taking account of local landform and vegetation, and those considered likely to incur effects included in the assessment.

19.6.4 Visual Amenity

The range of visual receptors within the study area will be identified which is anticipated to include the following:

- Coastal settlements including:
- Dublin and suburbs;
- Howth;
- Dalkey;
- Bray;
- Greystones;
- Wicklow Town;
- Arklow;
- Delgany;
- Kilcoole;

- Newtonmountkennedy;
- Newcastle;
- Ashford;
- Rathnew and Redcross;
- Greystones; and
- Wicklow.
- Road users along the coastline including the M50, N11, R119, R761, R755 roads;
- Users of the Dublin to Rosslare railway line;
- Walkers on the Wicklow Way and other coastal footpaths; and
- Coastal visitor attractions such as the promenade at Bray.

19.6.4.1 Viewpoints

Initial ZTV analysis has been carried out based on an indicative WTG layout for the proposed development in order to identify a list of suggested viewpoints representative of the main landscape and visual receptors within the study area, and at varying distances, directions and elevations from the proposed development. The ZTV has been carried out on the largest WTG height being considered.

Viewpoints have been selected to represent a range of views and viewer types; including settlements, transport routes, recreational routes, main visitor locations, landscape and seascape character areas as well as landscape designations. The context of views currently experienced by visual receptor locations will be described in the viewpoint assessment.

The final selection of viewpoints for assessment will be agreed with DHPLG and County Councils during the consultation process.

In order to keep the SLVIA focussed and to ensure a proportionate approach is taken to the scope of the assessment and associated figures, we propose to identify two lists of viewpoints. The first list will comprise viewpoints to be illustrated by visualisations based on photography of existing views and included in detailed assessment comprising of those anticipated to incur potentially significant landscape and/or visual effects (see Table 19.1, and Figure 19.1). The second list will comprise viewpoints that have views of the proposed development but are unlikely to occur significant effects. These viewpoints will be omitted from the detailed assessment but will be illustrated by wirelines.

