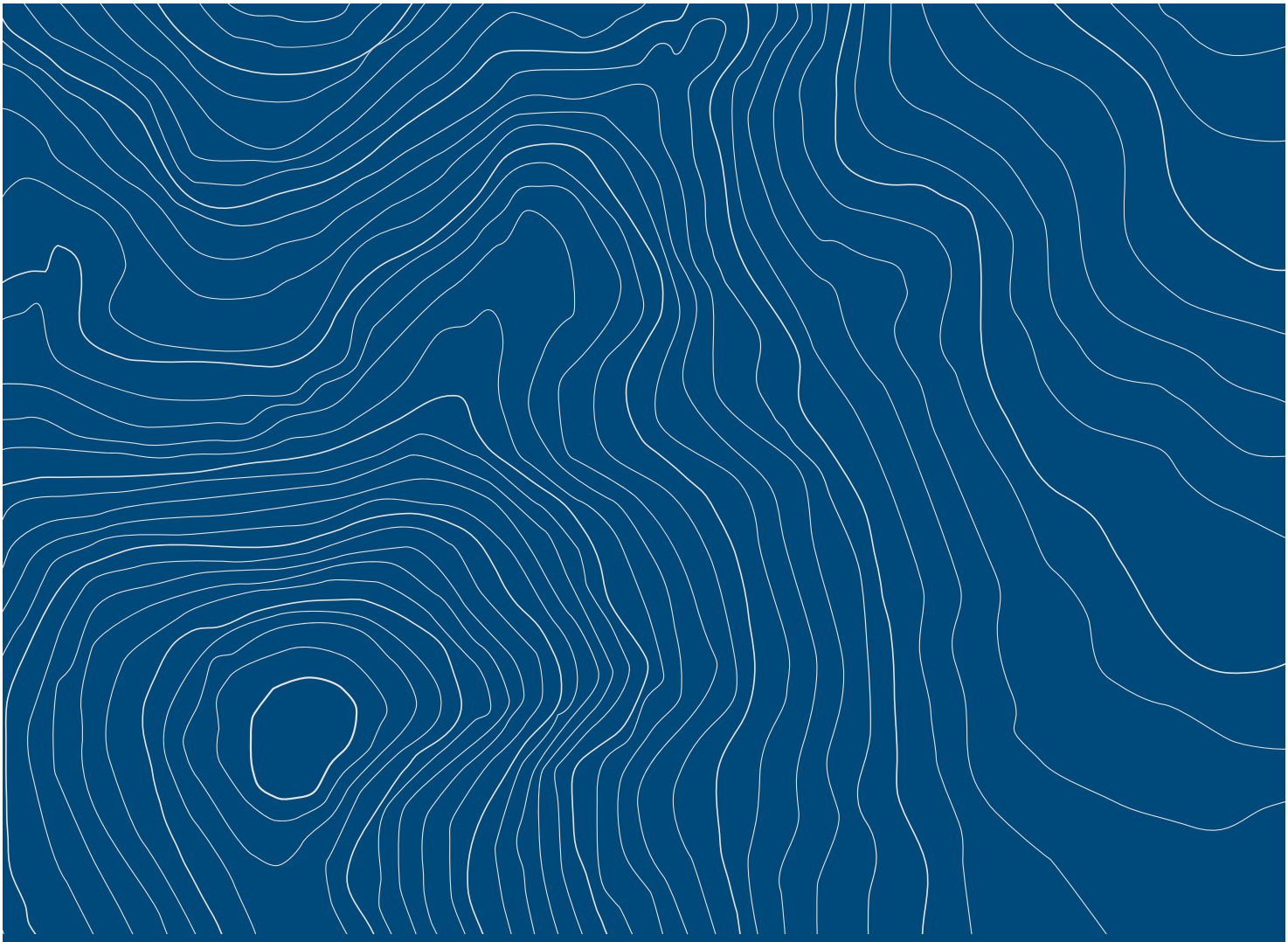

DublinArray
Generation for generations

EIAR Volume 3: Offshore Infrastructure Assessment Chapters Chapter 11: Marine Infrastructure and Other Users

Kish Offshore Wind Ltd.

RWE SLR GoBe APEM Group

www.dublinarray-marineplanning.ie

Dublin Array Offshore Wind Farm

Environmental Impact Assessment Report

Volume 3, Chapter 11: Marine Infrastructure and Other Users

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Glossary

Term	Definition
Array area	The area within which the WTGs and OSP's will be located.
Carbon Capture and Storage	The process of producing carbon dioxide artificially (burning fossil fuels or other chemical/biological processes), trapping it before it is released to the atmosphere, and then storing it in the ground or seabed.
Dredging and dumping at sea (DAS) sites	A specified location where disposal of dredged material and inert material of natural origin (in the absence of suitable alternative reuse and disposal methods) is permitted. A DAS permit is required for disposal.
Far-field	For the purposes of this chapter, far fields has been defined as extending beyond these boundaries of the array area and Offshore ECC but within the study area.
Marine aggregates	Marine dredged sand/and or gravel
Near-field	For the purposes of this chapter near field has been defined as within the array area and Offshore ECC.
Offshore Export Cable Corridor (Offshore ECC)	Corridor for an export transmission cable from the array to landfall.

Acronyms

Term	Definition
CEA	Cumulative Effects Assessment
ComReg	Commission for Communications Regulation
DAS	Dumping at Sea
DCCAE	Department of Communications, Climate Action and Environment (now Department of Energy, Climate and Communications – DECC)
DHLGH	Department of Housing, Local Government and Heritage
DLs	Discharge Locations
DoD	Department of Defence
Dublin Array	Dublin Array Offshore Wind Farm
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
GIS	Geographical Information Systems
GNI	Gas Networks Ireland
IFI	Inland Fisheries Ireland
LO	Licensing Option
MFE	Mass Flow Excavator
MHWS	Mean High Water Springs
MI	Marine Institute
MI&OU	Marine Infrastructure and Other Users
MW&SQ	Marine Water and Sediment Quality
NRA	Navigational Risk Assessment
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
O&M	Operations and Maintenance
PEXA	Practice and Exercise Areas
RPs	Relevant Projects
SSC	Suspended Sediment Concentration
TII	Transport Infrastructure Ireland
TBO	Telecommunications / Broadcasting Operators
VMP	Vessel Management Plan

Term	Definition
WTG	Wind Turbine Generator
ZoI	Zone of Influence

11 Marine Infrastructure and Other Users

11.1 Introduction

11.1.1 This chapter presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of the construction, operation and maintenance (O&M), and decommissioning phases the offshore infrastructure, namely the array area and offshore Export Cable Corridor (the latter referred to as the Offshore ECC) on marine infrastructure and other users.

11.1.2 This EIAR chapter is not supported by a separate technical baseline document and therefore presents a comprehensive characterisation of the Marine Infrastructure and Other Users (MI&OU) receptors, in support of the assessment.

11.1.3 This EIAR chapter considers the marine infrastructure and other users for Dublin Array alone and cumulatively, and should be read in conjunction with the following chapters of the EIAR, due to the potential interactions between the technical aspects:

- Volume 3, Chapter 1: Marine Geology, Oceanography and Physical Processes (hereafter referred to as the Physical Process Chapter); Changes to coastal processes have the potential to directly and/or indirectly impact MI&OU receptors and therefore the information from the coastal processes assessment will be used to inform this MI&OU assessment;
- Volume 3, Chapter 9: Commercial Fisheries (hereafter referred to as the Commercial Fisheries Chapter). Impacts on commercial fisheries users are considered in Chapter 9 and not considered further in this MI&OU chapter;
- Volume 3, Chapter 12: Aviation and Radar (Hereafter referred to as the Aviation Chapter). Impacts on aviation are considered in Chapter 12 and not considered further in this MI&OU chapter;
- Volume 3, Chapter 10: Shipping and Navigation (hereafter referred to as the Shipping and Navigation Chapter). Impacts on shipping and navigation are considered in Chapter 10 and not considered further in this MI&OU chapter; and
- Volume 3, Chapter 17: Offshore Socio-economic, Tourism, Recreation and Land Use (hereafter referred to as the Tourism Chapter). Impacts on marine recreation are considered in Chapter 17 and not considered further in this MI&OU chapter.
- Volume 4, Appendix 4.3.10-1: Dublin Array Navigational Risk Assessment (NRA);

11.1.4 The following topics are considered within this chapter:

- Oil and gas infrastructure;
- Subsea cables and pipelines;
- Other marine renewable energy projects;

- Dredging and dumping at sea (DAS) sites;
- Coastal and marine wastewater assets; and
- Telecommunications operations.

11.1.5 It should be noted that in some cases the consideration of telecommunication operations differs from the standard approach for other topics within this chapter (e.g. consultation approach, study area etc). Where relevant, this is identified and described within the appropriate section of the chapter.

11.1.6 The Scoping Report (RWE, 2020) scoped the following receptors out of further assessment in the Applicant's EIA on the basis that no licensed sites or activities were located in the study area (see Section 11.6), therefore there is an absence of a receptor-source pathway for impacts to occur. On the basis that no new licences have been submitted as of July 2024, the following topics are not considered further in this chapter:

- Marine aggregates;
- Carbon capture and storage; and
- Natural gas storage.

11.1.7 Military aviation Practice and Exercise Areas (PEXA) are considered in the Aviation Chapter and are not considered further in this chapter. No non-aviation PEXA have however been considered as relevant.

11.2 Regulatory Background

11.2.1 The legislation, policy and guidance relevant to the whole planning application is set out in Volume 2, Chapter 2: Consents, Legislation, Policy and Guidance (hereafter referred to as the Policy Chapter). The principal legislation, policy and guidance relevant to this chapter is set out in Annex A.:

11.2.2 The assessment of potential impacts upon MI&OU has been made with specific reference to the relevant regulations, guidelines and guidance, which include

- The Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs), as implemented in Ireland primarily through the Maritime Safety Act 2005, as amended, and regulations made under that Act and the Merchant Shipping Acts;
- The Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, 1972, and 1996 Protocol thereto (the "London Convention") as implemented in Ireland primarily through the Foreshore and Dumping at Sea Act 2009 and the Sea Pollution Act, 1991, as amended;
- The Submarine Telegraph Act (1885) and the UN Convention on the Law of the Sea, 1982 (UNCLOS) particularly as regards subsea telecommunications cables, and the Maritime Jurisdiction Act 2021, as amended;

- Petroleum and Other Minerals Development Act 1960, as amended (and repealed) by the Climate Action and Low Carbon Development (Amendment) Act 2021;
- The International Convention for the Safety of Life at Sea, 1974, (SOLAS), the Merchant Shipping Act 1894 and the Merchant Shipping (Commissioner of Irish Lights) Act 1997;
- The Foreshore Act 1933, as amended,
- The Maritime Area Planning Act 2021, as amended;
- The Urban Waste Water Treatment Directive 91/271/EEC[1], as implemented by S.I. No. 684/2007 - Waste Water Discharge (Authorisation) Regulations 2007, as amended by S.I. No. 231/2010; S.I. No. 652/2016; S.I. No. 214/2020; and S.I. No. 480/2024; and
- The Local Government (Water Pollution) Act 1977, as amended by the Local Government (Water Pollution) (Amendment) Act 1990, as further amended by the Water Services Act 2007, giving effect to trade effluent discharge licenses not covered by the Industrial Emissions Directive.

11.3 Consultation

11.3.1 As part of the EIA for Dublin Array, non-statutory consultation has been undertaken with various statutory and non-statutory bodies. A Scoping report (RWE, 2020) was made publicly available and issued to statutory consultees on 9th October 2020. Table 1 provides a summary of the consultation undertaken for MI&OU to date for Dublin Array.

11.3.2 Consultation relevant to vessel management and activity of relevance to Dublin Array on shipping and navigation users (commercial and recreational) is captured within the Navigational Risk Assessment (NRA) (Appendix 4.3.11-1).

11.3.3 In accordance with recommendations outlined in the DCCAE guidance[2] "the Applicant sought to consult during the scoping stage with all relevant telecommunications and broadcasting service providers to discuss concerns and the potential for benefits of the Dublin Array. These service providers were identified via ComReg in June 2021 due to their proximity. The service providers were supplied with the indicative locations of the proposed turbines and asked to advise whether any impact could occur to their networks. ComReg was re-checked in November 2024 to identify if any further operators were now present in the area. This confirmed the operators present had not changed since June 2021.

[1] The UWWTD is due to be revised pursuant to a proposal for a Directive concerning urban wastewater treatment (recast) 2022/0345(COD), which by 6 November 2024 was subject to provisional approval by the European Council following a first reading position adopted by the European Parliament. One of the objectives of the proposed new Directive is to integrate the Climate Neutrality Objective enshrined in the EU Climate Law Regulation (EU) 2021/1119, and the environmental protection objectives of the Water Framework Directive 2000/60/EU and the Marine Strategy Framework Directive 2008/56/EC, including the biodiversity of land-based, marine and coastal ecosystems from being adversely affected by insufficiently treated urban wastewater discharges, incorporating the green transition objectives set by the European Green Deal (2019).

[2] Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (Environmental Working Group of the Offshore Renewable Energy Steering Group and the DCCAE, 2017)

11.3.4 Consulted stakeholders include authorities with associated telecommunication infrastructure, wireless broadcasters, and cellular network providers. Internet service providers were eliminated from consultation given the offshore location of the turbines. The following stakeholders and telecommunications/broadcasting operators (TBO) were contacted for information regarding existing telecommunications and broadcasting links in the area:

- Eir;
- Vodafone;
- Three Mobile Networks; and
- RTE / 2RN Broadcasting network.

Table 1 Summary of consultation relating to MI&OU

Date	Consultation type	Consultation and key issues raised	Section where provision is addressed
November 2020	EIA Scoping Response – Gas Networks Ireland (GNI)	GNI suggest that their Marine and Coastal Unit datasets and maps are utilized for this project, including INFOMAR which contains products such as Shipping & Navigation, Fisheries Management, Aquaculture, Marine Leisure & Tourism, and Coastal Behaviour alongside seafloor mapping products.	The datasets suggested were investigated in the drafting of this EIAR. See Section 11.4 for details on the data sources. Products relating to Shipping & Navigation, Fisheries Management, Aquaculture, Marine Leisure & Tourism, and Coastal Behaviour have been considered for use in their relevant chapters (see Section 11.1).
November 2020	EIA Scoping Response – Inland Fisheries Ireland (IFI)	IFI suggest that offshore recreation should not be limited to Dublin Bay but also include recreational angling along the east coast to Greystones.	The Applicant can confirm that Greystones is included within the study area. Offshore recreation has been considered throughout the study area (see Figure 1) and is covered in Chapter 18 Socio-economic, tourism, recreation and land-use.
November 2020	EIA Scoping Response – Department of Defence (DoD)	The DoD request that the position of seabed cables emanating from the Wind Turbine Generators (WTG) to the shore need to be made known to the Naval Service.	This is agreed by the Applicant. All proposed cables will be contained within the Offshore ECC (Figure 1). After construction is completed, all installed assets will be charted, and locations made available.
June 2021	Three Networks	No response received	Discussed in Sections 11.6 and 11.9 of this report
24TH June 2021	Eir	Eir confirmed it has no transmission services that will be affected.	Discussed in Sections 11.6 and 11.9 of this report

Date	Consultation type	Consultation and key issues raised	Section where provision is addressed
June 2021	Vodafone	No response received	Discussed in Sections 11.6 and 11.9 of this report
8TH February 2022	RTE (2RN)	Confirmed slight risk of reflections from the turbines. RTE/2RN has requested that a 2rn protocol agreement is entered into between the Developer and 2RN/ RTE.	Discussed in Sections 11.6 and 11.9 of this report

11.4 Methodology

11.4.1 For a full description of the methodology as to how this EIAR was prepared, see Volume 2, Chapter 3 Methodology (hereafter referred to as the EIA Methodology Chapter. The methodology that follows below is specific to this chapter.

Study area

11.4.2 The DCCAE Guidance (2017) recommends that the Zone of Influence (ZoI) and study area are established at the scoping stage. It is acknowledged by the guidance that these zones may differ depending upon the pressure or receptor component under consideration. Data and identification of features of interest within the zones that might be impacted by an offshore renewable energy project are required so that a source – pathway – receptor risk assessment can be carried out and the subsequent evaluation of effects can be undertaken for key features.

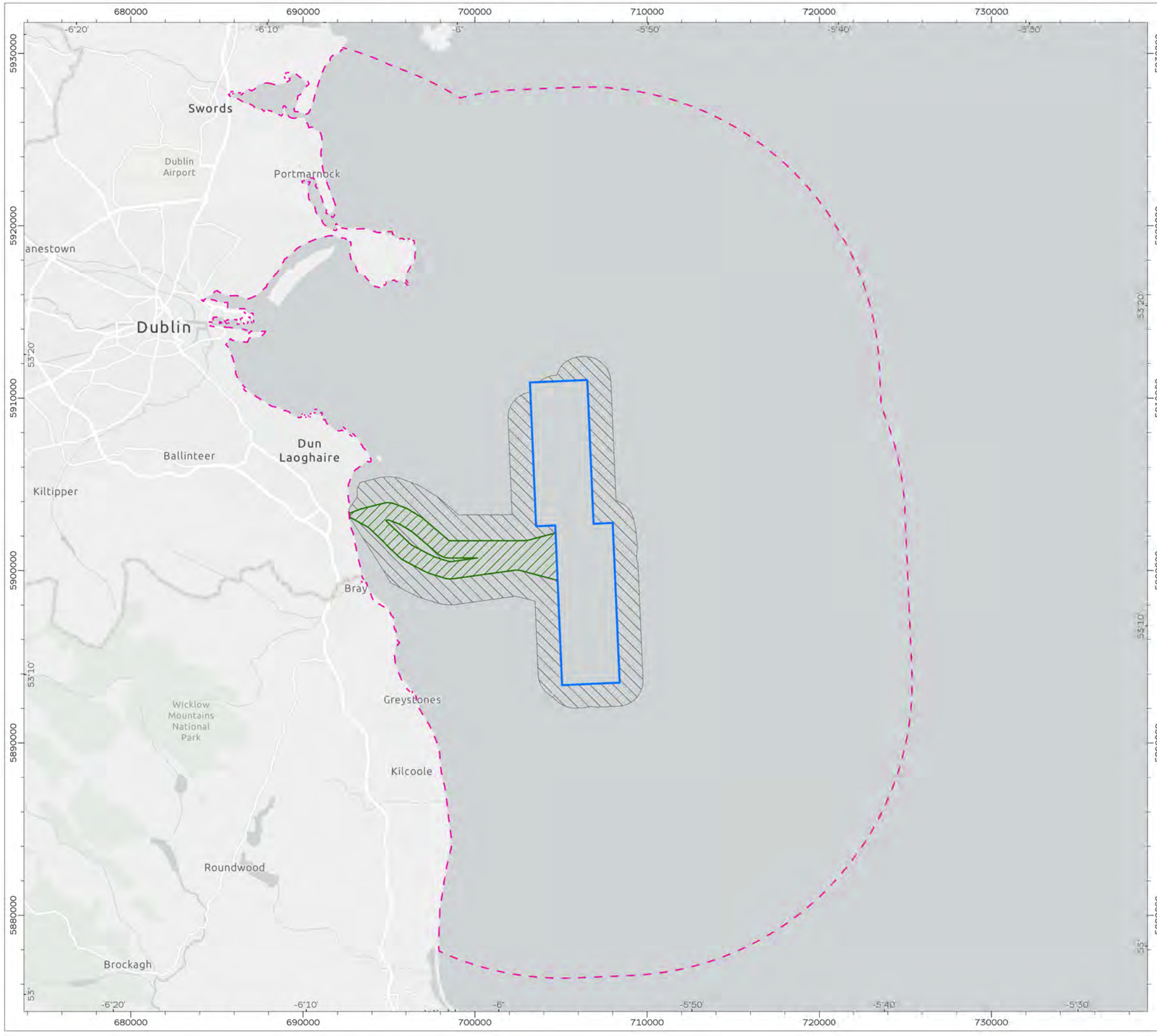
11.4.3 For the purposes of the EIA, the marine infrastructure and other users study area (hereafter referred to as the study area) is defined as the project boundary, which includes all offshore works including wind turbine generators (WTGs) and offshore substation platform (OSP) and associated inter-array cabling (IAC) within the array and offshore export cables and landfall, together with a wider impact ZoI, as shown in Figure 1. The ZoI has been defined as 17[3] km based on a spring tidal excursion (being 16km) from the boundary of the proposed array area and Offshore ECC[4] plus a 1km buffer (see Physical Processes Modelling Report: Volume 4, Appendix 3.1-2). Therefore, a study area of a 17 km buffer around the array area and Offshore ECC is considered to be precautionary and to encapsulate the area within which all of the potential significant secondary or indirect effects on MI&OU might occur.

[3] All distances are taken from the outer boundary of all offshore works incorporating the offshore infrastructure, the buffer also incorporates the temporary occupation area and as such are inherently precautionary
[4] Activities undertaken within the temporary occupation area, namely the use of jack-up vessels and anchors during the construction, O&M, and decommissioning phases have been screened out within the physical processes chapter for suspended sediment and deposition with their use not resulting in notable changes in SSC and associated sediment deposition, however the use of a buffer ensures a precautionary approach is taken.

11.4.4 The study area has been aligned with the Physical Processes Chapter so that it encapsulates the area in which measurable sediment deposition may theoretically occur. This has been considered appropriate as sediment deposition is considered to be the effect with the greatest spatial extent most likely to impact MI&OU. The study area is limited to the marine and coastal environment below Mean High Water Springs (MHWS).

Telecommunications onshore study area

11.4.5 The proposed turbines are located some 10 km from the nearest land where telecommunications masts are located. The onshore study area for telecommunications was limited to a corridor from Blackrock, following the N11/M11 southwards, terminating at Greystones. Telecommunications towers were identified in an area from the N11/M11 eastwards towards the shoreline, given the natural topography of this area, largely low-lying shoreline gradually sloping upwards to the Dublin / Wicklow Mountains. No telecommunications masts were identified offshore.



