Environmental Impact Assessment Report

Volume 3

Chapter 18 Material Assets – Marine Infrastructure

codling
wind park

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Abbreviations

Abbreviation	Term in Full
AEZ	Archaeological Exclusion Zones
BT	BT Group plc (trading as BT and formerly British Telecom)
CC-1	CeltixConnect-1
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CIL	Commissioners of Irish Lights
CSIP	Cable Specification and Installation Plan
CBRA	Cable Burial Risk Assessment
CO_2	Carbon dioxide
CWP	Codling Wind Park
CWPL	Codling Wind Park Limited
dB	Decibel
DAS	Dumping at Sea
DECC	Department of the Environment, Climate and Communications
DHLGH	Department of Housing, Local Government and Heritage
DPC	Dublin Port Company
EC	European Commission
EDF R	Électricité de France Renewables
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
FOS	Fred. Olsen Seawind
FSPL	Free Space Path Loss
GSI	Geographical Society of Ireland
IACs	Inter-array Cables
IAM	Impact Assessment Matrix
ICPC	The International Cable Protection Committee
JUVs	Jack-Up Vessels
JRC	The Joint Radio Company
LoD	Limit of Deviation

Abbreviation	Term in Full
MAC	Maritime Area Consent
MAP	Maritime Area Planning
MAPA	Maritime Area Planning Act
MBNL	Mobile Broadband Network Limited
MCA	Maritime and Coastguard Agency
MI	Marine Institute
MW	Megawatts
NM	Nautical Mile
NMPF	National Marine Planning Framework
NtM	Notice to Mariners
OECC	Offshore Export Cable Corridor
OfTI	Offshore Transmission Infrastructure
OOS	Out Of Service
OSS	Offshore Substation Structure
O&M	Operations and Maintenance
OMB	Operations and Maintenance Base
OWF	Offshore Wind Farm
PDA	Planning and Development Act
RCS	Radar Cross Section
SAR	Search and Rescue
SSC	Suspended Sediment Concentration
TV	Television
WTG	Wind Turbine Generator
ZoI	Zone of Influence

Definitions

Glossary	Meaning
the Applicant	The developer, Codling Wind Park Limited (CWPL).
array site	The red line boundary area within which the wind turbine generators (WTGs), inter-array cables (IACs) and the offshore substation structures (OSSs) are proposed.
Arqiva	Arqiva is responsible for providing the BBC, ITV and the majority of the UK's radio transmission network and is responsible for ensuring the integrity of Re-Broadcast Links.
Atkins	Atkins Limited is responsible for providing wind farm / turbine support services to the Telecommunications Association of the UK Water Industry (TAUWI).
Codling Wind Park (CWP) Project	The proposed development as a whole is referred to as the Codling Wind Park (CWP) Project, comprising of the offshore infrastructure, the onshore infrastructure and any associated temporary works.
Codling Wind Park Limited (CWPL)	A joint venture between Fred. Olsen Seawind (FOS) and Électricité de France (EDF R) Renewables, established to develop the CWP Project.
decommissioning	The final closing down and putting into a state of safety of a development, project or process when it has come to the end of its useful life.
Environmental Impact Assessment (EIA)	A systematic means of assessing the likely significant effects of a proposed project, undertaken in accordance with the EIA Directive and the relevant Irish legislation.
Environmental Impact Assessment Report (EIAR)	The report prepared by the Applicant to describe the findings of the EIA for the CWP Project.
export cables	The cables, both onshore and offshore, that connect the offshore substations with the onshore substation.
generating station	Comprising the wind turbine generators (WTGs), inter-array cables (IACs) and the interconnector cables.
inter-array cables (IACs)	The subsea electricity cables between each WTG between and the OSSs.
interconnector cables	The subsea electricity cables between OSSs.
impact / effect	Change resulting from the implementation of a project.
landfall	The point at which the offshore export cables are brought onshore and connected to the onshore export cables via the transition joint bays (TJB). For the CWP Project, the landfall works include the installation of the offshore export cables within Dublin Bay out to approximately 4 km offshore, where water depths that are too shallow for conventional cable lay vessels to operate.

Glossary	Meaning
Maritime Area Consent (MAC)	A Maritime Area Consent (MAC) provides State authorisation for a prospective developer to undertake a maritime usage and occupy a specified part of the maritime area. A MAC is required to be in place before planning consent can be sought.
Maritime Area Planning (MAP) Act 2021	An Act to regulate the maritime area, to achieve such regulation by means of a National Marine Planning Framework, maritime area consents for the occupation of the maritime area for the purposes of maritime usages that will be undertaken for undefined or relatively long periods of time (including any such usages which also require development permission under the Planning and Development Act 2000) and licences for the occupation of the maritime area for maritime usages that are minor or that will be undertaken for relatively short periods of time.
methodology	The specific approach or techniques used to analyse impacts or describe environments.
mitigation measures	Measures designed to avoid, prevent or reduce impacts.
offshore development area	The total footprint of the offshore infrastructure and associated temporary works, including the array site and the OECC.
offshore export cables	The cables which transport electricity generated by the WTGs from the offshore substation structures (OSSs) to the TJBs at the landfall.
offshore export cable corridor (OECC)	The area between the array site and the landfall, within which the offshore export cables will be installed, along with cable protection and other temporary works for construction.
offshore infrastructure	The permanent offshore infrastructure, comprising of the WTGs, IACs, OSSs, interconnector cables, offshore export cables and other associated infrastructure, such as cable and scour protection.
offshore substation structure (OSS)	A fixed structure located within the array site, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
OSS topside	This is the offshore substation topside structure resting on the OSS monopile foundation and housing all electrical and ancillary equipment. This includes all systems such as electrical, SCADA, safety and mechanical equipment.
offshore transmission infrastructure (OfTI)	The offshore transmission assets comprising the OSSs and offshore export cables. The EIAR considers both permanent and temporary works associated with the OfTI.
onshore substation	Site containing electrical equipment to enable connection to the national grid.

Glossary	Meaning
onshore substation site	The area within which permanent and temporary works will be undertaken to construction the onshore substation.
operations and maintenance (O&M) activities	Activities (e.g., monitoring, inspections, reactive repairs, planned maintenance) undertaken during the O&M phase of the CWP Project.
O&M phase	This is the period of time during which the CWP project will be operated and maintained.
parameters	Set of parameters by which the CWP Project is defined and which are used to form the basis of assessments.
Phase 1 Project	Under the special transition provisions in the Maritime Area Planning Act 2021, as amended (the MAP Act), the Minister for the Department of Environment, Climate and Communications (DECC) has responsibility for assessing and granting a Maritime Area Consent (MAC) for a first phase of offshore wind projects in Ireland. The Phase 1 Projects include Oriel Wind Park, Arklow Bank II, Dublin Array, North Irish Sea Array, Codling Wind Park and Skerd Rocks. A MAC has since been granted by DECC for each of the Phase 1 Projects.
planning application boundary	The area subject to the application for development consent, including all permanent and temporary works for the CWP Project.
receptor	Any element in the environment which is subject to impacts.
revetment	A facing of impact-resistant material applied to a bank or wall in order to absorb the energy of incoming water and protect it from erosion.
residual effect	The final predicted effect remaining after mitigation.
sensitivity	The potential of a receptor to be significantly affected.
transition joint bay (TJB)	This is required as part of the OTI and is located at the landfall. It is an underground bay housing a joint which connects the offshore and onshore export cables.
wind turbine generator	All the components of a wind turbine, including the tower, nacelle and rotor.
zone of Influence (ZoI)	Spatial extent of potential impacts resulting from the project.

18 MATERIAL ASSETS – MARINE INFRASTRUCTURE

18.1 Introduction

1. Codling Wind Park Limited (hereafter 'the Applicant') is proposing to develop the Codling Wind Park (CWP) Project, which is located in the Irish sea approximately 13–22 km off the east coast of Ireland, at County Wicklow.

2. This chapter forms part of the Environmental Impact Assessment Report (EIAR) for the CWP Project. The purpose of the EIAR is to provide the decision-maker, stakeholders and all interested parties with the environmental information required to develop an informed view of any likely significant effects resulting from the CWP Project, as required by the European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) (the Environmental Impact Assessment (EIA) Directive).

3. This EIAR chapter describes the potential impacts of the CWP Project's offshore infrastructure on material assets: marine infrastructure during the construction, operation and maintenance (O&M) and decommissioning phases.

4. Material assets are described in the 'Guidelines on the information to be included in Environmental Impact Assessment Reports' (Environmental Protection Agency (EPA), 2022) as 'built services and infrastructure'. The EPA Guidelines are largely focused on the terrestrial environment, with reference to transport and waste management infrastructure. In the marine environment, material assets take a number of forms, including power and telecommunication cables, pipelines, renewable energy projects, marine aggregate resources, oil and gas assets and communication structures. Waste management in the marine environment is also considered. According to the EPA guidelines, the three main areas to focus on under the heading of material assets are:

   - Built services and infrastructure (including electricity, telecommunications, gas, water supply infrastructure and sewerage) (covered in this **Chapter 18 Material Assets – Marine Infrastructure**);
   - Roads and traffic (considered in **Chapter 16 Shipping and Navigation** and **Chapter 27 Traffic and Transport**); and
   - Waste management (considered in **Chapter 31 Waste & Resource Management**).

5. For the purposes of this chapter, material assets are defined as built services and infrastructure that have an economic or otherwise material value. These include those that may be operational or out of service.

6. In summary, this EIAR chapter:

   - Details the EIA scoping and consultation process undertaken and sets out the scope of the impact assessment for material assets: marine infrastructure;
   - Identifies the key legislation and guidance relevant to material assets: marine infrastructure, with reference to the latest updates in guidance and approaches;
   - Confirms the study area for the assessment and presents the impact assessment methodology for material assets: marine infrastructure;
   - Describes and characterises the baseline environment for material assets: marine infrastructure, established from desk studies, project survey data and consultation;
   - Defines the project design parameters for the impact assessment and describes any embedded mitigation measures relevant to the material assets: marine infrastructure assessment;
   - Presents the assessment of potential impacts on material assets: marine infrastructure and identifies any assumptions and limitations encountered in compiling the impact assessment; and
   - Details any additional mitigation and / or monitoring necessary to prevent, minimise, reduce or offset potentially significant effects identified in the impact assessment.

7. The assessment should be read in conjunction with **Appendix 18.1 Cumulative Effects Assessment**, which considers other plans, projects and activities that may act cumulatively with the CWP Project and provides an assessment of the potential cumulative impacts on material assets: marine infrastructure.

8. A summary of the cumulative effectives assessment (CEA) for material assets: marine infrastructure is presented in **Section 18.11**.

9. Additional information to support the assessment includes:

- **Appendix 18.1 Cumulative Effects Assessment**
- **Appendix 18.2 Material Assets: Marine Infrastructure Representative Scenario and Limit of Deviation Assessment**
- **Appendix 18.3 Television and Radio Desk-Based Report**

18.2 Consultation

10. Consultation with statutory and non-statutory organisations is a key part of the EIA process. Consultation with regard to material assets: marine infrastructure has been undertaken to inform the approach to and scope of the assessment.

11. The key elements to date have included EIA scoping, consultation events and ongoing topic specific meetings with key stakeholders. The feedback received throughout this process has been considered in preparing the EIAR. EIA consultation is described further in **Chapter 5 EIA Methodology,** the **Planning Documents** and in the **Public and Stakeholder Consultation Report**, which has been submitted as part of the development consent application.

12. **Table 18-1** provides a summary of the key issues raised during the consultation process relevant to material assets: marine infrastructure and details how these issues have been considered in the production of this EIAR chapter.

Table 18-1 Consultation responses relevant to material assets: marine infrastructure

Consultee	Comment	How issues have been addressed
Scoping responses		
The Commissioners of Irish Lights (CIL) 1 July 2021	Add CIL to list of parties relevant to consultation for material assets.	CIL have been consulted throughout the development of the CWP Project, no comments on Marine Infrastructure have been received**.**
Atkins 10 November 2022	No formal response with respect to CWP Project.	No action required. Atkins were consulted again on 28 April 2023 regarding the CWP Project. No response was received.
Arqiva 10 November 2022	No concern with respect to CWP Project.	No action required.

Consultee	Comment	How issues have been addressed
BT Group plc. (BT) 11 November 2022	No concern with respect to CWP Project.	No action required.
The Joint Radio Company (JRC) 10 November 2022	No concern with respect to CWP Project.	No action required.
Mobile Broadband Network Limited (MBNL) 14 November 2022	No concern with respect to CWP Project.	No action required.
Virgin Media O2 7 November 2022	No concern with respect to CWP Project.	No action required.
Other		
Environmental Protection Agency (EPA) 27 May 2022	Discussion on project activities that will require a Dumping at Sea (DAS) permit, along with timelines, process and pre-application requirements. Dumping at sea from vessels, aircraft or offshore installation of a substance or material is regulated by the Dumping at Sea Act 1996 as amended. A pre-application meeting will be requested with the EPA to discuss the DAS permit and specifically the interface between the DAS permit process and the CWP Project planning application.	EPA were consulted again on the 16 March 2023 regarding the CWP Project DAS permit. The agreed approach is to submit the DAS permit application for the CWP Project once planning permission for the CWP Project is granted or, at the earliest, following submission of the planning application.
Dublin Port Company (DPC)	DPC discussions around the onshore substation. Dublin Waste to Energy Plant (cooling water channel).	Ongoing engagement has informed the design to ensure that CWP Project does not adversely affect DPC operations.

18.3 Legislation, policy and guidance

18.3.1 Legislation

13. The legislation that is applicable to the assessment of material assets: marine infrastructure is summarised below. Further detail is provided in **Chapter 2 Policy and Legislative Context**.

- EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU and transposed into Irish law in the Planning and Development Act, 2000–2023 and the Planning and Development Regulations 2001–2023 as amended;

- Article 3(1) of the amended EIA Directive (2014/52/EU) specifies that material assets should be identified, described and assessed in an EIAR.

- The Dumping at Sea Act 1996 (as amended);
- Continental Shelf Act 1968 (as amended);
- Water Framework Directive (WFD) (2000/60/EC);
- Marine Strategy Framework Directive (MSFD) (2008/56/EC);
- Marine Planning Policy Statement (November 2019);
- Maritime Spatial Planning (MSP) Directive (2014/89/EU); and
- Maritime Area Planning Act 2021.

18.3.2 Policy

14. The overarching planning policy relevant to the CWP Project is described in EIAR **Chapter 2 Policy and Legislative Context**.

15. The assessment of the CWP Project against relevant planning policy is provided in the **Planning Report**. This includes planning policy relevant to material assets: marine infrastructure.

18.3.3 Guidance

16. The principal guidance and best practice documents used to inform the assessment of potential impacts on material assets: marine infrastructure are summarised below.

- Department of Communications, Marine and Natural Resource (2001), Offshore Electricity Generating Stations Note for Intending Developers;
- Environmental Protection Agency (2022), Guidance on the information to be contained in Environmental Impacts Assessment;
- European Commission (EC) (1999), Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
- Marine Institute (2000), Assessment of the Impact of Offshore Wind Energy Structures on the Marine Environment;
- RenewableUK (2013), Cumulative Impacts Assessment Guidelines: Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms;
- International Telecommunications Union (1992), Assessment of impairment caused to television reception by a wind turbine, Recommendation ITU-R BT805;
- International Telecommunications Union (2010), ITU-R BT.2142-1;
- Bacon (2002), A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance;
- Joint Radio Company (JRC) (2014): Calculation of Wind Turbine clearance zones for JRC UHF (460MHz) Telemetry Systems when turbine sizes and locations are accurately known – Issue 4.2;
- International Telecommunications Union (1992), Assessment of impairment caused to television reception by a wind turbine, Recommendation ITU-R BT805*;
- Bacon, D.F. (2002), A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance, Radio Communications Agency;
- Hall, S.H. (1992), The assessment and avoidance of electromagnetic interference due to wind farms, Wind Engineering Vol 16 No 6;
- Dabis, H.S. (1999), The provision of guidelines for the installation of wind turbines near aeronautical radio stations, Civil Aviation Authority, CAA Paper 99002;
- ETSU (2003), Feasibility of mitigating the effects of wind farms on primary radar, ETSU W/14/00623/REP;

- Dabis, H.S. (1996), The establishment of guidelines for the installation of wind turbines near radio systems, Proceedings of the eighteenth BWEA Wind Energy Conference;
- FES (2003), Wind farms impact on aviation interests – final report, FES W/16/00614/00/REP; and
- Vila-Moreno, S. (2005), A Methodology to Assess Interference to TV Reception due to Wind Farms, RES.

18.4 Impact assessment methodology

17. **Chapter 5 EIA Methodology** provides a summary of the general impact assessment methodology applied to the CWP Project, which includes the approach to the assessment of transboundary and inter-related effects. The approach to the assessment of cumulative impacts is provided in **Chapter 5, Appendix 5.1 CEA Methodology**.

18. The following sections confirm the methodology used to assess the potential impacts on material assets: marine infrastructure.