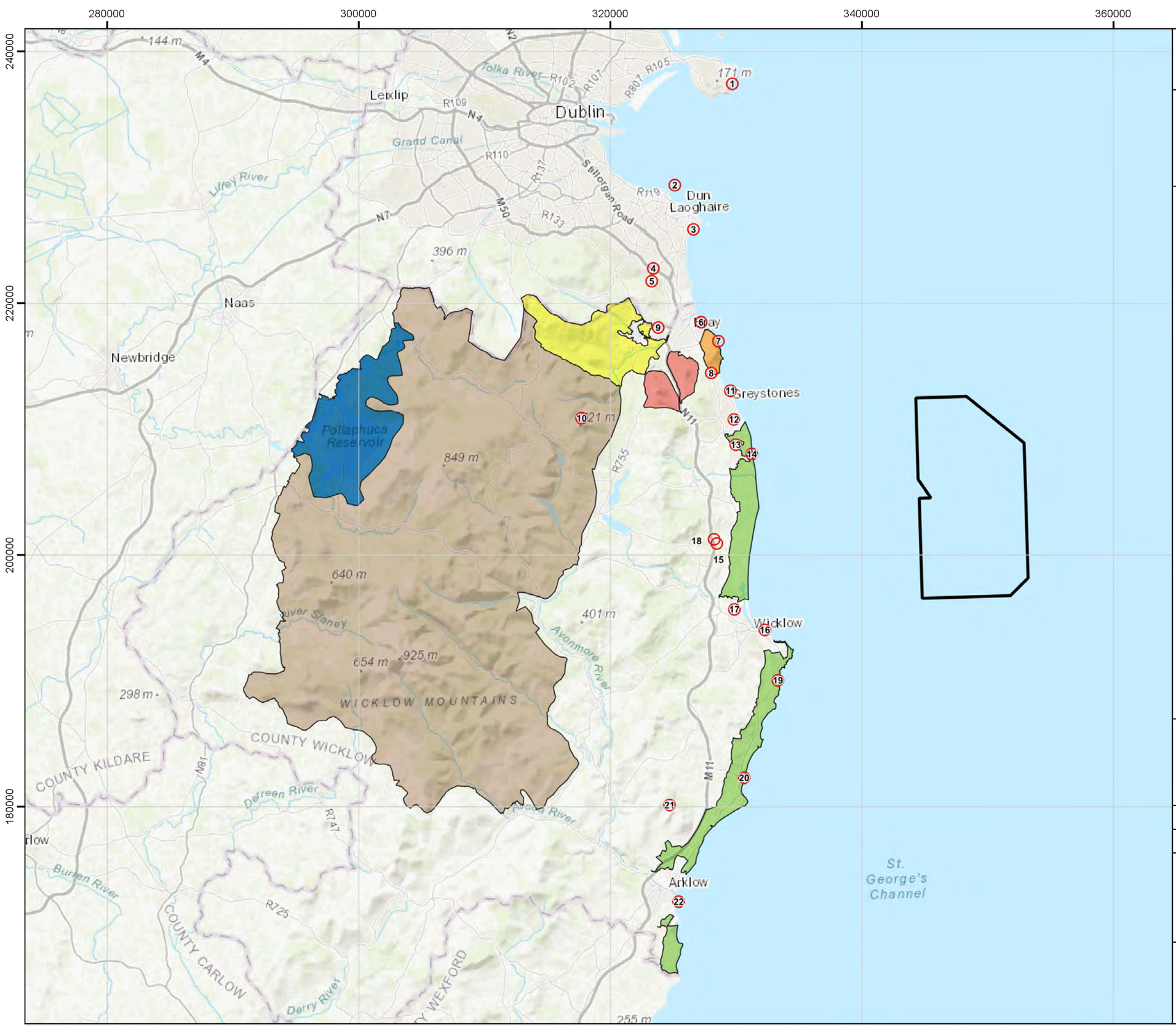
Table 19.1: Viewpoints to be included in detailed assessment

Viewpoint No.	Viewpoint Location	Approx. Grid Ref	Landscape / Seascape Receptor	Visual Receptor	Approx. distance from the application boundary of CWP	Bearing of view to proposed Development
6	Bray Promenade	727134, 718535	WCK13 – Urban Areas	Visitors / Residential receptors	18.4	118
7	Bray Head, Co. Wicklow	728508, 717018	WCK4 – The Northern Hills	Walkers	16.7	117
10	The Wicklow Way at White Hill	717633, 710908	WCK1 – Mountain Uplands (1 – AONB)	Walkers	26.9	105
13	Kilcoole, Co. Wicklow	729894, 708799	WCK13 – Urban Areas	Residential receptors	14.8	104
14	Kilcoole Train Platform	731158, 708057	WCK14 – Coastal Areas (AONB)	Rail users	13.5	103
16	Black Castle at Wicklow town	732200, 694090	WCK13 – Urban Areas	Visitors	13.1	55
17	Tinakilly Hotel, Rathnew, Co. Wicklow	729779, 695720	WCK13 – Urban Areas	Residential receptors Visitors	15.2	60

Table 19.2: Viewpoints to be illustrated by wireline and scoped out of the detailed assessment