Marine Infrastructure and Other Users Study Area (17km Buffer)

Array Area

Temporary Occupation Area

Export Cable Corridor

DRAWING STATUS

FINAL

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MAP NOTES / DATA SOURCES:

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Geographical Overview of the Study Area Relating to MI & OU

DRAWING NUMBER: **1**

PAGE NUMBER: **1 of 1**

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DATUM WGS 1984 VERTICAL REF LAT

PRJ WGS 1984 UTM Zone 29N

GoBe

DublinArray Generation for generations

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Baseline Data

11.4.6 Information on MI&OU within the study area was collected through a detailed desktop review and interrogation of existing licences and datasets. A list of data sources used is presented in Table 2. The baseline characterisation for MI&OU within the EIAR has not required primary survey work, as it relies, for the most part, on data pertaining to existing licences for the as built (or proposed) infrastructure. Every effort has been made to consult with licensed operators and regulating bodies to ensure for all existing licences, the data is up to date and no licences or amendments have been applied, together with any new licences that are pending. Further information on the consultation effort is provided in Section 11.3.

Table 2 Data sources considered in the development of the marine infrastructure and other users baseline

Data source	Type of data	Spatial coverage
4coffshore	▪ Location and project status of windfarms in Ireland	Ireland wide
Gas Networks Ireland (formerly known as Bord Gais Networks)	▪ Pipeline map displays the location of pipelines for gas connections	Ireland wide
The Environmental Protection Agency (EPA)	▪ Dumping at Sea; and ▪ Wastewater Treatment and Disposal locations.	Ireland wide
INFOMAR	▪ Physical, chemical and biological features of the seabed	Ireland wide
ComReg Site Viewer	▪ Location of telecommunications and media masts	Ireland wide
The Integrated Petroleum Affairs System (Department of Communications, Energy and Natural Resources)	▪ Location and status of offshore wells and authorisations	Ireland wide
The Kingfisher cable Awareness Chart (Irish Sea)	▪ Location of cables across the Irish Sea	Cable charts available for all waters around Ireland and Britain
The Marine Institute Marine Atlas	▪ Marine data set covered renewable energy resources, aquaculture and offshore energy licensing and infrastructure.	Ireland wide
Maritime Area Regulatory Authority (MARA)	▪ List of applications for a licence under the Maritime Area Planning Act 2021 ▪ List of applications for pending licences under the Foreshore Act 1933	Ireland wide
MIDA Marine Irish Digital Atlas	▪ Coastal and marine spatial data in Ireland including infrastructure	Ireland wide

Assessment methodology

11.4.7 As described above the baseline was established through the compilation of best available evidence from a desk-based review of the data sources identified in Table 2, including a review of licences and consents and applications and consultation with operators.

11.4.8 The assessment of potential impacts on MI&OU has considered the magnitude and duration of the impact, the reversibility of the impact and the timing and frequency of the activity. The sensitivity of different receptors has also been considered as part of the impact assessment, taking into account their anthropogenic nature. The sensitivity assessment of individual receptors has taken into account their current status and importance (locally, regionally, nationally or internationally), as detailed within Section 11.5, Assessment Criteria.

Telecommunications

11.4.9 Given the nature of telecommunications, a different approach has been taken in the assessment. All antenna / signal towers for telecommunications and media are mapped through the Commission for Communications Regulation (ComReg) site viewer[5]. This tool provides a location for each communications mast across all of the Republic of Ireland. Each mast location includes a mast ID, the name of the service provider, the coordinates of each mast and the service type provided.

11.4.10 The ComReg site viewer was consulted in November 2024 to ascertain the service providers of each tower located within the study area. One hundred eighty-seven (187) telecommunications sites were identified during this review, comprising three telecommunications service providers within the area – these are Three, , Eircom and Vodafone. Additionally, communications towers for RTÉ were also located in the area at Greystones. Further west but outside the Study Area is the Kippure transmitter in the Dublin Mountains and to the north west is the Three Rock transmitter at Stepaside, which is also located in the Dublin mountains.

11.4.11 During the baseline survey each service provider was contacted independently (as noted in Section 11.3) to ascertain what impacts, if any would occur from the proposed development on signal scattering and obstruction, electromagnetic fields and reflection. Each operator was provided with a list of their telecommunications masts identified within the study area. Table 1 provides a summary of the consultation undertaken for MI&OU to date for Dublin Array, including telecommunications responses.

11.5 Assessment criteria

11.5.1 This assessment for MI&OU is consistent with the EIA methodology presented in the EIA Methodology Chapter. The criteria for determining the sensitivity of the receiving environment and the identified impacts for the MI&OU assessment are defined in Table 3 and Table 4 respectively. A matrix was used for the determination of significance in EIA terms (see Table 5). The combination of the magnitude of the impact with the sensitivity of the receptor determines the assessment of significance of the effect.

[5]Commission for Communications Regulation Site Viewer https://siteviewer.comreg.ie/#explore

Sensitivity of asset criteria

11.5.2 As set out in the EIA Methodology chapter the sensitivity of a receptor (in this case an asset) is a function of its capacity to accommodate change and reflects its ability to recover if it is affected. The sensitivity is quantified via a consideration of its context (its adaptability, tolerance, and recoverability) and value.

11.5.3 However, due to the anthropogenic nature of MI&OU, not all the above quantifiers are appropriate for this assessment. Adaptability is not considered in this assessment as the assets in question are not part of a natural system and thus cannot adapt in response to change. It is also noted that recoverability as used within this chapter assumes a level of anthropogenic input (such as repair or a maintenance activity), as the assets are not part of a natural system and thus cannot recover independently.

11.5.4 Table 3 sets out the criteria used in defining the sensitivity of the identified MI&OU assets. Four defined levels of sensitivity have been determined (High, Medium, Low or Negligible) and where one of the definitions, for a given level, is met then this will determine the level of sensitivity assigned. Where an asset could reasonably be assigned more than one level of sensitivity, professional judgement has been used to determine which level is the most applicable.

Table 3 Sensitivity/ importance of the environment

Asset sensitivity / Importance	Definition
High	**Tolerance:** Asset is highly vulnerable to impacts that may arise from the project. **Recoverability:** Recoverability is long-term or not possible. **Value:** Asset is of high value or importance, with critical importance to the regional or national economy.
Medium	**Tolerance:** Asset is moderately vulnerable to impacts that may arise from the project. **Recoverability:** Asset has moderate to high levels of recoverability. **Value:** Asset is of medium value or importance, with reasonable contribution to the value of the local, regional, or national economy.
Low	**Tolerance:** Asset is not generally vulnerable to impacts that may arise from the project. **Recoverability:** Asset has high levels of recoverability. **Value:** Asset is of minor value or importance with a low level of contribution to the value of the regional or national economy.
Negligible	**Tolerance:** Asset is not vulnerable to impacts that may arise from the project. **Recoverability:** Asset has high recoverability. **Value:** Asset is of minor value or importance, with a low or very low level of contribution to the value of the local or regional economy.

Magnitude of impact criteria

11.5.5 It is noted here that a distinction is made throughout the assessment between the magnitude, as defined by the spatial extent, duration[6], frequency, likelihood and consequences/ reversibility of the impact and the resulting significance of the potential 'effects' upon MI&OU receptors. The descriptions of magnitude are specific to the assessment of MI&OU impacts and are considered against the magnitude descriptions presented in Table 4. Potential impacts have been considered in terms of whether they are adverse or beneficial effects.

11.5.6 Where an effect could reasonably be assigned more than one level of magnitude, professional judgement has been used to determine which rating is applicable with the primary judgement relating to the potential consequences of the impact. The level has been assigned based on the most appropriate potential consequences of the impact as defined for each level of magnitude (see Table 4). For example, an impact may occur constantly throughout the O&M period but does not affect other users' activities in practice, therefore it would be concluded to be of a Negligible magnitude despite the frequency of the impact.

11.5.7 For the purposes of the definitions below, near-field has been defined as within the array area and Offshore ECC. Far-field has been defined as extending beyond these boundaries but within the study area.

[6] This is the duration of the impact and not the time taken for the receptor to recover.

Table 4 Magnitude of the impact

Magnitude	Definition
High	**Extent:** The maximum extent is beyond the study area. **Duration:** The impact is anticipated to be permanent (i.e., over 60 years). **Frequency:** The impact will occur constantly throughout one or more project phases. **Probability:** The impact is likely to occur. **Consequences:** Total loss of ability to carry on activities and/ or the asset can no longer operate. The effect is not reversible**.**
Medium	**Extent:** The maximum extent of the impact is restricted to the study area. **Duration:** The impact is anticipated to be medium-term (i.e., seven to 15 years) to long-term (15 to 60 years). **Frequency:** The impact will occur constantly throughout a project phase. **Probability:** The impact is reasonably likely expected to occur. **Consequences:** Disturbance and/ or loss of access to an asset which may lead to a reduction in the level of activity that may be undertaken or the operation of an asset. This effect is anticipated to occur throughout an entire project phase.
Low	**Extent:** The maximum extent of the impact is restricted to the near-field and adjacent far-field areas. **Duration:** The impact is anticipated to be temporary (i.e., lasting less than one year) to short-term (i.e., one to seven years). **Frequency:** The impact will occur frequently throughout a project phase. **Probability**: The impact is unlikely to occur. **Consequences:** Disturbance and/ or loss of access to an asset which may lead to a reduction in the level of activity that may be undertaken or the operation of an asset. This effect is reversible and temporary.
Negligible	**Extent:** The maximum extent of the impact is restricted to the near-field and immediately adjacent far-field areas. **Duration:** The impact is anticipated to be momentary (seconds to minutes) to brief (lasting less than a day). **Frequency:** The impact will occur once or infrequently throughout a relevant project phase. **Probability:** The impact is not anticipated to occur. **Consequences:** Disturbance and/ or loss of access to an asset which does not affect the operation of the asset.

Defining the significance of effect

11.5.8 The significance of effect associated with the impact will be dependent upon the sensitivity of the asset and the magnitude of the effect. The assessment methodology of the significance of potential effects is described in Table 5. For the purposes of this assessment given assets are unable to adapt to change, potential effects identified to be of moderate significance or above are considered to be significant in EIA terms and additional mitigation will be required. Any effect that is slight (minor) or below is not significant with respect to the EIA Regulations.

Table 5 Significance of potential effects

			Existing Environment - Sensitivity			
			High	Medium	Low	Negligible
Description of Impact - Magnitude	Adverse impact	High	Profound or Very Significant	Significant	Moderate*	Imperceptible
		Medium	Significant	Moderate	Slight	Imperceptible
		Low	Moderate	Slight	Slight	Imperceptible
	Neutral impact	Negligible	Not significant	Not significant	Not significant	Imperceptible
	Positive impact	Low	Moderate	Slight	Slight	Imperceptible
		Medium	Significant	Moderate	Slight	Imperceptible
		High	Profound or Very Significant	Significant	Moderate	Imperceptible

*Moderate levels of effect have the potential, subject to the assessor's professional judgement, to be significant. Moderate will be considered as significant or not significant in EIA terms, depending on the sensitivity and magnitude of change factors evaluated. These evaluations are explained as part of the assessment, where they occur.

11.6 Receiving environment

11.6.1 The characterisation presented in this chapter focuses primarily on the study area as defined in Section 11.4 by the ZoI. The study area encompasses the array area as well as the offshore ECC and encapsulates the predicted zone of potential primary (direct) and secondary (indirect) impacts of the development.

Oil and Gas

Existing infrastructure

11.6.2 As presented in Figure 2, three oil well heads developed during previous exploration activity by other developers have been identified within the array area and study area with a fourth outside the study area. These are defined as 'Dry Holes'[7] by DCCAE (2020), therefore, it is understood that these have been plugged and abandoned as no significant reserves of oil were found during exploration.

[7] The term "dry hole" was originally used in oil exploration to describe a well where no significant reserves of oil were found. This term is now often used to describe any fruitless commercial initiative.

11.6.3 The Climate Action and Low Carbon Development Act 2015, as amended in 2021, repeals several sections of the Petroleum and Other Minerals Development Act 1960, as amended. This ended the issuing of new licences for the exploration and extraction of gas, whilst providing a saver for certain applications and undertakings pending.

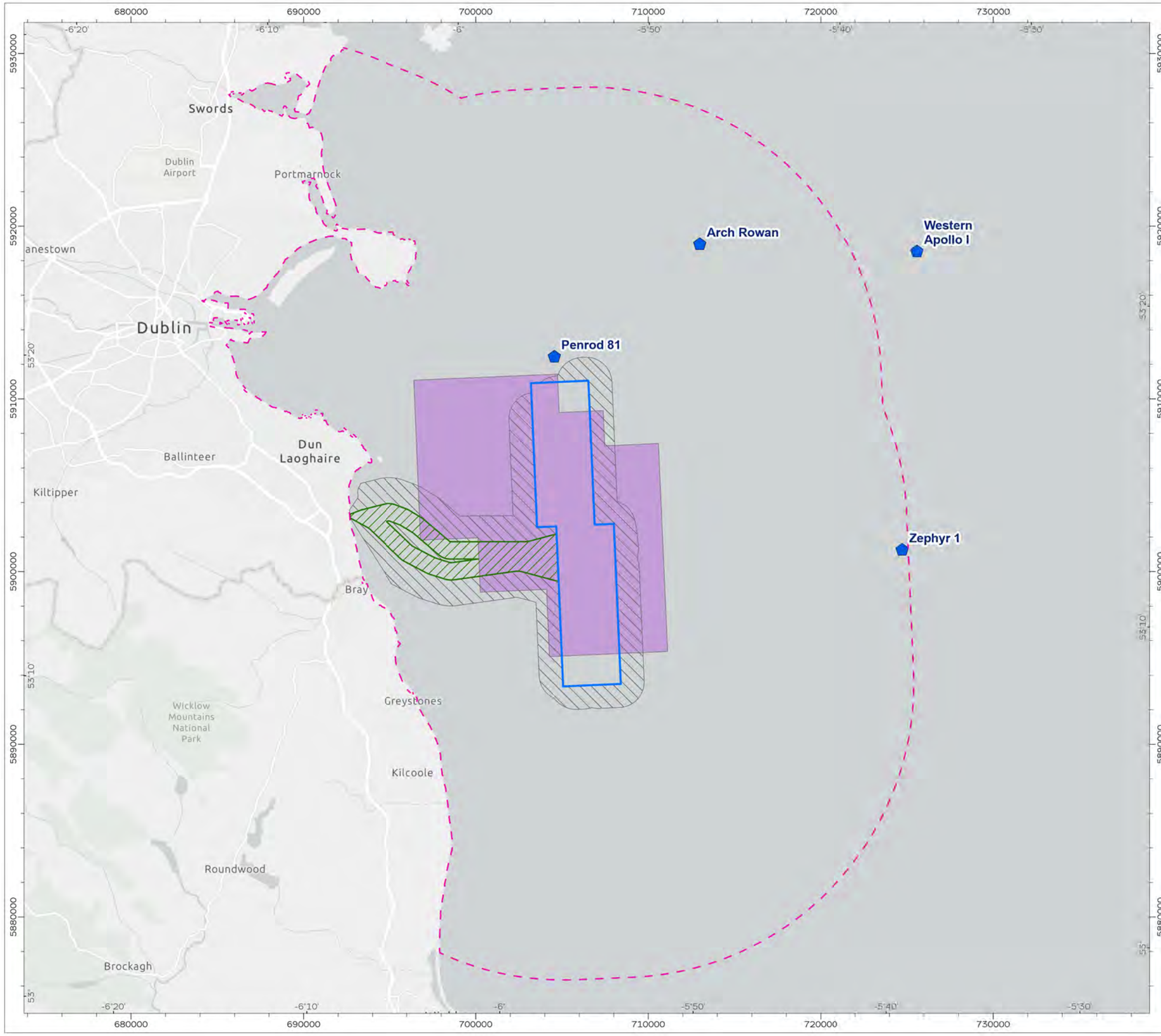
Historic licences

11.6.4 Providence Resources PLC was awarded in 2008 a Licensing Option (LO) in the Kish Bank Basin, which lies 8 km offshore of Dublin, in 25 m water depth. The LO 08/2 was originally awarded to Providence (50%) and Star Energy (Petronas, 50%).

11.6.5 In December 2011, LO 08/2 was converted into an Exploration Licence (EL) EL 2/11 with the same working interests and an exploration well commitment was made by the Joint Venture (JV) partners.

11.6.6 In January 2016, Providence assumed a 100% working interest in EL 2/11 and subsequently, sought an extension from the Irish government which was granted to extend the first phase of the Licence by two years until 17th August 2018 and an overall extension of one year to the licence term until 17th August 2020. The Kish Bank Basin (Figure 2) is no longer licensed for oil exploration[8] and is not considered any further in this assessment.

[8] https://www.gov.ie/en/publication/10d43-acreage-reports-and-concession-maps/#2021 (accessed 02/12/24)



Marine Infrastructure and Other Users Study Area (17km Buffer)

Array Area

Temporary Occupation Area

Export Cable Corridor

Exploration Licence (Kish Bank Basin)

Oil Well

DRAWING STATUS

FINAL

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MAP NOTES / DATA SOURCES:

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Oil and Gas Exploratory Wells in the Study Area

DRAWING NUMBER: **2**

PAGE NUMBER: **1 of 1**

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01	2024-04-22	For Issue	GB	BB	SS

0 2 4 6 8 km

0 1 2 3 4 nm

N GRID NORTH

SCALE 1:225,000 PLOT SIZE A3

DATUM WGS 1984 VERTICAL REF LAT

PRJ WGS 1984 UTM Zone 29N

GoBe

APEM group

Dublin Array

Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Subsea cables and gas pipelines

Existing Infrastructure

11.6.7 Ireland is connected by several existing telecommunications cables and gas pipelines to the UK, continental Europe, and the USA. Through GIS analysis of publicly available data sources various, cables and pipelines in the study area have been identified (see Figure 3). In addition, there are numerous proposed telecommunication cables within Irish waters where exact cable route and landfall locations are yet to be determined. As shown in Figure 3, six active cables cross the study area as shown in Figure 3; however, no active cables overlap with the array area or Offshore ECC or offshore temporary occupation area.

11.6.8 Three active submarine telecommunications cables make landfall in Dublin Bay - ESAT2, Hibernia 'D' (also known as the GTT Atlantic cable) and CeltixConnect-2 Three further active submarine telecommunications cables make landfall to the north of Dublin Bay - Hibernia 'C', Emerald Bridge one and Sirius South. (see Figure 3).

11.6.9 With the exception of Hibernia 'D', all of the above cables are routed in a north easterly direction from their landfall site in Ireland towards the UK. Hibernia 'D' however, is routed south east from Dublin, passing approximately [9]1.8 km from the north west corner of the proposed array area, outside of the offshore temporary occupation area (see Figure 3).

11.6.10 The Booterstown to Poolbeg pipeline is a Gas Networks Ireland underwater natural gas pipeline between Booterstown and Poolbeg in Dublin Bay. The pipeline does not overlap with the array area or Offshore ECC.

11.6.11 Details on the above assets and the proximity to the proposed development are included in Table 6.

Planned Infrastructure

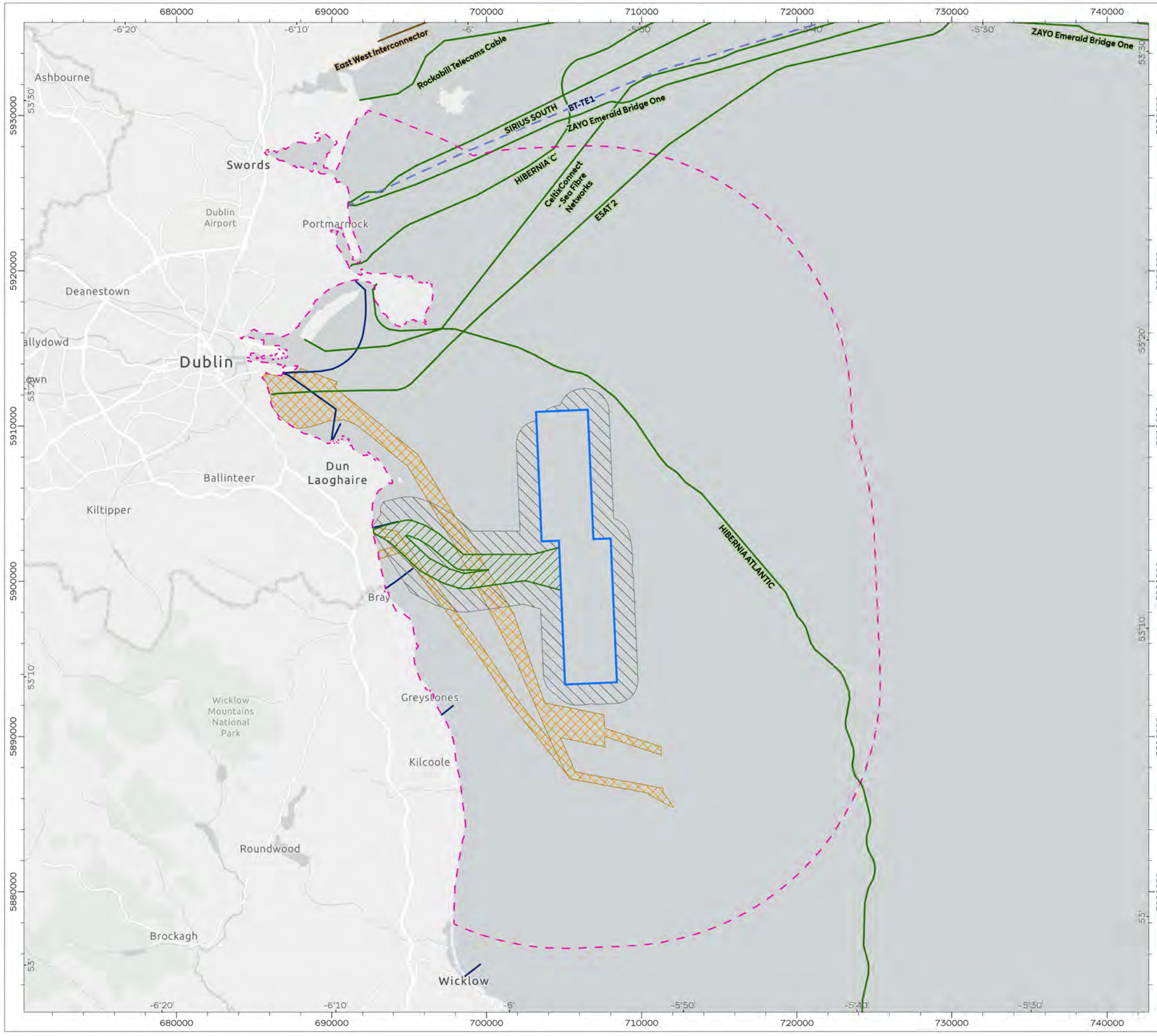
11.6.12 The MaresConnect is a proposed subsea electricity interconnector cable that will connect Wales and Ireland making landfall in Dublin. The MaresConnect project is targeting operation in 2029 with construction scheduled from 2026 subject to licences and approvals. At landfall it will connect to an existing sub-station in the Greater Dublin Area, although the exact cable landfall and route are currently unknown. These will be determined following extensive technical and environmental studies as well as consultations with local planning authorities, the respective grid operators and local communities to identify the optimum marine cable route corridor.