18.4.1 Study area

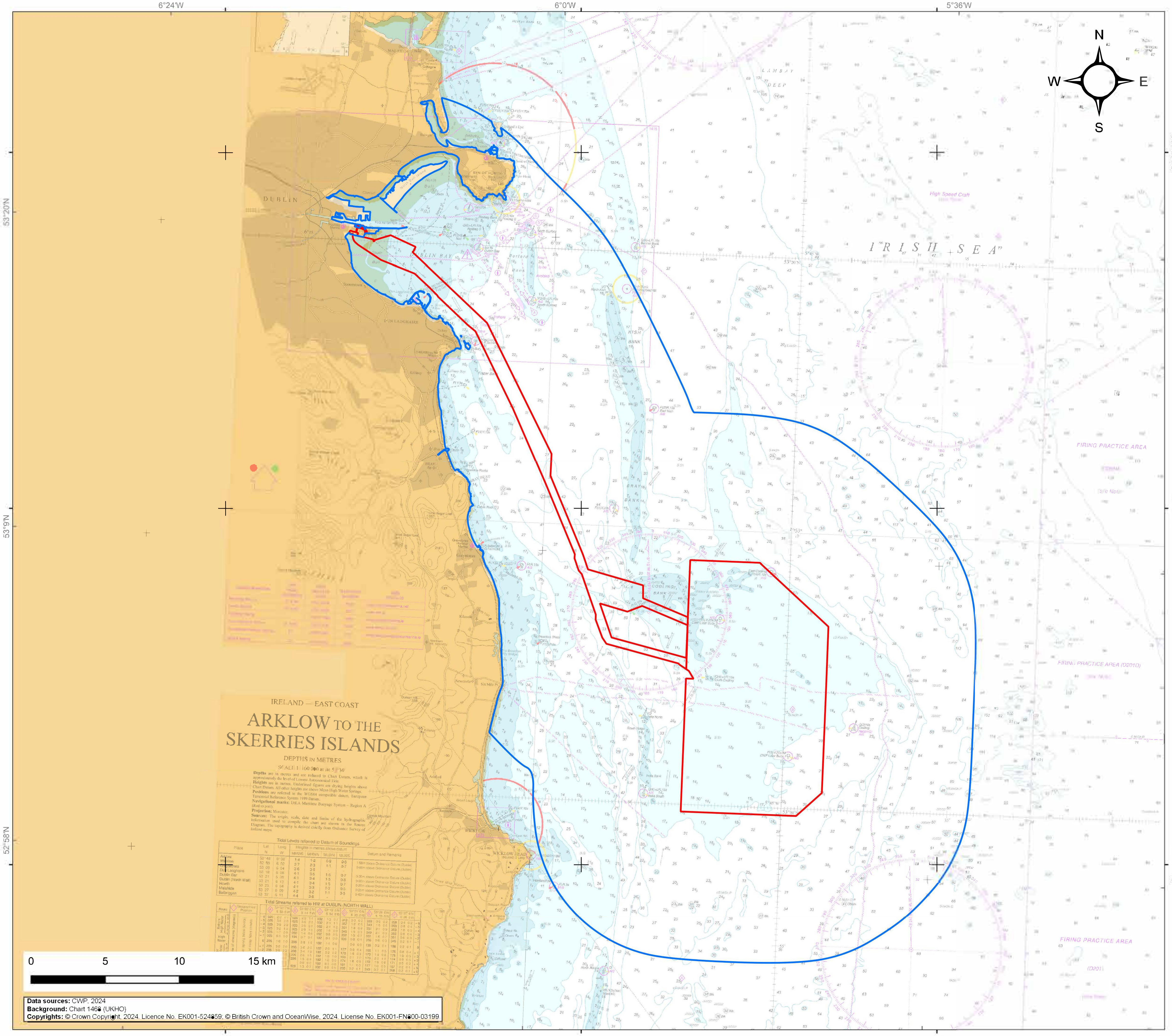
19. The study area has been defined through reference to the offshore development area, as this represents the area in which construction and operation of the development will take place, with the Marine Safety Demarcation Area being used only for short term navigation safety activities, such as deployment of buoyage.

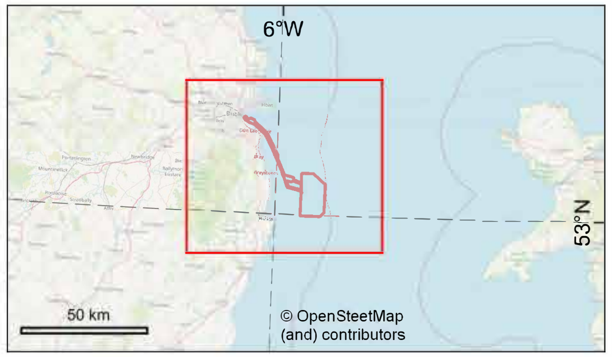
20. For the purposes of this assessment, the study area for material assets: marine infrastructure is defined as the area that will be directly impacted by the offshore development area, plus a 10 km buffer to account for potential indirect impacts. The study area is presented in **Figure 18-1**.

21. This study area has been defined based upon the modelling presented in **Appendix 6.3 Modelling Report**. Modelling was undertaken to identify the greatest extent of potential sediment plume dispersion, level of dispersion above background levels (mg/l) and accumulated level of deposited material. The modelling identified the greatest direction and distance of dispersion of disturbed material was 10 km to the east of the array site; a 10 km radius has been applied to the CWP Project.

22. The study area for the television (TV) and radio reception assessment has been defined as the closest transmitters serving the onshore residential areas relative to the CWP Project.

23. As outlined in **Section 18.1**, Shipping and navigation receptors, traffic receptors and waste management are considered as material assets but have been examined separately in **Chapter 16 Shipping and Navigation**, **Chapter 27 Traffic and Transport** and **Chapter 31 Waste & Resource Management** respectively.





Data sources: CWP, 2024
Background: Chart 1468 (UKHO)
Copyrights: © Crown Copyright, 2024. Licence No. EK001-524859, © British Crown and OceanWise, 2024. License No. EK001-FN800-03199

Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB

Project: Codling Wind Park	Contractor: www.naturalpower.com

Figure 18.1
The study area for material assets: marine infrastructure

CWP doc. number:	CWP-NPC-ENG-08-01-MAP-0903
Internal descriptive code: WE - PAB_STUDY AREA_FOR OFFSH.MATERIAL ASSETS - EIAR.FIG.18.01	Size: A3 Scale: 1:250,000 CRS: EPSG 25830

Rev.	Updates	Date	By	Chk'd	App'd
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.4.2 Data and information sources

Site specific surveys

24. In order to provide site specific and up to date information on which to base the impact assessment, a site characterisation survey was conducted. Geophysical surveys, including magnetometer surveys, were completed for CWP Project's offshore infrastructure in Irish coastal and offshore waters, at stations positioned across the array site and offshore export cable corridor (OECC) and near to landfall in the intertidal area, which have informed this chapter through the identification of any possible existing subsea cable and pipelines. These surveys are described in the MMT (2021) Codling Wind Park, Geophysical and 2D UHRS Survey report; notably Section 8.5 Existing Infrastructure of the report states '*according to available background data, there are two unknown cables in the area. None of them were detected during the survey operations*'.

25. The survey data remains valid and an appropriate characterisation of the receiving environment at the point of application.

Desk study

26. A comprehensive desk-based review was undertaken to inform the baseline for material assets: marine infrastructure. Key data sources used to inform the assessment are set out in **Table 18-2**.

Table 18-2 Data sources

Data	Source	Date	Notes
Location of marine aggregates, cabling and disposal sites in the Irish Sea	Ireland's Marine Atlas	2022	Available online from (Accessed November 2022): https://atlas.marine.ie/#?c=53.9108:-15.8972:6
Location of proposed offshore wind development	4C Offshore	2022	Available online from (Accessed November 2022): https://map.4coffshore.com/offshorewind/
Location of existing marine infrastructure themes (industrial facilities and administrative units)	Oceanwise	2022	Data purchased from Oceanwise (Accessed April 2022): https://www.oceanwise.eu/data/marine-themes/
Location of utilities (substation, offshore gas pipeline)	OpenStreetMap	2022	Available online from (Accessed November 2022): https://www.openstreetmap.org/
Irish Marine Institute Data Catalogue	Marine Institute	2022	Available online from (Accessed November 2022): https://data.marine.ie

Data	Source	Date	Notes
The Kingfisher Information Service – Offshore Renewable & Cable Awareness project (KIS-ORCA)	European Subsea Cables Association (ESCA) and the Kingfisher Information Service of Seafish	2022	Available online from (Accessed November 2022): https://kis-orca.org/map/
Current Applications for Statutory Consents	Department of the Environment, Climate and Communications, (DECC)	2022	Available online from (Accessed November 2022): https://www.gov.ie/en/organisation/department-of-the-environment-climate-and-communications/
EMODnet Central Portal for marine data in Europe	EMODnet	2022	Available online from (Accessed November 2022): https://emodnet.ec.europa.eu/geoviewer/
Irish Geological Survey Database	Geological Survey	2022	Available online from (Accessed November 2022): https://www.gsi.ie/en-ie/data-and-maps/Pages/Marine.aspx
Irish Seabed Mapping	INFOMAR	2022	Available online from (Accessed November 2022): https://www.infomar.ie/

18.4.3 Impact Assessment

27. The significance of potential effects has been evaluated using a systematic approach, based upon identification of the importance / value of receptors and their sensitivity to the project activity, together with the predicted magnitude of the impact.

28. The terms used to define receptor sensitivity and magnitude of impact are described in key industry guidance (EPA Guidelines, 2022). These criteria have been adopted in order to implement a specific methodology for material assets: marine infrastructure.

Sensitivity of receptor

29. For each effect, the assessment identifies receptors sensitive to that effect and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors.

30. Receptor sensitivity is determined by considering a combination of value, tolerance, adaptability and recoverability. The definitions of receptor sensitivity for the purpose of the material assets: marine infrastructure assessment are provided in **Table 18-3**.

Table 18-3 Criteria for determination of receptor sensitivity

Sensitivity	Criteria
High	Receptor has little to no capacity to retain material asset value as a result of change to baseline conditions; damage to material assets results in major financial consequences; or assets of particularly high economic value.
Medium	Receptor has some tolerance to change by retaining some material asset value in view of the change; damage to material assets results in minor financial consequences; or assets are of some economic value.
Low	Receptor has high tolerance to change by retaining full material asset value in view of the change; damage to material assets results in no financial consequences; or assets of low economic value.
Negligible	Change to material asset value is undetectable in view of the change; damage to material assets cannot occur; or assets have negligible economic value.

Magnitude of impact

31. The scale or magnitude of potential impacts (both beneficial and adverse) depends on the degree and extent to which the CWP Project activities may change the environment, which usually varies according to project phase (i.e., construction, operation and maintenance or decommissioning).

32. Factors that have been considered to determine the magnitude of potential impacts include:

- Level of deviation from baseline conditions; and
- Duration of impact.

33. The criteria for defining magnitude of impact for the purpose of the material assets: marine infrastructure assessment are provided in **Table 18-4**.

Table 18-4 Criteria for determination of magnitude of impact

Magnitude	Criteria
High	A regional loss of asset value; or other fundamental change to the baseline quality of material asset availability in the long term (15–60 years).
Medium	A local loss of asset value; or other material change to the baseline quality of available material asset in the medium term (7–15 years).
Low	A site specific loss of asset value; or changes are detectable but not material to the baseline quality of available material asset in the short term (1–7 years).
Negligible	Very little to no change from baseline conditions; or change is not detectable in relation to the overall quality of available material asset.

Significance of effect

34. As set out in **Chapter 5 EIA Methodology**, an Impact Assessment Matrix (IAM) is used to determine the significance of an effect. In basic terms, the potential significance of an effect is a function of the sensitivity of the receptor and the magnitude of the impact, as shown in **Table 18-5**.

35. The matrix provides a framework for the consistent and transparent assessment of predicted effects across all technical chapters; however, it is important to note that individual assessments are based on relevant guidance and the application of professional judgement.

36. The matrix provides levels of effect significance ranging from Imperceptible to Very Significant, as defined in the Environmental Protection Agency (EPA) (2022) EIAR Guidelines. For the purposes of this assessment, potential effects identified to be of moderate significance or above are considered to be significant in EIA terms and additional mitigation will be required. Effects identified as less than moderate significance are generally considered to be not significant in EIA terms.

Table 18-5 Impact assessment matrix for determination of significance of effect

Sensitivity of Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Very Significant	Significant	Moderate	Imperceptible
Medium	Significant	Moderate	Slight	Imperceptible
Low	Slight	Slight	Slight	Imperceptible
Negligible	Not Significant	Imperceptible	Imperceptible	Imperceptible

18.5 Assumptions and limitations

37. The assessment has been undertaken based on the information and design parameters presented in **Chapter 4 Project Description**.

38. Data was gathered from a wide variety of data sources (**Table 18-2**), as such the limitations of this data are based upon the data source assumptions made.

39. It is possible that additional subsea cables exist in the marine environment that have not yet been identified. Some subsea cables are particularly old, with the earliest cables dating back to the 19th century, so mapping is consequently unreliable. Others may have become buried, be very small and have been undetected by the survey work undertaken.

40. Consultation with the owners or operators of existing cables may provide additional information that will inform operations during the construction phase on the CWP Project. Pre-installation surveys will also be undertaken to further define the presence of subsea cables, so while it is possible that there are cables that have not been specifically identified at the time of writing, the approach to mitigating any effects of crossing such cables is defined in this chapter and would be applicable to any cables identified at a later time. This possible data gap is therefore not likely to materially influence the outcome of this assessment.

41. The availability of data or information regarding the offshore wind farm sites which may be taken forward through the planning and consenting stage into operational sites is currently commercially sensitive and therefore unavailable.

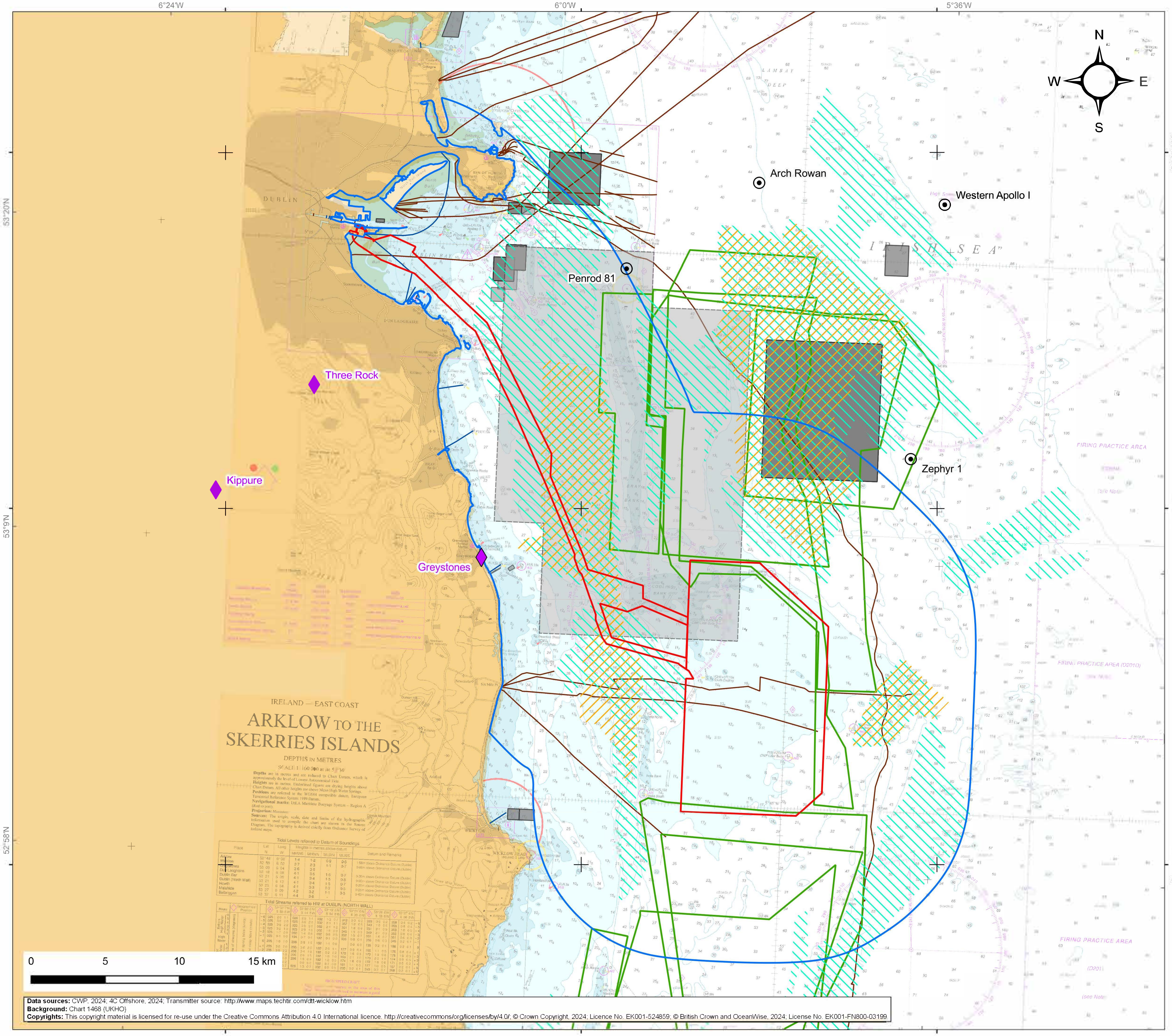
18.6 Existing environment

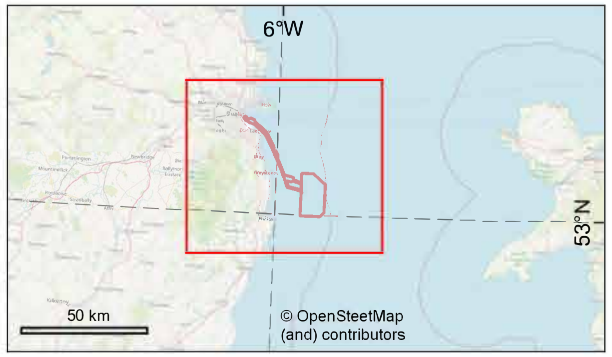
42. The following sections provide a description of the baseline conditions for material assets: marine infrastructure.

43. The review of datasets identified several offshore material assets within the study area. Namely, the review identified:

- **Subsea utilities (cables and pipelines)** – numerous operational and out-of-service cables / pipelines;
- **Oil and gas licensed exploration areas** – several licences issued for oil and gas exploration and production off the coast of Dublin and Wicklow;
- **Marine aggregates and disposal sites (including dredging)** – an area of sand identified as having potential for marine aggregate extraction;
- **Renewable energy (wind, wave and tidal)** – the site of an operational offshore wind farm (OWF) and proposed OWFs (in concept / early planning); and
- **TV and radio reception** – broadcast from transmitters most likely serving the urban areas closest to the CWP Project.

44. **Figure 18-2** illustrates the locations of material assets within the study area, and those that are near to and / or intersect with the study area. Additional details describing the current status of these material assets are described below.





Data sources: CWP, 2024; 4C Offshore, 2024; Transmitter source: http://www.maps.techtir.com/dtt-wicklow.htm
Background: Chart 1468 (UKHO)

Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB

Subsea utilities (cables and pipelines)

- Submarine cable (telephone/power)
- Pipeline (sewage/wastewater)

Oil and gas infrastructure licensed exploration areas

- Exploration well
- Authorised oil and gas exploration area

Renewable energy

- Proposed offshore wind development

Marine aggregates and disposal sites

- Aggregate resource area
- Aggregate study area
- Disposal at sea

TV and radio reception

- TV and radio transmitter

codling wind park

Project: Codling Wind Park

Contractor: www.naturalpower.com natural power

Figure 18.2
Material assets at the study area

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0904

Internal descriptive code:	*Size:* A3	*CRS:*
WE - ALL.RLB..STUDY AREA..ALL.OFFSH.MATERIAL. ASSETS - EIAR.FIG.18.02	*Scale:* 1:250,000	EPSG 25830

Rev.	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.6.1 Subsea utilities (cables and pipelines)

45. Ireland is connected by several existing submarine power and telecommunications cables and pipelines to the UK, Europe and the USA.

46. The routes of existing subsea cables have been identified from desktop review and subsea (geophysical) surveys undertaken for the CWP Project. A number of subsea cables and pipelines have been identified within the study area (**Figure 18-3**), as described in **Table 18-6** and **Table 18-7**.