Viewpoint No.	Viewpoint Location	Approx. Grid Ref	Landscape / Seascape Receptor	Visual Receptor	Approx. distance from the application boundary of CWP	Bearing of view to proposed Development
1	The Summit, Howth, Co. Dublin	729612, 737462	FIN1 – Coastal LCA	Walkers / Scenic View	29.4	145
2	Dun Laoghaire, East Pier, Co. Dublin	725043, 729418	Howth Head to Sorrento Point LSU	Walkers / Scenic View	25.9	130
3	R119 at Dalkey Hill	726527, 725901	Dublin City / Sorrento Point to Bray Head LSU	Road users / Scenic View	22.6	125
4	M50 Overbridge at Cherrywood, Co Dublin	723334, 722798	DLR 14 – Cherrywood/Rathmic heal / Sorrento Point to Bray Head LSU	Road users	23.6	123
5	Third Class Road at Rathmichael, Co. Dublin	723206, 721789	DLR6 - Ballycorus	Road users	23.3	122
8	R761 at Windgate, Co. Wicklow	727940, 714497	WCK14 – Coastal Areas (AONB)	Road users	16.7	110
9	Summit of the Great Sugar Loaf, Co. Wicklow	723721, 718100	WCK13 – Urban Areas	Walkers	21.6	115
11	Greystones, Co. Wicklow	729463, 713085	WCK13 – Urban Areas / The Grey Stones to Six Mile Point LSU	Residential receptors Visitors	15.1	103
12	Greystones exit from N11, Co. Wicklow	729741, 710804	WCK13 – Urban Areas	Road users	14.8	105
15	N11 at Rathmore, Co. Wicklow	728380, 700948	WCK11 – Corridor Area East	Road users	16.6	85
18	N11 at Ballybarney, Co. Wicklow	728168, 701282	WCK11 – Corridor Area East	Road users	16.8	90
19	Blairnroe Gold Club, Co. Wicklow	733237, 690082	WCK14 – Coastal Areas (AONB)	Recreational users	13.6	45

Viewpoint No.	Viewpoint Location	Approx. Grid Ref	Landscape / Seascape Receptor	Visual Receptor	Approx. distance from the application boundary of CWP	Bearing of view to proposed Development
20	South Beach at Brittas Bay, Co. Wicklow	730558, 682344	WCK14 – Coastal Areas (AONB) / Wicklow Head to Mizen Head LSU	Visitors Walkers	20.6	30
21	Barranisky Crossroads, Co. Wicklow	724624, 680171	WCK7 – South East Mountain Lowlands (3 – AHA)	Road users	26.4	30
22	South Beach, Arklow, Co. Wicklow	725347, 672496	WCK13 – Urban Areas / Mizen Head to Arklow Head	Visitors / Walkers	31.4	25



Project:

Codling Wind Park

Title:

Figure 19.1: Protected & Designated Landscapes with Viewpoints

Key

- Codling Wind Park
- Viewpoint

Area of Outstanding Natural Beauty (AONB) *

- Bray SAAO
- Coastal Area
- Glencree/Glencullen
- Mountain Uplands
- Northern Hills
- Poulaphuca Reservoir

* Wicklow County Council Development Plan.

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.

Scale @ A3: 1:300,000

Coordinate System: TM65/Irish Grid

0 2.5 5 7.5 10 km

N

Date: 30-07-20	Prepared by: LG	Checked by: GG
Ref: IE200091_M_312_B		

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19.6.5 Scoping of Cumulative Assessment

The current EIA Regulations (EU (Planning and Development) (EIA Regulations 2018) and 2017 DCCAE Guidance require the likely significant environmental effects of a development to be considered cumulatively and in combination with effects to be experienced as a consequence of other existing or consented projects to be considered.

Whilst the EIA Regulations 2018 and 2017 guidance states that only projects that are existing or have already received consent need to be considered in the Cumulative Impact Assessment (CIA), at this stage other offshore wind farms which have been confirmed as a 'Relevant Project' are also under consideration where they may result in cumulative effects.

It should however be noted that the projects to be considered as part of the CIA will be kept under review and will be updated where appropriate to take into consideration new information. It is considered that the CIA should be an iterative process and as such to help inform the CIA, advice will be sought from relevant regulators and consultees where appropriate.

It is suggested a 'cut-off' date of three months prior to the submission of the SLVIA be a reasonable timeframe

The analysis of the cumulative ZTVs will establish the general patterns of theoretical cumulative visibility within the study area. As OWFs are a key component within the vicinity of the site and the following developments will are currently proposed to be included in the cumulative assessment:

- Arklow Bank Phase 1 (Operational);
- Arklow Bank Phase 2 (Consented);
- Dublin Array (Relevant Project);
- North Irish Sea Array (Relevant Project); and
- Oriel Wind Farm (Relevant Project).