[9] Distances provided are straight line (geodesic) as calculated using GIS and as such are precautionary in nature.

Table 6 Distance of cables and pipelines to Dublin Array

Type	Name	Status	Closest distance to array (km)	Closest distance to Offshore ECC (km)
Telecomm cable	ESAT 2	Active	7.0	8.4
Telecomm cable	CeltixConnect – Sea Fibre Networks	Active	8.1	11.3
Telecomm cable	Hibernia 'D'	Active	1.7	8.7
Telecomm cable	Hibernia 'C'	Active	14.3	16.80
Telecomm cable	Emerald bridge	Active	16.5	20.5
Telecomm cable	Sirius south	Active	17.3	20.7
Telecomm cable	BT-TE1	Non-operational	17.1	20.6
Subsea electricity	MaresConnect	Proposed	[10]tbc	tbc
Gas pipeline	Booterstown and Poolbeg pipeline	Constructed	6.4	7.3

10 The final cable route and landfall have not been determined at the date of publication https://maresconnect.ie/home-5/the-interconnector/ Accessed June 2024,



- Marine Infrastructure and Other Users Study Area (17km Buffer)
- Array Area
- Temporary Occupation Area
- Export Cable Corridor
- Codling Wind Park - Proposed Export Cable Corridor
- Pipeline

Subsea Cable (Type - Status)

- Power - Active
- Telecom - Active
- Telecom - Disused

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MAP NOTES / DATA SOURCES:

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Subsea Cables and Pipelines within the Study Area

DRAWING NUMBER: **3**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2024-04-22	For Issue	GB	BB	SS

0 2 4 6 8 km
0 1 2 3 4 nm

N (GRID NORTH)

SCALE 1:250,000 PLOT SIZE A3
DATUM WGS 1984 VERTICAL REF LAT
PRJ WGS 1984 UTM Zone 29N

GoBe

Dublin Array
Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Dredging and Dumping At Sea Sites

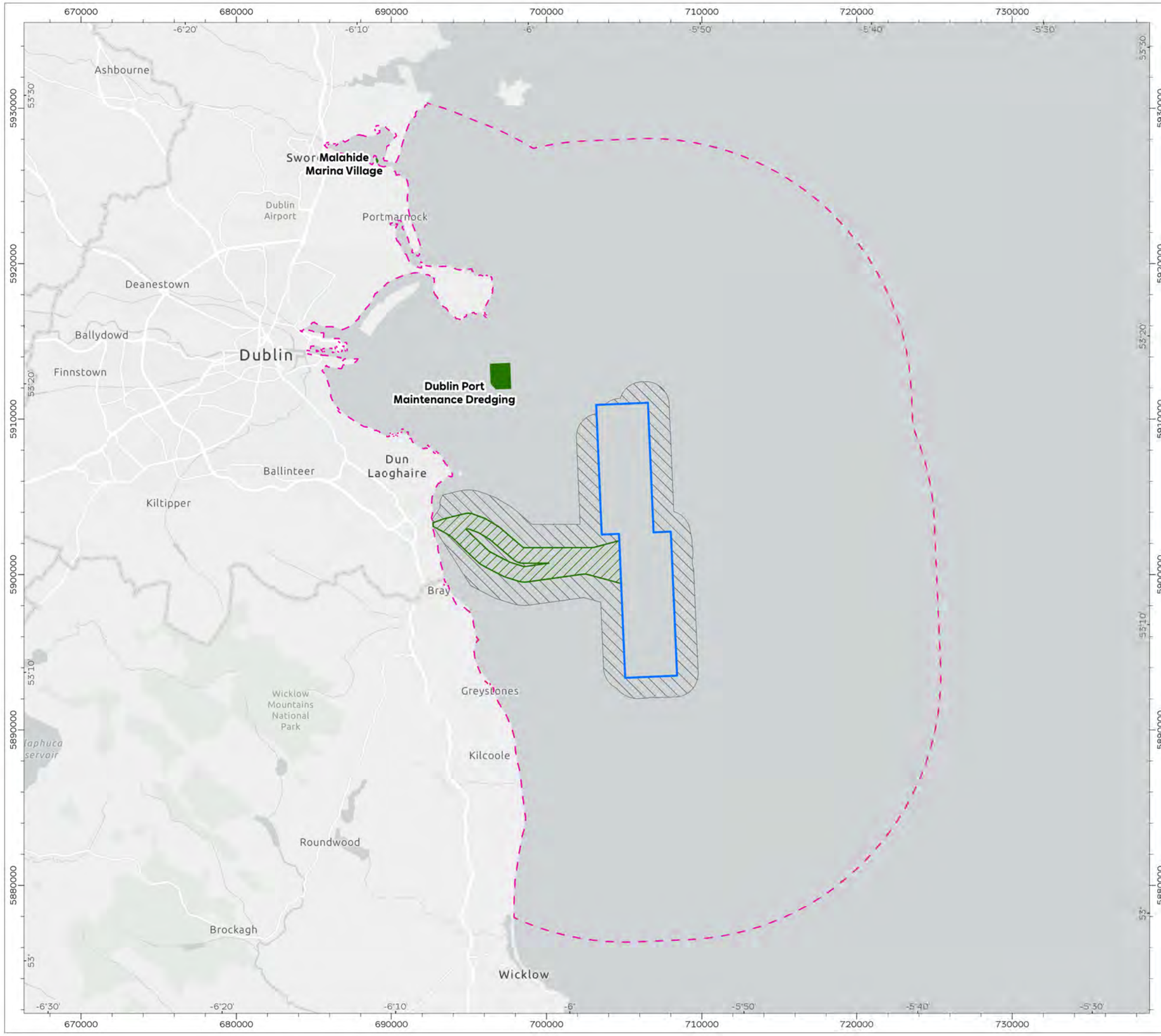
11.6.13 The Foreshore and Dumping at Sea (Amendment) Act 2009 makes it the function of the EPA to regulate Dumping at Sea (DAS) Permits. In outer Dublin Bay, to the west of Burford Bank, is an existing licensed offshore DAS site used by Dublin Port to dispose of dredged material as part of the Alexandra Basin re-development scheme. The Burford Bank site has historically been used by Dún Laoghaire Harbour Company, Howth Yacht Club and the Dublin Local Authorities for the disposal of dredged material.

11.6.14 The following licences exist, or have been applied for, in relation to dredging within the study area:

- Dublin Port Company (Permit S0024-02, expires in 2035);
- Dublin Port Company (Permit: S0004-03, expires in 2029); and
- Malahide Marine Village (Permit S0031-01 expires in 2025).

11.6.15 There are two historic DAS sites which were used for the disposal of sewage sludge by Dublin Corporation (Poolbeg) in the 1990s. These sites are located between Howth and Bennet Bank, and to the east of the Kish Bank. None of these sites are considered to be live (EPA[11]).

[11] https://gis.epa.ie/EPAMaps/ (Accessed October 2024)



Marine Infrastructure and Other Users Study Area (17km Buffer)

Array Area

Temporary Occupation Area

Export Cable Corridor

Dumping at Sea Site

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MAP NOTES / DATA SOURCES:

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PROJECT TITLE

Dublin Array

DRAWING TITLE

DAS sites within the Study Area

DRAWING NUMBER: **4**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2024-04-22	For Issue	GB	BB	SS

0 2 4 6 8 km

0 1 2 3 4 nm

SCALE 1:250,000 PLOT SIZE A3

DATUM WGS 1984 VERTICAL REF LAT

PRJ WGS 1984 UTM Zone 29N

GoBe

APEM group

Dublin Array

Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Wastewater

11.6.16 There are 63 wastewater assets, including outfalls and treatment works, within the study area, primarily Shanganagh wastewater treatment works and the recently extended Ringsend wastewater treatment works (Figure 5).

11.6.17 The sewerage pipelines consist of long sea outfalls associated with wastewater treatment works, which extend 0.95 km to 2.20 km offshore, and pipelines which pump the effluent to elsewhere in the sewerage network. There are two long sea outfalls extending offshore and within the Offshore ECC operated by Uisce Éireann

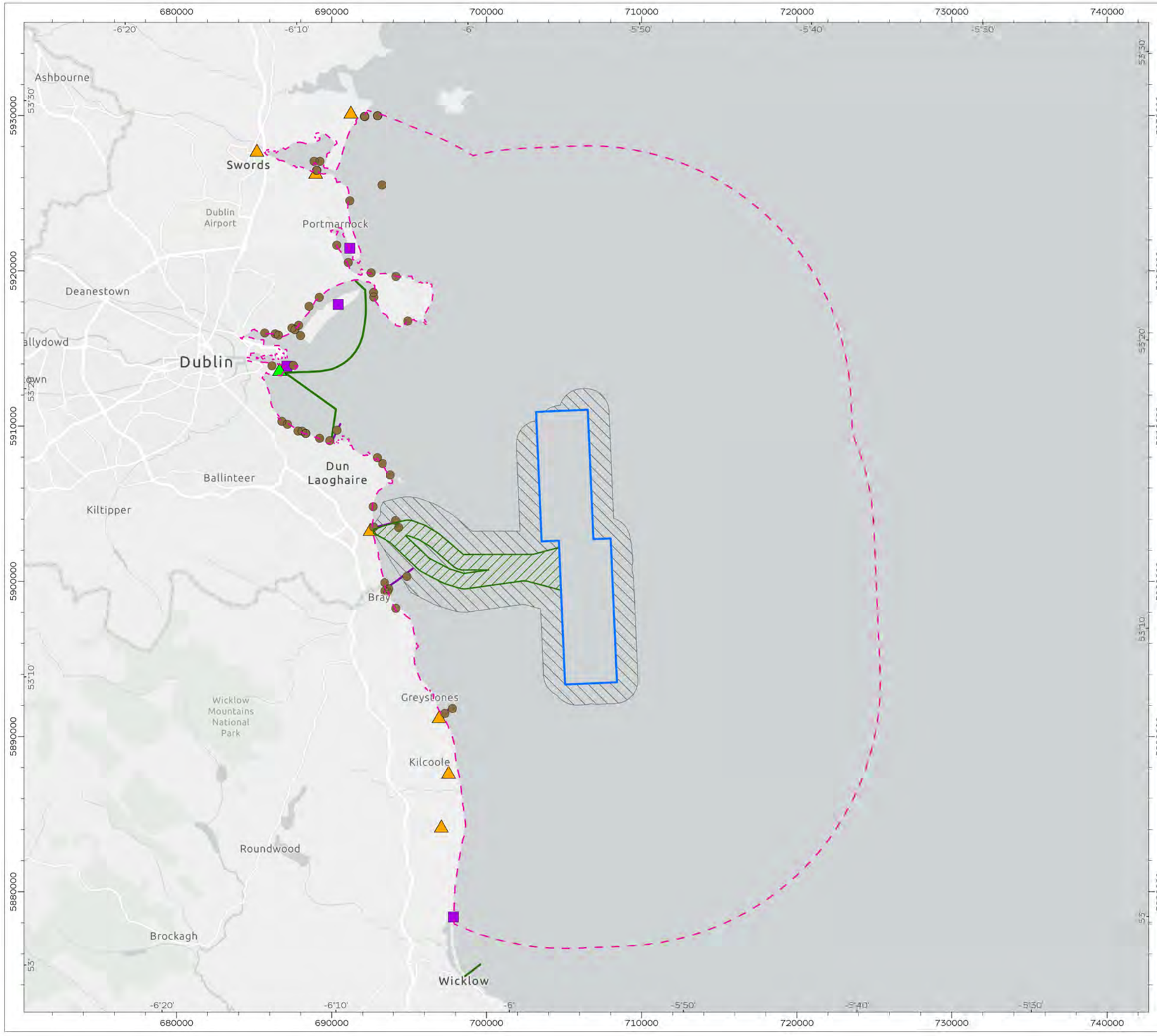
11.6.18 As shown in Figure 3, there are an additional two sea outfalls within the study area; however, these do not intersect the project infrastructure, and are not considered further within this assessment. The discharge of wastewater into the marine environment is regulated by the Waste Water Discharge (Authorisation) Regulations 2007, as amended. As presented in Figure 5, there are eight wastewater treatment works for wastewater within the study area.

11.6.19 There are four types of sewage effluent[12] outfall within the study area - primary, secondary, tertiary and storm water overflow which are characterised by the degree of wastewater treatment that is undertaken. There are a total of 50 licenced discharge locations (DLs) within the study area, with zero in the array area and three within the offshore ECC (Figure 5). Presented in Figure 5 are the details of the 50 DLs .

11.6.20 Figure 5There are four Section 4 trade effluent Discharge Licences within the study area. Section 4 trade effluent Discharge licences are issued under Section 4 of the Local Government (Water Pollution) Act 1977, as amended, in respect of the discharge of trade effluent to surface water or groundwater. Licences issued by local authorities under section 4 set conditions to control discharges in a manner that protects the receiving environment, including Dublin Bay and the surrounds. The details of these trade effluent outfalls are presented in Figure 5.

11.6.21 Further details of the wastewater outfalls and wastewater treatment works, including locations and treatment type, is provided in Annex A.

[12] Effluent can be defined as “wastewater - treated or untreated - that flows out of a wastewater treatment works, sewer, or industrial outfall”. The treatment levels are primary, secondary, tertiary and storm overflows (no treatment)



- Marine Infrastructure and Other Users Study Area (17km Buffer)
- Array Area
- Temporary Occupation Area
- Export Cable Corridor
- Waste Water Discharge Location
- Raw Sewage & Waste Water Treatment Works
- Waste Water Treatment Works
- Section 4 Trade Effluent
- Outfall Pipe
- Sewer Pipe

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PROJECT TITLE

Dublin Array

DRAWING TITLE

Wastewater Assets in the Study Area

DRAWING NUMBER: **5**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2024-04-22	For Issue	GB	BB	SS

0 2 4 6 8 km
0 1 2 3 4 nm

N (GRID NORTH)

SCALE 1:250,000 PLOT SIZE A3
DATUM WGS 1984 VERTICAL REF LAT
PRJ WGS 1984 UTM Zone 29N

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Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Other marine renewable energy projects

Existing OWF

11.6.22 The Arklow Bank Wind Park 1, located 10 km off the coast of Arklow on the Arklow Bank in the Irish Sea, was Ireland's first offshore wind farm and to date is the only wind farm in Ireland. The wind farm is owned and built by GE Energy and was co-developed by Airtricity and GE Energy. The site has 7 GE Energy 3.6 MW turbines that generate a total of 25 MW. A second phase of wind energy development is planned at Arklow Bank, known as Arklow Bank Wind Park 2, which is for 520 MW. It is noted that the potential decommissioning of Arklow Bank Wind Park 1 is referred to in the planning application for Arklow Bank Wind Park 2, but no further details are provided. Both Arklow Bank projects lie over 25 km from Dublin Array and therefore are outside of the study area for this chapter of the EIAR and not considered further in this chapter.

Planned Projects

11.6.23 The Offshore Renewable Energy Development Plan (OREDP) (DCCAE, 2014, reviewed 2018) identified opportunities to develop Ireland's abundant renewable energy resource. The OREDP was subject to Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA). The SEA identified and considered the proposed Dublin Array project together with other planned marine renewable energy projects (SEA and Addendum, 2010, 2011). The Maritime Area Planning Act 2021, as amended (MAP Act), made special provision for proposed OWF projects to transition from the former foreshore leasing system under the Foreshore Act 1933, as amended, to the new consent architecture under the MAP Act. These provisions facilitated several OWF projects to make an application for development permission under the Planning and Development Act 2000, as amended by the MAP Act, as a first phase in the Government's offshore wind strategy, as subsequently set out in the Climate Action Plans and National Energy and Climate Plans. The first phase of projects ('Phase 1' projects) includes the Dublin Array, Arklow Bank Wind Park 2 (referred to above), Codling Wind Park, Oriel Wind Park, and the North Irish Sea Array offshore wind projects in the Irish Sea. Each of these projects has secured a Maritime Area Consent (MAC) from the Maritime Area Regulatory Authority (MARA) and are 'planned projects' for the purposes of this chapter of the EIAR.

11.6.24 Codling Wind Park is the only Phase 1 project within the study area. Table 7 and Figure 6 provides the status and location. An application for development permission has been submitted to An Bord Pleanála under section 293 of the Planning Acts to construct and operate the Codling Wind Park, with a requested operating life of 25 years from the date of commissioning of the wind farm (ABP Ref 320768-24). Codling Wind Park has secured an offer quantity of 1300 MW in Ireland's first Offshore Renewable Energy Support Scheme (ORESS), and is seeking development permission for either 75 WTGs with a rotor diameter of 250m and blade type height of 287.72 m above Lowest Astronomical Tide (LAT) on monopile foundations, or 60 WTGs with a rotor diameter of 276m and blade tip height of 313.72m above LAT on monopile foundations, with three offshore export cables to be installed within a defined offshore export cable corridor as outlined in the application (Figure 6), which will transmit electricity generated by the WTGs via the onshore substation to the TJBs at the landfall location on the southern shoreline of Poolbeg Peninsula (Codling Wind Park, 2024[13]).

11.6.25 The two Dublin Array export cables from the OSP to landfall will cross three planned export cables from the proposed Codling Wind Park project, with six cable crossings identified. Export cables will cross each other in a corridor approximately 1 km wide and 3 km long located on the west side of the Kish and Bray Banks which will be east of the Fraser Bank.

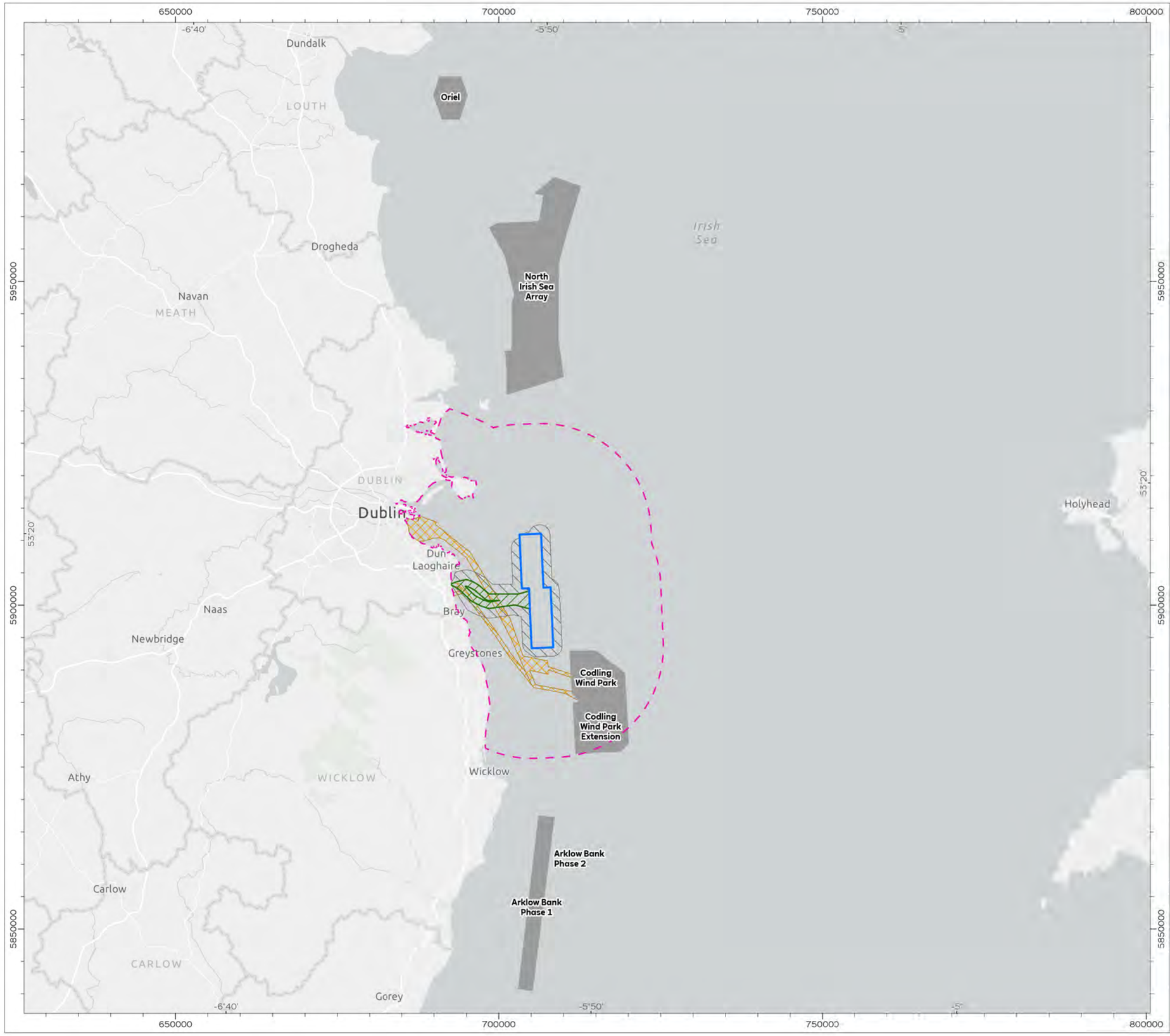
11.6.26 It is the Government's intention to hold a second ORESS in 2025 in relation to a proposed second phase of offshore renewable energy (ORE) development[14] within a defined spatial boundary as set out in the South Coast Designated Maritime Area Plans (SC-DMAP, 2024). Whilst there are large areas of potential ORE development identified around Ireland, there is uncertainty regarding route to grid, route to market, or the future plans or DMAPs that may be made to facilitate such ORE projects[15]. Accordingly, only the Phase 1 projects within the study area are considered further.