47. The OECC intersects with the existing operational ESAT 2 subsea cable. The nearest existing operational subsea cable to the array site is the EXA Atlantic (EXA South segment), which is located *c*. 4 km east of the array site (**Figure 18-3**).

48. Several undefined / unknown cables exist with the study area, as identified on Admiralty Chart 1468, although only the near shore elements of the cables are illustrated. The cables would have been surface laid and their exact location is not known with any degree of certainty. BT have confirmed that the cables were installed in the 1890s and have been out of service since the 1930s. The array site intersects with the charted positions of two out of service (OOS) cables (**Figure 18-3**), however no OOS cables were confirmed during the geophysical survey operations (MMT 2021) and BT when consulted raised no concerns regarding any assets in the area. No pipelines were observed in the study area from the geophysical survey operations, or desk-based data review (MMT 2021).

49. Opposite the proposed landfall location lies the proposed onshore substation site, on the south bank of the river Liffey. The river Liffey has been heavily industrialised at its mouth, with Dublin Port located on either side of the river Liffey alongside other facilities. Three power plants discharge to the river Liffey in the study area and close (within 1 km) to the onshore substation site, as follows:

- Dublin Waste to Energy Plant;
- ESB Dublin Bay Power Plant; and
- Ringsend Wastewater Treatment Plant.

50. The Dublin Waste to Energy Plant takes in water from the river Liffey estuary to act as coolant for the plant's processes. It discharges the temperature-elevated cooling waters further downstream from the intake location. The ESB Dublin Bay Power Plant and Dublin Waste to Energy have separate cooling water intakes but discharge into the same discharge channel (cooling channel). This discharge channel is adjacent to (west of) the onshore substation site. Ringsend WWTP discharges to the east (1 km downstream) of the Dublin Waste to Energy Plant and ESB Dublin Bay Power Plant discharge channel.

51. The river Liffey channel in Dublin Port is influenced by a number of freshwater river inflows and by thermal inputs from the three power station cooling water systems; stratification of the water column occurs under certain tidal conditions in the river Liffey channel, particularly in the central section of the port. A description of the tidal and wave regime within the subtidal area of the river is presented in **Appendix 6.4 Codling Wind Park Hydraulic Modelling Support**.

Table 18-6 Subsea cables within the study area

No.	Cable Ref	Cable Name	Cable Type	Description	Owner	Status
1	302781100	CeltixConnect-1 (CC-1)	Telephone	The CC-1 is a 131 km fibre optic submarine telecommunications cable system in the Irish Sea connecting Ireland and the UK. The CC-1 cable, which is currently in-service, has been operational since 2012. Its landing points are in two locations, from Dublin in Ireland to Holyhead in the UK. The CC-1 is owned and operated by Aqua Comms.	Aqua Comms	Operational
2	101871644	ESAT-2	Telephone	The ESAT-2 is a 245 km fibre optic submarine telecommunications cable system connecting Ireland and the UK. The ESAT-2 cable, which is currently in-service, has been operational since 2000. Its landing points are in two locations, from Sandymount in Ireland to Southport in the UK. The ESAT-2 is owned and operated by Virgin Media Business.	BT	Operational
3	101871666	EXA South (formerly Hibernia South)	Telephone	EXA Atlantic (formerly Hibernia Atlantic) is a 12,200 km transatlantic fibre optic submarine telecommunications cable system in the North Atlantic Ocean, connecting Canada, the United States, Ireland and the United Kingdom. The EXA Atlantic consists of EXA South and EXA North cables.	EXA Infrastru cture (formerly Hibernia Atlantic)	Operational
4	101871665	EXA North (formerly Hibernia South)	Telephone			Operational

No.	Cable Ref	Cable Name	Cable Type	Description	Owner	Status
				The EXA North and South cables, which are currently in-service, have been operational since 2001. Their landing points span several locations, including Halifax, Nova Scotia in Canada; Dublin in Ireland; Coleraine in Northern Ireland; Southport in England and Lynn, Massachusetts in the United States. The EXA North and South subsea cables are owned and operated by EXA Infrastructure.		
5	302294745	1898 Anglo-Irish Telephone Cable (1)	Telephone	According to available background data, there are two unknown cables in the array site. These are likely old telegraph copper cables laid in 1898 between Newcastle in Wicklow and Nevin in North Wales. (Called the 1898 Anglo-Irish Telephone Cable). The disused cables are identified on Admiralty Chart 1468, although only the nearshore elements of the cables are illustrated. BT confirmed that these cables have been out of service since 1930 and they would have been surface laid so their exact location is not known. None of these unknown cables were detected during the geophysical survey operations.	BT	Out of service
6	302294746	1898 Anglo-Irish Telephone Cable (2)	Telephone			Out of service
7	302294747	Undefined	Undefined	Undefined	Undefined	Out of service

No.	Cable Ref	Cable Name	Cable Type	Description	Owner	Status
8	302687557	Undefined	Power line	Undefined	Undefined	Undefined
9	302687556	Undefined	Power line	Undefined	Undefined	Undefined
10	203028344	Undefined	Power line	Undefined	Undefined	Undefined
11	203028183	Undefined	Power line	Undefined	Undefined	Undefined
12	203028182	Undefined	Power line	Undefined	Undefined	Undefined
13	203028181	Undefined	Power line	Undefined	Undefined	Undefined
14	203028186	Undefined	Power line	Undefined	Undefined	Undefined
15	302687704	Undefined	Undefined	Undefined	Undefined	Out of service
16	302687703	Undefined	Undefined	Undefined	Undefined	Out of service
17	302687702	Undefined	Undefined	Undefined	Undefined	Out of service
18	302687701	Undefined	Undefined	Undefined	Undefined	Out of service
19	302687695	Undefined	Undefined	Undefined	Undefined	Out of service
20	302687700	Undefined	Undefined	Undefined	Undefined	Out of service
21	302687699	Undefined	Undefined	Undefined	Undefined	Out of service
22	302687698	Undefined	Undefined	Undefined	Undefined	Out of service
23	302687696	Undefined	Undefined	Undefined	Undefined	Out of service
24	302687705	Undefined	Undefined	Undefined	Undefined	Out of service
25	300858767	Undefined	Undefined	Undefined	Undefined	Undefined
26	302687717	Undefined	Undefined	Undefined	Undefined	Out of service
27	302781100	Undefined	Undefined	Undefined	Undefined	Undefined

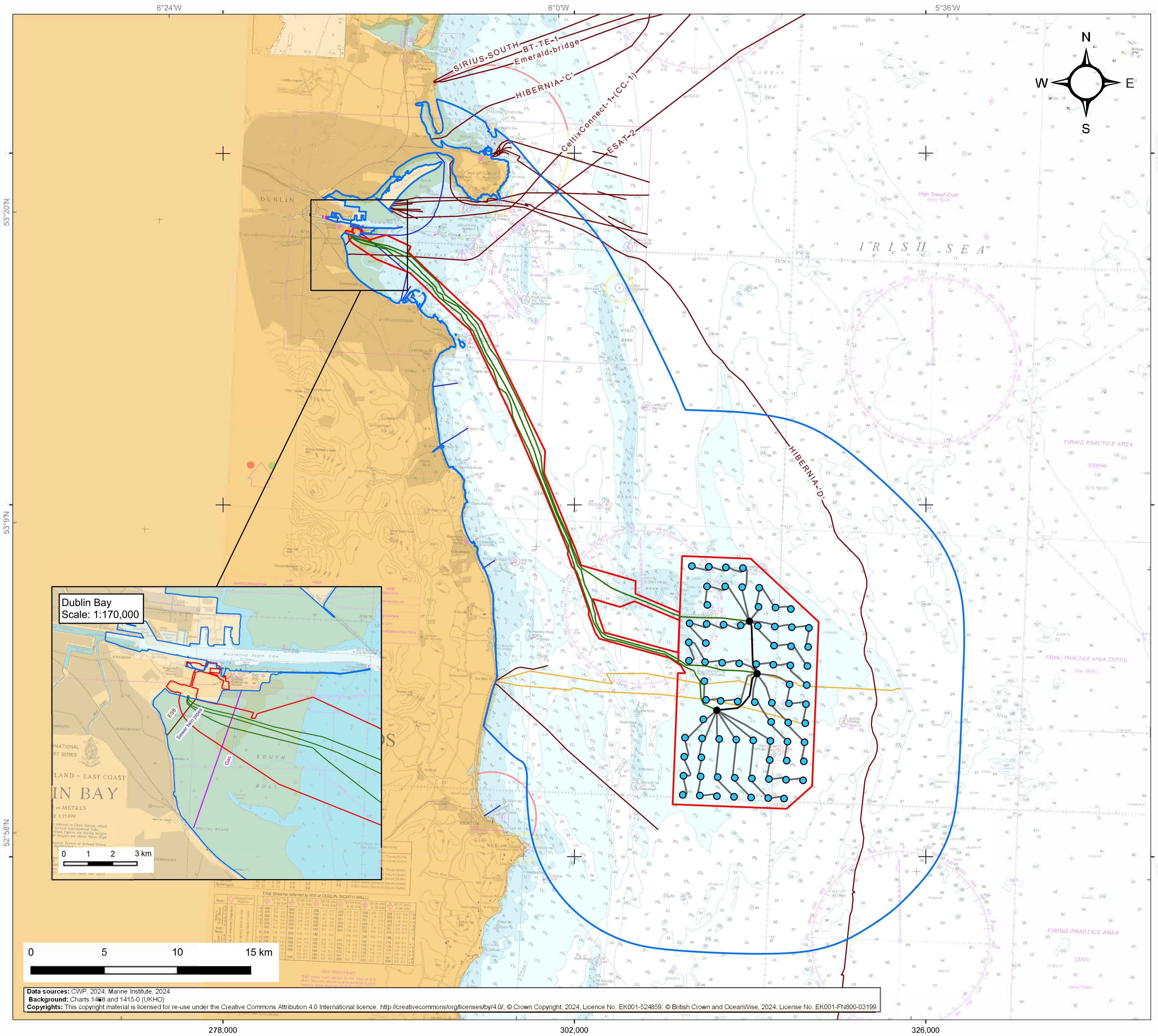
No.	Cable Ref	Cable Name	Cable Type	Description	Owner	Status
28	302687715	Undefined	Undefined	Undefined	Undefined	Out of service
29	302687714	Undefined	Undefined	Undefined	Undefined	Out of service
30	302688091	Undefined	Undefined	Undefined	Undefined	Undefined
31	302687706	Undefined	Undefined	Undefined	Undefined	Out of service
32	203967303	Undefined	Undefined	Undefined	Undefined	Out of service
33	203967309	Undefined	Undefined	Undefined	Undefined	Out of service
34	203967300	Undefined	Undefined	Undefined	Undefined	Out of service
35	203967299	Undefined	Undefined	Undefined	Undefined	Out of service
36	203967298	Undefined	Undefined	Undefined	Undefined	Out of service
37	203967297	Undefined	Undefined	Undefined	Undefined	Out of service
38	101644533	Undefined	Undefined	Undefined	Undefined	Out of service
39	203027850	Undefined	Undefined	Undefined	Undefined	Out of service
Subsea cables outside the study area						
40	101871705	Sirius South	Telephone	The Sirius South is a 219 km fibre optic submarine telecommunications cable system in the Irish Sea connecting Ireland and the UK. The Sirius South cable, which is currently in-service, has been operational since 1999. Its landing points are in two locations, from Portmarnock in Ireland to Lytham in the UK.	Virgin Media Business	Operational

No.	Cable Ref	Cable Name	Cable Type	Description	Owner	Status
				The Sirius South is owned and operated by Virgin Media Business.		
41	101871625	BT-TE1	Telephone	The BT-TE1 is a submarine telecommunications cable that runs from Portmarnock in Ireland and lands in Port Dafarch in the UK. It is co-owned by Eircom and BT. This cable has not been in use for more than 10 years.	Eircom and BT	Out of service
42	300858767	Emerald Bridge Fibres	Telephone	The Emerald Bridge Fibres is a 120 km fiber optic submarine telecommunications cable system in the Irish Sea connecting Ireland and the UK. The Emerald Bridge Fibres cable, which is currently in-service, has been operational since 2012. Its landing points are in two locations, from Clonshaugh in Ireland to Holyhead in the UK. The Emerald Bridge Fibres is owned and operated by a consortium consisting of ESB Telecoms, Zayo Group.	ESB Telecoms	Operational

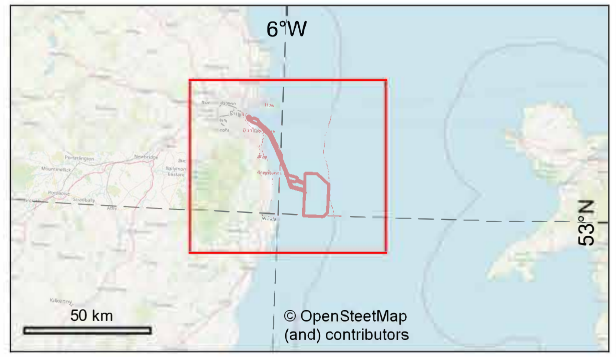
Table 18-7 Subsea pipelines in the study area

No.	Pipeline Ref	Pipeline Type	Owner	Status
1	302686603	Sewer	Uisce Éireann (formerly Irish Water)	Operational
2	302686603	Sewer		
3	302686602	Sewer		
4	203967315	Outfall pipe		
5	101264673	Undefined		
6	101263122	Sewer		

No.	Pipeline Ref	Pipeline Type	Owner	Status
7	302795432	Sewer		
8	302795434	Sewer		
9	302795434	Sewer		
10	101264609	Undefined		
11	101263077	Outfall pipe		
12	101263276	Outfall pipe		
13	101644967	Outfall pipe		
14	101644966	Outfall pipe		
15	101263277	Outfall pipe		
16	101645454	Outfall pipe		



Data sources: CWP, 2024; Marine Institute, 2024
Background: Charts 1468 and 1415-0 (UKHO)



Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB
- Option A WTG
- Offshore substation structure
- Inter-array cable
- Interconnector cable
- Offshore export cable

Subsea utilities (cables and pipelines)

- Submarine cable (telephone/power)
- Pipeline (gas)
- Pipeline (sewage/wastewater)

Submarine abandoned utilities (cables)

- Submarine cable (telephone/power)

Project: Codling Wind Park

Contractor: www.naturalpower.com

Figure 18.3
Subsea cables and pipelines at the study area

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0905

Internal descriptive code: WE - PAB..PAB.BUFF.10km.S..WTG.LO75.L219..IACs..OSSs..INTCs..OECs.3PB.L2xx - OFFSH.UTIL - EIAR.FIG.18.03

Size: A3
Scale: 1:250,000

CRS: EPSG 25830

Rev.	Updates	Date	By	Chk'd	App'd
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.6.2 Oil and gas licensed exploration areas

52. The sheltered and shallow character of the Irish Sea mean that this area is attractive for oil and gas exploration.

53. The Minister for DECC is responsible for all oil and gas-related activity in Ireland. Under the Petroleum and Other Minerals Development Act 1960, oil and gas developers need to be issued an authorisation by the Minister for DECC in order to carry out any oil and gas exploration or productions activities in the Irish marine environment.

54. **Figure 18-4** shows the locations of 'Current Authorisations' for oil and gas exploration, as leased and regulated by DECC. Authorisations typically cover a large area within which the authorised developer can operate, subject to the approval of leases to undertake the proposed operations, which may include activities such as site surveys or the installation of infrastructure. The nearest oil and gas exploration to the array site took place in the Kish Bank Basin to the north of the array site.

55. There is one oil and gas exploration area (SEL2/11) located within the study area. This is shown on **Figure 18-4** and described in **Table 18-8.** The licence for this exploration area expired in August 2020 (DECC, 2020), and therefore is no longer an 'authorised' active exploration licence. In February 2021, DECC confirmed it would no longer be accepting new applications for exploration licences for natural gas or oil.

Table 18-8 Offshore oil and gas exploration licence area in the study area

No.	Area Ref	Area Type	Area Size	Owner	Status
1	SEL2/11	Standard Exploration Licence	384.182 km^2	Providence Resources	Expired

56. The first license blocks for exploration of the Kish Bank Basin were acquired in 1966, however, the licence blocks were surrendered without being drilled and became available under the First Irish Licencing Round in 1975 and the blocks were assigned to a major oil company. A dry well was drilled in 1977 and another company acquired the majority share in the licence in 1979 and drilled a well in the same year, however, it again was dry and the licence was subsequently surrendered in 1980. A second round of licencing awards in 1982 resulted in another well being drilled in 1986, but again the well was dry and the licence was surrendered late in the same year.

57. In late 1997 / early 1998 a shallow water well was drilled in the Kish Bank. Again this well was unsuccessful in encountering hydrocarbons. The fact that all wells that have been drilled in the Kish Bank have been dry and a lack of sustained interest by licence holders indicates that the prospective opportunities for oil or gas in the area are poor (GSI, 1989a).