If there are onshore wind farms (existing or proposed) on the coastal edge with which the proposed development could interact causing significant cumulative effects, these will also be included in the assessment.

19.7 Assessment

Once the baseline seascape, landscape and visual context has been established and following completion of the design optimisation process, the detailed assessment will be undertaken.

The assessment will be carried out in accordance with the agreed methodology to identify the susceptibility and overall sensitivity of the landscape, seascape and visual receptors in the study area, as well as the magnitude of change, including cumulative change and related effects on these receptors caused by the proposed development.

An assessment of the potential impacts on landscape and seascape character as well as visual amenity arising from the proposed development at each of the agreed viewpoints will be carried out. This assessment will involve the production of computer-generated wirelines and, in some cases, photomontages to predict the views of the proposed turbines from each of the agreed viewpoints. The existing and predicted views from each of these viewpoints will be analysed to identify the magnitude of change and the residual effects on landscape character and visual amenity based on field work as well as desk-based assessment.

An assessment of the effects of aviation lighting will be carried out as part of the SLVIA. This will be based on preparation of night-time visualisations for 4 locations. The locations have been selected on the basis of providing a reasonable spread of locations from a variety of baseline lighting conditions and are proposed as:

- Viewpoint 6: Bray Promenade;
- Viewpoint 13: Urban centre of Kilcoole, Co. Wicklow;

- Viewpoint 16: Scenic Car park at Wicklow town; and
- Viewpoint 17: Tinakilly Hotel, Rathnew, Co. Wicklow.

The existing night-time context at these viewpoints will be described, with the related sensitivity identified and the magnitude of change arising from the aviation lighting of the proposed development will be assessed for these locations. The predicted effects of aviation lighting on seascape and landscape character and visual amenity at these viewpoints will be drawn on to provide general comment on the likely effects in the wider study area.

The findings of the SLVIA will draw on the viewpoint assessment as well as desk study and field work to identify potentially significant effects on seascape and landscape character, landscape designations and visual amenity receptors in the study area.

The SLVIA assessment in the EIAR will include the following documents:

- SLVIA Chapter;
- Appendix for SLVIA Methodology;
- Appendix for Landscape Assessment;
- Appendix for Seascape Assessment;
- Appendix for Viewpoint Assessment;
- Appendix for Sequential Routes;
- Appendix for Cumulative Assessment; and
- Figures: to include ZTVs, landscape and seascape character areas/units, landscape designations, visualisations, including photomontages and cumulative figures.

19.8 Scoping Questions

The following summarises the key questions for consultees in respect of the SLVIA:

- Are consultees content with the proposed 45 km radius study area?
- Are consultees content with the proposed methodology for carrying out the SLVIA? We are aware that new seascape characterisation areas, and assessment guidance is currently or will soon be in production (and is referenced in the draft National Marine Planning Framework). Advice on timing of the new guidance and how assessment should be carried out in its absence would be particularly useful.
- Have key landscape, seascape and visual resources been identified?
- Are consultees content with the list of proposed viewpoints?
- Are consultees content with the approach to identifying viewpoints to be included in the detailed assessment and those to be scoped out?
- Are you content with the approach taken with regards to the CIA?
- Are consultees able to provide any data on offshore and onshore wind farms to be included in the assessment (turbine heights and grid references)?
- Are consultees content with the list of viewpoints for which night-time assessment of effects is to be carried out?

20 SUMMARY OF EIA SCOPING

This Scoping Report identifies what is currently known and understood by CWPL with respect to CWP. The Scoping Report outlines existing data and assessment undertaken for CWP which will be utilised as part of the new CWP assessment. This Scoping Report applies only to the marine elements of CWP. A separate scoping report will be developed for the terrestrial elements of CWP.