11.6.27 No other marine renewable energy projects (such as tidal energy) are present or planned within the study area.

Table 7 Offshore renewable energy sites within the MI&OU study area (Dublin Array excluded)

Offshore Wind Farm	Operator/Developer	Status	Distance to Offshore ECC (km)	Distance to array area (km)
Codling Wind Park and Codling Wind Park Extension	Codling Wind Park Ltd	MAC awarded and application submitted September 2024. Indicative construction commencement dates 2027-2028, lasting 2 years.	0	2.9

[13] https://codlingwindparkplanningapplication.ie/environmental-impact-assessment-report-eiar/
[14] https://www.gov.ie/en/publication/dac99-oress-tonn-nua-offshore-wind-auction/
[15] The Future Framework Policy Statement for Offshore Renewable Energy, 2024 - https://www.gov.ie/en/publication/0566b-future-framework-for-offshore-renewable-energy/



- Marine Infrastructure and Other Users Study Area (17km Buffer)
- Array Area
- Temporary Occupation Area
- Export Cable Corridor
- Phase 1 Offshore Wind Farms
- Codling Wind Park - Proposed Export Cable Corridor

DRAWING STATUS

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MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Offshore Renewable Energy Sites in the Study Area

DRAWING NUMBER: **6**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2024-04-22	For Issue	GB	BB	SS

0 5 10 15 20 km

0 3 6 9 12 nm

N GRID NORTH

SCALE 1:600,000 PLOT SIZE A3

DATUM WGS 1984 VERTICAL REF LAT

PRJ WGS 1984 UTM Zone 29N

GoBe APEM group

Dublin Array Generation for generations

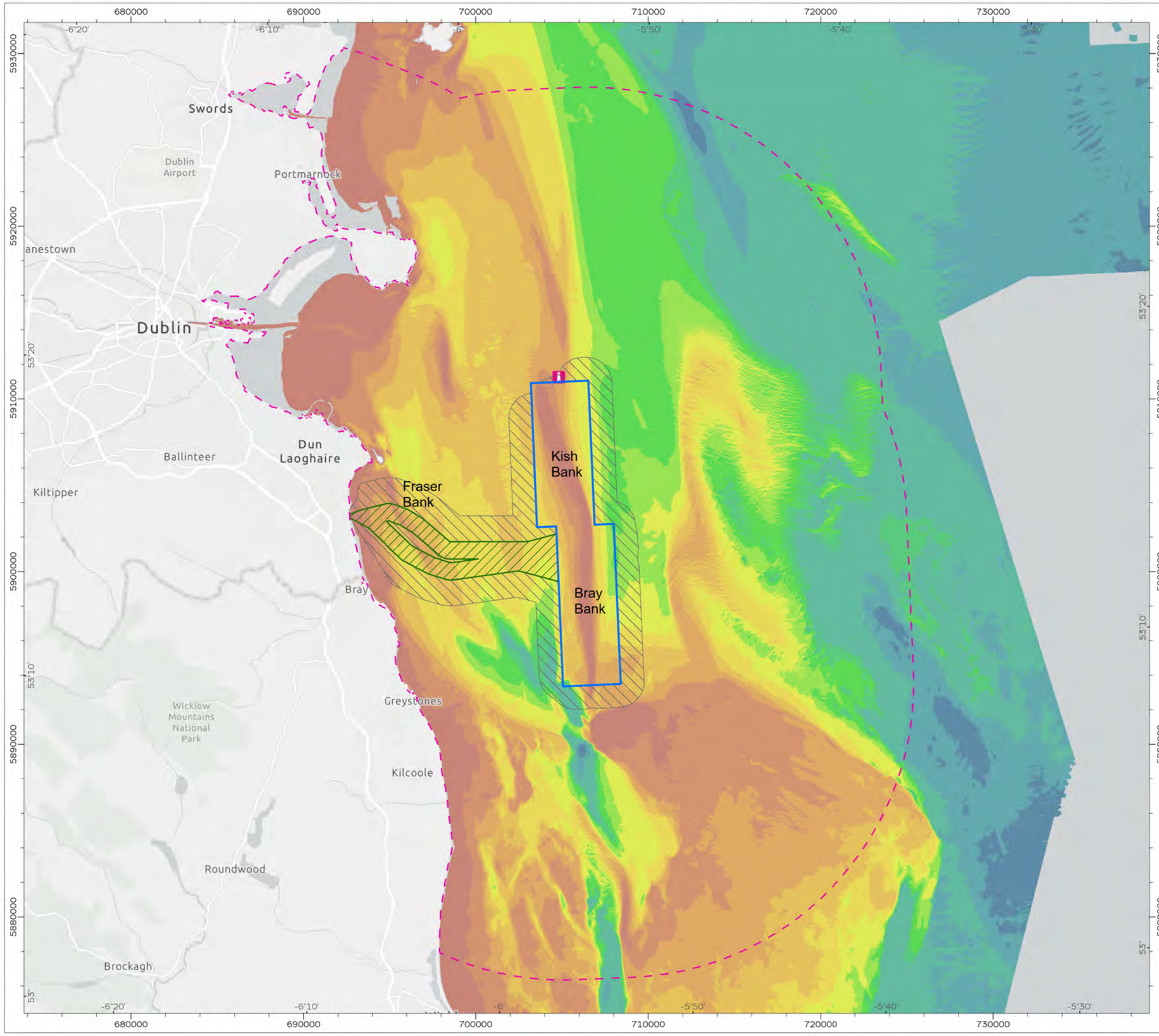
Kish Offshore Wind Limited - Bray Offshore Wind Limited

Kish Bank Lighthouse

11.6.28 The Kish Bank Lighthouse (also known as the Kish Tower) is located approximately 0.3 km to north of the array area. The Kish Bank Lighthouse was constructed between 1963 to 1964 and became operational in 1965. The base of the lighthouse was built as a caisson, which has been filled with sand to hold the structure on the seabed. The tower is a self-contained unit of twelve floors built within the caisson. It is 100 feet high (approximately 31 m) and surmounted by a 32 feet diameter helicopter landing platform which is surrounded by a safety net. On 11 January 2011, as a result of an aids to navigation review, the fog signal at Kish Lighthouse was permanently discontinued; however, the lighthouse continues to operate with light, providing aids to navigation (Commissioners of Irish Lights, 2021).

11.6.29 The presence of the Kish Bank Lighthouse is included in the baseline receiving environment for shipping and navigation, in terms of an existing allision risk with consideration of vessel access and the Kish Bank Lighthouse assessed in the Navigation Risk Assessment (Appendix 4.3.10-1)

11.6.30 An assessment of the potential impact of the Dublin Array on helicopter operations to the Kish Tower is provided in Volume 4, Appendix 3.12-2. Consideration of the potential for moving existing buoyage, including the East and North Kish buoys, and the potential for confusion for mariners and increased allision risk is presented in the Shipping and Navigation Chapter. No further impacts associated with these buoys have been identified and are not considered further in this assessment.



- Kish Lighthouse
- Marine Infrastructure and Other Users Study Area (17km Buffer)
- Array Area
- Temporary Cccupation Area
- Export Cable Corridor

Depth (m)

- >100
- 75 - 100
- 50 - 75
- 45 - 50
- 40 - 45
- 35 - 40
- 30 - 35
- 25 - 30
- 20 - 25
- 15 - 20
- 10 - 15
- 5 - 10
- 0 - 5

DRAWING STATUS

FINAL

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MAP NOTES / DATA SOURCES:

PROJECT TITLE

Dublin Array

DRAWING TITLE

Kish Bank Lighthouse

DRAWING NUMBER: **7**

PAGE NUMBER: **1 of 1**

VER	DATE	REMARKS	DRAW	CHEK	APRD
01	2024-04-22	For Issue	GB	BB	SS

0 2 4 6 8 km
0 1 2 3 4 nm

N (GRID NORTH)

SCALE 1:225,000 PLOT SIZE A3
DATUM WGS 1984 VERTICAL REF LAT
PRJ WGS 1984 UTM Zone 29N

GoBe APEM Group

Dublin Array Generation for generations

Kish Offshore Wind Limited - Bray Offshore Wind Limited

Telecommunications and Broadcasting

11.6.31 The landscape of the receiving environment is broadly shoreline and low-lying areas to the east of the Dublin/Wicklow Mountains, with the western boundary of the study area roughly following the N11/M11 corridor

11.6.32 The study area is characterised broadly as a largely built-up urban corridor interspersed with open space between settlements. From Blackrock to Shankill is a heavily populated and urbanised suburban development of Dublin City. Between Shankill and Bray, there is a band of agricultural fields. Bray and Greystones are two relatively compact areas with significant urban development which are split by large areas of agricultural, recreational and rural development.

11.6.33 Telecommunications masts are more prominent in urban areas given the large subscriber base to mobile and media suppliers in these areas, whereas in more rural locations, telecommunications masts would be fewer given less demand for their services.

Future receiving environment

11.6.34 The future receiving environment with respect to the contents of this chapter is unlikely to undergo any unanticipated changes. Any major new infrastructure projects would be subject to licencing and impact assessments which will take into account the Dublin Array development and the combined impact on the environment.

Do-nothing environment

11.6.35 In the absence of Dublin Array being constructed, the characterisation of the receiving and future environment, as presented above, is anticipated to remain valid, i.e. no alterations are currently anticipated beyond the known, planned developments described in this chapter.

11.7 Defining the sensitivity of the baseline

11.7.1 The sensitivity of the assets to each potential effect, using the criteria outlined in Section 11.5, are presented in Section 11.12 to 11.14.

11.8 Uncertainties and technical difficulties encountered

11.8.1 Charts of known material assets have been prepared to inform the impact assessment and are prepared with the best available and accessible data at the time of writing. These charts (and associated data) used are considered appropriate and sufficient for the purposes of EIA characterisation and assessment.

11.8.2 For proposed developments (not yet consented) there is inherent uncertainty as to whether that development will proceed. For the purposes of this assessment, it has been assumed that all such development will come to fruition and the effects of the Dublin Array project on assets has been assessed accordingly. For the Phase 1 projects, a request from An Bord Pleanála that Phase 1 projects should collaborate and share project information where appropriate pre submission ensures that information that has been shared between the East Coast Phase 1 projects[16] for all projects pre submission and allows robust assessments to be undertaken on agreed project parameters. Planning applications for projects which have now submitted their planning applications have been used to verify information. The information for all projects is believed to be accurate at the time of preparing the EIAR.

11.8.3 A series of potential sediment release scenarios have been modelled and considered within the Physical Processes Modelling Report. Together, these scenarios capture the maximum design option in terms of the highest concentration suspended sediment plumes, the most persistent suspended sediment plumes, the maximum changes in bed level elevation and the greatest spatial extent of change in bed level. Therefore, whilst the exact volumes and tidal states are unknown, the modelling scenarios are precautionary, and any impacts will be within the limits of the assessment and modelling. The impacts on MI&OU have been informed by the project specific modelling and the Physical Processes Chapter.

11.9 Scope of the assessment

11.9.1 The following potential impacts have been assessed:

Table 8 Potential impacts/changes identified within the marine infrastructure and other users' assessment.

Potential impact/ change	Impact
Construction	
Direct disturbance and damage to other infrastructure (such as existing cables, pipelines and wastewater outfalls)	Impact 1
Restriction of access to assets and use of Dumping At Sea sites	Impact 2
Increased burial of existing infrastructure such as existing cables, pipelines and wastewater outfalls as a result of increased sediment deposition / scour	Impact 3
Impacts to DAS sites from increased sediment deposition	Impact 4
Operation and Maintenance (O&M)	
Restriction of access to assets and use of DAS sites	Impact 5
Indirect disturbance of assets from presence of infrastructure and O&M activity	Impact 6
Disruption to telecommunications and terrestrial broadcasting signals	Impact 7
Decommissioning	
Direct disturbance and damage to assets and infrastructure	Impact 8

[16] East Coast Phase 1 projects term is used collectively to refer to all projects in receipt of a MAC on the east coast of Ireland: Dublin Array, Arklow, Codling, Oriel and NISA.

Potential impact/ change	Impact
Restriction of access to existing cables and pipelines	Impact 9
Increased burial of existing other infrastructure (such as existing cables, pipelines and wastewater outfalls) as a result of increased sediment deposition	Impact 10
Impacts to DAS sites from increased sediment deposition	Impact 11

Scoped out

11.9.2 As detailed in Section 11.1, the following material asset types were scoped out at the scoping stage and therefore have not been considered further (see Dublin Array EIA Scoping Report (RWE, 2020) for further details):

- Carbon capture and storage;
- Marine aggregates; and
- Natural gas storage.

11.9.3 Using The Marine Institute's Marine Atlas no aquaculture sites were identified within the study area, therefore no further consideration to these sites has been given in this chapter.

11.9.4 Thermal disturbance arising from the presence of subsea cabling associated with Dublin Array on other assets has also been scoped out of this assessment. The use of standard industry practice and crossing and proximity agreements will ensure that thermal effects on other users' assets will not occur.

11.10 Key parameters for assessment

11.10.1 As set out in the Application for Opinion under Section 287B of the Planning and Development Act 2000, flexibility is being sought where details or groups of details may not be confirmed at the time of the application. In summary, and as subsequently set out in the ABP Opinion on Flexibility (detailed within the EIA Methodology Chapter) the flexibility being sought relates to those details or groups of details associated with the following components (in summary - see further detail in see Volume 2, Chapter 6 Project Description [hereafter referred to as the Project Description Chapter]):

- WTG (model – dimensions and number);
- OSP (dimensions);
- Array layout;
- Foundation type (WTG and OSP; types and dimensions and scour protection techniques); and
- Offshore cables (IAC and ECC; length and layout).

11.10.2 To ensure a robust, coherent, and transparent assessment of the proposed Dublin Array project for which development consent is being sought under section 291 of the Planning Act, the Applicant has identified and defined a Maximum Design Option (MDO) and Alternative Design Option(s) (ADO) for each environmental topic/receptor. The MDO and ADO have been assessed in the EIAR to determine the full range and magnitude of effects, providing certainty that any option within the specified parameters will not give rise to environmental effects more significant than that which could occur from those associated with the MDO. The extent of significant effects is therefore defined and certain, notwithstanding that not all details of the proposed development are confirmed in the application.

11.10.3 The range of parameters relating to the infrastructure and technology design allow for a range of options in terms of construction methods and practices, which are fully assessed in the EIAR. These options are described in the project description and are detailed in the MDO and ADO tables within each offshore chapter of the EIAR. This ensures that all aspects of the proposed Dublin Array project are appropriately identified, described and comprehensively environmentally assessed.

11.10.4 In addition to the details or groups of details associated with the components listed above (where flexibility is being sought), the confirmed design details and the range of normal construction practises are also assessed within the EIAR (see the Project Description Chapter). Whilst flexibility is not being sought for these elements (for which plans and particulars are not required under the Planning Regulations), the relevant parameters are also incorporated into the MDO and alternative option(s) table (Table 6, with details provided in Appendix B) to ensure that all elements of the project details are fully considered and assessed.

11.10.5 With respect to project design features where flexibility is not being sought, such as trenchless cable installation methodology at the landfall, the MDO and alternative design option(s) are the same (as there is no alternative). With respect to the range of normal construction practises that are intrinsic to installation of the development, such as the nature and extent of protection for offshore cables and the design of cable crossings, but which cannot be finally determined until after consent has been secured and detailed design is completed, the parameters relevant to the receptor being assessed are quantified, assigned and assessed as a maximum and alternative, as informed by the potential for impact upon that receptor. In the event of a favourable decision on the application they will be agreed prior to the commencement of the relevant part of the development by way of compliance with a standard 'matters of detail' planning condition (see the Policy Chapter). Throughout, an explanation and justification is provided for the MDO and alternative(s) within the relevant tables, as it relates the details or groups of details where statutory design flexibility is being sought, and wider construction practises where flexibility is provided by way of planning compliance condition.

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Table 6 Maximum and Alternative Design Options assessed

Maximum design option	Alternative design options	Justification
Construction		
Impact 1: Direct disturbance and damage to assets and infrastructure		
Dredging prior to foundation installation: Trailer suction hopper dredger (TSHD). - Option B: 45 WTGs - One Offshore Substation Platform (OSP) requiring seabed preparation 100% of WTGs requiring seabed preparation **Jack up and anchoring operations:** - Option A: 50 WTGs - WTG/OSP installation jack up vessel (JUV) footprint - 6 jack-up operations required per turbine - WTG/OSP installation of foundation vessel anchor footprints **IAC Sandwave Clearance (excluding Sandbank Crossing):** Dredging using TSHD to undertake sandwave clearance - Maximum total length of IAC = 120 km, up to 50% requiring seabed preparation; - 40 m (maximum width of disturbance) **IAC - Sandbank Crossing** Method: TSHD Dredging to be undertaken for sandwave clearance across the Kish and Bray sandbanks at two locations with three cables at each site, to allow the IAC cables to cross the sandbank. 6 X 1000 m crossings with 100% requiring seabed preparation **IAC Pre-Lay Grapnel Run (PLGR):** - 50 m (maximum width pre-sweeping disturbance) - 120 km (maximum total length of IAC) **IAC Seabed preparation:** - 40 m (maximum width of disturbance) - 120 km (maximum total length of IACs) - 50% (proportion of array cable length subject to seabed preparation **IAC Cable installation - Ploughing:** - 12 m (width of seabed disturbance) - 95% of 120 km maximum total length of IAC	**Dredging prior to foundation installation:** Alternative options include the potential for fewer locations requiring seabed preparation. All seabed preparation operations of this type will take place using TSHD. Preparation for alternative foundation types and WTG options may also give rise to varying areas of seabed affected and volumes of sediment disturbed, all less than those which arise from the maximum design option Option A: Where 17 WTGs out of 50 WTGs on monopile foundations require seabed preparation; and One OSP x 100% of OSPs requiring seabed preparation **Jack up and anchoring operations:** No alternative options have been considered for this operation, as the methodology described as the maximum design option is considered the most appropriate option. However, lower number of WTGs will reduce the number of operations and reduce the level of seabed disturbance. **IAC Sandwave Clearance (excluding Sandbank Crossing):** Alternative options for cable installation involve the potential for varying percentages of total cable lengths requiring sandwave clearance than the MDO resulting in lower area of seabed disturbance. Similarly, lower number of WTGs will have concomitantly reduced overall length of IAC cable. **IAC sandbank crossing** No alternative options have been considered for this operation, as the methodology described as the maximum design option is considered the most appropriate option. As for the MDO Alternative options for cable installation involve the potential for varying percentages of total cable lengths requiring seabed preparation than the MDO resulting in lower area of seabed disturbance. **IAC - Cable installation:** Alternative options for cable installation involve the use of different cable installation methodologies including jet trenching, rock cutting and	The temporary disturbance relates to seabed preparation for foundations and cables, jack up and anchoring operations, and cable installation. The footprint of infrastructure is assessed as a permanent impact in O&M.

Maximum design option	Alternative design options	Justification
IAC Cable installation MFE: - 15 m (width of seabed disturbance) - 5% of 120 km maximum total length of IAC **Export Pre-Lay Grapnel Run:** - 50 m (maximum width seabed disturbance) - 18.35 km (maximum length of one cable) **Export cable seabed preparation:** - 40 m (maximum width of seabed disturbance - 18.35 km (maximum length of one cable) - 70% subject to seabed preparation) **Export Cables** Dredging using TSHD to undertake sandwave clearance - Two cables; - Maximum length of one export cable = 18.35 km, - up to 70% requiring seabed preparation.	mechanical chain excavating in addition to ploughing and MFE (which are outlined within the maximum design option). **Method**: The alternative option will result in the smallest are of disturbance with simultaneous lay and burial (ploughing). As for the MDO **Export cable seabed preparation** Alternative options for cable installation involve the potential for varying percentages of total cable lengths requiring seabed preparation than the MDO resulting in lower area of seabed disturbance. **Export Cables** Dredging using TSHD to undertake sandwave clearance - Two cables - Maximum length of one export cable = 18.35 km - up to 25% requiring seabed preparation	(See previous page)
Landfall methodology: Trenchless installation (via HDD or direct pipe) beneath the beach, cliffs and intertidal area to be undertaken at Shanganagh. Excavation pits to be excavated and reinstated using back hoe dredge. Material will be stored to minimise loss of sediment as far as is reasonably practicable.	**Landfall methodology**: No alternative options have been considered for this operation, as the methodology described as the maximum design option is considered the most appropriate option.	
- Drilling punch-out location: Subtidal; - One per cable (2); - Excavation pits: Up to one per cable (2); - Maximum excavation pit dimensions: 30 m (long) x 5 m (wide) x 2.5 m (depth); - Estimated maximum excavated volume = 375 m3 x 2 (number of cables) = **750 m3;** - Maximum length of drill = 856 m; and - Maximum installation period: 40 weeks subject to suitable weather conditions, inclusive of site mobilisation and demobilisation.	No alternative options have been considered for this operation, as the methodology described as the maximum design option is considered the most appropriate option.	
Use of drilling fluid (landfall): Trenchless installaton The drilling fluid is anticipated to be a low concentration bentonite/water mixture. Drill exit head to will stop short of punch out, flush bentonite, and complete the final 10 m in order to mitigate bentonite release on punch out. For the purposes of the assessment this is assumed to be an instantaneous release as this is the most conservative assumption for the purposes of the study/assessment model.	No alternative options have been considered for this operation, as the methodology described as the maximum design option is considered the most appropriate option.	