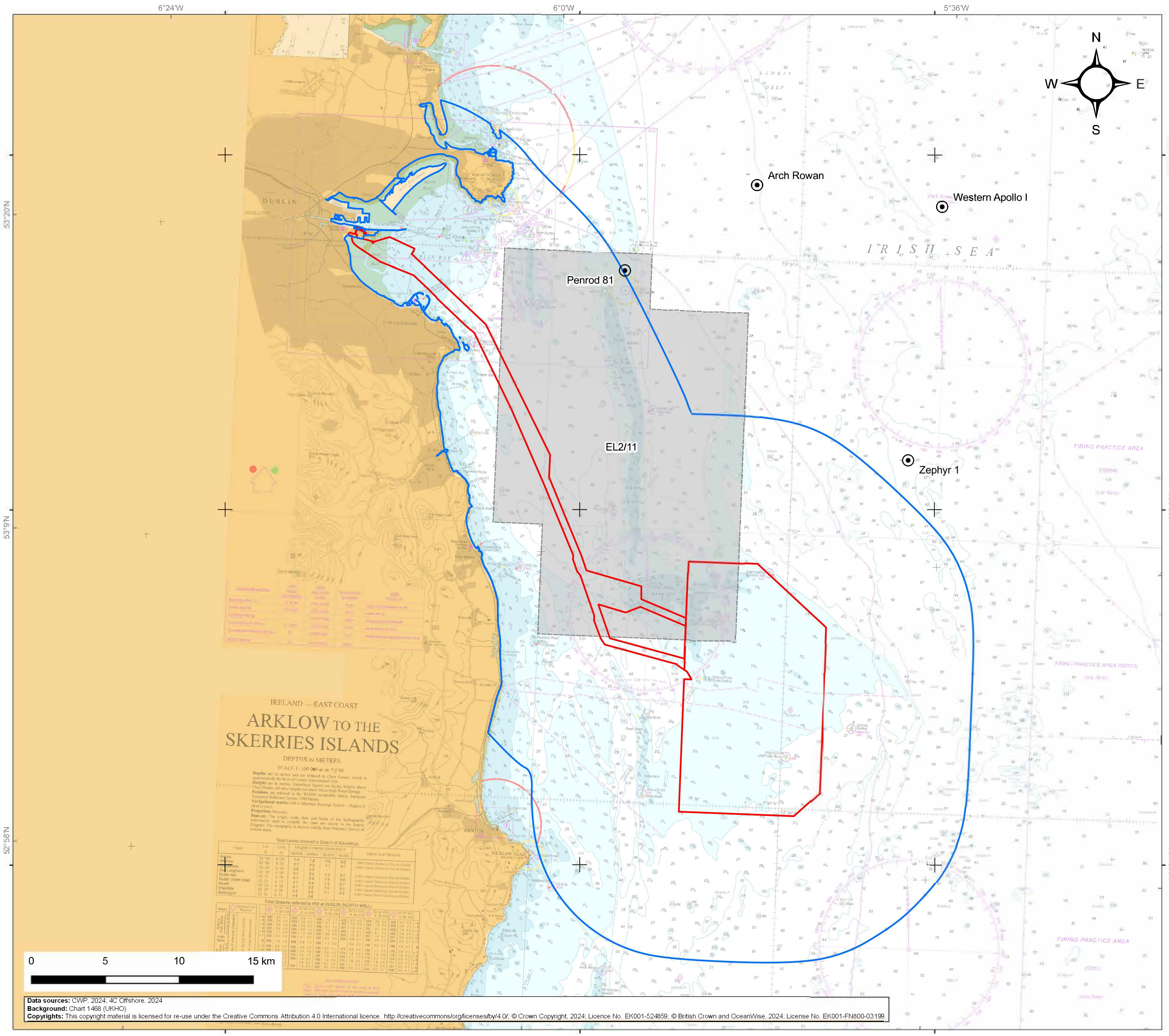
58. Currently two oil well heads, Penrod 81 (33/21-1) and Zephyr 1 (33/22-1), are located in close proximity to the CWP Project but fall outside the study area. Both wells are more than 10 km from the CWP Project. This is shown on **Figure 18-4** and described in **Table 18-9**.

59. Exploration for non-oil and gas hydrocarbons in 1977 discovered substantial coal deposits, estimated at 215 M recoverable tonnes in total. (GSI, 1989a). These resources have not been exploited. Other exploration wells are also located around Dublin and Wicklow, however none overlap the CWP Project.

Table 18-9 Offshore oil exploration wells outside the study area

No.	Well Ref	Well Name	Well Type	Location	Owner	Spud Date[1]	Status
1	33/21-1	Penrod 81	Oil Exploration	Kish Bank Basin	Shell	30 October 1979	Dry Hole (abandoned)[2]
2	33/22-1	Zephyr 1	Oil Exploration	Kish Bank Basin	Amoco	03 November 1977	Dry Hole (abandoned)[2]

[1] 'Spud Date' is the date the seafloor has been first penetrated for the purposes of drilling an oil and gas well.
[2] 'Dry Hole' is a well where no significant reserves of oil were found. The well is plugged and abandoned.



Data sources: CWP, 2024; 4C Offshore, 2024
Background: Chart 1468 (UKHO)
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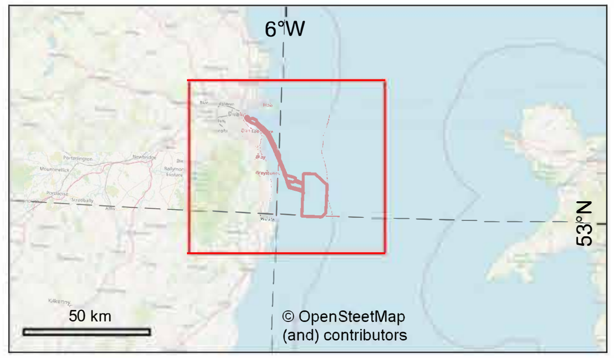


Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB

Oil and gas infrastructure licensed exploration areas

- Exploration well
- Authorised oil and gas exploration area

codling wind park	*Project:* Codling Wind Park	*Contractor:* www.naturalpower.com natural power

Figure 18.4
Oil and gas licensed exploration at the study area

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0906

Internal descriptive code:	*Size:* A3	*CRS:*
WE - PAB...STUDY.AREA. OFFSH.OIL.GAS. EXPLORATION - EIAR.FIG.18.04	*Scale:* 1:250,000	EPSG 25830

Rev.	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.6.3 Marine aggregates and disposal sites (including dredging)

60. There are no licensed sites for marine aggregates in Irish waters and all aggregates used commercially are from terrestrial sources (DHLGH, 2018; 2019).

61. Significant marine aggregate deposits have been identified in the Irish Sea[3], some of which overlap the OECC (**Figure 18-5**). Based upon the information currently available, these resources are not currently exploited, as shown in **Figure 18-5** and **Table 18-10**.

62. The most accessible sand / gravel deposits have been identified[3] as the offshore banks which extend from Dublin Bay South to the area of Carnsore Point off County Wexford including the Bennet Bank, the Burford Bank, the Kish Bank, the Frasier Bank, the Bray Bank, the South Ridge, the India Bank, the Arklow Bank, the Seven Fathom Bank, the Glasgorman Bank, the Blackwater Bank and the Long Bank. However, as they are products of coastal erosion they must be regarded as an integral part of the coastal system and probably act to some extent as a barrier to more rapid coastal erosion (GIS 1986b).

63. Nearshore sandbanks have been exploited for some years by local authorities for beach replenishment and as infill for harbour development. At the end of October 2000, some 250,000 m^3 of seabed gravels was dredged from the Codling Bank for the replenishment of the beach at Bray where erosion had occurred. The extraction was located within the array site and covered an area approximately 300 m by 850 m.

64. The issue of further exploration licences for gravel extraction at the Codling Bank would be at the discretion of the Minister for Agriculture, Food and the Marine. No live licenses for aggregate extraction in the Codling Bank exist currently, as shown in **Figure 18-5**.

Table 18-10 Aggregates areas in the study area

No.	Area Ref	Area Name	Area Type	Description	Status
Aggregates Study Areas (high potential – orange)					
1	F65__7	7	Sand deposits	Marine aggregate deposit in Irish Sea	Unexploited
2	F65__3	3	Gravel deposits	Marine aggregate deposit in Irish Sea	Unexploited
3	F65__2	2	Mixed sand and gravel deposits	Marine aggregate deposit in Irish Sea	Unexploited
4	F65__1	1	Sand deposits	Marine aggregate deposit in Irish Sea	Unexploited
5	F65__7	7	Sand deposits	Marine aggregate deposit in Irish Sea	Unexploited
Aggregates Resource Areas (potential – yellow)					
6	F66__6	IRL4	Sand & gravel	Irish Sea marine aggregate resource area boundary	Unexploited

[3] Ireland's Marine Atlas (2022) available from: https://atlas.marine.ie/#?c=53.9108:-15.8972:6 [Accessed, 10 November 2022].

No.	Area Ref	Area Name	Area Type	Description	Status
7	F66__11	IRL3	Sand	Irish Sea marine aggregate resource area boundary	Unexploited
8	F66__10	IRL2	Sand	Irish Sea marine aggregate resource area boundary	Unexploited
9	F66__4	IRL1	Sand	Irish Sea marine aggregate resource area boundary	Unexploited
10	F66__3	IRL5	Gravel	Irish Sea marine aggregate resource area boundary	Unexploited
11	F66__2	IRL6	Sand	Irish Sea marine aggregate resource area boundary	Unexploited

65. The Foreshore and Dumping at Sea (Amendment) Act 2009 (EPA, 2009) makes it the function of the EPA to issue Dumping at Sea Permits. A number of marine disposal sites have been identified within the study area, however no marine disposal sites occur within the offshore development area, as shown in **Figure 18-5** and outlined in **Table 18-11**.

66. Dredging activities for maintenance purposes of shipping channels are undertaken in some ports along the coast of Dublin and Wicklow, however no dredging sites or areas licenced for dredging occur within the offshore development area (**Figure 18-5**).

Table 18-11 Disposal sites in the study area

No.	Site Ref	Site Name	Owner	Dumping Material	Dumping Method	End Date
1	194_DS_NA	Dun Laoghaire Harbour	Department of the Marine, Engineering Division	Dredged Material	Release through the hull of the vessel	15-Oct-94
2	384_DS_NA	Burford Bank	Dublin City Council (Macken Street Bridge)	Dredged material	Release through the hull of the vessel while the vessel is in motion	31-Oct-09
3	328_DS_NA	Burford Bank	Dublin Corporation	Dredged material	Release through barge hold splitting while vessel is in motion	30-Jun-01
4	186_DS_NA	Dublin Bay (sewage)	Dublin Corporation (Poolbeg)	Sewage sludge	Release through six dump valves in the bottom of the ship over at least a 10 min period while vessel is in motion	31-Dec-94
5	153_DS_NA				Release from vessel through submerged fixed steel pipes	13-Sep-92

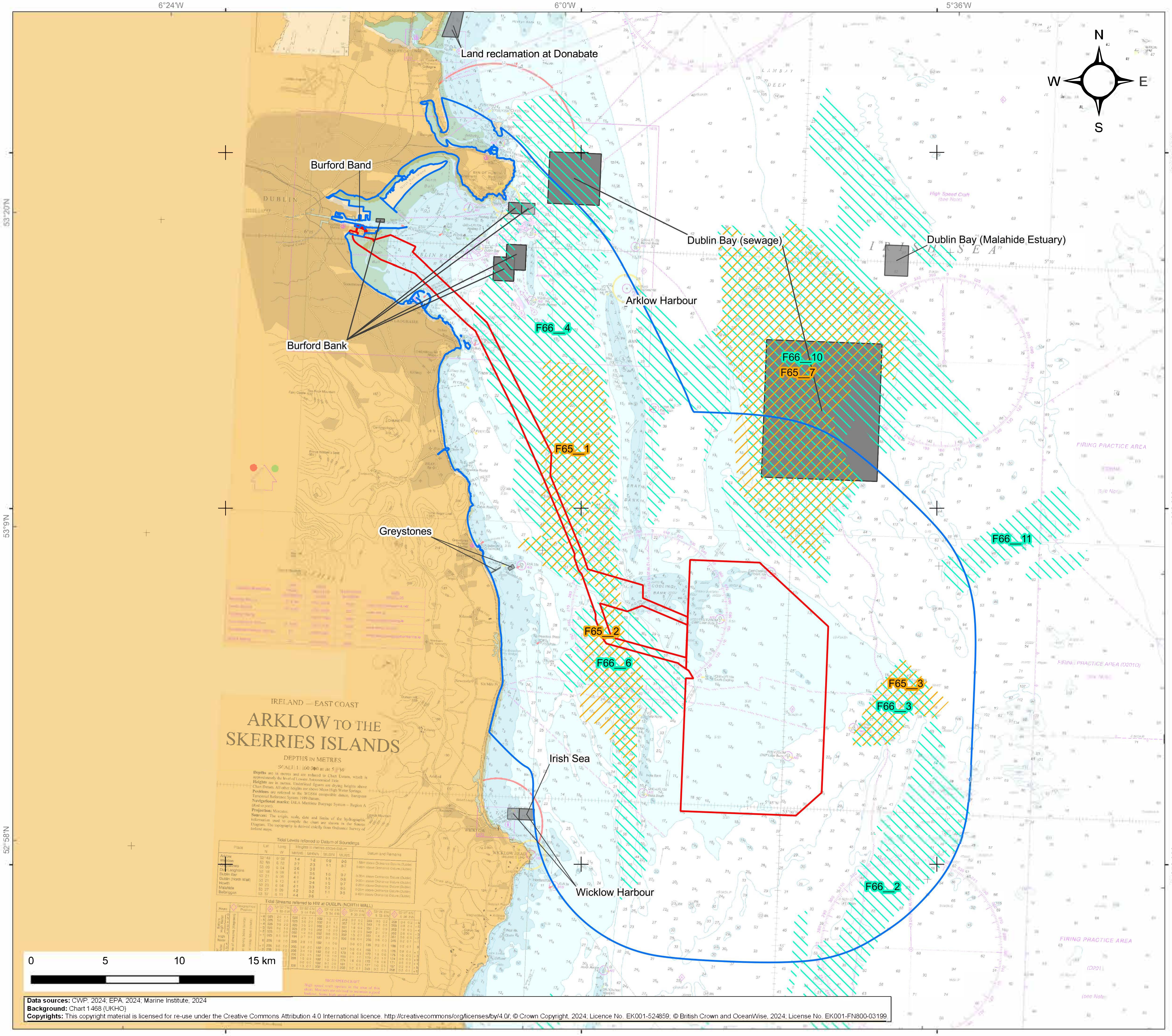
No.	Site Ref	Site Name	Owner	Dumping Material	Dumping Method	End Date
6	57_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-86
7	30_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-84
8	159_DS_NA				Release through six dump valves in the bottom of the boat over a 10 minute period	31-Dec-93
9	96_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-89
10	84_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-88
11	74_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-87
12	122_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	28-Feb-91
13	209_DS_NA				Release through six dump valves in the bottom of the ship over at least a 30 min period while vessel is in motion	01-Jan-96
14	140_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-92
15	110_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-90
16	123_DS_NA				Release through sea-cocks below the waterline when the vessel is underway	31-Dec-91

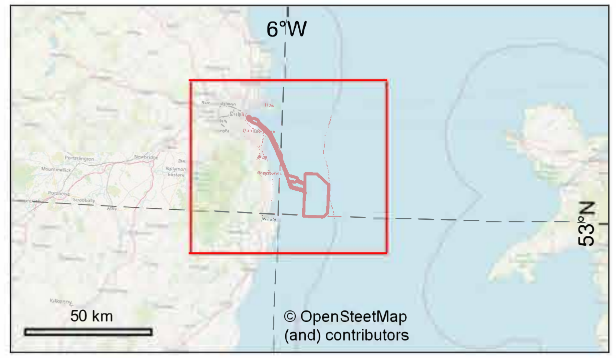
No.	Site Ref	Site Name	Owner	Dumping Material	Dumping Method	End Date
17	275_DS_NA	Dublin Bay (sewage)	Dublin Corporation (Ringsend)	Sewage sludge	Through six dump valves in the bottom of ship over at least a 30 min period while vessel is in motion	31-Dec-98
18	233_DS_NA				Dumping from the vessel through 6 dump valves over at least a 30 minute period while the vessel is in motion	31-Dec-96
19	255_DS_NA				Release through six dump valves in the bottom of the ship over at least a 30 min period while vessel is in motion	31-Dec-97
20	239_DS_NA	Burford Bank	Dublin Port Company	Dredged material	Grabbing from hopper while vessel is stationary – land reclamation at Dublin Port	31-Dec-96
21	258_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-97
22	238_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-96
23	187_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-94
24	167_DS_NA				Release through hull of the vessel	31-Oct-93
25	170_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-93
26	37_DS_NA				Release through the hull of the vessels	31-Oct-84
27	69_DS_NA				Release through the hull of the vessel	30-Sep-87
28	55_DS_NA				Release through the hull of the vessel	30-Sep-86
29	62_DS_NA				Release through the hull of the vessel	31-Aug-86
30	40_DS_NA				Release through the hull of the vessel	30-Sep-85

No.	Site Ref	Site Name	Owner	Dumping Material	Dumping Method	End Date
31	109_DS_NA				Release through the hull of the vessel	30-Jun-90
32	98_DS_NA				Release through the hull of the vessel	15-Sep-89
33	94_DS_NA				Release through the hull of the vessel	31-Dec-89
34	83_DS_NA				Release through the hull of the vessel	30-Sep-88
35	90_DS_NA				Release through the hull of the vessel	30-Sep-89
36	89_DS_NA				Release through the hull of the vessel	30-Sep-88
37	228_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-96
38	218_DS_NA				Release through the hull of the vessel	30-Sep-95
39	211_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-95
40	26_DS_NA				Release through bottom opening doors of the vessel	30-Sep-84
41	149_DS_NA				Release through the hull of the vessel	19-Jul-93
42	133_DS_NA				Release through the hull of the vessel	19-Jul-92
43	132_DS_NA				Release through the hull of the vessel	30-Sep-91
44	117_DS_NA				Release through the hull of the vessel	30-Apr-91
45	388_DS_NA				Contaminated material will be dumped during slack water by reverse suction of the trailer dredger	17-Dec-08
46	361_DS_NA				Release through the hull of the vessel(s)	31-Dec-04
47	297_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-99

No.	Site Ref	Site Name	Owner	Dumping Material	Dumping Method	End Date
48	296_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-99
49	298_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-99
50	277_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-98
51	326_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-05
52	332_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-02
53	316_DS_NA				Release through barge hold splitting while vessel is in motion	28-Feb-01
54	S0004-01_DS_NA				Release through the hull of the vessel	6 years from date of commencement of activities
55	264_DS_NA				Release through barge hold splitting while vessel is in motion	30-Sep-97
56	263_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-97
57	356_DS_NA				Release through the hull of the vessel	31-Dec-03
58	313_DS_NA	Burford Bank	Dun Laoghaire Harbour Company	Dredged material	Release through barge hold splitting while vessels are in motion	30-Apr-00
59	287_DS_NA				Release through barge hold splitting while vessel is in motion	31-Dec-98
60	349_DS_NA				Release through the hull of the vessel	30-Sep-02
61	S0010-01_DS_NA	Burford Bank	Howth Yacht Club	Dredged material	Release through the hull of the vessel while the vessel is in motion	1 year from date of commence

No.	Site Ref	Site Name	Owner	Dumping Material	Dumping Method	End Date
						ment of activities
62	397_DS_NA				Opening the lower doors of the grab hopper barge	31-May-09
63	88_DS_NA	Unknown	Office of Public Works (Dun Laoghaire)	Dredged Material	Release through the hull of the vessel	31-Dec-88
64	195_DS_NA	Greystones	Pierse Contracting Ltd.(Greystones)	Dredged Material	Release through the hull of the vessel	30-Sep-94
65	205_DS_NA				Release through the hull of the vessel	22-Dec-94
66	363_DS_NA	Burford Bank	Poolbeg Yacht and Boat Club	Dredged material	Release through the hull of the vessel(s)	10-Jun-04
67	99_DS_NA	Wicklow Harbour	Wicklow Harbour Commissioners	Dredged Material	Release through the hull of the vessel	30-Jun-89
68	73_DS_NA	Unknown	Wicklow Harbour Commissioners	Dredged Material	Release through the hull of the vessel	30-Jun-87





Data sources: CWP, 2024; EPA, 2024; Marine Institute, 2024
Background: Chart 1468 (UKHO)

Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB

Marine aggregates and disposal sites

- Aggregate resource area
- Aggregate study area
- Disposal at sea

Project: Codling Wind Park

Contractor: www.naturalpower.com

Figure 18.5
Marine aggregate deposits and maintenance dredging activities at the study area

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0907

Internal descriptive code:	*Size:*	A3	*CRS:*
WE - PAB_STUDY AREA_OFFSH AGGREGATES_DISPOSAL - EIAR FIG.18.05	*Scale:*	1:250,000	EPSG 25830

Rev.	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.6.4 Renewable energy (wind, wave and tidal)

67. There is currently only one operational offshore wind farm in Ireland, Arklow Bank Phase 1. It is located 18 km south of the CWP Project and is outside the study area (as shown in **Figure 18-7**).