Where receptor specialists consider that additional knowledge of the baseline conditions is required to inform the EIA process, the Scoping Report outlines what studies, surveys and consultations have been undertaken to date and what additional surveys or assessments are required to increase knowledge and inform a robust assessment. In some instances, further advice on whether additional work is needed is requested. In any case, the scope of additional surveys and / or methodology will be agreed with regulators and relevant consultees where appropriate.

Following the gathering of data, the assessment methodologies described in each section will be undertaken and a receptor specific EIA on the potential effects predicted to arise from the CWP produced. Should unacceptable significant effects be identified, mitigation measures will be sought and incorporated into the CWP Design Parameters where appropriate, and applicable

A consolidated EIAR will be produced for CWP (consisting of the original CWP, for which a Foreshore Lease has been received, and the extension, for which an application has been made pursuant to the Foreshore Act 1933-2014), which will be used to apply for development consent pursuant to the MPDM Act (when enacted). The EIAR will include consideration of transboundary effects and a cumulative impact assessment. A screening for an Appropriate Assessment will also be undertaken and submitted along with the EIAR.

Consultations with relevant authorities, organisations and stakeholders will continue to be undertaken throughout the EIA process.

21 PROPOSED ENVIRONMENTAL IMPACT ASSESSMENT REPORT CONTENTS

The proposed structure of the EIAR will mirror the structure of the Scoping Report as outlined in Chapter 1, Table 1.1. The final EIAR structure will also incorporate the onshore EIA topics.

There will also be some additional sections which will need to be added including certain requirements implemented through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 such as the need to consider reasonable alternatives to the proposed project, and details of technical expertise of the EIAR authors.

The final structure of the EIAR will be agreed in consultation with regulators and consultees.

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APPENDIX A: UKHO AND NMS CHARTERED SITES

WA ID	Name	Type	Sunken Date	Description	Latitude	Longitude	Sources
2001	*Lanarkshire*	Steam ship	15/01/1882	British steam ship - dangerous wreck; found by multi-beam. Length of 64 m; beam of 8.5 m; draught of 6.4 m; gross tonnage of 929. Built in 1871 and sank on Codling Bank, off Wicklow while on passage from Clyde to Lisbon. At the time of loss, it was owned by Burrell & Sons. In 2007 the vessel was amended to 'dead' by the UKHO.	53.106167	-5.860722	UKHO_7140; NMS_1567
2002	*County of Lancaster*	Sailing vessel	12/11/1901	British sailing vessel - non-dangerous wreck. The vessel was built of wood and registered in Glasgow. During her passage from Glasgow to Carnlough, railway workers saw distress signals off Greystones. The crew of four abandoned the vessel and came ashore with their boat between Jack's Thile and Mizen Head, causing the boat to overturn, and all crew lost.	53.154167	-6.045833	UKHO_79518
2003	*Explorer I*	Fishing vessel	13/03/2005	Irish fishing vessel - dangerous wreck. Length of 24.4 m. A decommissioned fishing vessel caught fire and later sank 4.3 km NNE off Wicklow, with all three of the crew surviving.	53.014	-6	UKHO_65656; NMS_9339
2004	*John Morrison*	Wreck	Unknown	Dangerous wreck	53.044778	-6.007389	UKHO_6942
2005	Unknown	Trawler	Unknown	Unknown, trawler - dangerous wreck; found by diver - possible wooden hull with remains of a boiler and engine. During a survey carried out in 1992, the wreck of an old steamship was located approximately 2 miles east of Bray Head. Remains consist of a boiler, engine and iron deck coaming. No visible remains of the hull, probably the wreck of a wooden trawler or drifter. Wreckage stands 3.5 m high and extends 15 x 4 m.	53.186444	-6.042667	UKHO_6974; NMS_10226