Maximum design option	Alternative design options	Justification
Impact 2: Restriction of access to assets		
Construction period: Maximum of **30 months**. **Total project area:** Full build out of the array area (total array project area: **59 km²**). Temporary works area: 88 km² **Advisory safe passing distances:** Advisory safe passing distances of 500 m around all active construction works = 0.79 km² per structure under construction at any one time. Advisory safe passing distances of 50 m around incomplete structures = 7,854 m² per partially constructed structure at any one time. **Buoyed construction area:** Buoyed construction area around array area. **Structures:** Option A: Up to 50 Wind Turbine Generators (WTG); Foundation: multileg foundations; Minimum spacing between turbines of 944 m; Offshore substation platform (OSP): one OSP on multileg foundations; Met mast: Up to one met mast on a multileg foundation; Permanent vessel moorings: two with drag embedment anchors and maximum impact footprint of all buoys on sea floor during construction of 0.006 km². **Export cable:** Two offshore export cable routes; Length of single export cables from OSP to landfall: (Route A) 15.0 + (Route B) 15.3 = 30.3 km; Max spacing between parallel cables if two cables (in single corridor): 1,000 m; Proportion of route subject to seabed preparation: 70% with 0.5 km² area of disturbance; Offshore export cable requiring remedial protection (Route A) 3.0 + (Route B) 6.0 = 9.0 km (with combined total footprint of 0.108 km² protection); Offshore export cable remedial protection of height 1 m and width 6 m; Up to six cable crossings with mattress and rock berm protection (with total footprint of crossing protection material of 0.015 km²); and Minimum burial depth in standard conditions: 1 m. **Inter-array cables:** 120 km of buried inter-array cables, with protection along up to 20% of route length (including rock or gravel, concrete mattress, Flow energy dissipation devices, dredged sandy material, protective aprons, coverings, cladding or pipe, bagged solutions), and two cable crossings (including rock dumping, concrete mattress, steel bridging, concrete bridging) Minimum burial depth in standard conditions: 1 m.	**Construction period:** Minimum of **18 months** or a mid-case of **24 months**. **Total project area:** As per MDO. **Advisory safe passing distances:** As per MDO. **Buoyed construction area:** As per MDO. **Structures:** Option B: Up to 45 WTGs or Option C: Up to 39 WTGs; Foundation: monopile; Minimum spacing between turbines of 1,000 m (Option B) or 1,112 m (Option C); Offshore substation platform (OSP): As per MDO; and Met mast: As per MDO. **Export cable:** As per MDO. Maximum burial depth in standard conditions: 3 m. **Inter-array cables:** As per MDO. Maximum burial depth in standard conditions: 3 m.	The MDO represents the maximum duration and the maximum extent of asset exclusion throughout the construction phase and hence the greatest potential to restrict access to assets. The construction footprint comprises the full array area due to the presence of a buoyed construction area plus the temporary footprint of preparatory works within the temporary occupation area. It is important to note that the temporal aspect of temporary works will not apply in full throughout the 30 month offshore construction phase, as activities will be completed sequentially.

Maximum design option	Alternative design options	Justification
Project vessels	**Project vessels**	The maximum number of vessels transits and the maximum duration of the construction would result in the greatest potential for interference. The alternative design options (or any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.
Construction vessels will comprise of installation vessels and smaller support vessels. Installation vessels include those for foundation, WTG and OSP installation and cable lay vessels. The foundation, WTG and OSP installation vessels will include cranes, which when fully extended will be 220 m in height. Up to three large installation vessels and associated support craft operating simultaneously with a total of **66** vessels on site at any time; and	Construction vessels will comprise of installation vessels and smaller support vessels. Installation vessels include those for foundation, WTG and OSP installation and cable lay vessels. The foundation, WTG and OSP installation vessels will include cranes, which when fully extended will be 220 m in height. Up to three large installation vessels and associated support craft operating simultaneously with a total of **51** vessels on site at any time; and	
Up to **813** round trips to port from construction vessels and an additional **1,825** round trips from small vessels such as CTVs during construction period.	Up to **774** round trips to port from construction vessels and an additional **538** round trips from small vessels such as CTVs during construction period.	
Impact 3: Increased burial of infrastructure as a result of increased sediment deposition		
Dredging prior to foundation installation: Trailer suction hopper dredger (TSHD). - Option B: Up to 45 WTGs - One Offshore Substation Platform (OSP) requiring seabed preparation 100% of WTGs requiring seabed preparation **Disposal:** For all options where seabed preparation prior to foundation installation will take place, the material is dredged by a TSHD. **Foundation installation** Option C: 39 WTGs with four-legged jacket foundations; Jacket pin-piles foundations for one OSP Drilling required at 100% of foundations **IAC - Cable Installation:** - The maximum total length of IAC has been identified as 120 km. Although the total length may be less than this, depending on final routeing options yet to be decided, the total value will not exceed 120 km. **- Method**: ploughing of a V shaped trench 12m width x 3m depth; -Controlled displacement of sediment onto the seabed with approximately 15% of sediment ejected from trench; - **Method**: mass flow excavator (MFE); Assumes up to 100% of material elevated above the seabed with up to two backfill passes expected (for spoil mounds either side of the trenches).	**Dredging prior to foundation installation:** No seabed preparation in advance of foundation installation. Foundations will be installed directly onto the seabed in its existing condition without dredging or equivalent methodology with no SSC plumes generated. This approach would represent the design option with the minimum scale of effect, i.e. 0 m^2 of seabed affected and 0 m^3 of disturbed sediment. Alternative options include the potential for varying percentages of locations between 0% and 100% requiring seabed preparation. All seabed preparation operations of this type will take place using TSHD. Preparation for alternative foundation types and WTG options may also give rise to varying areas of seabed affected and volumes of sediment disturbed, all generating less SSC than the maximum design option. **Disposal:** For all options where seabed preparation prior to foundation installation will take place, the material is dredged by a TSHD with drilling spoil released at, or above the water surface. **Foundation installation** There will be no drill arisings generated with foundation installation using driven piles and vibro-piles. This approach would not result in the creation of any SSC plumes and would therefore represent the minimum scale of effect. Alternative options include the potential for varying percentages, less than 50%, of foundation locations requiring drilling. **IAC - Cable installation:** Alternative options for cable installation involve the use of different cable installation methodologies including jet trenching, rock cutting and mechanical chain excavating in addition to ploughing and MFE (which are outlined within the maximum design option). **Method**: The alternative option will result in the smallest volume of fine sediment release into the water column is simultaneous lay and burial (ploughing).	The MDO for seabed preparation prior to foundation installation results in the largest footprint on the seabed and the greatest volumes of disturbed sediment from the WTG and foundation options. For drilling of foundation piles which produce drill cuttings, the realistic worst-case is represented by the largest volume of fine sediments released into the water column over the shortest interval which then has the potential to lead to the highest SSC within a plume that advects away from the point of discharge. For both Inter-array cable installation and Export cable installation Mass Flow Excavation (MFE) will produce both a wide trench and also have the greatest potential to fluidise and raise fine sediments into suspension and is therefore considered as the realistic worst-case option for cable installation. With regards to increases in turbidity due to release of drilling fluid from trenchless techniques, this scenario represents the maximum volumes of drilling mud discharges (bentonite) into the marine environment for HDD works. Alternative foundation types and WTG options will give rise to varying volumes of drill arisings, all less than the maximum design option.

Maximum design option	Alternative design options	Justification
IAC - Sandwave Clearance (excluding Sandbank Crossing): - Method: TSHD - Maximum total length of IAC = 120 km, - Up to 50% requiring seabed preparation; - 40 m (maximum width of disturbance); **IAC - Sandbank Crossing** Method: TSHD Dredging to be undertaken for sandwave clearance across the Kish and Bray sandbanks at two locations with three cables at each site, to allow the IAC cables to cross the sandbank. 6 X 1000 m crossings with 100% requiring seabed preparation **Export Cables** Dredging using TSHD to undertake sandwave clearance and disposal - Two cables; - Maximum length of export cable = 18.35 km; - up to 70% requiring seabed preparation.	**IAC (excluding Sandbank Crossing)** -Method: TSHD - Maximum total length of IAC = 120 km, - Up to 25% requiring seabed preparation; - 40 m (maximum width of disturbance) **IAC: Sandbank Crossing** No alternative options have been considered for this operation, as the methodology described as the maximum design option is considered the most appropriate option. **Export Cables** Dredging using TSHD to undertake sandwave clearance and disposal - Two cables; - Maximum length of export cable = 18.35 km; - Up to 25% requiring seabed preparation.	(See previous page)
Landfall methodology: Trenchless techniques will be used beneath the beach, cliffs and intertidal area to be undertaken at Shanganagh. - Drilling punch-out location: Subtidal; - Up to one per cable; - Excavation pits: Up to one per cable; - Maximum excavation pit dimensions: 25 m (long) x 5 m (wide)	**Landfall methodology:** No alternative options have been considered for this operation, as trenchless techniques are considred the most appropriate option.	
Use of drilling fluid (landfall) using trenchless techniques: The drilling fluid is anticipated to be a low concentration bentonite/water mixture. Drill exit head to will stop short of punch out, flush bentonite, and complete the final 10 m in order to mitigate bentonite release on punch out. For the purposes of the assessment this is assumed to be an instantaneous release as this is the most conservative assumption for the purposes of the study/assessment model.	**Use of drilling fluid (landfall) using trenchless techniques:** - The drilling fluid is anticipated to be a low concentration bentonite/water mixture. Drill head will stop short of punch out, flush bentonite, and complete the final 10 m in order to mitigate bentonite release on punch out. For the purposes of the assessment this is assumed to be an instantaneous release as this is the most conservative assumption for the purposes of the study/assessment model.	
Impact 4: Impacts to Dumping at Sea sites from increased sediment deposition		
As above. See Impact 3: Increased burial of infrastructure as a result of increased sediment deposition		The MDO represents the greatest likely local and total volume of sediment disturbed by dredging (and associated spoil disposal) and rate of release into suspension in the water column.

Maximum design option	Alternative design options	Justification
Operation and Maintenance		
Impact 5: Restriction of access to assets		
Lifetime of the proposed development: 35 years (operating life) Full build out of the array area. Option A: 50 WTGs, and one OSP, comprising **51** structures. **Export cables** Maximum total length = **2 x 18.35 km** Three daily CTV trips with the addition of up to **100** vessels trips to support scheduled routine and non-routine maintenance per year.	**Lifetime of the proposed development:** 35 years (operating life) All design option layouts represent similar spatial use of the array area. Option B: 45 or Option C: 39 WTGs and one OSP, comprising **46** or **40** structures **Export cables** Maximum total length = **2 x 17.95 km** Two daily CTV trips with the addition of up to **75** vessels trips to support scheduled routine and non-routine maintenance.	This represents the maximum duration and extent of restricted access throughout the operation and maintenance phase and hence the greatest potential to restrict access to assets. It comprises the maximum footprint of infrastructure on the seabed plus maintenance activities throughout the operational and maintenance phase and associated temporary advisory safe passing distances.
Impact 6: Indirect disturbance of assets from presence of infrastructure and O&M activity		
Cable activities: - Methodology: Jetting tools potentially followed by rock dumping and / or concrete mattress installation; - Remedial burial of cables: 10 km per event x 5 reburial events assumed over the project lifetime = 50 km; - For IAC repairs seabed disturbance will be 3,300 m x 10 m (trench width) . An estimated four events over the project lifetime - For export cable repairs seabed disturbance will be 600 m x 10 m (trench width) . An estimated two events over the project lifetime	**Cable activities:** - Methodology: Jetting tools potentially followed by rock dumping and / or concrete mattress installation; - Remedial burial of cables: 10 km per event x 3 reburial events assumed over the project lifetime =30 km - For IAC repairs seabed disturbance will be 3,300 m x 10 m (trench width) . An estimated two events over the project lifetime - For export cable repairs seabed disturbance will be 600 m x 10 m (trench width) . An estimated one event over the project lifetime	The MDO represents the greatest magnitude of O&M activities likely to be required and hence greatest potential for increase in sediment deposition. Precautionary assumptions have been made in terms of repair and maintenance requirements. Cables may become un-buried due to seabed mobility and require reburial. For other repairs, a length of cable is assumed to be pulled from a trench.
Impact 7: Telecommunications and signals		
Lifetime of the proposed development: 35 years (operating life) Option A: 50 WTGs	**Lifetime of the proposed development:** 35 years (operating life) Option B: 45 WTGs or Option C: 39 WTGs	The greatest number of WTGs (Option A: 50 WTGs) has the greatest potential to affect telecommunications and signals.
Decommissioning		
Impact 8: Direct disturbance and damage to assets and infrastructure		
.- Removal of structures is expected to be undertaken as an approximate reverse of the installation process; - It is anticipated that piled foundations will be cut at a level just below the seabed; - Buried cables to be cut and left in situ (but to be determined in consultation with key stakeholders as part of the decommissioning plan and following best practice at the time of decommissioning); - Scour and cable protection left in situ; and - Decommissioning activities lasting approximately three years for both onshore and offshore works. **Removal of foundations:** - 50 WTGs; and - One OSP.	Decommissioning activities are expected to be the same for all design options. Alternative design options are represented by varying numbers of total structures within the array area (represented by different WTG options), as shown below. **Removal of foundations:** - Option C: 39 WTGs and Option B: 45 WTGs; and - One OSP.	The MDO is the option with the greatest number of WTGs (Optopn A: 50 WTGs). All alternatives have lower potential for damage to assets and infrastructure during decommissioning.

Maximum design option	Alternative design options	Justification
- Landfall infrastructure will be left in situ where considered appropriate. Any requirements for decommissioning at the landfall will be agreed with statutory consultees; and - It is likely judged that cable removal will bring about further environmental impacts. At present it is therefore proposed that the cables will be left in situ, but this will be reviewed over the design life of the project.	As for the MDO Landfall infrastructure will be left in situ where considered appropriate. Any requirements for decommissioning at the landfall will be agreed with statutory consultees; and - It is likely judged that cable removal will bring about further environmental impacts. At present it is therefore proposed that the cables will be left in situ, but this will be reviewed over the design life of the project.	
Impact 9: Restriction to access to assets		
As above. See Impact 8: Direct disturbance and damage to assets and infrastructure		
Impact 10: Increased burial of assets as a result of increased sediment deposition		
As above. See Impact 8: Direct disturbance and damage to assets and infrastructure		
Impact 11: Impacts to DAS sites from increased sediment deposition		
As above. See Impact 8: Direct disturbance and damage to assets and infrastructure		

11.11 Project Design Features and Avoidance and Preventative Measures

11.11.1 As outlined within the EIA Methodology Chapter and in accordance with the EPA Guidelines (2022), this EIAR describes the following:

- Project Design Features: These are features of the Dublin Array project that were selected as part of the iterative design process, which are demonstrated to avoid and prevent significant adverse effects on the environment in relation to marine infrastructure and other users. These are presented within Table 7.
- Other Avoidance and Preventative Measures: These are measures that were identified throughout the early development phase of the Dublin Array project, also to avoid and prevent likely significant effects, which go beyond design features. These measures were incorporated in as constituent elements of the project, they are referenced in the project description chapter of this EIAR and they form part of the project for which development consent is being sought. These measures are distinct from design features and are found within our suite of management plans. These are also presented within Table 7.
- Additional Mitigation: These are measures that were introduced to the Dublin Array project after a likely significant effect was identified during the EIA assessment process. These measures either mitigate against the identified significant adverse effect or reduce the significance of the residual effect on the environment. The assessment of impacts is presented in Sections 1.14 and 1.17 of this EIAR chapter.

11.11.2 All measures are secured within Volume 8, Chapter 2: Schedule of Commitments. Any measures relevant to vessel management and compliance with legal requirements for shipping, navigation and aviation marking and lighting and captured within the relevant chapters (Shipping and Navigation, and Aviation).

11.11.3 Where additional mitigation is identified as being required to reduce the significance of any residual effect in EIA terms, this is presented in Sections 11.12, 11.13 and 11.14.

Table 10 Project design feature/other avoidance and preventative measures relating to MI&OU

Project design feature / other avoidance and preventative measures	Where secured
Navigational safety measures including: ▪ Buoyed construction and decommissioning zones; ▪ Compliance with COLREGs; ▪ Marine coordination; ▪ Temporary lighting and marking; ▪ Operational lighting and marking; ▪ Use of guard vessels; ▪ Advisory safe passing distances; and ▪ Emergency Response Cooperation Planning.	Measures contained within the Vessel Management Plan designed to prevent any risks of collision or disruption to other craft, all measures will ensure compliance with the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) (International Maritime Organization (IMO), 1972/77)
Installation of cables to an optimum cable burial depth - offshore cables will, where possible, be buried in the seabed to the optimal performance burial depth for the specific ground conditions. Where optimum burial depth cannot be achieved secondary protection measure will be deployed e.g. concrete mattress, rock berm, grout bags or an equivalent in key areas	The Project Description Chapter details the requirement for a Cable Installation Plan (CIP) and Cable Burial Risk Assessment (CBRA) which will be developed upon award of consent and in advance of construction. The CIP and CBRA will provide information on the installation plan for subsea cables. The CBRA, will provide a risk assessment and evaluation for cable protection, unburied or shallow buried cables. The CIP will detail pertinent mitigation measures to be used during cable installation and will be applied throughout the construction phase. The CIP and CBRA will be submitted to the consenting authority in advance of construction phase. "
Agreement with Uisce Éireann on separation distances between the Shanganagh Waste Water treatment outfall and Offshore EEC to ensure no direct overlap with existing long sea outfalls	Outlined within the Project Description Chapter subject to agreement between the Applicant and Uisce Éireann
Engagement with Irish Lights on any project vessel activity occurring within 500 m of the centre point of the Kish Tower	Outlined within the Project Description Chapter subject to agreement between the Applicant and Irish Lights
Cable crossings agreements between the Applicant, CWP and EirGrid to include the following general design principals : ▪ Vertical separation between cables will be a minimum of 300mm in addition to burial depths of the first cable; ▪ The minimum mattress thickness will be 300 mm and constructed of high-density concrete; ▪ Pre lay mattress(s) will be installed over the pre-installed (buried) cable perpendicular to the direction of the lay of the crossing cable; ▪ Top mattresses or rock armour will be installed (subject to crossing agreement), which will cover approximately 50 m on each side of the first cables;	Outlined within the Project Description Chapter subject to agreement between the Applicant, CWP and EirGrid

Project design feature / other avoidance and preventative measures	Where secured
▪ The profile of crossing will not reduce navigable depth by greater than 5% of surrounding charted depths referenced to chart datum; and ▪ The horizontal crossing angle will be between 60 – 90˚ but will endeavor to achieve as close to 90˚ as possible.	

11.12 Environmental Assessment: Construction phase

11.12.1 The effects of the construction of the offshore infrastructure for Dublin Array have been assessed on the MI&OU as defined in Section 11.6. The environmental impacts arising from construction are listed in Table 9, along with the MDO and alternative design options against which each construction phase impact has been assessed.

Impact 1: Direct disturbance and damage to assets and infrastructure

11.12.2 The construction of the offshore infrastructure for Dublin Array represents a risk to assets and infrastructure, through the installation of cables and foundations, deployment of jack-up vessels, anchor placement, cable pre-sweeping, seabed preparation to other infrastructure such as existing cables and outfalls. The MDO for direct disturbance and damage is presented in Table 12. Direct disturbance of other assets will only occur within the near field encompassed by the offshore temporary occupation area.

11.12.3 As outlined in Section 11.6, Dublin Array offshore cables will not cross any existing third-party cables or pipelines but the two Dublin Array export cables from the OSP to landfall will cross three planned export cables from the proposed Codling Wind Park (CWP) project, with six cable crossings identified.

11.12.4 Taking a precautionary approach all other existing (or planned) assets that overlap the offshore infrastructure or wider temporary occupation area s were identified. The assets identified which may be impacted for direct disturbance and/ or damage are outlined in Table 11.

Table 11 Assets with potential for direct disturbance and / or damage.

Asset type	Asset
Lighthouse	Kish Bank Lighthouse (no direct overlap)
Export cable	Codling Wind Park export cable route
Wastewater assets (outfalls and wastewater treatment works)	Two long sea outfalls associated with Shanganagh-Bray wastewater treatment works
	Shanganagh-Bray wastewater treatment works (Ref: TPEFF1000D0038SW001) – primary treatment (within the Offshore ECC)
	Shanganagh-Bray (Ref: TPEFF3900D0038SW018) Storm Water outflow (overlap with offshore temp works area)
	Shanganagh-Bray (Ref: TPEFF1000D0038SW002) Storm Water outflow (overlap with offshore temp works area
	Shanganagh wastewater treatment works (Ref: D0038-01) – secondary treatment (no direct overlap, 0.22 km from the Offshore ECC)
	C1-C4 sewerage pipes and long sea outfalls associated with Ringsend wastewater treatment works
	Ringsend wastewater treatment works (Ref: D0034-01) – secondary treatment (no direct overlap, 0.32 km from the Offshore ECC)
	Ringsend wastewater treatment centre (Ref: TPEFF0700D0034SW001) – primary treatment (no direct overlap, 0.32 km from the Offshore ECC)
	ESB trade effluent outfall (Ref: LDW/001/93) (no direct overlap 0.37 km from the Offshore ECC)

11.12.5 Whilst it is noted that construction within the array area will be within approximately 1.7 km of the existing Hibernia 'D' telecommunications cable, these assets will not be directly affected due to this spatial separation with no direct overlap of planned construction works.

11.12.6 The proposed MaresConnect[17] route scheduled for construction 2026 – 20029 is proposed to make landfall at an existing substation in the Greater Dublin area, the final cable route has not been finalised, therefore, these assets are not considered further.