68. Future offshore wind farm projects are considered in **Section 18.6.8**, however there is significant uncertainty with respect to any Phase 2 developments, with any future offshore wind farm projects expected to be subject to the Designated Maritime Area Plan process.

69. No wave and tidal development sites are located on the east coast of Ireland.

18.6.5 Power plants discharge channel

70. Opposite the proposed landfall location lies the proposed onshore substation site, on the south bank of the river Liffey. The river Liffey has been heavily industrialised at its mouth, with Dublin Port located on either side of the river Liffey alongside other facilities. Three power plants discharge to the river Liffey in the study area and close (within 1 km) to the onshore substation site, as follows:

- Dublin Waste to Energy Plant;
- ESB Dublin Bay Power Plant; and
- Ringsend Wastewater Treatment Plant.

71. The Dublin Waste to Energy Plant takes in water from the river Liffey estuary to act as coolant for the plant's processes. It discharges the temperature-elevated cooling waters further downstream from the intake location. The ESB Dublin Bay Power Plant and Dublin Waste to Energy have separate cooling water intakes but discharge into the same discharge channel (cooling channel). This discharge channel is adjacent to (west of) the onshore substation site. Ringsend WWTP discharges to the east (1 km downstream) of the Dublin Waste to Energy Plant and ESB Dublin Bay Power Plant discharge channel.

72. The river Liffey channel in Dublin Port is influenced by a number of freshwater river inflows and by thermal inputs from the three power station cooling water systems. Stratification of the water column occurs under certain tidal conditions in the river Liffey channel, particularly in the central section of the port. A description of the tidal and wave regime within the subtidal area of the river is presented in **Appendix 6.4 Codling Wind Park Hydraulic Modelling Support**.

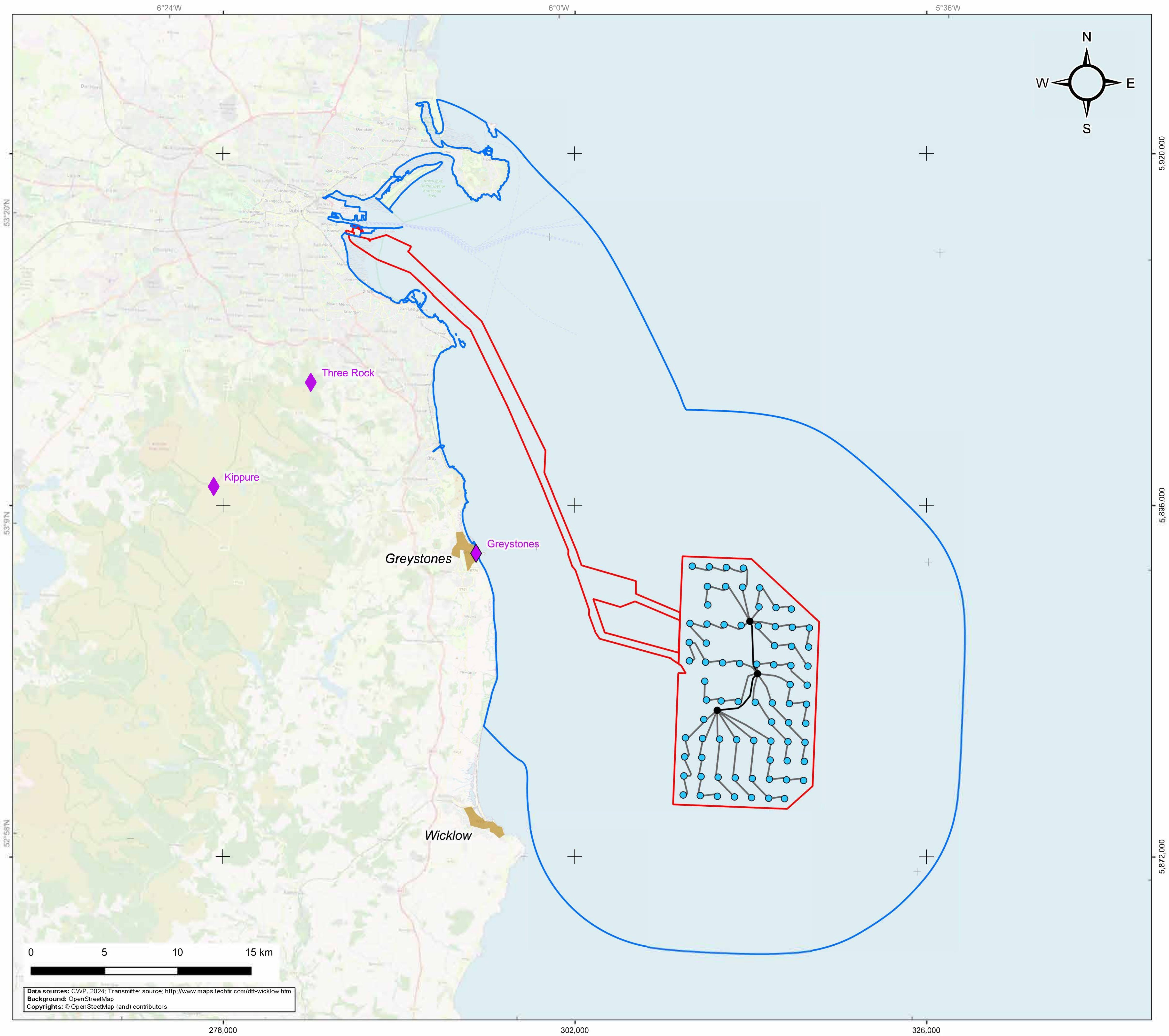
18.6.6 TV and radio reception

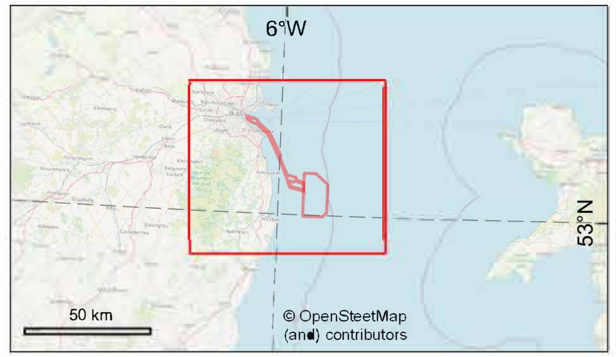
73. As outlined in **Section 18.4**, the study area for the TV and radio reception assessment has been defined as the closest transmitters serving the onshore residential areas relative to CWP Project. The relevant transmitters serving these areas are the Three Rock transmitter, Kippure transmitter and Greystones transmitter (**Figure 18-6**).

74. Digital terrestrial TV signals in the area are understood to be provided by the Kippure main transmitter and Greystones transmitter, both providing channels on two digital multiplexes. The Three Rock main transmitter also exists on a similar bearing and distance from CWP Project as the Kippure main transmitter, however the coverage checker indicates that Kippure and Greystones serves the area closest to the CWP area and therefore have been considered.

75. The Kippure and Greystones are transmitters serving the area around the CWP Project. TV services broadcast from both transmitters are digital and the most likely serving transmitters to the areas closest to the CWP Project.

76. The surrounding area is urban, with numerous areas of residential dwellings expected to predominantly use horizontally polarised ultra-high frequency aerials directed towards these transmitters.





Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB
- Option A WTG
- Offshore substation structure
- Inter-array cable
- Interconnector cable
- Closest towns to the array site

TV and radio reception

- TV and radio transmitter

codling wind park	*Project:* Codling Wind Park
Contractor: www.naturalpower.com	natural power

Figure 18.6
TV and radio transmitters near the array site

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0908

Internal descriptive code:	*Size:* A3	*CRS:*
WE - PAB, PAB BUFF 10km,G WTG LO75 L216, IACs, OSSs, INTCs - TV RADIO TRANSMITTERS - EIAR FIG 18.06	*Scale:* 1:250,000	EPSG 25830

Rev.	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.6.7 Climate change and natural trends

77. Climate change predictions by the EPA Climate Change Research Programme (EPA, 2021) indicate that winters in Ireland will generally become wetter, summers will become drier, and that peak rainfall intensities could increase, with a consequent effect on the frequency and magnitude of high river flows. Mean sea level is likely to rise during the 21st century as a consequence of either vertical land (isostatic) movements or changes in eustatic sea level. A rise in sea level may allow larger waves, and therefore more wave energy, to reach the coast in certain conditions and consequently result in an increase in local rates or patterns of erosion and the equilibrium position of coastal features. It is, however, unlikely that significant changes in marine infrastructure in the study area will occur as a result. In addition, there is a high degree of uncertainty of how winter storm tracks over the North Atlantic Ocean may be altered due to climate change. Natural variability in wind speeds and hence wave height is large and dominant and is projected to remain so for the century to come (Gallagher et al., 2016).

78. Climate change has been considered but it is concluded that, on the basis of the nature of marine infrastructure not being sensitive to the impacts associated with climate change and natural trends, there will be no implications for marine infrastructure related to climate and natural trends. This is because the projections for climate change and the hazards associated with changes to the climate are unlikely to affect material assets: marine infrastructure, and there is no potential for a significant effect.

18.6.8 Predicted future baseline

79. The Applicant is aware that Dun Laoghaire-Rathdown Harbour have future aspirational growth plans which will potentially see up to two approach channels dredged. At this stage there is no information within the public domain, however Dun Laoghaire-Rathdown Harbour (DLRH) have provided sufficient detail to enable CWP Project to identify and plan areas of deeper burial which will ensure no impediment to DLH future growth aspirations. Whilst there is insufficient information to undertake a detailed cumulative effect assessment, the anticipated development timescales for DLRH are such that it is not predicted that there will be a cumulative effect, as CWP Project is anticipated to be constructed in advance of DLRH and there is no temporal overlap for cumulative effects to occur.

80. The future development of other proposed OWFs has the potential to coincide with CWP Project and to affect the future baseline with respect to other marine infrastructure.

81. Firstly, there are a number of Phase 1 Projects on the east coast of Ireland including Oriel Wind Park, Arklow Bank II, Dublin Array and North Irish Sea Array. The closest planned OWFs are Dublin Array (3 km north) and Arklow Bank II (6 km south); they currently have a potentially overlapping construction and operation timeline with CWP Project. These sites are presented in **Figure 18-7**

82. In March 2023 DECC confirmed that all development beyond Phase 1 will be plan-led whereby the State will designate ORE development areas via the Designated Maritime Area Plan (DMAP) process (DECC, 2023). The next phase of OWF development, Phase 2, aims to procure the remainder of Ireland's 5GW capacity target through further competitive ORESS auctions.

83. The first of these Phase 2 projects will be located off the south east coast, procured via an auction referred to as ORESS 2.1/ Tonn Nua. In the event of attrition, a second Phase 2 auction may be required to achieve Ireland's 5GW target. However, this is highly dependent on the outcomes of Phase 1 (both ORESS and non-ORESS projects) and the ORESS 2.1 project.

84. Following Phase 2 auctions, the next phase of ORE deployment is the Future Framework. At a minimum Ireland has committed, at the North Sea Energy Ministerial in November 2023, to procure over 11.5GW additional capacity, via the future framework (DECC, 2024). This will comprise 2 GW

non-grid-limited connected capacity (previously known as Phase 3) and at least 9.5GW of capacity to be procured via the successor to ORESS, all of which will be through a competitive process by 2030 with construction by 2040. Based on the roadmap to 2040 provided in the North Sea Energy Cooperation (NSEC) this will likely comprise two projects for the non-grid aspect and a further five projects,[4] however the location and timing of these is highly uncertain.

85. For the purposes of this assessment, Phase 2 and Future Framework projects in the public domain have been mapped and the projects located in the study area are presented in **Figure 18-7** and outlined in **Table 18-12.**

Table 18-12 Proposed renewable energy sites in the study area

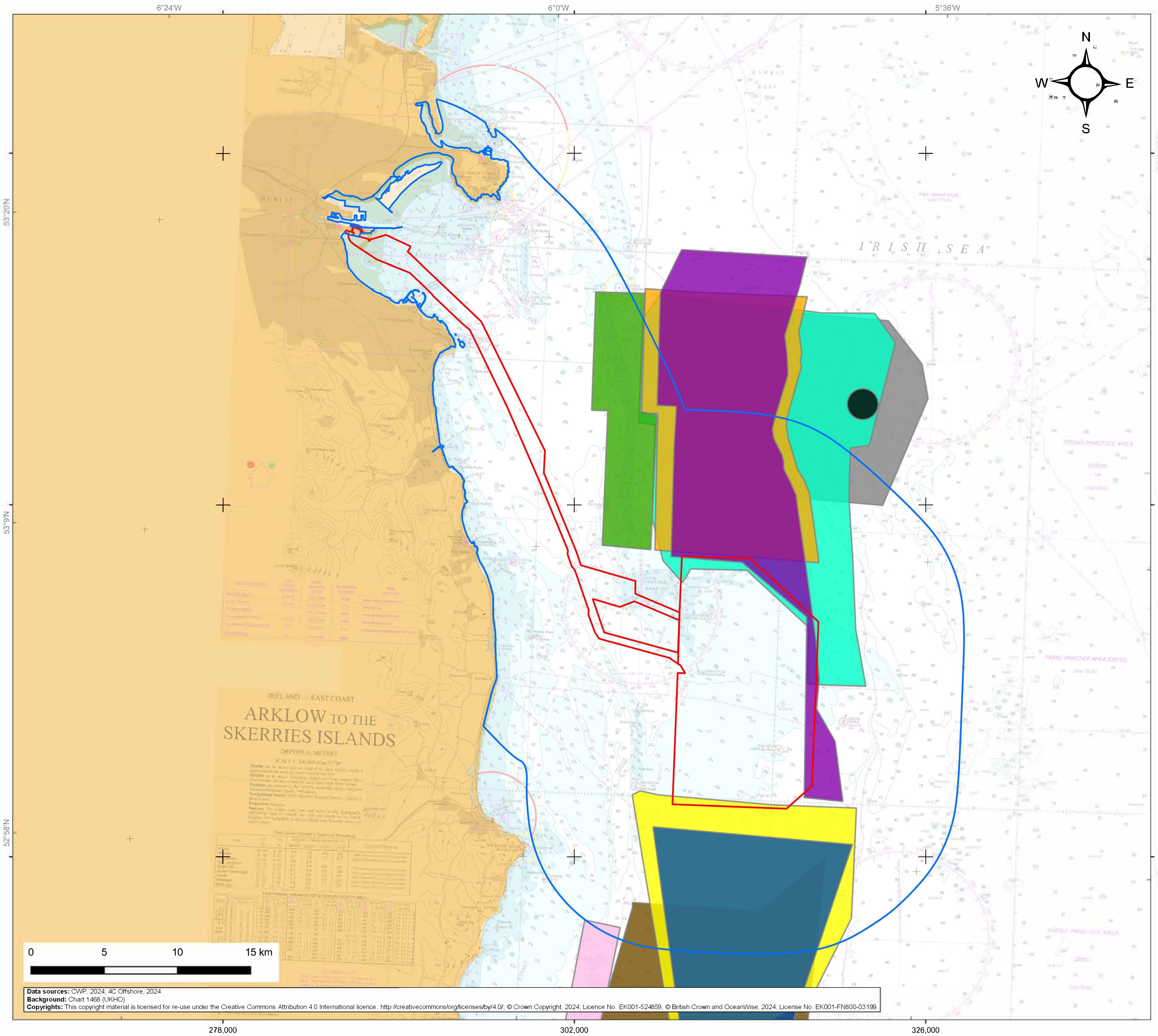
No.	Site Ref	Site Name	Site Type	Capacity (MW)	No. Turbine	Owner	Status
Phase 1 OWF Projects							
1	IE04	Dublin Array	Fixed	850	50	Saorgus Energy Ltd, RWE Renewables	Concept / Early Planning
2	IE07	Arklow Bank Phase 2	Fixed	800	62	SSE Renewables (formerly Airtricity)	Concept / Early Planning
Phase 2 / Future Framework OWF Projects							
3	IE53	Sunrise Wind	Fixed	1,330	Unknown	Ivernia Energy	Concept / Early Planning
4	IE44	Wicklow	Fixed	500	35	InisOffshore Wind	Concept / Early Planning
5	IE47	Sea Stacks	Fixed	800	Unknown	ESB	Concept / Early Planning
6	IE54	Banba Wind	Fixed	1,000	Unknown	Ivernia Energy	Concept / Early Planning
7	IE38	Greystones	Fixed	1,200	Unknown	Cobra Instalaciones y Servicios, S.A. and Flotation Energy plc	Concept / Early Planning
8	IE40	Latitude 52	Fixed	1,000	84	DP Energy Ireland Ltd	Concept / Early Planning
9	IE33	Realt na Mara	Fixed	1,600	Unknown	Ocean Winds, Bord na Mona	Concept / Early planning
10	IE45	Leinster Offshore Wind	Fixed	500	Unknown	InisOffshore Wind	Concept / Early Planning

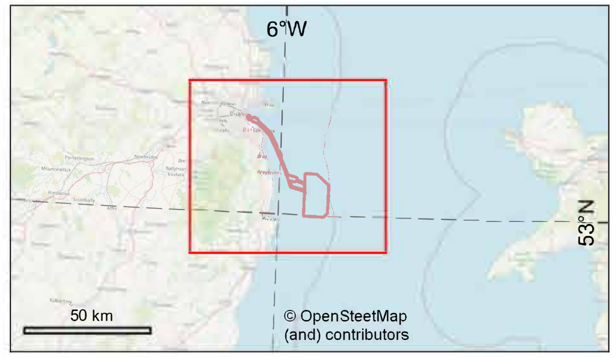
[4] This is based on information contained in the North Seas Energy Cooperation NSEC tender planning – November 2023 document, available at: https://energy.ec.europa.eu/system/files/2023-11/231117%20NSEC%20tender%20planning%20-%20November%202023_0.pdf

86. At the time of writing, the availability of data or information regarding the offshore wind farm sites which may be taken forward through the planning and consenting stage into operational sites is currently commercially sensitive and therefore unavailable.

87. It will, however, be the duty of future projects and plans to consider CWP Project as a material consideration for their applications.

88. The assessment should be read in conjunction with **Appendix 18.1 Cumulative Effects Assessment**, which considers other plans, projects and activities that may act cumulatively with the CWP Project and provides an assessment of the potential cumulative impacts on material assets: marine infrastructure.