WA ID	Name	Type	Sunken Date	Description	Latitude	Longitude	Sources
2006	Unknown	Wreck	Unknown	Unknown - dangerous wreck; found by multibeam. Last examined and observed in 2016, measuring approximately 40 m in length, 12 m in width and 5.5 m in height.	53.124769	-5.853467	UKHO_85304
2007	*Aid*	Brig	10/01/1804	149-ton brig built in Quebec in 1802, classed A1 by Lloyd's. Owned by Beatson & Company, master was William Cranetch/Crantick/Cranick. En route from Leghorn to Dublin via Bristol, laden with a valuable cargo of Roman, Greek and Egyptian antiquities. Wrecked 3 miles north of Killoughter Strand, Wicklow.	53.02973	-6.04506	NMS_2303
2008	Unknown	Wreck	Unknown	Wreck discovered during search for the *Aid* by DUSAC. Initially thought to be the wreck of the *Aid* (NMS Wreck No. W02313) but it is several decades later in the date and the vessel was most likely built sometime during the late 19th century. Lost on Killoughter Strand.	53.02973	-6.04506	NMS_17937
2009	*Rose of Lough Gill*	Fishing boat	01/10/1995	Irish fishing boat sank 5 km east of Bray Head. Listed by the UKHO as a dangerous wreck.	53.18279	-6.00176	UKHO_7141; NMS_9650
2010	Unknown	Anchor	Unknown	Large anchor located on hard seabed, approximately 6 km east of Shankill.	53.23305	-6.02083	UKHO_6971; NMS_10225
2011	*Loch Fergus*	Barque	06/02/1898	British barque listed by the UKHO as a non-dangerous wreck. Classed as 100 A1 by Lloyd's. Owned by J. Sproat & Co., Liverpool, master was T. Williams. En route from Glasgow to Brisbane when it went ashore near Old Station, Killiney Bay, during a SSE gale and heavy seas.	53.24667	-6.10667	UKHO_6968; NMS_1820
2012	*Guide Me II* (HMS)	Anti-submarine Drifter	28/08/1918	British fishing vessel listed as a non-dangerous wreck by the UKHO. Built in 1907, hired by the Admiralty in 1915 and converted to an armed patrol vessel/anti-submarine drifter. The vessel sank following a collision. Owned by J. Mitchell & J. Cow. Sank 1.5 km ESE of Muglins, Dublin Bay.	53.27209	-6.05441	UKHO_6943; NMS_1474
2013	Unknown	Anchor & Cable	Unknown	Anchor and Cable. Dublin Bay	53.32083	-6.12	UKHO_6970; NMS_10224

WA ID	Name	Type	Sunken Date	Description	Latitude	Longitude	Sources
2014	Unknown	Wreck	Unknown	Dutch dredging company discovered a wreck in June 1989 while excavating route for new sewerage pipe. Wreck lay exposed in the southern bank of the trench, measuring c. 15 ft across and consisting of a 'wooden framework'. Located off Poolbeg lighthouse, Dublin Bay.	53.32575	-6.16793	NMS_1536
2015	*Privet*	Fishing boat	01/09/1988	Irish fishing vessel sank Dublin Bay, 1.7 km SE off Poolbeg Lighthouse. Mapped by the Irish National Seabed Survey (INSS) in 2003. Consists of a wooden hull badly broken up. Listed by the UKHO as a dead.	53.32952	-6.13603	UKHO_6965; NMS_9630
2016	Unknown	Barge	Unknown	Upright, intact wreck, in scour hole. Listed by the UKHO as a dangerous wreck.	53.3304	-6.13457	UKHO_69592
2017	Unknown	Wreck (possible)	Unknown	Possible wreck (INSS No. G160) identified during the National Seabed Survey. Wreck measures L. 3m, W. 3m with a height of 3 m off the seabed. It lies in a general sea depth of 9 m.	53.33208	-6.0893	NMS_1543
2018	Unknown	Debris	Unknown	Debris. Listed by the UKHO as dead.	53.3321	-6.08393	UKHO_69650 / UKHO
2019	Unknown	Foul Ground	Unknown	Debris. Listed by the UKHO as dead.	53.3338	-6.08943	UKHO_77923
2020	Unknown	Wreck (possible)	Unknown	One of three anomalies indicating a possible wreck (INSS No. G161a), identified by the National Seabed Survey. Anomaly measures L. 3 m, W. 3 m with a height of 2 m off the seabed. It lies in a general sea depth of 8 m.	53.33377	-6.08944	NMS_1544
2021	Unknown	Wreck (possible)	Unknown	One of three anomalies indicating a possible wreck (INSS No. G161b), identified by the National Seabed Survey. Anomaly measures L. 3 m, W. 3 m with a height of 1 m off the seabed. It lies in a general sea depth of 8 m.	53.33401	-6.08959	NMS_1545
2022	Unknown	Wreck (probable)	Unknown	Probable broken up and collapsed wreck. Listed by the UKHO as a dangerous wreck.	53.3340	-6.08958	UKHO_79106
2023	Unknown	Wreck	Unknown	Upright, intact wreck. Listed by the UKHO as a dangerous wreck.	53.3343	-6.08945	UKHO_79105