11.12.7 As presented in Table 10, the following avoidance and preventative measures and commitments have been considered in the determination of the significance of the effect on the identified receptors (assets):

- A pre-construction survey will be carried out which will include geophysical and magnetometer surveys that will be able to identify existing assets, including out of service cables, which may be in a different position to their charted location because of past use of outdated locating techniques. Micrositing will be carried out where practicable and to minimise crossings and maintain a safe distance from, existing assets;

[17] Website accessed November 2024: https://maresconnect.ie/home-5/the-interconnector/non-technical-summary-2/

- Cable crossings agreements will be designed in line with best practice and will ensure suitable protection is offered to both the cable/ being crossed and the Dublin Array Offshore ECC. A number of potential methodologies for cable crossings are under consideration, including rock dumping, concrete mattressing, and steel or concrete bridging. Standard industry techniques, such as adhering to the International Cable Protection Committee (ICPC) criteria, will be used to ensure no operational impacts to other subsea cables occur. The final crossing design will be determined post-consent, in conjunction with the asset owner;
- Agreement with Uisce Éireann on separation distances between the Shanganagh Waste Water treatment outfall and Offshore EEC has been confirmed to ensure no direct overlap with existing long sea outfalls; and
- Engagement with Irish Lights on any project vessel activity occurring within 500 m of the centre point of the Kish Tower.

11.12.8 The final offshore ECC will be designed to ensure that there is no direct interaction with any of these assets through consultation with asset owners and agreements in place, including the existing long sea outfalls and the Kish Bank Lighthouse, such that no direct damage would occur.

11.12.9 The magnitude of the impact is presented in Table 12 based on the methodology outlined in Section 11.4. For the identified MI&OU assets, the sensitivity to direct disturbance and damage is presented in Table 13.

Table 12 Determination of magnitude for direct disturbance and damage to other infrastructure

	Assessment of maximum design option	Assessment of alternative design options
Extent	The maximum extent of the impact is restricted to the near-field (i.e. directly where the infrastructure is installed within Dublin Array).	The extent of impact is the same as for the MDO being restricted to the near field (i.e. directly where the infrastructure is installed within Dublin Array).
Duration	Direct disturbance to assets can only occur during construction when a cable crossing is being installed. No planned construction works are proposed which may directly affect another operator's asset. Direct damage to assets is not anticipated to occur as a result of the appropriate design of the cable crossing infrastructure. Installation will be restricted to within a short period during the overall construction phase of the project (30 months) and will therefore be short-term (1 - 7 years), although the cable crossing installation	The number of cable crossings is the same for all options and therefore duration of impact is the same with Installation will be restricted to within a short period during the overall construction phase of the project (18 months) and therefore short term.

	Assessment of maximum design option	Assessment of alternative design options
	works will be short term (less than 1 year).	
Frequency	Direct disturbance and damage to assets is not anticipated to occur. However, if direct damage to assets was to occur it would only occur once during the cable laying works and installation of the cable crossing infrastructure.	The frequency of cable laying works and installation of the cable crossing infrastructure is the same under all options.
Probability	Direct disturbance to assets is anticipated to be minimised as much as possible based on the controls that are in place. Therefore, the impact is not anticipated to occur.	Direct disturbance to assets is anticipated to be minimised as much as possible for both alternative options based on the controls that are in place. Therefore, the impact is not anticipated to occur.
Consequence	With separation distance agreements for the Shanganagh outfalls, consultation with Irish Lights on any project vessel activity occurring within 500 m of the centre point of the Kish Tower and Kish Bank Lighthouse and crossing agreements for the Codling ECC this will ensure that the crossing of these assets by Dublin Array's export cables will not interfere with the operation of these assets. No direct interaction with the Kish Bank Lighthouse is anticipated.	Alternative design options will have same consequence as the MDO subject to crossing and proximity agreements.
Overall magnitude	The potential magnitude on marine infrastructure is rated as Negligible.	The potential magnitude on marine infrastructure is rated as Negligible.

Table 13 Determination of sensitivity for marine infrastructure to direct disturbance and damage to existing cables, pipelines and wastewater outfalls

	Justification
Context	**Tolerance:** With the mitigation measures in place, the identified assets are not generally vulnerable to impacts that may arise from the project. **Recoverability:** The assets have moderate to high levels of recoverability.
Value	The Kish Bank Lighthouse is considered to be of high value to the regional environment and communities.
	Codling ECC is considered of high value or importance, with critical importance to the regional or national economy.
	The routine operation of wastewater assets and long sea outfalls is critical for prevention of surface water flooding and water quality deterioration. Therefore, these assets are considered to be of high value/ importance to the regional economy and environment.
Overall sensitivity	The potential sensitivity on the identified assets are rated as High.

11.12.10 The magnitude of the impact has been assessed as **Negligible for both the alternative options and the MDO**, with the maximum sensitivity of the assets being **High**. Therefore, the maximum significance of effect from direct disturbance and damage to other infrastructure is **Neutral** impact, which is not significant in EIA terms.

11.12.11 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Residual effect

The significance of effect from direct disturbance and damage to other infrastructure is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 10 is considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of MI&OU.

Impact 2: Restriction of access to assets

11.12.12 Restriction of access to an existing asset for inspection and maintenance activities could be critical to the operation of that asset. The Maritime Area Consent issued does not grant exclusive use of the MAC area, however for the purposes of navigational safety, a number of avoidance and preventative measures will be implemented which include:

- Application of advisory safe passing distances[18] surrounding infrastructure and vessels that are undertaking sensitive construction works promulgated via Notice to Mariners and marine notices; and
- Implementation of a temporary buoyed construction area around the site to alert of potential hazards in consultation with Irish Lights.

11.12.13 The assets and other users which may be affected are those located within active works with advisory safe passing distances:

- .The Kish Bank Lighthouse,
- Long sea outfalls and further seven outfalls ; and
- Codling Bank OWF export cable corridor.

11.12.14 Advisory safe passing distances around all active works and use of guard vessels may be required during construction as part of the avoidance measures proposed (see Table 10). These measures will provide protection for both the proposed development and other marine users as defined in the Vessel Management Plan (VMP) but will not restrict access to the area for vessels or restrict access to third party assets but will serve to alert passing mariners to potential hazards.

11.12.15 Crossing and proximity agreements with asset owners will ensure close communication and planning between both parties to ensure disruption of activities is minimised, and that risks are reduced to acceptable levels.

11.12.16 The final layout of structures will also be designed and agreed with Irish Lights to ensure that access to the Kish Bank Lighthouse is not restricted. The Applicant will ensure close communication and planning between all parties to ensure access to assets is maintained.

11.12.17 The magnitude of the impact is assessed in Table 14 based on the methodology outlined Section 11.4. For the identified MI&OU assets, the sensitivity of the assets to restricted access is assessed in Table 15 to the potential effect.

[18] Advisory safe passing distances would indicatively be 500m around active works subject to the nature of the works and 50m around infrastructure

Table 14 Determination of magnitude for restriction of access to existing cables and pipelines

	Assessment of maximum design option	Assessment of alternative design options
Extent	The maximum extent of the impact is restricted to the near-field and immediately adjacent far-field areas within the advisory safe passing distances for all active works.	In line with the maximum design option with all works within the advisory safe passing distances for all active works therefore restricted to the near field and immediately adjacent far field areas.
Duration	The impact will be restricted to the construction phase of the project (30 months) and will therefore be short-term (one - seven years), although works in any given discrete moving locations where there is overlap with assets will be temporary (in the order of days to weeks).	Alternative options have a construction period of minimum of 18 months and a mid of 24 months and therefore will therefore be short-term (one - seven years) although works in any given discrete moving locations where there is overlap with assets will be temporary (in the order of days to weeks).
Frequency	Restriction of access to assets may occur during construction activities. Therefore, the frequency of the impact is anticipated to apply throughout the construction phase.	Restriction of access to assets will only occur during construction activities. Therefore, the frequency of the impact is anticipated to apply throughout the construction phase.
Probability	Disturbance through restriction of access to assets is not anticipated to occur due to the short duration of activities, communication between operators and the low likelihood of the maintenance and repairs being required on those other assets during those discrete construction events.	Disturbance through restriction of access to assets is not anticipated to occur due to the short duration of activities, communication between operators and the low likelihood of the maintenance and repairs being required on those other assets during those discrete construction events
Consequence	The restriction of temporary access to an asset through use of advisory safe passing distances may result in short term, temporary access to assets for maintenance operations by third party vessels. Promulgation of information between the project and third party asset providers will ensure restriction for the operation and maintenance of assets is avoided.	The restriction of temporary access to an asset through use of advisory safe passing distances may result in short term, temporary access to assets for maintenance operations by third party vessels. Promulgation of information between the project and third party asset providers will ensure the operation and maintenance of assets is avoided.
Overall magnitude	The potential magnitude on marine infrastructure is rated as Negligible.	The potential magnitude on marine infrastructure is rated as Negligible.

Table 15 Determination of sensitivity for marine infrastructure to restriction of access to existing cables and pipelines

	Justification
Context	**Tolerance:** No direct overlap with third party assets with exception of Codling OWF export cable, impact limited to potential for temporary and short-term restriction of access for third party vessels for operation and maintenance activity, the assets are not generally vulnerable to impacts that may arise from the project. **Recoverability:** Full access will be restored following the removal of the safe passing distances.
Value	The routine operation of wastewater assets is critical for prevention of surface water flooding and water quality deterioration. Therefore, these assets are considered to be of high value/ importance to the regional economy and environment. The Kish Bank Lighthouse is considered to be of high value to the regional environment and communities. Codling ECC is considered of high value or importance, with critical importance to the regional or national economy.
Overall sensitivity	The potential sensitivity on designated sites is rated as High.

11.12.18 The magnitude of the impact has been assessed as **Negligible for both the alternative options and the MDO**, with the maximum sensitivity of the assets being **High**. Therefore, the significance of effect from restriction of access to existing cables and pipelines is a **Neutral** impact, which is not significant in EIA terms.

11.12.19 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Residual effect

The significance of effect from restriction of access to existing assets is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 10 is considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of MI&OU.

Impact 3: Increased burial of infrastructure as a result of increased sediment deposition

11.12.20 There is the possibility of increased burial of existing infrastructure and assets from the deposition of sediment suspended during construction and installation of Dublin Array. The MDO for the potential for burial of infrastructure is presented in Table 17.

11.12.21 A full assessment of the potential increases in suspended sediment concentration (SSC) and deposition is presented in the Physical Processes Chapter for all phases of the development. A summary of the findings is presented in Table 17. This assessment of potential burial of infrastructure from increased sediment deposition has been based on those findings. As outlined in the Project Description, some construction activities proposed for Dublin Array may result in the deposition of sediment during construction; in particular, the installation of the export cables (see further detail Table 9). As shown in sediment deposition modelling[19], temporary increase in sediment deposition from construction activities is expected to be restricted to the near field and adjacent areas of the far field as outlined in Table 17.

11.12.22 As per the project design and the avoidance and preventative measures (Table 10), the installation of the Dublin Array subsea cables will follow the ICPC Criteria (ICPC 2021[20]) with cable crossings designed to ensure suitable protection is proffered to both the existing asset(s) and the proposed project.

11.12.23 Within the study area, the following assets are within the ZoI for sediment deposition during construction, these assets are presented in Table 16.

Table 16 Assets within the ZoI for sediment deposition during construction

Asset type	Asset
Cables	ESAT 2 (Operational)
	Celtic Connect – Havhingsten (operational)
	Hibernia 'D' (Constructed)
	MaresConnect (proposed)
	Hibernia 'C' (Constructed)
	Emerald bridge (Operational)
	Sirius south (Operational)
	BT-TE1 (non-operational)
Offshore wind farms	Codling Wind Park Ltd array area and ECC (Proposed)
63 wastewater assets	The wastewater assets including outfalls and treatment works which may be affected by sediment deposition are outlined in Annex B.

11.12.24 The magnitude of impact is described in Table 18 is based on the methodology outlined in Section 11.4. For the identified MI&OU assets, the sensitivity of the identified assets to burial is assessed in Table 19.

[19] To quantify the potential impacts of the construction and operation, maintenance and decommissioning of the array area and Offshore ECC on the physical marine environment a suite of project specific calibrated numerical models, which collectively form The Dublin Array Physical Process Modelling System (DAPPMS). This includes a Hydrodynamic (HD) model and a Spectral Wave (SW) model, which have been used to quantify changes to the physical environment from the proposed wind farm development during its operational life span, please refer to Appendix 4.3.1-2 of Volume 4 of the EIAR.

20 The International Cable Protection Committee identifies a number of criteria or recommendations, intended as a guide to aid cable owners and other seabed users in promoting the highest goals of reliability and safety in the submarine cable environment. 13-2C covers The Proximity of Offshore Renewable Wind Energy Installations and Submarine Cable Infrastructure in National Waters. The objective is to focus on proximity between the various offshore wind farm structures (OWF) and submarine cables. There are common interests between offshore wind farm developers/owners and cable owners regarding safety, access and maintenance and there is a necessity for the parties to spatially interact in terms of access to the seabed.

Table 17 Temporary increases in SSC and sediment deposition as a result of construction activities at Dublin Array (based on Maximum Design Option)

Construction impact	Sediment fractions	Maximum sediment plume distance	Duration	SSC concentrations & deposition
Seabed preparation for foundation installation (dredged sediment during overspill)	Fine	900 m	Not detectable after an hour from release. The majority of suspended settling out of the water column within 30 minutes from release.	▪ Maximum concentrations predicted on a neap and spring tide are 140 mg/l and 50 mg/l, respectively. ▪ Deposition depths are predicted to be up to 10 mm, with the footprint of deposition for all thicknesses typically being 600 m by 200 m.
	Coarse	It is anticipated that the overspill will only consist of fine sediment fractions.		
Disposal of material associated with seabed preparation for foundations	Fine	10 – 100 m	Sediments settled out within the order of minutes if deposited near the seabed.	▪ Maximum concentration of 300 mg/l. ▪ The footprint of deposition of the disposed material occurs at a sub-grid scale within the Dublin Array Physical Process Modelling System as the sediment is shown to settle to the seabed immediately. Therefore, based on expert judgement it is expected that the footprint of the fine sediment fractions would be in the order of a few hundred meters.
	Coarse	Very localised	Only be in suspension during active dredging.	▪ Locally very high concentrations (in the order of thousands of mg/l) at the location of disposal, with SSC expected to reduce by several orders of magnitude within tens to low hundreds of metres. ▪ Maximum depth of deposition for one dredger load is expected to be 1.77 m when deposited on a slack tide at low water, in the northern extent of the array. This represents a worst case tidal state, and deposition depths will be lower for deposition during other tidal states. ▪ The maximum spatial extent of deposited material, exceeding a height of 30 cm, is predicted to be 4,355 m^2 for a single dredger load when deposited in the southern extent of the array. ▪ The maximum spatial extent of deposited material, exceeding a height of 5 cm, was predicted to be 23,690 m^2 for a single

Construction impact	Sediment fractions	Maximum sediment plume distance	Duration	SSC concentrations & deposition
				dredger load when deposited in the southern extent of the array area.
Drill arisings from foundation installation (if required)	Fine	Plumes may extend up to approximately 10 km from the source, however at this distance these concentrations will close to ambient conditions and well within the natural variability of the study area	Sediments settled out within three hours of the end of release.	▪ Values of up 200 mg/l and 600 mg/l are observable on spring and neap tides respectively albeit within 150 m of the release location. ▪ Concentrations are generally very low, typically 8 mg/l but can be up to 12 mg/l. ▪ Under both neap and spring tidal release scenario show a relatively large depositional footprint with a thickness of less than 2 mm. ▪ Within 2 km of the drilling location, the thickness is less than 20 mm.
	Coarse	Very localised	Only in suspension during the active drilling.	▪ The level of SSC caused by all sediment types together is realistically expected to be locally high (in the order of tens to hundreds of thousands) at the location of release. Noting that this will be highly localised and short-lived. ▪ It is expected that coarser fractions of sediment will be concentrated into a 'mound' in the vicinity of the foundation locations (within tens of meters) with an average thickness in the order of (likely order of tens of centimetres to a few meters in height) but will remain highly localised to the release point.

Construction impact	Sediment fractions	Maximum sediment plume distance	Duration	SSC concentrations & deposition
Inter-array cable installation	Fine	A few hundred meters	Sediments settled out within 30 to 60 minutes (spring and neap tidal releases)	▪ While trenching is underway, plumes are predicted to high concentrations (up to 5,000 mg/l) within a single model cell, before decreasing rapidly to between 5 mg/l and 20 mg/l within 200 m. ▪ Sediment deposited in a linear feature following the modelled cable trenching track, with deposition between 10 cm to 75 cm. ▪ Areas with a wider footprint will be anticipated to have a lower height on the seabed.
	Coarse	Very localised	Only be in suspension during the active trenching.	▪ The level of SSC caused by all sediment types together is realistically expected to be locally high (in the order of tens to hundreds of thousands) at the location of release. ▪ Deposition will be spatially limited to within meters to tens of meters for the coarser fractions with a proportion settling into the trench and burying the cable. ▪ A deposition height in the order of tens of centimetres to a few metres depending on the specific sediment present.
Export cable installation	Fine	2 km on a spring tide, and 1.5 km on a neap tide.	Sediments settled out within 60 minutes of the completion of sediment release.	▪ Both spring and neap show high SSC at the point of release (5,700 mg/l), with concentrations of up to 100 mg/l extending 600 m beyond this. ▪ The increase seabed height is typically between 25 cm and 75 cm with a maximum of 98 cm predicted (on a neap tide). ▪ Beyond the model cells which the trenching is being modelled the maximum increase in seabed height is 3 cm. Therefore, the modelling demonstrated that the displaced sediment will be deposited within the offshore ECC.
	Coarse	Very localised	Only be in suspension during the active trenching.	▪ The level of SSC caused by all sediment types together is realistically expected to be locally high (in the order of tens to hundreds of thousands) at the location of release.

Construction impact	Sediment fractions	Maximum sediment plume distance	Duration	SSC concentrations & deposition
				▪ Deposition will be spatially limited to within meters to tens of meters for the coarser fractions with a proportion settling into the trench and burying the cable. ▪ A deposition height in the order of tens of centimetres to a few metres depending on the specific sediment present.
Release of drilling mud (bentonite)	Fine	Approximately 1 km	Expected take hours if not days to settle out of suspension	▪ A larger footprint plume with elevated SSC (e.g. 250 m across, circa 320 mg/l) would take only approximately 45 minutes to pass. It is considered most likely that individual grains will become dispersed widely over very large areas and so will not result in any measurable thickness of bentonite accumulation or change in seabed sediment type or texture. ▪ The worst-case scenario would result in total thickness of the deposit circa 2.58 m
Sandwave clearance (overspill)	Fine	Approximately 1 km	Sediments settled out within an hour from release, with the majority of suspended settling out of the water column within 30 minutes.	▪ Maximum concentrations occur at slack water when concentrations increase to between 110 mg/l and 160 mg/l at the end of the release. ▪ Typically, each overspill will cover an area of approximately 900 m by 200 m, with settled depths of circa 2 mm to 6 mm, with a maximum depth less than 10 mm.
	Coarse	It is anticipated that the overspill will only consist of fine sediment fractions.		
Sandwave clearance (disposal)	Fine	Very localised	Sediments settled out within the order of minutes if deposited near the seabed.	▪ Up to 600 mg/l (locally very high at the location of active disposal). ▪ The footprint and depths for the worst-case location predict a footprint of around 250 m by 200 m, with a maximum depth of approximately 40 mm to 60 mm.
	Coarse	As above.	As above.	▪ Locally very high concentrations (in the order of thousands of mg/l) at the location of disposal, with SSC expected to reduce by several orders of magnitude within tens to low hundreds of metres. ▪ The maximum depth of deposition for one dredger load was circa 1.2 m when deposited on a slack tide.

Construction impact	Sediment fractions	Maximum sediment plume distance	Duration	SSC concentrations & deposition
				▪ The maximum spatial extent of deposited material, exceeding a height of 30 cm, was predicted to be approximately 9,523 m^2 for a single dredger load when deposited in the southern extent of the array area. ▪ The maximum spatial extent of deposited material, exceeding a height of 5 cm, was predicted to be approximately 23,226 m^2 for a single dredger load when deposited in the southern extent of the array area.

Table 18 Determination of magnitude for increased burial of existing cables, pipelines and wastewater outfalls as a result of increased sediment deposition

	Assessment of maximum design option	Assessment of alternative design options
Extent	The temporary impact of increased deposition from construction activities is expected to be restricted to the near field and the adjacent areas of the far-field (within one tidal cycle).	In line with the maximum design option, impacts restricted to the near field and adjacent areas of the far field,
Duration	The impact will be restricted to the construction phase of the project (30 months) and will therefore be short-term (1 - 7 years), although works in any given discrete location and activity within the project boundary will often be temporary (less than 1 year).	Alternative options have a minimum of 18 months and a mid of 24 months and will therefore be short-term (1 - 7 years), although works in any given discrete location and activity within the project boundary will often be temporary (less than 1 year).
Frequency	The impact will occur frequently in discrete areas throughout the construction phase of the development.	As the maximum design option, the impact will occur frequently in discrete areas throughout the construction phase of the development.
Probability	The impact upon the assets can reasonably be expected to occur.	In line with the maximum design option
Consequence	Sediment deposition will consist primarily of coarser sediments deposited close to the source, with a small proportion of silt deposition (reducing exponentially from source). Therefore, the consequence will be barely discernible where changes in sediment deposition occur on assets within the study area and operation is not anticipated to be disrupted.	As the maximum design scenario however the increase in SSC will be less.
Overall magnitude	The potential magnitude on marine infrastructure is rated as Negligible.	The potential magnitude on marine infrastructure is rated as Negligible.

Table 19 Determination of sensitivity for marine infrastructure to increased burial of assets

	Justification
Context	**Tolerance:** The identified assets have been engineered for offshore installation, and operation within the marine environment, and as such are not typically vulnerable to increased sediment deposition. **Recoverability:** The assets have moderate to high levels of recoverability, with intervention methods for installation upgrade works contained within risk assessment and operation and maintenance plans for offshore infrastructure.
Value	The telecommunications cables are considered to be of high value / importance, with a critical contribution to the value to the national economy. The continuous operation of wastewater assets is critical for prevention of surface water flooding and water quality deterioration. Therefore, these assets are considered to be of high value/ importance to the regional economy and environment. The offshore wind farms will contribute to renewable energy targets and energy security, and is considered of high value or importance, with critical importance to the regional or national economy.
Overall sensitivity	The potential sensitivity on marine infrastructure is rated as High.