Legend

- Planning Application Boundary (PAB)
- 10 km seawards buffer from PAB

Renewable energy/proposed offshore wind farms

Phase One

- Arklow Bank Phase 2
- Dublin Array

Phase Two

- Banba Wind
- Greystones
- Latitude 52
- Leinster Offshore Wind
- Realt na Mara
- Sea Stacks
- Sunrise Wind
- Wicklow

Project: Codling Wind Park

Contractor: www.naturalpower.com

Figure 18.7
Renewable energy developments at the study area

CWP doc. number: CWP-NPC-ENG-08-01-MAP-0909

Internal descriptive code:	*Size:* A3	*CRS:*
WE - ALL.RLB..STUDY.AREA..NEARBY.CONCEPT OWFs - EIAR.FIG.18.07	*Scale:* 1:250,000	EPSG 25830

Rev.	*Updates*	*Date*	*By*	*Chk'd*	*App'd*
00	Final for issue	2024/06/10	AC	CG/EA	SM

18.6.9 Summary of baseline conditions

89. The review of datasets identified several offshore material assets in the vicinity of the CWP Project offshore infrastructure, within the study area. Namely, the review identified:

- **Subsea utilities (cables and pipelines)** – a number of subsea utilities (cables and pipelines) have been identified in the study area, including pipelines for gas and sewer systems and four operational telephone / power cables located within the OECC and two out of service cables that are potentially located within the array site;
- **Oil and gas licensed exploration areas** – one authorised area for oil and gas exploration are located within the study area;
- **Marine aggregates and disposal sites (including dredging)** – significant marine aggregate deposits have been identified in the Irish Sea, some of which overlap the OECC. A number of marine disposal sites have been identified within the study area, however no marine disposal sites occur within the Offshore development area;
- **Renewable energy (wind, wave and tidal)** – no existing renewable energy infrastructure is located within the study area. Arklow Bank Phase 1 (operational OWF) is located 18 km south of the CWP Project. The development of proposed OWFs have been discussed under predicted further baseline conditions and considered in **Appendix 18.1 Material Assets - Marine Infrastructure CEA**;
- **Power plants discharge channel** – two power plants discharge to the river Liffey within the onshore substation site; and
- **TV and radio reception** – two transmitters are serving the urban areas closest to the array site.

18.7 Scope of the assessment

90. An EIA Scoping Report for the Offshore infrastructure was published on the 6 January 2021. The Scoping Report was uploaded to the CWP Project website and shared with regulators, prescribed bodies and other relevant consultees, inviting them to provide relevant information and to comment on the proposed approach being adopted by the Applicant in relation to the offshore elements of the EIA.

91. Based on responses to the Scoping Report, further consultation and refinement of the CWP Project design, potential impacts to material assets: marine infrastructure scoped into the assessment are listed below in **Table 18-13,** and as follows:

- **Subsea utilities (cables and pipelines)** – the potential for impacts to subsea utilities are assessed further in **Section 18.10**. Effects on navigation and / or vessel activities associated with the maintenance operations for subsea utilities are addressed within **Chapter 16 Shipping and Navigation**;
- **Oil and gas licensed exploration areas** – the potential for impacts to authorised oil and gas exploration areas are assessed further in **Section 18.10**;
- **Marine aggregates and disposal sites (including dredging)** – the potential for impacts to arise on aggregates, and disposal sites, are assessed further in **Section 18.10**;
- **Renewable energy (wind, wave and tidal)** – the potential for impacts to existing OWF infrastructure are assessed further in **Section 18.10**. Effects on vessel activities in relation to existing OWF are addressed within **Chapter 16 Shipping and Navigation**;
- **Power plants discharge channel** – the potential for impacts to arise on the power plants discharge channel in the river Liffey is assessed further in **Section 18.10**; and
- **TV and radio reception** – two transmitters are serving the urban areas closest to the array site. The potential for impacts to TV and radio reception are limited to the operational phase of the proposed project and are assessed further in **Section 18.10.**

Table 18-13 Potential impacts scoped into the assessment

Impact No.	Description of impact	Notes
Construction		
Impact 1	**Direct effects on marine infrastructure** – i.e., damage to existing infrastructure (e.g., existing cables at cable crossings and discharge channel intersected by the CWP Project during construction).	Impacts on existing infrastructure from the construction of CWP Project are assessed throughout this chapter in **Sections 18.10–18.15**.
Impact 2	**Indirect effects on marine infrastructure** – i.e., disturbance of assets (e.g., increased suspended sediment concentrations (SSC) and associated deposition resulting in the reduction or restriction of oil and gas exploration activities and discharge channel by the CWP Project during construction).	Impacts on existing assets from the construction of CWP Project are assessed throughout this chapter in **Sections 18.10–18.15**.
Operation and Maintenance (O&M)		
Impact 1	**Direct effects on marine infrastructure** – i.e., damage to existing infrastructure (e.g., existing and planned cables at cable crossings and discharge channel intersected by the CWP Project during O&M).	Impacts on existing infrastructure from the O&M of CWP Project are assessed throughout this chapter in **Sections 18.10–18.15**.
Impact 2	**Indirect effects on marine infrastructure** – i.e., disturbance of assets (e.g., sediment transportation and deposition during cable recovery and reburial).	Impacts on existing and planned assets from the O&M of CWP Project are assessed throughout this chapter in **Sections 18.10–18.15**.
Impact 3	**Interference of TV and radio reception** – wind turbine generator (WTG) could interfere with existing telecommunication links.	Impacts on TV and radio reception occurring when the turbine blades are rotating are assessed throughout this chapter in **Sections 18.10–18.15**.
Decommissioning		
Impact 1	**Direct effects on marine infrastructure** – i.e., damage to existing and planned infrastructure (e.g., discharge channel and cables at cable crossings intersected by the CWP Project during decommissioning).	Impacts on existing and planned infrastructure from the decommissioning of CWP Project are assessed throughout this chapter in **Sections 18.10–18.15**.
Impact 2	**Indirect effects on marine infrastructure** – i.e., disturbance of assets (e.g., increased SSC and associated deposition affecting aggregate extraction areas by the CWP Project during decommission).	Impacts on existing and planned assets from the decommissioning of CWP Project are assessed throughout this chapter in **Sections 18.10–18.15**.

92. Based on responses to the Scoping Report, further consultation and refinement of the CWP Project design, potential impacts to material assets: marine infrastructure scoped out of the assessment are listed below in **Table 18-14**.

Table 18-14 Potential impacts scoped out of the assessment

Description of impact	Justification for scoping out
Impacts on wave and tidal	No existing sites overlap with the study area.

18.8 Assessment parameters

18.8.1 Background

93. Complex, large-scale infrastructure projects with a terrestrial and marine interface, such as the CWP Project, are consented and constructed over extended timeframes. The ability to adapt to changing supply chain, policy or environmental conditions and to make use of the best available information to feed into project design promotes environmentally sound and sustainable development. This ultimately reduces project development costs and therefore electricity costs for consumers and reduces CO_2 emissions.

94. In this regard, the approach to the design development of the CWP Project has sought to introduce flexibility where required, among other things, to enable the best available technology to be constructed and to respond to dynamic maritime conditions, whilst at the same time to specify project boundaries, project components and project parameters wherever possible, having regard to known environmental constraints.

95. **Chapter 4 Project Description** describes the design approach that has been taken for each component of the CWP Project. Wherever possible, the location and detailed parameters of the CWP Project components are identified and described in full within the EIAR. However, for the reasons outlined above, certain design decisions and installation methods will be confirmed post-consent, requiring a degree of flexibility in the planning consent.

96. Where necessary, flexibility is sought in terms of:

- Up to two options for certain permanent infrastructure details and layouts, such as the WTG layouts.
- Dimensional flexibility, described as a limited parameter range i.e., upper and lower values for a given detail such as cable length.
- Locational flexibility of permanent infrastructure, described as Limit of Deviation (LoD) from a specific point or alignment.

97. The CWP Project had to procure an opinion from An Bord Pleanála to confirm that it was appropriate that this application be made and determined before certain details of the development were confirmed. An Bord Pleanála issued that opinion on 25 March 2024 (as amended in May 2024) and it confirms that the CWP Project could make an application for permission before the details of the permanent and temporary infrastructure identified in Section 4.3 of **Chapter 4 Project Description** is confirmed.

98. In addition, the application for permission relies on the standard flexibility for the final choice of installation methods and O&M activities.

99. Notwithstanding the flexibility in design and methods, the EIAR identifies, describes and assesses all of the likely significant impacts of the CWP Project on the environment.

18.8.2 Options and dimensional flexibility

100. Where the application for permission seeks options or dimensional flexibility for infrastructure or installation methods, the impacts on the environment are assessed using a representative scenario approach. A 'representative scenario' is a combination of options and dimensional flexibility that has been selected by the author of this EIAR chapter to represent all of the likely significant effects of the project on the environment. Sometimes, the author will have to consider several representative scenarios to ensure all impacts are identified, described and assessed.

101. For material assets: marine infrastructure this analysis is presented in **Appendix 18.2**, which identifies one or more representative scenarios for each impact, with supporting text to demonstrate that no other scenarios would give rise to new or materially different effects, taking into consideration the potential impact of other scenarios on the magnitude of the impact or the sensitivity of the receptor(s) that are being considered.

102. **Table 18-5** below presents a summarised version of **Appendix 18.2** and describes the representative scenarios on which the construction and O&M phase material assets: marine infrastructure assessment has been based. Where options exist, for each receptor and potential impact, the table identifies the representative scenario and provides a justification for this.

18.8.3 Limit of deviation

103. Where the application for permission seeks locational flexibility for infrastructure, the impacts on the environment are assessed using a LoD. The LoD is the furthest distance that a specified element of the CWP Project can be constructed.

104. This chapter assesses the specific preferred location for permanent infrastructure. However, **Appendix 18.2** provides further analysis to determine if the proposed LoD for permanent infrastructure may give rise to any new or materially different effects, taking into consideration the potential impact of the proposed LoD on the magnitude of the impact.

105. For material assets: marine infrastructure, this analysis is summarised in **Table 18-16**.

106. Where the potential for LoD to cause a new or materially different effect is identified, then this is noted in **Table 18-16** and is considered in more detail within **Section 18.10** of this chapter.

Table 18-15 Representative scenario summary

Impact	Representative scenario details	Value	Notes / Assumptions
Construction			
Impact 1: Direct effects on marine infrastructure	Installation methods and effects (array site and offshore export cable corridor) (Layout Option A)		The construction of the CWP Project has the potential to result in direct effects (damage to existing infrastructure, as a result of cable snagging during seabed preparation or installation works). Temporary disturbance relates to seabed preparation for foundations and cables, geotechnical survey, jack-up and anchoring operations, and cable installation. It should be noted that where boulder clearance overlaps with sandwave clearance, the boulder clearance footprint will be within the sandwave clearance footprint. Offshore, WTG Option A forms the representative scenario, as this represents the greatest level of temporary disturbance and therefore Option A forms the presentational basis of the assessment for Impact 1 in this chapter. Option B would result in a lower level of disturbance and would not introduce new impacts, or an impact of a materially different magnitude. There is only one installation method being proposed at landfall, open cut trenching. Therefore, the open cut method to install the cable ducts forms the presentational basis of this assessment.
	Boulder clearance: array site seabed clearance area (m^2)	2,556,000–2,934,000	
	Sandwave clearance: array site seabed clearance area (m^2)	205,250–259,250	
	IAC and interconnector cable installation: Total seabed disturbed (m^2)	1,911,000–2,214,000	
	Boulder clearance: OECC seabed clearance area (m^2)	2,220,000–2,616,000	
	Sandwave clearance: OECC seabed clearance area (m^2)	198,550	
	Offshore export cable installation: Total seabed disturbed (m^2)	1,890,000–2,187,000	
	JUV operations total impact area (m^2)	240,000	
	WTGs and OSS anchoring operations total impact area (m^2)	280,800	
	IAC and interconnector cable anchoring operations total impact area (m^2)	371,520	

Impact	Representative scenario details	Value	Notes / Assumptions
	Offshore export cable anchoring operations total impact area (m^2)	630,720	The total area of disturbed sediment for construction activities based on this representative scenario is calculated to be **12,088,840 m^2.** The total area of disturbed sediment for construction activities in the Liffey based on this representative scenario is calculated to be **1,800 m^2 .**
	Installation methods and effects (landfall)		
	Total seabed disturbed by cofferdam (m^2)	6,100	
	Total seabed disturbed by intertidal cable duct installation (m^2)	36,000	
	Total area of seabed in transition zone affected by support structures (m^2)	6,900	
	Total area of seabed in transition zone affected by installation of cables using either open cut trenching or a shallow water trenching tool (m^2)	108,000	
	Installation methods and effects (onshore substation)		
	Area of reclaimed land from Liffey (m^2)	1,800	

Impact	Representative scenario details	Value	Notes / Assumptions
Impact 2: Indirect effects on marine infrastructure	Representative scenario parameters are the same as those above for Impact 1 above. Sediment plume modelling suggests that the greatest direction and distance of dispersion of disturbed material would be 9–10 km to the east, although one scenario showed dispersion to the southeast reaching 6–7 km and to the west reaching 3–4 km.	As above	The construction of the CWP Project has the potential to result in indirect effects on marine infrastructure, through the increase in SSC resulting in associated deposition. Temporary disturbance relates to seabed preparation for foundations and cables, jack-up and anchoring operations and cable installation. Increases in SSC and remobilisation of contaminated sediments occur as a result of temporary disturbance to the seabed. It should be noted that where boulder clearance overlaps with sandwave clearance, the boulder clearance footprint will be within the sandwave clearance footprint. Offshore, WTG Option A forms the representative scenario, as this represents the greatest level of temporary disturbance (increased levels of SSC), and therefore Option A forms the presentational basis of the assessment for Impact 2 in this chapter. Option B would result in a lower level of disturbance and would not introduce new impacts, or an impact of a materially different magnitude.
Operations and maintenance			
Impact 1: Direct effects on marine infrastructure	Permanent infrastructure		The operational phase of the CWP Project has the potential to result in direct effects (damage to existing infrastructure, as a result of cable snagging during repair works) and indirect effects (through the increase in SSC as cable maintenance is
	Total WTG monopile seabed area take (with scour protection) across the array site (m^2)	273,000	

Impact	Representative scenario details	Value	Notes / Assumptions
	Total OSS monopile seabed area take (with scour protection) across the array site (m^2)	10,920	likely to require cable recovery to the surface, repair and reburial) on marine infrastructure. The operational activities relating to Impact 1 and Impact 2 are the same and both impacts have been assessed together, as both direct and indirect effects results in temporary disturbance to the seabed. Option A forms the representative scenario, as this represents the greatest level of temporary disturbance, and therefore Option A forms the presentational basis of the assessment for Impact 1 and Impact 2 in this chapter. Option B would result in a lower level of disturbance and would not introduce new impacts, or an impact of materially different magnitude. **Total length of cables with the potential to emit EMF and/or temperature changes 253.4 km – 293.6 km.**
	Interconnector and inter-array cabling – total area of seabed covered by cable protection (m^2)	208,600	
	Offshore export cables – total area of seabed covered by cable protection (m^2)	105,000	
	Interconnector and IAC length (km)	127.4–147.6	
	Interconnector and IAC trench depth (m)	1.5	
	Interconnector and IAC voltage (kV)	66	
	Offshore export cables length (km)	126.0–146.0	
	Offshore export cables trench depth (m)	2.0 (except cable buried within the zone of greater burial depth adjacent to DL Harbour which will have a trench depth of 3 m)	
	Offshore export cables voltage (kV)	220	
	Onshore substation: length of combi-wall below the HWM (requiring marine piling) (m)	150	

Impact	Representative scenario details	Value	Notes / Assumptions
	Onshore substation: Total length of new revetments (m)	150	
	Total length of perimeter structures (m)	**300**	
	Area of reclaimed land at onshore substation (m^2)	1,800	
Impact 2: Indirect effects on marine infrastructure	Unscheduled maintenance activities of WTGs will be required should a component fail or break. If a component requires replacing, this may be done from a JUV and would result in some temporary disturbance (increases in SSC and remobilisation of contaminated sediments), however this is likely to be at one location at a time and therefore the potential impact is much less than that of JUV operations during construction. Anticipated JUV requirements during operation and maintenance are for two JUVs making three round trips annually, equating to 150 round trips over an anticipated CWP Project lifetime of 25 years. Unscheduled maintenance activities of IACs, interconnector cables and offshore export cables include cable repair. Should it be required, this may involve a faulty section of cable being removed from the seabed, repaired, relayed and reburied. Therefore, resulting in an increase in temporary disturbance. As repair is likely to only ever be required for a section of cable at a time the impacts will be less than the construction phase cable lay and burial. As temporary disturbance during O&M activities will arise due to unscheduled maintenance activities the values of these activities are unknown. However, reliability and ease of maintenance have been carefully considered in the CWP Project design to minimise maintenance requirements and although maintenance activities will be carried out over a longer period of time than construction activities, the amount of area disturbed during repair activities is likely to be less than those of the installation of the infrastructure, as maintenance activities will be conducted at specific locations (i.e., cable repair) while construction activities cover the whole CWP Project. Given this it is anticipated that for the purposes of a representative scenario, the impacts will be no greater than those identified for the construction phase.		
Impact 3: Interference of TV and radio reception	Permanent infrastructure	WTG Option A	The WTGs could interfere with signals to and from existing TV and radio transmitters and receivers during the operational phase. Option A forms the representative scenario, as this represents the greatest number of turbines with the potential to interfere with signals to and from existing TV / radio
	Number of WTGs	75	
	WTG rotor diameter (m)	250	

Impact	Representative scenario details	Value	Notes / Assumptions
	Hub height above LAT (m)	163	transmitters and receiver, and therefore Option A forms the presentational basis of the assessment for Impact 3 in this chapter. Option B would result in a lower level of interference and would not introduce new impacts, or an impact of materially different magnitude.
	Tip Height above LAT (m)	288	
	Blade tip clearance above LAT (m)	37.72	
	WTG tower diameter (m)	8	
	Rotor swept area per turbine (m^2)	49,087	
	Total rotor swept area of project (m^2)	3,681,554	
Decommissioning			
Impact 1: Direct effects on marine infrastructure **Impact 2**: Indirect effects on marine infrastructure	It is recognised that legislation and industry best practice change over time. However, for the purposes of the EIA, at the end of the operational lifetime of the CWP Project, it is assumed that all offshore infrastructure will be removed where practical to do so. In this regard, for the purposes of a representative scenario for decommissioning impacts, the following assumptions have been made: • The WTGs and OSS topsides will be completely removed. • Following WTG and OSS topside decommissioning and removal, the monopile foundations will be cut below the seabed level, to a depth that will ensure the remaining foundation is unlikely to become exposed. This is likely to be approximately one metre below seabed, although the exact depth will depend upon the seabed conditions and site characteristics at the time of decommissioning. • All cables and associated cable protection in the offshore environment will be wholly removed. It is likely that equipment similar to that which is used to install the cables may be used to reverse the burial process and expose them. Therefore, the		

Impact	Representative scenario details	Value	Notes / Assumptions
	area of seabed impacted during the removal of the cables is anticipated to be the same as the area impacted during the installation of the cables. • Generally, decommissioning is anticipated to be a reverse of the construction and installation process for the CWP Project, and the assumptions around the number of vessels on site and vessel round trips is therefore the same as described for the construction phase of the offshore components. • Given the above it is anticipated that for the purposes of a representative scenario, the impacts will be no greater than those identified for the construction phase.		