WA ID	Name	Type	Sunken Date	Description	Latitude	Longitude	Sources
2024	Unknown	Wreck (possible)	Unknown	One of three anomalies indicating a possible wreck (INSS No. G161c), identified by the National Seabed Survey. Anomaly measures L. 2 m, W. 2 m with a height of 1 m off the seabed. It lies in a general sea depth of 8 m.	53.33432	-6.08945	NMS_1546
2025	Unknown (Ringsens Wreck)	Wooden Wreck	Unknown	Wooden wreck, known as the 'Ringsend Wreck', became exposed during dredging operations for the Dublin Bay pipeline in April 2001. Located off South Bull, near Ringsend, Dublin Bay.	53.33625	-6.17844	NMS_1726 / NMS_11141 / NMS_11142
2026	Unknown	Ship Timbers	Unknown	Re-deposited ship timbers. Located off South Bull, near Ringsend, Dublin Bay.	53.33704	-6.1798	NMS_11137
2027	Unknown	Ship Timbers	Unknown	Re-deposited ship timbers. Located off South Bull, near Ringsend, Dublin Bay.	53.33705	-6.18	NMS_11138
2028	Unknown	Wooden Wreck	Unknown	Wooden wreck measuring 16.4 m long, 5.5 m wide, standing 20 cm proud of the seabed. The wreck was identified during a geophysical survey for the Dublin Bay Pipeline Project. Dublin Bay, 420 m SE of Poolbeg Lighthouse.	53.33976	-6.1463	NMS_17909

APPENDIX B: DOCUMENTED LOSSES

NMS_ID	Name	Type	Location of Loss
NMS_1518	Unknown	Wreck	One of five wrecks plotted on William Bligh's 1803 map of Dublin Bay. It is located in shallow water just off the South Bull.
NMS_1524	Unknown	Wreck	One of four wrecks marked on a chart (Admiralty Chart 1415) of Dublin. It is described as "remains of wrecks" and is located in about 10 m of water. Dublin Bay, 1.5 km NE of the east Pier Head of Dun Laoghaire Harbour.
NMS_1525	Unknown	Wreck	One of four wrecks marked on a chart (Admiralty Chart 1415) of Dublin. It is described as "remains of wrecks" and is located in about 10 m of water. Dublin Bay, 1.5 km NE of the east Pier Head of Dun Laoghaire Harbour.
NMS_1723	Unknown	Wreck	One of five wrecks plotted on William Bligh's 1803 map of Dublin Bay. It is located in shallow water, just off the South Bull, at the entrance to the 'Cock Lake'. It also appears to feature on John Taylor's 1816 map of Dublin.
NMS_10963	Unknown	Unknown	Wrecked off Codling Bank
NMS_10964	Unknown	Unknown	Wrecked off Codling Bank
NMS_10965	Unknown	Unknown	Wrecked off Codling Bank
NMS_10966	Unknown	Unknown	Wrecked off Codling Bank
NMS_10967	Unknown	Unknown	Wrecked off Codling Bank
NMS_10968	Unknown	Unknown	Wrecked off Codling Bank
NMS_10969	Unknown	Unknown	Wrecked off Codling Bank
NMS_10970	Unknown	Unknown	Wrecked off Codling Bank
NMS_10971	Unknown	Unknown	Wrecked off Codling Bank
NMS_10972	Unknown	Unknown	Wrecked off Codling Bank
NMS_10973	Unknown	Unknown	Wrecked off Codling Bank