11.12.25 The magnitude of the impact has been assessed as **Negligible for the alternative options and the MDO**, with the maximum sensitivity of the assets being **High**. Therefore, the significance of effect from increased burial of existing cables, pipelines, and wastewater outfalls as a result of increased sediment deposition is a **Neutral** impact, which is not significant in EIA terms for the range of scenarios.

11.12.26 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Residual effect

The significance of effect from increased burial of existing cables, pipelines and wastewater outfalls as a result of increased sediment deposition is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 10 is considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of MI&OU.

Impact 4: Impacts to Dumping at Sea (DAS) sites from increased sediment deposition

11.12.27 There are two active DAS site within the study area, the closest being Burford Bank, which is approximately 2 km away from the ECC (Figure 4). Burford Bank is licensed for use by Dublin Port Company to dispose of dredged material as part of both the MP2 project, under S0024-02 with activities licenced until December 2035, and the Alexandra Basin Redevelopment scheme, under S0004-03 with activities licenced until September 2029. Dumping activity by Malahide Marina Village Limited is permitted at Malahide Marina under licence S0031-01 until January 2025.

11.12.28 As described in Impact 3: Increased burial of infrastructure as a result of increased sediment deposition, the proposed activities have the potential to cause changes to bathymetry due to potential increases in suspended sediment and associated sediment deposition within DAS sites. An assessment of the likely impact of increases in SSC and sediment deposition caused by construction processes, are described in detail in the Physical Processes Chapter and Physical Processes Modelling report. In summary all pathways causing increases in SSC and deposition of disturbed sediments to the seabed modelled resulted in, brief and localised low magnitude effects.

11.12.29 The magnitude of sediment deposition on DAS sites will be the same as described in Impact 3, i.e. negligible. For the identified DAS sites, the sensitivity to increased sediment deposition is presented in Table 20.

Table 20 Determination of sensitivity for marine infrastructure to impacts to DAS sites from increased sediment deposition.

	Justification
Context	**Tolerance:** A DAS is not vulnerable to sediment deposition by its very nature. **Recoverability:** The DAS site is anticipated to have high levels of recoverability.
Value	Due to the importance of the Burford Bank DAS to other projects within the study area, the site is considered to be of medium value or importance, with reasonable contribution to the value of the regional and national economy.
Overall sensitivity	The potential sensitivity on marine infrastructure is rated as Low.

11.12.30 The magnitude of the impact has been assessed as **Negligible for the alternative design options and the MDO**, with the maximum sensitivity of the assets being **Low**. Therefore, the significance of effect from impacts to DAS sites from increased sediment deposition is a **Neutral** effect, which is not significant in EIA terms.

11.12.31 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Residual effect

The significance of effect from impacts to DAS sites from increased sediment deposition is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 10 is considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of MI&OU.

11.13 Environmental assessment: Operational phase

11.13.1 The effects of operation and maintenance of Dublin Array offshore infrastructure have been assessed on the MI&OU study areas as defined in Section 11.6.

11.13.2 The environmental impacts arising from operation and maintenance of Dublin Array are listed in Table 9, along with the MDO against which each O&M phase impact has been assessed.

11.13.3 A description of the significance of effect upon MI&OU receptors caused by each identified impact is provided below.

Impact 5: Restriction of access to assets

11.13.4 There may be temporary restrictions of access to assets during repairs and maintenance activities associated with the use of advisory safe passing distances around all active maintenance works. These activities will be discrete events as part of routine and non-routine maintenance operations instigated for purposes of navigational safety as outlined in the NRA. Guard vessels will be in operation to ensure other users do not enter safety zones (See Table 10). The use of safe passing distances will provide protection for both the proposed development and other marine users.

11.13.5 The magnitude of the impact has been assessed as **Negligible for both the alternative options and the MDO**, with the maximum sensitivity of the assets being **High**. Therefore, the significance of effect from Restriction of access to existing cables and pipelines is a **Neutral** impact, which is not significant in EIA terms.

11.13.6 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Table 21 Determination of magnitude for restriction of access to existing cables and pipelines

	Assessment of maximum design option	Assessment of alternative design options
Extent	The maximum extent of the impact is restricted to the near-field and immediately adjacent far-field areas advisory safe passing distances for all active works.	In line with the maximum design option with all works within advisory safe passing distances for all active works therefore restricted to the near field and immediately adjacent far field areas.
Duration	The impact will be restricted to the operation and maintenance phase of the project (35 years) and will therefore be long-term, although works will often be temporary (less than 1 year).	Alternative options also have an operation and maintenance phase of 35 years and will therefore be long-term, although works will often be temporary (less than 1 year).
Frequency	Restriction of access to assets may occur during routine and non-routine O&M activities. Therefore, the frequency of the impact is anticipated to apply throughout the O&M phase.	Restriction of access to assets will only occur during routine and non-routine O&M activities. Therefore, the frequency of the impact is anticipated to apply throughout the O&M phase.
Probability	Disturbance through restriction of access to assets is not anticipated to occur due to the short duration of activities, communication between operators and the low likelihood of the maintenance and repairs being required on those other assets during those discrete construction events.	Disturbance through restriction of access to assets is not anticipated to occur due to the short duration of activities, communication between operators and the low likelihood of the maintenance and repairs being required on those other assets during those discrete construction events
Consequence	The restriction of temporary access to an asset through use of safe passing distances may result in short term, temporary access to assets for maintenance operations by third party vessels but is non statutory and promulgation of information between the project and third party asset providers will ensure the operation of the operation and maintenance of assets is not anticipated to be affected.	The restriction of temporary access to an asset through use of safe passing distances may result in short term, temporary access to assets for maintenance operations by third party vessels but is non statutory and promulgation of information between the project and third party asset providers will ensure the operation and maintenance of assets is not affected.
Overall magnitude	The potential magnitude on marine infrastructure is rated as Negligible.	The potential magnitude on marine infrastructure is rated as Negligible.

Table 22 Determination of sensitivity for marine infrastructure to restriction of access to existing cables and pipelines

	Justification
Context	**Tolerance:** No direct overlap with third party assets with exception of Codling OWF export cable, impact limited to potential for temporary and short-term restriction of access for third party vessels for operation and maintenance activity, the assets are not generally vulnerable to impacts that may arise from the project. . **Recoverability:** Full access will be restored following the removal of the safe passing distances.
Value	The routine operation of wastewater assets is critical for prevention of surface water flooding and water quality deterioration. Therefore, these assets are considered to be of high value/ importance to the regional economy and environment. The Kish Bank Lighthouse is considered to be of high value to the regional environment and communities. Codling ECC is considered of high value or importance, with critical importance to the regional or national economy.
Overall sensitivity	The potential sensitivity on designated sites is rated as High.

Residual effect

The significance of effect from the restriction of access to existing assets resulting from O&M activities is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 10 is considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of MI&OU.

Impact 6: Indirect disturbance of assets from presence of infrastructure and O&M activity

11.13.7 During operation, the presence of the offshore infrastructure and scour protection has the potential to lead to impacts of marine processes (hydrodynamics, wave and sediment transport processes) and as such result in potential for damage through exposure or increased deposition of assets.

11.13.8 During O&M, there is also the possibility of increased burial of assets from the deposition of sediment suspended during repair and maintenance activities as outlined within Table 23. The impact of maintenance operations mainly relates to a localised and temporary re-suspension and settling of sediments from cable repairs and replacement.

11.13.9 An assessment of the potential increases in SSC and disposal are presented in the Physical Processes Chapter for all the operation and maintenance phase which concludes that the magnitude of these potential impacts would be low. O&M impacts are likely to be localised and occur over a short duration. Therefore, no disturbance to other operator's assets is anticipated.

11.13.10 Within the physical processes chapter, the magnitude of the potential modification of hydrodynamics, wave and sediment transport processes has been assessed as **Negligible** for the presence of foundations, cable protection and cable exposures.

11.13.11 The magnitude of the impact has been assessed as **Negligible for the alternative options and the MDO** (Table 23) for increased deposition and changes to marine processes, with the maximum sensitivity of the assets being **High**. Therefore, the significance of effect on existing. cables, pipelines, and wastewater outfalls as a result of O&M activity is a **Neutral** impact, which is not significant in EIA terms for the range of scenarios.

11.13.12 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Table 23 Determination of magnitude for increased burial or exposure of existing cables, pipelines and wastewater outfalls

	Assessment of maximum design option	Assessment of alternative design options
Extent	The changes will be restricted to the near field and immediately adjacent far field within the array area and its immediate surroundings.	The changes will be restricted to the near field and immediately adjacent far field within the array area and its immediate surroundings.
Duration	The changes would be long-lasting, i.e. throughout the operational phase of the project.	The changes would be long-lasting, i.e. throughout the operational phase of the project.
Frequency	The changes will occur throughout the operational phase of the project.	The changes will occur throughout the operational phase of the project.
Probability	The impact upon the assets can reasonably be expected to occur.	In line with the maximum design option
Consequence	No discernible change in the wave and tidal regime or sediment transport pathways, throughout the operation of Dublin Array, will be encountered within the near-field and the adjacent areas of the far-field. Sediment deposition will consist primarily of coarser sediments deposited close to the source, with a small proportion of silt deposition (reducing exponentially from source). Therefore, the consequence will be barely discernible where changes in sediment deposition occur on assets within the study area and operation is not anticipated to be disrupted.	No discernible change in the tidal regime, throughout the operation of Dublin Array, will be encountered within the near-field and the adjacent areas of the far-field. Sediment deposition will consist primarily of coarser sediments deposited close to the source, with a small proportion of silt deposition (reducing exponentially from source). Therefore, the consequence will be barely discernible where changes in sediment deposition occur on assets within the study area and operation is not anticipated to be disrupted.

	Assessment of maximum design option	Assessment of alternative design options
Overall magnitude	The potential magnitude on marine infrastructure is rated as Negligible.	The potential magnitude on marine infrastructure is rated as Negligible.

Table 24 Determination of sensitivity for marine infrastructure to increased burial of assets

	Justification
Context	**Tolerance:** The identified assets have been engineered for offshore installation, and are not generally vulnerable to localised changes to physical processes or sediment transport pathways **Recoverability:** The assets have moderate to high levels of recoverability subject to maintenance operations
Value	The telecommunications cables are considered to be of high value / importance, with a critical contribution to the value to the national economy. The continuous operation of wastewater assets is critical for prevention of surface water flooding and water quality deterioration. Therefore, these assets are considered to be of high value/ importance to the regional economy and environment. The offshore wind farms will contribute to renewable energy targets and the provision of energy and energy security and is considered of high value or importance, with critical importance to the regional or national economy.
Overall sensitivity	The potential sensitivity on marine infrastructure is rated as High.

Residual effect

The significance of effect from impacts of the indirect disturbance resulting from O&M activities is not significant in EIA terms. Therefore, no additional mitigation to that already identified in Table 10 is considered necessary. Therefore, no significant adverse residual effects have been predicted in respect of MI&OU.

Impact 7: Telecommunications and signals

11.13.13 Interference to a communication system can occur due to the following:

- Signal scattering as a result of the obstruction presented by the blades, an effect that mimics the presence of a lower power source operating from the location of the wind turbine;
- Signal obstruction as it passes through the area swept by the rotating blade or the tower; and
- Electromagnetic fields associated with the wind turbine generator.

11.13.14 The separation distance between the turbines and any telecommunications mast is 10 km. The receptors for the signal (i.e. television viewers or mobile device users) are also on the landward side of the windfarm where the broadcasting infrastructure is located. Signal interference on land is unlikely to occur.

Reflection and Signal Scattering

11.13.15 Wind turbines can act as sources of re-radiation producing delayed 'ghost' signals that are modulated in amplitude by the rotation of the blades. Radio waves can be reflected by many surfaces including turbines, reflection can interfere with the quality of the signal.

11.13.16 The amount of interference caused is dependent on a number of different factors. These factors include the following:

- Distance from the alanantenna (either receiving or transmitting);
- Material used to make the wind turbines;
- Angle of the blades in relation to the incoming signal;
- Direction in relation to the receiving antenna;
- Height of the turbine;
- Meteorological conditions; and
- Rotor rotation speed.

Signal Obstruction

11.13.17 If an absorbing object such as a WTG is placed in the path of a radio wave, obstruction can occur, detrimentally affecting the signal detected at the receiver. This is an impact that needs to be avoided in the case of point-to-point links, unless appropriate mitigation measures are provided to negate the impact.

Electromagnetic Fields

11.13.18 The operation of a wind turbine generator, and associated electrical transmission infrastructure, creates an electromagnetic field which can theoretically interfere with telecommunication signals. However, electromagnetic field levels in the vicinity of wind turbines are relatively low and diminish rapidly with distance.

11.13.19 The magnitude of the impact is presented in Table 25 based on the methodology outlined in Section 11.5. For telecommunication assets, the sensitivity to direct disturbance and damage is presented in Table 26.

Table 25 Determination of magnitude for impacts on telecommunications and signals

	Assessment of maximum design option	Assessment of alternative design options
Extent	The maximum extent of the impact is restricted to the near-field and immediately adjacent far-field areas (i.e. within 500 m of infrastructure being installed or the operation of vessels jacking up or anchoring).	In line with the maximum design option
Duration	The impact will be restricted to the operation and maintenance phase of the project (35 years) and will therefore be long-term.	In line with the maximum design option, alternative options B and C have an operational duration of 35 years which is also long-term.
Frequency	The impact is unlikely to occur	In line with the maximum design option
Probability	The separation distance between the turbines and any communications masts is 10 km and therefore is unlikely to cause signal disruption.	In line with the maximum design option
Consequence	Reflections from the turbines causing interference in coastal areas.	In line with the maximum design option
Overall magnitude	The potential magnitude on marine infrastructure is rated as Negligible.	The potential magnitude on marine infrastructure is rated as Negligible.

Table 26 Determination of sensitivity for impacts on telecommunications and signals

	Justification
Context	**Tolerance:** Consultation has identified that assets are not generally vulnerable to impacts that may arise from the project. **Recoverability:** The assets have moderate to high levels of recoverability.
Value	The telecommunications signals are considered to be of high value given their national importance to Ireland.
Overall sensitivity	The potential sensitivity of telecommunications is rated as

11.13.20 The proposed WTGs are located 10 km from the nearest telecommunications / broadcasting mast. Impacts, if any, during the operational phase of the project are unlikely, given the distance from the nearest turbine to the nearest antenna / signal tower.

11.13.21 The magnitude of the impact has been assessed as **Negligible for both the alternative options and the MDO**, with the maximum sensitivity of the assets being **High**. Therefore, the maximum significance of effect on telecommunications and signals is **Not Significant** effect.

11.13.22 The alternative design options (any other option within the range of parameters set out in the project description) will not give rise to an effect which is more significant than the maximum design option.

Additional mitigation

11.13.23 Further engagement with telecommunications service providers - Dublin Array will further engage with telecommunications service providers during the detailed design process for the wind farm. Further engagement will be undertaken when confirmed turbine locations and sizes are known and the need for any further protocols is established. Measures may comprise a 2rn protocol agreement.

Residual effect

The proposed turbines are located 10km from the nearest telecommunications / broadcasting mast. Impacts, if any, during the operational phase of the project are unlikely, given the distance from the nearest turbine to the nearest antenna / signal tower. This is the case for both the alternative design options and the MDO. Therefore, no significant adverse residual effects have been predicted in respect of reflection, signal scattering, signal obstruction or electromagnetic fields.

11.14 Environmental assessment: Decommissioning phase

11.14.1 As referenced in the Project Description, the Decommissioning and Restoration Plan (Volume 7, Appendix 2), including the three rehabilitation schedules attached thereto, describes how the Applicant proposes to rehabilitate that part of the maritime area, and any other part of the maritime area, adversely affected by the permitted maritime usages that are the subject of the MACs (Reference Nos. 2022-MAC-003 and 004 / 20230012 and 240020). 2022-MAC-003 and 004 / 20230012 and 240020).

11.14.2 It is based on the best scientific and technical knowledge available at the time of submission of this planning application. However, the lengthy passage of time between submission of the application and the carrying out of decommissioning works (expected to be in the region of 35 years as defined in the MDO) gives rise to knowledge limitations and technical difficulties. Accordingly, the Decommissioning and Restoration Plan will be kept under review by the Applicant as the project progresses, and an alteration application will be submitted if necessary. In particular, it will be reviewed having regard to the following:

- The baseline environment at the time rehabilitation works are proposed to be carried out,
- What, if any, adverse effects have occurred that require rehabilitation,
- Technological developments relating to the rehabilitation of marine environments,
- Changes in what is accepted as best practice relating to the rehabilitation of marine environments,
- Submissions or recommendations made to the Applicant by interested parties, organisations and other bodies concerned with the rehabilitation of marine environments, and/or

- Any new relevant regulatory requirements.

11.14.3 The Decommissioning and Restoration Plan outlines the process for decommissioning of the WTG, foundations, scour protection, OSP, inter array cables and Offshore ECC. The plan outlines the assumption that the most practicable environmental option is to leave certain structures in situ (e.g. inter array cables, scour protection), however the general principle for decommissioning is for all surface structures to be removed and it is assumed that the wind turbine generators (WTG's) will be dismantled and completely removed to shore. Piled foundations will be cut at a level below the seabed, buried cables and scour and cable protection left in situ.

Impact 8: Direct disturbance and damage to assets and infrastructure

11.14.4 As described in the Decommissioning and Restoration Plan, during decommissioning, the WTGs are expected to be removed in a reverse of the construction methodology with piles assumed to be cut off at or below the seabed to a depth so as not to be uncovered in the future. For the OSP, the decommissioning method is expected to be similar to the WTGs. For offshore cables, it is expected that where appropriate all buried assets will be left in situ.

11.14.5 The decommissioning activity will occur within the same footprint as the construction and the potential impacts for MI&OU during decommissioning are considered to be less than those during construction given offshore cables and scour protection are proposed to be left in situ. Accordingly, the magnitude (and so significance) of the effect on MI&OU resulting from decommissioning activities would be no greater than those assessed in Impact 1. Therefore, **no significant adverse residual effects** have been predicted in respect of MI&OU for both the MDO and the alternative design options.

Impact 9: Restriction of access to assets

11.14.6 As for Impact 8, the potential impacts during decommissioning are considered to be similar or less than during construction. Accordingly, the magnitude (and so significance) of the effect on MI&OU resulting from decommissioning activities would be no greater than those assessed in Impact 2. Therefore, **no significant adverse residual effects** have been predicted in respect of MI&OU for both the MDO and the alternative design options.

Impact 10: Increased burial of assets as a result of increased sediment deposition

11.14.7 The potential impacts during decommissioning are considered to be similar or less than during construction. Accordingly, the magnitude (and so significance) of the effect on MI&OU resulting from decommissioning activities will be no greater than those assessed in Impact 3. Therefore, **no significant adverse residual effects** have been predicted in respect of MI&OU for both the MDO and the alternative design options.

Impact 11: Impacts to DAS sites from increased sediment deposition

11.14.8 The potential impacts during decommissioning are considered to be similar or less than during construction. In addition, it is worth noting that those licences permitting DAS at Burford Bank and Malahide Marina will be expired by the time decommissioning commences. Accordingly, the magnitude (and so significance) of the effect on MI&OU resulting from decommissioning activities will be no greater than those assessed in Impact 4. Therefore, **no significant adverse residual effects** have been predicted in respect of MI&OU for both the MDO and the alternative design options.

11.15 Environmental assessment: cumulative effects

Methodology

11.15.1 This section outlines the cumulative impact assessment on MI&OU and takes in account the impacts of the proposed development alone, together with other plans and projects. As outlined in Volume 2, chapter 4: Cumulative Effects Assessment Methodology chapter (hereafter referred to as the Cumulative Effects Assessment Methodology), the screening process involved determination of appropriate search areas for projects, plans and activities and Zones of Influence (ZoIs) for potential cumulative impacts. These were then screened according to the level of detail publicly available and the potential for interactions with regard to the presence of an impact pathway as well as spatial and temporal overlap.

11.15.2 The CEA long list of projects, plans and activities (Volume 2, Chapter 4, Annex A: Offshore Long-list) with which Dublin Array's offshore infrastructure has the potential to interact to produce a cumulative impact is presented within the Cumulative Effects Assessment Methodology chapter.

11.15.3 Each plan and project has been considered on case by case basis with the maximum suite of projects identified from a long list within a search area defined as the ICES Ecoregion subsection 7a. Although this search area is defined for ecological purposes at a project level it has been defined to encompass all projects, plans and activities that could potentially act cumulatively with the proposed development. The MI&OU ZoI for the proposed development alone was scaled to represent a single tidal ellipse plus a 1 km buffer around the offshore infrastructure[21]. Any location beyond this distance is not predicted to have the potential to experience any direct or indirect cumulative impact to MI&OU receptors.

11.15.4 Plans and projects screened in, together with their allocated tier as defined in the Cumulative Effects Assessment Methodology Chapter that reflects their current stage within the planning and development process are presented in Table 27. For the purposes of the cumulative impact assessment, a precautionary construction period has been assumed between the years 2029 to 2032, with offshore construction (excluding preparation works) lasting up 30 months as a continuous phase within this period (refer to the Project Description Chapter).

[21] Activities undertaken within the temporary occupation area, namely the use of jack-up vessels and anchors during the construction, O&M, and decommissioning phases have been screened out within the physical processes chapter for suspended sediment and deposition with their use not resulting in notable changes in SSC and associated sediment deposition.

Projects screened out

11.15.5 Shipping and Navigation effects have been removed from this assessment as these have been fully addressed in the Shipping and Navigation Chapter.

11.15.6 Based on the criteria outlined in the Cumulative Effects Assessment Methodology Chapter and presented in the cumulative long list (Volume 2, Chapter 4, Annex A: Offshore Long-list), the following projects that were discussed as part of the receiving environment in Section 11.6 of this chapter were scoped out of the Cumulative Effect Assessment (CEA) and therefore have not been considered further:

- Oil and Gas;
- Shipping;
- Telecommunications and Broadcasting;
- Tidal power systems; and
- Wave power systems.