Table 18-16 LoD assessment summary

Project component	Limit of deviation	Conclusion from Appendix 18.2
WTGs / OSSs	100 m from the centre point of each WTG and OSS location is proposed to allow for small adjustments to be made to the structure locations.	No potential for new or materially different effects.
IACs / interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable is proposed to allow for small adjustments to be made to the cable alignments.	No potential for new or materially different effects.
Offshore export cables	250 m either side of the preferred alignment within the array site. The offshore export cable corridor (OECC) outside of the array site.	No potential for new or materially different effects.
TJBs	0.5 m either side (i.e., east / west) of the preferred TJB location	No potential for new or materially different effects.
Landfall cable ducts (and associated offshore export cables within the ducts)	Defined LoD boundary	No potential for new or materially different effects.
Intertidal cable ducts (and associated offshore export cables within the ducts)	The OECC	No potential for new or materially different effects.
Intertidal offshore export cables (non ducted sections)	The OECC	No potential for new or materially different effects.
Location of onshore substation revetment perimeter structure	Defined LoD	No potential for new or materially different effects.

18.9 Primary mitigation measures

107. Throughout the evolution of the CWP Project, measures have been adopted as part of the evolution of the project design and approach to construction, to avoid or otherwise reduce adverse impacts on the environment. These mitigation measures are referred to as ‘primary mitigation’. They are an inherent part of the CWP Project and are effectively ‘built in’ to the impact assessment.

108. Primary mitigation measures relevant to the assessment of material assets: marine infrastructure are set out in **Table 18-17**. Where additional mitigation measures are proposed, these are detailed in the impact assessment (**Section 18.10**). Additional mitigation includes measures that are not incorporated into the design of the CWP Project and require further activity to secure the required outcome of avoiding or reducing impact significance.

Table 18-17 Primary mitigation measures

Project Element	Description
All offshore infrastructure	Positions of WTGs and OSSs have been informed by a wide range of site specific data, including metocean data (e.g., wind speed and direction), geophysical and geotechnical survey data (e.g., bathymetry), environmental data (e.g., benthic surveys and archaeological assessment) and stakeholder consultation. Designing and optimising the layout of the WTGs has considered multiple constraints identified from analysis of these datasets, alongside the consideration of layout principles taken from relevant guidance on the design of OWFs. A summary of the key actions taken to avoid or otherwise reduce impacts is provided below: • The WTG layout options include Search and Rescue (SAR) access lanes to allow a SAR resource to fly on the same orientation continuously through the array site. This is provided to minimise risks to surface vessels and / or SAR resource transiting through the array site; • Archaeological exclusion zones (AEZs) around known features of archaeological interest have been avoided. No works that impact the seabed will be undertaken within the extent of an AEZ during the construction, operational or decommissioning phases; • The locations of offshore infrastructure have been developed to avoid known sensitive ecological habitats, including areas with suitable conditions for *Sabellaria spinulosa*, which can form reefs under some circumstances. Whilst reefs were not identified during the characterisation surveys, as an ephemeral feature it will be necessary to validate the results in advance of construction. A pre-construction geophysical survey will therefore be undertaken to facilitate the micro-siting around sensitive habitats, such as *Sabellaria spinulosa*; • The WTG layout options have been developed to avoid or minimise interaction with known areas of high fishing density, where possible. As avoidance is not always possible, the layouts have also been developed to increase the potential for coexistence; and

Project Element	Description
	• A paleochannel (the remnants of a river or stream channel that flowed in the past) in the centre west of the array site has been avoided.
All offshore infrastructure	In general, the CWP Project has sought to specify the location, scale and extents of permanent and temporary offshore infrastructure, however, in some cases a degree of locational flexibility is required. Locational flexibility of permanent and temporary infrastructure is described as a LoD from a specific point or alignment. LoDs, described in **Chapter 4 Project Description**, are required to: • Take account of additional ground conditions data acquired during pre-construction geotechnical surveys and results from pre-construction offshore UXO surveys; • Avoid and minimise adverse impacts on offshore ephemeral benthic habitats, such as *Sabellaria spinulosa* reef, identified during pre-construction surveys; and • Take account of the confirmed position of existing subsea infrastructure and archaeological features.
All offshore infrastructure	For the consideration of potential array sites on the east coast of Ireland, a thorough site selection process was developed that considered all aspects of the site that would have a bearing on the economic viability and the technical and environmental acceptability of an eventual OWF development in that area. This included an analysis of existing underwater pipelines and cables. As a result of this constraints analysis the array site boundary has been selected to avoid active utility assets, such as underwater pipelines and cables. Likewise, the route selection for the OECC has been informed by the location of existing seabed infrastructure. The OECC has sought to take into account known subsea obstructions, including cables and pipelines, by enabling perpendicular crossings where possible.
All offshore infrastructure	A pre-construction geophysical survey will be undertaken to verify the location of existing subsea infrastructure.
Offshore Cables	The Applicant will, where practicable, bury all cables within the offshore development area: • IACs and interconnector cables will have a minimum depth of cover of 1.0 m; and • Offshore export cables will have a minimum depth of cover of 1.4 m. In cases where burial is inadequate due to unforeseeable seabed conditions and at cable crossings, cable protection will be implemented as mitigation to avoid risks to other marine operations.
All offshore infrastructure	Consultation and liaison will be undertaken with asset owners and other energy infrastructure operators, as required. This is proposed to promote and maximise cooperation between parties

Project Element	Description
	and minimise spatial and temporal interactions between simultaneous activities.
All offshore infrastructure	A **Rehabilitation Schedule** is provided as part of the planning application. This has been prepared in accordance with the MAP Act (as amended by the Maritime and Valuation (Amendment) Act 2022) to provide preliminary information on the approaches to decommissioning the offshore components of the CWP Project. A final Rehabilitation Schedule will require approval from the statutory consultees prior to the undertaking of decommissioning works. This will reflect discussions held with stakeholders and regulators to determine the exact methodology for decommissioning, taking into account available methods, best practice and likely environmental effects.

18.10 Impact assessment

18.10.1 Construction phase

109. The potential environmental impacts arising from the construction of the CWP Project are listed in **Table 18-15** and **Table 18-16,** along with the parameters against which each construction phase impact has been assessed. A description of the potential effect on material assets: marine infrastructure receptors caused by each identified impact is given below.

Impact 1: Direct effects on marine infrastructure

110. The construction of the CWP Project has the potential to result in damage to existing cable infrastructure where these occur within the OECC and array site, as a result of cable snagging during seabed preparation or installation works. It is also possible for the routing of the OECC to compromise maintenance access for the owner or operator if the OECC routing ran parallel or near-parallel to an existing operational cable, but the OECC was designed to avoid this and to approach existing cables from a perpendicular direction where practicable.

111. Where this relates to live or operational cables, this could result in financial consequences for the cable owner or operator, or for Codling Wind Park Limited (CWPL), developers of the CWP Project. Where this relates to out-of-service cables (two out-of-service cables are in the array site) and the damage was not pre-agreed through a crossing agreement, this could also result in a financial liability.

112. Prior to seabed preparation and cable installation activities, all existing cables will be confirmed within 100 m either side of the crossing point and a cable crossing agreement reached with the relevant party.

113. The construction of the CWP Project has the potential to result in damage to an existing discharge channel in the river Liffey. At the onshore substation site, marine piling works, construction of new revetments and land reclamation works -2 m CD are to be performed. Immediately to the west of the onshore substation is the power plants' discharge channel. A new bridge is proposed to provide vehicle access across the power plants' discharge channel.

114. **Chapter 4 Project Description** describes the design approach that has been taken for each component of the CWP project.

Receptor sensitivity

115. The sensitivity of existing operational cables and pipelines to direct damage is high due to their economic value and their importance for national utilities and global communications.

116. The sensitivity of existing out-of-service or undefined cables and pipelines is considered to be negligible, given they are no longer in use.

117. The sensitivity of the power plants' discharge channel to direct damage is high due to its importance to act as a cooling channel for the two power plants' processes and associated economic value.

Magnitude of impact

118. The magnitude of the effect for a damaged cable is low. The effect would be temporary until repairs could be undertaken. All subsea cables can be expected to require repair during their operational lifetime and cable operators are typically prepared to mobilise repairs quickly to minimise outage time. This would be likely to be undertaken within a year of damage occurring. The likelihood of damage to any given cable as a direct result of the CWP Project OECC is also low, as it has been designed to limit the potential for interactions with existing cables (please refer to **Chapter 4 Project Description** for more details).

119. Likewise, the magnitude of the effect for damage to the power plants' discharge channel is low. The effect would be temporary until repairs could be undertaken. The likelihood of damage to any given discharge channel as a direct result of the CWP Project OECC and / or onshore substation site is low as it has been designed to limit the potential for interactions with the existing discharge channel (please refer to **Chapter 4 Project Description** for more details).

Significance of the effect

120. The sensitivity of existing cables receptors in the study area is considered to be high for all operational cables and pipelines (but negligible for out of service cables and pipelines). The magnitude of impact for all cables and pipelines is assessed as low. Therefore (as per the matrix in **Table 18-5**), an effect of **Moderate** adverse significance on existing cables is predicted for all operational cables (but **Imperceptible** for out of services cables and pipelines), which is not significant. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

121. The sensitivity of discharge channel receptors in the study area is considered to be high. The magnitude of impact is assessed as low, as per the matrix in **Table 18-5**, it is concluded that the significance of the effect on the power plants' discharge channel will be **Moderate** during the construction phase. which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

Additional mitigation

122. The CWP Project offshore export cables will cross a number of existing assets. Where the existing assets' depth of burial is sufficiently deep, the offshore export cable will be laid directly on the seabed. However, where the existing asset is too shallow, additional protection will be required to protect both

the existing asset and the CWP Project offshore export cables. It is likely that concrete mattress will be placed over the existing asset, which is known as a separation layer. The offshore export cable will then be laid across this at an angle as close to 90 degrees as possible. The export cable will then be covered by a second mattress to secure the cables in place and ensure that they remain protected.

123. The design and methodology of these crossings will be confirmed in agreement with the asset owners. Furthermore, the cable protection at cable crossings will be inspected during the life of the project and may need to be replenished with additional protection, depending on their condition.

124. Prior to seabed preparation and cable installation activities, all existing cables will be confirmed within 100 m either side of the crossing point. As described in **Chapter 4 Project Description**, cable burial is the preferred method of cable protection. Due to ground conditions within the OECC, cable burial is more likely to be undertaken by ploughing, however a combination of cable burial methods may be used. The preferred method will be confirmed on completion of the pre-construction geotechnical site investigation surveys.

Residual effect

125. With the adoption of the additional mitigation measures the magnitude of effect will be negligible. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant in EIA terms.

Impact 2: Indirect effects on marine infrastructure

126. The construction of the CWP Project has the potential to result in indirect effects on marine infrastructure, through the increase in SSC and associated deposition which may affect other infrastructure in the study area, such as:

- Cables or pipelines;
- Aggregate extraction areas;
- Marine disposal sites;
- Oil and gas exploration activities (including surveys, drilling and the placement of infrastructure); and
- Power plants' discharge channel (two power plants discharge to the river Liffey within the onshore substation site).

Receptor sensitivity

127. The sensitivity of cables / pipelines, the power plants' discharge channel, oil and gas exploration areas and marine aggregate areas is low due to their high levels of tolerance and recoverability to increases in SSC.

Magnitude of impact

128. Peak levels of SSC from the construction of the CWP Project will only persist for a very short period of time (hours) and will affect only a very small area around the location of the activity (<1 km). Beyond this, a discreet plume of elevated SSC will be present for a number of days, though levels will quickly fall to those experienced by the majority of habitats during the normal course of the year, i.e., through storm events or periods of high wave or tidal action. Due to the coarse nature of much of the sediments

in the area, <1 cm of sediment is likely to be deposited, which will quickly be remobilised and integrated into the natural sediment transport regime.

129. The duration of this impact is short (no more than 3 years in duration), and elevated levels of SSC and associated deposition will not persist for this entire period, instead acting as discreet events throughout the construction phase. It is recognised that some areas may see repeated increases in SSC and deposition within the construction period.

130. In the context of installed infrastructure or other ongoing activities, the levels of deposition predicted are negligible and will not affect in any way the operability of any other activity or infrastructure.

131. The potential impacts of the works associated with the onshore substation relevant to this assessment (i.e., the installation of a combi-wall, new revetments and an area of reclaimed land) on the power plants' discharge channel have been assessed using a numerical modelling approach (see **Appendix 6.4 Codling Wind Park Hydraulic Modelling Support**). The findings of this exercise indicated that the impact of the works on the hydrodynamic and wave regime were deemed to be imperceptible within the bounds of natural variability. Therefore, the magnitude of the effect for damage to the power plants' discharge channel is low.

132. Based on the criteria set out in **Table 18-4**, the potential magnitude of impact is considered to be negligible**.**

Significance of the effect

133. The sensitivity of cables / pipelines, oil and gas exploration areas, marine aggregate / disposal areas and the power plants' discharge channel in the study area is considered to be low. The magnitude of impact for all areas is assessed as low. Therefore (as per the matrix in **Table 18-5**), an effect of **Imperceptible** adverse significance is predicted, which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

134. Though highly localised, low magnitude sediment plumes may be generated during the installation of the sheet piling, this will be transient in nature and **Imperceptible** beyond the natural variation of SSC in the river Liffey.

Additional mitigation

135. Based on the predicted level of effect, it is concluded that no additional mitigation is required beyond the embedded mitigation described in **Section 18.9**.

Residual effect

136. With the adoption of the primary mitigation measures, the magnitude of effect will be negligible. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant in EIA terms.

18.10.2 Operation and maintenance

Impact 1: Direct effects on marine infrastructure

137. The O&M activities (such as repair work) during the O&M phase of the CWP Project have the potential to result in damage to existing cable infrastructure where these occur within the CWP Project, as a result of cable snagging during repair works or through increased vessel traffic.

138. The O&M activities at CWP Project have the potential to impact on the O&M activities (such as repair work) of other cables in the area through increased vessel traffic. The operation of CWP Project will have minimal effects in terms of disruption to passing traffic (**Chapter 16 Shipping and Navigation**), however the maintenance vessels for other cables could pass close to, or through the CWP Project offshore development area.

139. The O&M activities undertaken for other cable assets in the study area is vital for their continued operation, however there are established mitigation measures which will be implemented during the construction of CWP Project, such as the issuing of Notice to Mariners (NtM) (**Chapter 16 Shipping and Navigation**), this will ensure that disruption to other ongoing O&M activities is minimal and vessel activities are managed such that they will not interact at a level that leads to adverse effects.

140. The obstruction during the O&M phase will be reduced compared to the construction stage, as obstruction will only occur occasionally / intermittently for short periods of time during the annual / bi-annual routine inspections and ad-hoc repairs. Given there will be cable crossing agreement(s) in place (**Section 18.9**), and prior NtMs sent out, it is expected that the operators of subsea cable assets will have the ability to adapt around the O&M activities.

141. Arklow Bank Phase 1 (operational OWF) infrastructure is located 18 km south of the CWP Project and is outside the study area; there is no potential impact pathway for interactions with the CWP Project.

Receptor sensitivity

142. The sensitivity of existing cables is high due to their economic value and their importance for national utilities and global communications.

143. The sensitivity of the power plants' discharge channel to direct damage is high due to its importance to act as a cooling channel for the two power plants' processes and associated economic value.

Magnitude of impact

144. Survey work required to establish any possible need for operational maintenance of the cable protection and cable crossings would use non-intrusive methods, and as such would not impact upon existing subsea cables. Any necessary operational maintenance of the cable protection and cable crossings will be undertaken in line with the relevant cable crossing agreements, so any consequential risk to existing subsea cables is anticipated to be low.

Significance of the effect

145. The sensitivity of existing cables receptors in the study area is considered to be high for all cables and the magnitude of the impact for all cables is assessed as low. Therefore (as per the matrix in **Table 18-5**), an effect of **Moderate** adverse significance on existing cables is predicted for all cables, which

is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a materially different effect.

Additional mitigation

146. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the embedded mitigation described in **Section 18.9**.

Residual effect

147. With the adoption of the primary mitigation measures the magnitude of effect will be negligible. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant in EIA terms.

Impact 2: Indirect effects on marine infrastructure

148. The O&M activities (such as repair work) during the O&M phase of the CWP Project has the potential to result in indirect effects on marine infrastructure, through the increase in SSC resulting in associated deposition which may affect other infrastructure in the study area such as:

- Cables or pipelines;
- Aggregate extraction areas;
- Marine disposal sites;
- Oil and gas exploration activities (including surveys, drilling and the placement of infrastructure); and
- Power plants' discharge channel (two power plants discharge to the river Liffey within the onshore substation site).

Receptor sensitivity

149. The sensitivity of cables / pipelines, the power plants' discharge channel, oil and gas exploration areas, and marine aggregate areas is low due to their high levels of tolerance and recoverability to increases in SSC.

Magnitude of impact

150. During maintenance and repair operations, marine infrastructure may be affected due to cable recovery and reburial and the vessel anchoring during these operations.

151. Cable maintenance may include the need to rebury exposed cables, cable repairs and replacements requiring vessels anchoring on site during operations. Cable repair / replacement is likely to require cable deburial, recovery to the surface, repair and reburial. Where cable repair / replacement is required, it is likely that near bed SSCs may be elevated compared to baseline levels as cable sections would be exposed and recovered to the surface. The redistribution of liberated sediments is a function of their hydraulic properties and highly dependent on conditions at the time of repair. It is anticipated that any release and redistribution of sediment will be limited, short term and highly localised. Though during the removal of the cable the total volume of sediment displaced is likely to be low, the potential exists for a shallow trench to form on the seabed immediately following removal of the section of the

cable to be repaired. However, the scale and geometry of this trench is considered to be within the scale of natural variability of the local seabed topography.

152. Following repair, the cable will be reburied using similar methods utilised during construction, with vessels anchoring on site during operations. As such, it is anticipated that the effects and subsequent impacts upon marine infrastructure are as described (and no greater than those) in the assessment of impacts during the construction phase.