NMS_ID	Name	Type	Location of Loss
NMS_10974	Unknown	Unknown	Wrecked off Codling Bank
NMS_10975	Unknown	Unknown	Wrecked off Codling Bank
NMS_10976	Unknown	Unknown	Wrecked off Codling Bank
NMS_10977	Unknown	Unknown	Wrecked off Codling Bank
NMS_10978	Unknown	Unknown	Wrecked off Codling Bank
NMS_10979	Unknown	Unknown	Wrecked off Codling Bank
NMS_10980	Unknown	Unknown	Wrecked off Codling Bank
NMS_10981	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10982	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10983	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10984	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10985	Unknown	Unknown	Wrecked off Codling Bank
NMS_10986	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10987	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10988	Unknown	Unknown	Codling Bank. Have put down as approximate location because says 'layback not applied'
NMS_10989	Unknown	Unknown	Wrecked off Codling Bank
NMS_10990	Unknown	Unknown	Wrecked off Codling Bank

APPENDIX C: INTERTIDAL HERITAGE ASSETS

WA ID	Site Type	Description	RMP	Easting	Northing
1001	Military Defence	Battery, Dublin South City	DU01564	322351	233866
1002	Structure	Martello tower, Sandymouth	DU01553	319524	232018
1003	Coastal Defence	Sea wall, Dublin South City	DU03581	320712	233779
1004	Military Defence	Town defences, Bullock	DU03605	326290	227610
1005	Structure	Martello tower, Seapoint or Templehill	DU01886	322738	229058
1006	Structure	Martello tower, Bullock	DU01917	325847	228115
1007	Structure	Castle - tower house, Bullock	DU01918	326191	227719
1008	Well	Well, Bullock	DU01920	326159	227739
1009	Quay	Quay, Bullock	DU01921	326203	227756
1010	Structure	Martello tower, Bullock	DU01924	326527	227536
1011	Well	Well, Dalkey Commons	DU01945	326896	227003
1012	Coastal Defence	Promontory fort - coastal, Dalkey Island	DU01952	327701	226466
1013	Midden	Midden, Dalkey Island	DU01953	327691	226484
1014	Inscribed Stone	Cross-inscribed stone, Dalkey Island	DU01954	327750	226393
1015	Ritual Site	Holy well, Dalkey Island	DU01955	327690	226379
1016	Burial	Burial ground, Dalkey Island	DU01957	327759	226401
1017	Earthworks	Field system, Dalkey Island	DU01958	327762	226388
1018	Structure	Martello tower, Dalkey Island	DU01961	327788	226272
1019	Military Defence	Battery, Dalkey Island	DU01964	327909	226157
1020	Structure	Castle - unclassified, Seapoint or Templehill	DU01976	322336	229195
1021	Coastal Defence	Promontory fort - coastal, Duleary	DU01980	323925	228947
1022	Structure	Martello tower, Dunleary	DU01982	323928	228946
1023	Ritual Site	Holy well, Newtown, Blackrock	DU01885	322206	229184

WA ID	Site Type	Description	RMP	Easting	Northing
1024	Structure	Martello tower, Intake	DU01878	320798	229977
1025	Structure	Church, Dalkey Island	DU03716	327760	226387
1026	Inscribed Stone	Cross-inscribed stone, Dalkey Island	DU03978	327750	226393
1027	Structure	Martello tower, Cork Great	DU02359	326714	219836