153. The magnitude of the effect is negligible. The effect would be localised and site specific.

Significance of the effect

154. The sensitivity of cables / pipelines, the power plants' discharge channel, oil and gas exploration areas and marine aggregate / disposal areas in the study area is considered to be low. The magnitude of impact for all areas is assessed as negligible. Therefore (as per the matrix in **Table 18-5**), an effect of **Imperceptible** significance is predicted, which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a materially different effect.

Additional mitigation

155. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the embedded mitigation described in **Section 18.9**.

Residual effect

156. With the adoption of the primary mitigation measures the magnitude of effect will be negligible. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant in EIA terms.

Impact 3: Interference of TV and radio reception

157. The WTGs could interfere with signals to and from existing TV and radio transmitters and receivers.

158. **Appendix 18.3 Television and Radio Desk-Based Report** details the methodology for the modelling of likely TV interference from wind farms. To outline, the likelihood of TV and radio interference is determined by considering the strength of the direct, or carrier, signal in comparison to the reflected, or interfering, signal. The Carrier to Interference Ratio (CI Ratio) quantifies the relative strength of the direct and reflected signals.

159. A high CI Ratio means interference is less likely. A low CI Ratio means that interference is more likely. The CI Ratio is normally expressed in decibels (dB).

160. TV and radio signals weaken over distance. The closer a receiver is to a transmitter the stronger its received signal will be. This reduction in signal strength due to separation distance is referred to a Free Space Path Loss (FSPL).

161. An electromagnetic signal may travel between two points, even when no direct line of sight exists between those two points. This is because transmission travels as a series of waves rather than as a direct ray. When no direct line of sight exists between the two points the signal is considerably weakened. This weakening is known as a diffraction loss.

162. Total path loss for a specific path is determined by adding FSPL to Diffraction Loss.

163. The size of the interfering signal is dependent on the amount of energy that is reflected from the wind turbine. This reflective quality is known as the Radar Cross Section (RCS) and can be expressed in metres squared or in dBm^2.

164. The main TV transmitters serving the CWP Project study area are Kippure and Greystones, located approximately 32 km and 17 km west of CWP Project respectively. Both transmitters broadcast Saorview digital terrestrial TV services and radio transmissions.

Receptor sensitivity

165. The sensitivity of existing TV and radio reception is high due to their economic value and their importance for national and global communications.

Magnitude of impact

166. A technical report has been produced in order to assess the potential TV and radio interference effects associated with the CWP Project (**Appendix 18.3 Television and Radio Desk-Based Report**). In summary, no interference is predicted for transmissions between the Kippure and Greystone transmissions and the relevant receivers, as no receivers are located within the interference zones of the CWP Project. The effects from wind farms on TV signals are unlikely beyond distances of 10–15 km. Effects on radio services are judged to be unlikely beyond distances of 5 km. The CWP is predicted to produce an interference zone to the southeast of the turbine area, where no dwellings or receivers exist.

167. Signals from the transmitters reach receivers before encountering the WTGs. Therefore, magnitude of the effect for interference with TV and radio reception is considered **Imperceptible**.

Significance of effect

168. The sensitivity of potential TV and radio reception in the study area is considered to be high and the magnitude of impact is assessed as **Imperceptible**, as dwellings and receivers are outside of the interference zone are not expected to be affected. Therefore, as a result of project design and detailed analysis there is no interaction, which is categorised as **Imperceptible** adverse significance which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

Additional mitigation

169. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the embedded mitigation described in **Section 18.9**.

Residual effect

170. With the adoption of the primary mitigation measures, the magnitude of effect will be nil. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant.

18.10.3 Decommissioning phase

Impact 1: Direct effects on other infrastructure

171. The term of the MAC for the CWP Project will be 45 years. The operational lifetime of the CWP Project is expected to be 25 years. At the end of this period the CWP Project could be life-extended, repowered or decommissioned. If the CWP Project is repowered during the period of the MAC, this would be subject to a new consent application supported by an EIAR.

172. It is assumed that the equipment will be decommissioned. The requirement to decommission the offshore components of the CWP Project is a condition of the MAC. The CWP Project operator(s) will be required to prepare detailed, costed decommissioning plans for approval by the competent authority and to set aside funds for the purposes of decommissioning.

173. The decommissioning of the CWP Project has the potential to result in damage to existing cable infrastructure where these occur within the CWP Project OECC (ESAT-2 cable) and array site (two unknown cables).

Receptor sensitivity

174. The sensitivity of existing cables is high due to their economic value and their importance for national utilities and global communications.

175. The sensitivity of the power plants' discharge channel to direct damage is high due to its importance to act as a cooling channel for the two power plants' processes and associated economic value.

Magnitude of impact

176. In the event that any part of the CWP Project offshore infrastructure is removed from the seabed upon decommissioning, any associated risk of damage to existing cables and the power plants' discharge channel are anticipated to be the same magnitude of effect during the construction phase. These would be of short duration and would also be managed in line with relevant legislation and guidance at that time. The magnitude of the effect for a damaged cable and power plants' discharge channel is low.

Significance of the effect

177. The sensitivity of existing cables receptors in the study area is considered to be high for all cables and the magnitude of the impact for all cables is assessed as low. Therefore, as per the matrix in **Table 18-5**, an effect of **Moderate** adverse significance on existing cables is predicted for all cables, which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a materially different effect.

178. The sensitivity of discharge channel receptors in the study area is considered to be high. The magnitude of impact is assessed as low, as per the matrix in **Table 18-5**, it is concluded that the significance of the effect on the power plants' discharge channel will be **Moderate** during the construction phase, which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a more significant effect.

Additional mitigation

179. Consultation with existing cable operators, approval of cable crossing agreements prior to decommissioning and adherence with relevant legislation and guidance at the time of decommissioning will be required to ensure that cable crossings are appropriately designed to mitigate environmental effects and damage to existing operational cables.

Residual effect

180. With the adoption of the additional mitigation measures the magnitude of effect will be negligible. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant in EIA terms.

Impact 2: Indirect effects on marine infrastructure

181. As stated above, it is assumed that all infrastructure associated with the CWP Project will be decommissioned at the end of the operational lifetime (expected to be 25 years). The requirement to decommission the offshore components of the CWP Project is a condition of the MAC. The CWP Project operator(s) will be required to prepare detailed, costed decommissioning plans for approval by the competent authority and to set aside funds for the purposes of decommissioning.

182. At decommissioning phase, the CWP Project has the same potential for indirect effects on marine infrastructure as during the construction phase, which is the increase in SSC resulting in associated deposition, which may affect other infrastructure in the study area, such as:

- Cables or pipelines;
- Aggregate extraction areas;
- Marine disposal sites;
- Oil and gas exploration activities (including surveys, drilling and the placement of infrastructure); and
- Power plants' discharge channel (two power plants discharge to the river Liffey within the onshore substation site).

Receptor sensitivity

183. The sensitivity of cables / pipelines, the power plants' discharge channel, oil and gas exploration areas and marine aggregate areas is low due to their high levels of tolerance and recoverability to increases in SSC.

Magnitude of impact

184. The magnitude of the effect is anticipated to be the same magnitude of effect during the construction phase, therefore negligible. As impacts are predicted to be highly localised and short term. Though it is predicted that that although the seabed will not return to its exact baseline state, it is likely only a short duration until the mobile seabed will have reached a new natural state of equilibrium (timescale anticipated to be a matter of weeks to months).

Significance of the effect

185. The sensitivity of cables / pipelines, the power plants' discharge channel, oil and gas exploration areas and marine aggregate / disposal areas in the study area is considered to be low. The magnitude of impact for all areas is assessed as low. Therefore (as per the matrix in **Table 18-5**), an effect of **Imperceptible** adverse significance is predicted, which is not significant in EIA terms. Where flexibility in the proposed design exists, there is no other scenario which would lead to a materially different effect.

Additional mitigation

186. Based on the predicted level of effect it is concluded that no additional mitigation is required beyond the embedded mitigation described in **Section 18.9**.

Residual effect

187. With the adoption of the primary mitigation measures the magnitude of effect will be negligible. The significance of the residual effect is therefore predicted to be **Imperceptible**, which is not significant in EIA terms.

18.11 Cumulative impacts

188. A fundamental component of the EIA is to consider and assess the potential for cumulative effects of the CWP Project with other projects, plans and activities (hereafter referred to as 'other development').

189. **Appendix 18.1 Cumulative Effects Assessment** presents the findings of the CEA for material assets - marine infrastructure, which considers the residual effects presented in **Section 18.11** alongside the potential effects of other proposed and reasonably foreseeable other development. The CEA concludes that there will be no significant effects as a result of CWP cumulatively with other proposed and reasonably foreseeable developments.

18.12 Transboundary impacts

190. Due to the localised nature of any potential impacts and mitigation options implemented, transboundary impacts will not occur with regard to material assets: marine infrastructure.

18.13 Inter-relationships

191. The inter-related effects assessment considers the potential for all relevant effects across multiple topics to interact, spatially and temporally, to create inter-related effects on a receptor group. This includes incorporating the findings of the individual assessment chapters to describe potential additional effects that may be of greater significance when compared to individual effects acting on a receptor group.

192. The term 'receptor group' is used to highlight the fact that the proposed approach to the inter-relationships assessment has not assessed every individual receptor considered in this chapter, but instead focuses on groups of receptors that may be sensitive to inter-related effects.

193. **Chapter 5 EIA Methodology** provides a matrix to show at a broad level where across the EIAR interactions between effects on different receptor groups have been identified.

194. The potential inter-related effects that could arise in relation to material assets: marine infrastructure are presented in **Table 18-18**.

Table 18-18 Inter-related effects assessment for material assets: marine infrastructure

Impact / Receptor	Related chapter	Phase Assessment
Impact 1: Direct effect on other infrastructure	**Chapter 12 Commercial Fisheries** **Chapter 16 Shipping and Navigation** **Chapter 26 Material Assets – Built Services**	The scope of this chapter (**Material Assets: Marine Infrastructure**) assessment has been limited to potential impacts on existing cables and discharge channel during construction, O&M and decommissioning, the potential for impact upon TV and radio reception and impacts on proposed offshore wind projects during operation. Impacts to oil and gas infrastructure, marine aggregate resources, dredging and disposal grounds were scoped out of the assessment as no interactions will occur. Potential changes to seabed conditions (including chemical quality and physical properties such as transmissivity) during construction could affect the quality and quantity of groundwater and hydrologically connected surface water receptors. The likelihood of effects on any other existing cables as a direct result of the CWP Project is low, as it has been designed to limit the potential for interactions with existing cables. TV and radio reception interference, likely to arise during all phases of the CWP Project, will be within the capacity and capability of existing transmitters, with no subsequent effects on other aspects. It is therefore considered that there is no potential for any additional inter-related effects to commercial fisheries, shipping and navigation, commercial fisheries, aviation, military and radar from effects on material assets, which have not already been identified in the separate assessments (**Chapter 12: Commercial Fisheries**, **Chapter 16: Shipping and Navigation**, **Chapter 17 Aviation, Military and Radar,** and **Chapter 26 Material Assets –**
Impact 2: Indirect effects on other infrastructure	**Chapter 16 Shipping and Navigation**	
Impact 3: Interference of TV and radio reception	**Chapter 17 Aviation, Military and Radar**	

Impact / Receptor	Related chapter	Phase Assessment
		Built Services).

18.14 Potential monitoring requirements

195. Monitoring requirements for the CWP Project will be described in the **In Principle Project Environmental Monitoring Plan** submitted alongside the EIAR and further developed and agreed with stakeholders prior to construction.

196. The assessment of impacts on material assets: marine infrastructure as a result of the construction, operation and maintenance and decommissioning phases of the CWP Project are predicted to be not significant.

197. Pre-construction surveys will establish and confirm positions of out of service (OOS) cables that may need to be removed from the offshore development area. The OOS cables are removed to form a clear corridor for the OWF cable installation.

198. Based on an existing desktop study, it is anticipated that approximately 18 km of OOS cable within the array site will need to be removed.

199. No OOS cables have been identified within the OECC.

200. The operational success of the recovery is highly dependent on the age and burial depth of the cable being removed. Where possible, the cable is removed in a single activity, but is likely that multiple operations will be required and in some cases complete removal is not achievable.

201. The indicative cable removal procedure is described below;

- The removal vessel shall position itself perpendicular to the OOS cable, ideally at a location where the cable is known to be unburied or buried at a shallow depth.
- A detrenching grapnel (DTG) is lowered from the vessel stern.
- The vessel moves towards the cable, allowing the fluke of the DTG to penetrate the seabed and hook / unbury the cable.
- The vessel will manoeuvre until the cable is exposed and then broken, leaving the two ends on the seabed.
- The vessel will either repeat grapnel runs (see section above) to retrieve a cable end for recovery, or use an ROV to clamp a line to the end of the exposed cable ready for recovery to the vessel deck.
- Once the cable end is recovered to the vessel deck, a suitably controlled recovery of the cable along its route will be carried out. The intention will be to continue until the required clearance corridor is achieved for cable and foundation installation.
- The remaining cable will be cut by an ROV equipped with cutting tools, and suitable clump weights attached and deployed to the remaining cable end(s). The process shall be repeated for the other exposed cable end(s).
- Any recovered cable will be handled safely and brought onshore for proper disposal.

18.15 Impact assessment summary

202. This chapter of the EIAR has assessed the potential environmental impacts on material assets: marine infrastructure from the construction, operation and maintenance and decommissioning phases of the

CWP Project. Where significant impacts have been identified, additional mitigation has been considered and incorporated into the assessment.

203. This section, including **Table 18-19**, summarises the impact assessment undertaken and confirms the significance of any residual effects, following the application of additional mitigation.

204. The CWP Project has the potential to result in direct and indirect impacts on marine infrastructure, including potential impact to interfere with signals to and from existing onshore TV and radio transmitters.

205. The CWP Project has the potential for direct damage to existing or proposed infrastructure. Owners and operators of all infrastructure will be consulted and where appropriate legal agreements will be put in place to mitigate any impact on existing infrastructure as appropriate. Existing operational cables and pipelines have been assessed as having a high sensitivity to damage due to their high economic value and importance for global communications. The impact magnitude has been assessed as low, however, due to the temporary duration of the effect (1–7 years) and the low likelihood of occurrence. Given the mitigations described, the residual impact to existing cables is assessed as **Imperceptible**.

206. The CWP Project has the potential for indirect disturbance to existing or proposed infrastructure. The impact of the project infrastructure may affect other assets, for instance the increase in SSC resulting in associated deposition which may affect other infrastructure. Owners and operators of all infrastructure will be consulted to ensure appropriate and adequate separation distances are implemented (where appropriate). Oil and gas infrastructure and marine aggregates areas have been assessed as having a low sensitivity to damage due to their high levels of tolerance and recoverability to increases in SSC. The impact magnitude has been assessed as negligible, however, due to the site specific loss of asset value and the low likelihood of occurrence. Given the mitigations described, the residual impact to other infrastructures is assessed as **Imperceptible**.

207. The potential impact to interfere with signals to and from existing TV and radio transmitters and receivers was assessed as Nil due to the nil (no) impact magnitude and the high receptor sensitivity. The residual impact to TV and radio transmitters therefore assessed as **Imperceptible**.

Table 18-19 Summary of potential impacts and residual effects

Potential Impact	Receptor	Receptor Sensitivity	Magnitude of Impact	Significance of effect	Additional Mitigation	Residual effect
Construction						
Impact 1: Direct effects on marine infrastructure	Subsea utilities (cables and pipelines) Power plants' discharge channel (two power plants discharge to the river Liffey)	High	Low	Moderate (**Not significant**)	The CWP Project offshore export cables will cross a number of existing assets. Where the existing assets' depth of burial is sufficiently deep, the offshore export cable will be laid directly on the seabed. However, where the existing asset is too shallow, additional protection will be required to protect both the existing asset and the CWP Project offshore export cables. It is likely that concrete mattress will be placed over the existing asset, which is known as a separation layer. The offshore export cable will then be laid across this at an angle as close to 90 degrees as possible. The export cable will then be covered by a second mattress to secure the cables in place and ensure that they remain protected. The design and methodology of these crossings will be confirmed in agreement with the asset owners. Furthermore, the cable protection at cable crossings will be inspected during the life of the project and may need to be replenished with	Imperceptible (**not significant**)

Potential Impact	Receptor	Receptor Sensitivity	Magnitude of Impact	Significance of effect	Additional Mitigation	Residual effect
					additional protection, depending on their condition.	
Impact 2: Indirect effects on marine infrastructure	Subsea utilities (cables and pipelines)	Low	Negligible	Imperceptible (**not significant**)	No additional mitigation required.	Imperceptible (**not significant**)
	Oil and gas licensed exploration areas					
	Marine aggregates					
	Power plants' discharge channel (two power plants discharge to the river Liffey)					
Operation and Maintenance						
Impact 1: Direct effects on marine infrastructure	Subsea utilities (cables and pipelines)	High	Low	Moderate (**not significant**)	No additional mitigation required, beyond primary measures.	Imperceptible (**not significant**)
	Power plants' discharge channel (two power plants discharge to the river Liffey)					

Potential Impact	Receptor	Receptor Sensitivity	Magnitude of Impact	Significance of effect	Additional Mitigation	Residual effect
Impact 2: Indirect effects on marine infrastructure	Subsea utilities (cables and pipelines)	Low	Negligible	Imperceptible (**not significant**)	No additional mitigation required.	Imperceptible (**not significant**)
	Oil and gas licensed exploration areas					
	Marine aggregates					
	Power plants' discharge channel (two power plants discharge to the river Liffey)					
Impact 3: Interference of TV and radio reception	TV and radio reception	High	Nil	Imperceptible (**not significant**)	Any reported interference following construction will be investigated and, where found to be attributable to the CWP Project, mitigated (to be evaluated on a case-by-case basis).	Imperceptible (**not significant**)
Decommissioning						
Impact 1: Direct effects on marine infrastructure	Subsea utilities (cables and pipelines)	High	Low	Moderate (**not significant**)	Consultation with existing cable operators, approval of cable crossing agreements prior to decommissioning and adherence with relevant legislation and guidance at the time of decommissioning will be required to ensure that cable	Imperceptible (**not significant**)
	Power plants' discharge channel (two					

Potential Impact	Receptor	Receptor Sensitivity	Magnitude of Impact	Significance of effect	Additional Mitigation	Residual effect
	power plants discharge to the river Liffey)				crossings are appropriately designed to mitigate environmental effects and damage to existing operational cables.	
Impact 2: Indirect effects on marine infrastructure	Subsea utilities (cables and pipelines)	Low	Negligible	Imperceptible (**not significant**)	No additional mitigation required**.**	Imperceptible (**not significant**)
	Oil and gas infrastructure					
	Marine aggregates					
	Power plants' discharge channel (two power plants discharge to the river Liffey)					

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