11.15.7 Telecommunication and Broadcasting effects have not been taken forward to the cumulative assessment as effects arising as a result of the operation of Dublin Array were considered to be Negligible only. Therefore, it is considered that there is no potential for this to contribute to a cumulative effect.

Projects for cumulative assessment

11.15.8 The specific projects scoped into this cumulative impact assessment, and the tiers into which they have been allocated are presented in Table 27 below.

11.15.9 The rationale and MDO for the projects selected which have a potential to give rise to cumulative effects for sediment deposition is presented in the Physical Processes chapter.

Table 27 Short listed projects for cumulative assessment

Development type	Project Name	Current Status of Development	Data confidence assessment/ phase	Planned programme
Tier 1				
Jetty construction and dredging	Dublin Port Company MP2 Project	Consented	High – Consented Licence FS006893	2022 - 2032
Dredging	Dublin Port Company Maintenance Dredging	Consented	High Licence Permit S0004-03	Maintenance dredging at various locations in Dublin Port for the years 2022-2029 (four to six weeks each year).

Development type	Project Name	Current Status of Development	Data confidence assessment/ phase	Planned programme
Lighthouse	Kish lighthouse	Active	High	Operational lighthouse situated on Kish Bank
Gas pipeline	Gas Network Ireland pipeline	Constructed	High	Ongoing impacts from the operation and maintenance of subsea cables and outfalls may impact on infrastructure and other users receptors cumulatively with the construction, operations and decommissioning activities of the offshore infrastructure of Dublin Array
Telecomm cable	ESAT 2	Operational	High	
Telecomm cable	Hibernia 'D'	Operational	High	
Telecomm cable	Hibernia 'C'	Operational	High	
Telecomm cable	Emerald bridge	Operational	High	
Telecomm cable	Sirius south	Operational	High	
Telecomm cable	CeltixConnect-2–Havhingsten	Operational	High	
Long sea outfall	Shanganagh-Bray	Constructed	High	
Long sea outfall	Shanganagh-Bray	Constructed	High	
Tier 2				
No tier 2 projects identified				
Tier 3				
Interconnector	Mares Connect	Pre-consent	Scoping report not submitted; Public brochure online. Foreshore licence submitted for site investigations to define final landfall and route options	Planning applications to be submitted 2025; Construction planned for 2026 - 2029; Operational target 2029 Site investigation works have the potential to increase vessel numbers in the study area

Development type	Project Name	Current Status of Development	Data confidence assessment/ phase	Planned programme
Offshore Wind Farm	Codling Wind Park	MAC awarded, Pre-consent	Medium – Phase 1 (MAC awarded). Scoping report and EIA available (EIA submitted Q2 2024). Initial foreshore licence granted in 2005, more recently in 2021.	Commencement in 2027 with construction lasting 2 years.
Terminal construction and dredging	Dublin port Company 3FM Project	Pre-consent	Medium – EIA available (submitted July 2024)	2026 – 2040

11.15.10 The only direct potential physical overlap with the project's offshore infrastructure and other infrastructure is with the Codling Offshore ECC with separation distances agreed for the wastewater outfall pipe associated with the Shanganagh waste water treatment works. However, any potential impacts will be minimised through the final offshore ECC design which will ensure that there is no direct interaction or physical overlap with any of these assets, including the wastewater assets and the Kish Bank Lighthouse, such that no direct damage would occur, or through implementation of crossing agreements that will be designed in line with best practice and will ensure suitable protection is offered to both the cable/pipeline/outfall being crossed and the Dublin Array Offshore ECC.

11.15.11 Standard industry techniques, such as adhering to the International Cable Protection Committee (ICPC) criteria, will be used to ensure no operational impacts to other subsea cables occur (ICPC, 2021). As such it is not predicted that a pathway exists for cumulative direct disturbance or damage to other assets and infrastructure, therefore this effect is not considered further herein

Effect 12: Cumulative restriction of access to assets

11.15.12 The potential for significant cumulative effects, as a result of restriction of access to assets is presented in Table 28. Due regard has been afforded to the possibility of the works associated with the Dublin Port Company MP2 and 3FM Projects, Codling Wind Park Offshore Wind Farm, routine O&M activity at existing assets, Mares Connect and Dublin Array occurring simultaneously.

11.15.13 None of the existing subsea cables and pipeline receptors overlap with the offshore infrastructure of Dublin Array, as such, the only potential cumulative effect on these receptors are from implementation of safe passing distances around any active works and vessels transiting to the offshore infrastructure area and combining with the vessel movements from other projects which could restrict access for routine or unplanned O&M activity of cables and pipelines outside of any safety zones. However, it should be noted that vessel activity relating to the project will occur within the baseline conditions of existing high levels of shipping activity.

11.15.14 There is no publicly available information on the exact location of where the MaresConnect subsea cable is planned to be installed. It is expected to make landfall and connect to an existing sub-station in the Greater Dublin Area, although the exact cable route is still to be determined.

11.15.15 Consideration is given below to the potential for cumulative impact on Codling ECC, waste water assets and Kish lighthouse. The Applicant has no statutory ability to restrict access to third party assets during the construction of Dublin Array. Any restrictions will be advisory only in nature and intended to make third party vessels and operators aware of risks.

11.15.16 Noting that the final offshore export cable route and export cable landfall location will be designed to ensure that there is no direct interaction with any of these assets or effects on access. The final layout of structures will also be designed and agreed with Irish Lights to ensure that access to the Kish Lighthouse is not prohibited. The Applicant will ensure close communication and planning between all parties to ensure access to assets is maintained as far as possible throughout all phases of the development.

Table 28 Determination of significance for cumulative restriction of access to assets

	Justification
Step 1: Drivers	Simultaneous construction and/or O&M activity
Step 2: Pressures	Increased vessel activity and advisory safety zones, which would temporarily limit access to assets for O&M works (planned or unplanned)
Step 3: States	All assets and operations that overlap with any safety zones both present in the existing environment and those proposed to be constructed (or operated) as defined in Section 11.6.
Step 4: Impacts	Advisory safe passing distances will be in place during construction and active maintenance activity as part of the avoidance measures proposed (Table 10). These advisory safety zones will be encompassed entirely by the offshore temporary occupation area and will provide protection for both the proposed development and other marine users. These safe passing distance will be limited to areas where work is being undertaken and will be communicated via marine notices Therefore, no additional potential impacts are identified than when considering Dublin Array alone. The magnitude (and so significance) of the effect on MI&OU receptors from cumulative activities would be no greater than negligible, as assessed in Impacts 2, 5, and 9.

	Justification
Step 5: Responses	No additional mitigation to that already identified in Table 10 is considered necessary to prevent significant effects.
Conclusion	The magnitude of the potential restriction of access from simultaneous operations is concluded to be negligible i.e. the same as the project alone.

Effect 13: Cumulative increases in burial of assets and DAS sites

11.15.17 The potential for significant cumulative effects, as a result of simultaneous sediment disturbance and subsequent deposition, is presented in Table 29, Table 30, Table 31 and Table 33. Due regard has been afforded to the possibility of the works associated with the Dublin Port Company MP2 and 3FM Projects, Codling Wind Park Offshore Wind Farm, Mares Connect and Dublin Array occurring simultaneously, however, given the project timelines it is highly unlikely that the proposed construction programmes would overlap. However, the projects could undertake these activities sequentially to one another.

Table 29 Determination of significance for cumulative increases in sediment deposition with MP2

	Justification
Step 1: Drivers	Simultaneous cable laying and capital dredging in Dublin Bay.
Step 2: Pressures	Temporary increases in SSC and associated sediment deposition.
Step 3: States	All assets and operations (cables, pipelines, DAS sites, wastewater outfalls) both present in the existing environment and those proposed to be constructed (or operated) as defined in Section 11.6.
Step 4: Impacts	As detailed in the Physical Processes chapter, cumulative effects may arise between the installation of the offshore components of Dublin Array and the MP2 project and maintenance dredging in Dublin Bay, and so could result in the potential for interaction of sediment plumes. If this interaction were to occur, based on the modelling undertaken in the MP2 EIAR, the plumes concentration may increase by an additional 10 mg/l but will dissipate following cessation of cable laying activity (after approximately an hour) (Dublin Port Company, 2020). The potential increases in SSC, when considered cumulatively, are still anticipated to be within natural variation within Dublin Bay. Plumes generated from maintenance dredging are anticipated to dissipate quickly and be on a smaller geographical scale that the capital dredging associated with MP2. As demonstrated by the water quality monitoring undertaken for Dublin Port (Dublin Port Company, 2021), elevated suspended sediment concentrations resulting from seabed activities will remain local to the works. Furthermore, as previously stated, any increased SSC levels will immediately dissipate following the cessation of works removing the possibility for an additive process of these levels.

	Justification
	Therefore, no additional potential impacts are identified than when considering Dublin Array cumulatively. The magnitude (and so significance) of the effect on MI&OU receptors from cumulative activities would be no greater than those assessed in Impacts 3, 4, 6, 10 and 11.
Step 5: Responses	No additional mitigation to that already identified in Table 10 is considered necessary to prevent significant effects.
Conclusion	The magnitude of the potential cumulative increases in SSC and deposition from simultaneous operations is concluded to be Neutral, i.e. the same as the project alone.

Table 30 Determination of significance for cumulative increases in sediment deposition with Codling Wind Park

	Justification
Step 1: Drivers	Simultaneous cable laying in Dublin Bay.
Step 2: Pressures	Temporary increases in SSC and associated sediment deposition.
Step 3: States	All assets and operations (cables, pipelines, DAS sites, wastewater outfalls) both present in the existing environment and those proposed to be constructed (or operated) as defined in Section 11.6.
Step 4: Impacts	Should the programme of any of the projects change such that they are scheduled for the same period, combined with a decision to make landfall at the same location, the greatest likelihood is for the project's installation periods to be sequenced to allow for the availability of installation equipment. As increased SSC rapidly dissipates immediately following the cessation of activities, it is not expected for there to be any additive process for the increased turbidity within the water column. Therefore, no additional potential impacts or receptors are identified than when considering Dublin Array cumulatively with Codling Wind Park. The magnitude (and so significance) of the effect on MI&OU receptors from cumulative activities would be no greater than those assessed in Impacts 3, 4, 6, 10 and 11.
Step 5: Responses	No additional mitigation to that already identified in Table 10 is considered necessary to prevent significant effects.
Conclusion	The magnitude of the potential cumulative increases in SSC and deposition from simultaneous operations is concluded to be Neutral, i.e. the same as the project alone.

Table 31 Determination of significance for cumulative increases in sediment deposition with MaresConnect

	Justification
Step 1: Drivers	Simultaneous cable laying
Step 2: Pressures	Temporary increases in SSC and associated sediment deposition.
Step 3: States	All assets and operations (cables, pipelines, DAS sites, wastewater outfalls) both present in the existing environment and those proposed to be constructed (or operated) as defined in Section 11.6.
Step 4: Impacts	The laying of subsea cable for the MaresConnect project, will cause temporary localised sediment plumes. As increased SSC rapidly dissipates immediately following the cessation of activities, it is not expected for there to be any additive process for the increased turbidity within the water column. The potential increase in SSC, when considered cumulatively, are anticipated to be within natural variation within Dublin Bay. Sediment plumes generated by construction, O&M or decommissioning of the offshore infrastructure associated with Dublin Array, particularly those containing coarser sediment fractions, are expected to quickly dissipate after cessation of the activities, due to settling and wider dispersion with the concentrations reducing quickly over time to background levels. Sediment deposition will consist primarily of coarser sediments deposited close to the source, with a small proportion of silt deposition (reducing exponentially from source). Therefore, no additional potential impacts are identified than when considering Dublin Array cumulatively. The magnitude (and so significance) of the effect on MI&OU receptors from cumulative activities would be no greater than those assessed in Impacts 3, 4, 6, 10 and 11.
Step 5: Responses	No additional mitigation to that already identified in Table 10 is considered necessary to prevent significant effects.
Conclusion	The magnitude of the potential cumulative increases in SSC and deposition from simultaneous operations is concluded to be Neutral, i.e. the same as the project alone.

Table 32 Consideration of potential for cumulative increases in SSC and deposition with the Dublin Port Company 3FM Project.

	Justification
Step 1: Drivers	Capital dredging and disposal as part of the Dublin Port Company 3FM Project.
Step 2: Pressures	Temporary increases in SSC and associated sediment deposition.
Step 3: States	All assets and operations (cables, pipelines, DAS sites, wastewater outfalls) both present in the existing environment and those proposed to be constructed (or operated) as defined in Section 11.6.
Step 4: Impacts	The capital dredging and disposal associated with the 3FM Project will cause temporary localised sediment plumes both at the loading

	Justification
	location and licensed disposal sites. Modelling and monitoring data analysed from earlier works in Dublin Bay has shown that plumes from proposed dredging operations are confined to the immediate area of operation and do not impact the wider environment. Plumes associated with the disposal of material in the greater Dublin Bay area have been shown to settle rapidly and within 750 m from the location of disposal (Dublin Port Company, 2024). As predicted in the Dublin Array modelling, the SSC plumes are anticipated to rapidly dissipate following the cessation of activities, and so it is not expected for there to be any measurable plume coalescence. The magnitude (and so significance) of the effect on physical processes resulting from these activities would be no greater than those assessed in Impacts 1. Consequently, the maximum magnitude of the impact for these receptors is assessed as being **Low adverse**. Therefore, no additional potential impacts are identified than when considering Dublin Array cumulatively. The magnitude (and so significance) of the effect on MI&OU receptors from cumulative activities would be no greater than those assessed in Impacts 3, 4, 6, 10 and 11.
Step 5: Responses	No additional mitigation to that already identified in **Error! Reference s ource not found.** are considered necessary to prevent significant effects.
Conclusion	The magnitude of the potential cumulative increases in SSC and deposition from simultaneous operations is concluded to be Neutral, i.e. the same as the project alone.

Table 33 Determination of significance for cumulative increases in sediment deposition with maintenance of existing cables and pipelines

	Justification
Step 1: Drivers	Maintenance work of subsea cables.
Step 2: Pressures	Temporary increases in SSC and associated sediment deposition.
Step 3: States	Subsea cables and pipelines present in the existing environment as defined in Section 11.6.
Step 4: Impacts	As detailed in the Physical Processes and MW&SQ chapters, cumulative effects may arise between the installation of the offshore components of Dublin Array and the planned and unplanned maintenance of operational subsea cables, and so could result in the potential for interaction of sediment plumes, resulting in an increase in sediment deposition. Potential maintenance works could be both planned (routine) and unplanned works (where corrective action is needed) but at the time of writing it is unknown when these works could occur. However, there is the potential for a temporal overlap and so a potential

	Justification
	interaction of sediment plumes and associated impacts on MW&SQ receptors. The lengths of cable to be replaced or reburied would be shorter, and the potential impacts will be more localised and occur over a shorter duration than those considered presented for the installation of the offshore export cables. As increased SSC rapidly dissipate following the cessation of activities, it is not expected for there to be any measurable plume coalescence. The magnitude (and so significance) of the effect on marine water and sediment quality in the marine environment resulting from these activities would be no greater than those assessed in Impacts 3, 6, 7 and 10.
Step 5: Responses	No additional mitigation to that already identified in Table 10 is considered necessary to prevent significant effects
Conclusion	The magnitude of the potential cumulative increases in SSC and deposition from simultaneous operations is concluded to be Neutral, i.e. the same as the project alone.

11.16 Interactions of the environmental factors

11.16.1 A matrix illustrating where interactions between effects on different factors is presented in Volume 8, Chapter 1: Interactions of the Environmental Factors.

11.16.2 Interactions are considered to be interactions between effects of different aspects of the proposal on different environmental factors[22] (EPA guidelines, 2022). These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the project (construction, O&M and decommissioning) to interact and potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project phases; and
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on benthic ecology such as direct habitat loss or disturbance, sediment plumes, scour, jack up vessel use etc., may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short-term, temporary or transient effects.

11.16.3 As indicated in the interactions matrix (Volume 8, Chapter 1) there are linkages between the topic-specific chapters presented within this EIAR, whereby the effects assessed in one chapter have the potential to result in secondary effects on another receptor (e.g. effects on fish and shellfish ecology have the potential to result in secondary effects on marine mammals prey resources).

11.16.1 The potential effects on infrastructure and other users during construction, operational and maintenance and decommissioning phases of the Project have been assessed in sections 11.12 – 11.14 above.

11.16.2 Effects on MI&OU (i.e. direct disturbance and damage to assets and infrastructure, restriction of access) also have the potential to have secondary effects on other receptors which have been fully assessed in the topic-specific chapters. These receptors are:

- Volume 3, Chapter 1: Physical Processes.

11.16.3 For MI&OU receptors, the following potential impacts have been considered within the interactions assessment:

- Direct disturbance and damage to assets and infrastructure;
- Restriction of access to assets; and
- Increased burial of infrastructure as a result of increased sediment deposition (including DAS sites).

[22] Interactions of environmental factors are also commonly referred to as 'interactions of the foregoing'. The EPA guidelines (2022) refer to interactions as 'Interactions Between Impacts on Different Factors'.

Physical Processes Interactions

11.16.4 Effects on the sediment regime (i.e. from increases in SSC and sediment deposition above background levels or changes to sediment transport pathways) associated with physical processes also have the potential to have secondary effects on Infrastructure and Other Users receptors (i.e. increased burial of assets).

11.16.5 The potential effects of the construction, O&M and decommissioning of the offshore infrastructure of Dublin Array on coastal processes and resulting indirect effects on MI&OU have been assessed in Section 11.12 – 11.14 .

11.16.6 Changes in physical processes from increased SSCs and associated deposition resulting in increased burial of infrastructure during the construction and decommissioning phases of the proposed development were assessed as of Neutral adverse significance. During the operational and maintenance phase no disturbance to other operator's assets is anticipated.

Project lifetime effects

11.16.7 Project lifetime effects consider impacts from the construction, operation or decommissioning of Dublin Array on the same receptor (or group). The potential inter-related effects that could arise in relation to MI&OU are presented in Table 34.

Table 34 Project lifetime effects assessment for potential inter-related effects on MI&OU

Impact Type	Effects (Assessment Alone)			Interaction Assessment
	C	O&M	D	Project lifetime effects
Direct disturbance and damage to assets and infrastructure	Neutral adverse	N/A	Neutral adverse	Disturbance and damage effects on infrastructure and other users have the potential to occur during all phases of the offshore works, with the majority of potential disturbance and damage effects to infrastructure arising during construction and decommissioning phases. There is potential for less disturbance during the operational phase however, these activities will be highly localised to the array area and cable corridor, and temporally discrete, occurring only where required as part of operation and maintenance activities resulting in temporary and intermittent effects during the operational phase. It is therefore considered that impacts in the operation phase will not materially contribute to inter-related effects. During the construction and decommissioning phases, the implementation of the avoidance measures referenced in Table 10 reduce the risk of significant effects on infrastructure and other users. In addition, direct disturbance of other assets will only

Impact Type	Effects (Assessment Alone)			Interaction Assessment
	C	O&M	D	Project lifetime effects
				occur within the near field within the footprint of all construction works encompassed by the offshore. As such, the construction and decommissioning phases are significantly temporally separate such that there will be no interaction between the two. There will therefore be no inter-related effects of greater significance compared to the impacts considered alone.
Restriction of access to assets	Neutral adverse	Not significant	Neutral adverse	During all phases of the project, advisory safe passing distances will be active, and therefore the areas from which access to existing infrastructure and assets will be excluded or restricted, will be highly localized to any active works. During construction and decommissioning, for example, buoyage will be implemented around construction activity and will provide protection for both the proposed development and other marine users. There will be no formal exclusion of other users, all measures are advisory for navigational safety. In addition, guard vessels will be in operation to ensure other users do not enter safety zones to provide protection for both the proposed development and other marine users. Furthermore, crossing and proximity agreements will ensure close communication and planning between the Project and other surrounding asset owners to ensure disruption of activities is minimised, and that risks are reduced to acceptable levels. As access restrictions will be temporary and intermittent in nature, effects on infrastructure and other users are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.
Increased burial of infrastructure as a result of increased sediment deposition	Neutral adverse	N/A	Neutral adverse	The majority of the seabed disturbance (resulting in the highest SSC and sediment deposition) will occur during the construction and decommissioning phases, in particular, during the construction period during installation of the export cables through the use of a mass flow excavator. With regards to the levels of sediment

Impact Type	Effects (Assessment Alone)			Interaction Assessment
	C	O&M	D	Project lifetime effects
(including DAS sites)				deposition that may occur on other assets, the modelling of sediment deposition levels has found that the temporary increase in sediment deposition is expected to be restricted typically to the near field and adjacent areas of the far-field. The impact will occur frequently in discrete areas throughout the construction and decommissioning phase of the development. Furthermore, the consequence will be barely discernible where changes in sediment deposition occur on assets within the study area, and operation is not anticipated to be disrupted. During O&M, the impact of maintenance operations on sediment mainly relates to a localised and temporary re-suspension and settling of sediments. The exact nature of the disturbance will be determined by the sediment conditions and maintenance work required. Therefore, across the project lifetime, the effects on infrastructure and other users are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.

Receptor led effects

11.16.8 Potential exists for spatial and temporal interactions between impacts to MI&OU receptors. The greatest scope for potential interactions between impacts is predicted to arise from the interaction of the restriction of access to assets and the potential for disturbance or damage of infrastructure. In the unlikely event that disturbance or damage to assets occurs during the construction or decommissioning phases of the Project, the resulting maintenance/repair required may result in a further restriction of access to assets due to advisory clearance distances around vessels. Early promulgation of information on maintenance/repair works at existing assets will be communicated through Notices to Mariners. Other required works on existing assets could then be planned to avoid interactions with these maintenance/repair works, limiting the effect of access restrictions. While the two effects may act together, it is considered that appropriately mitigated construction and decommissioning activities to avoid potential damage or disturbance to infrastructure (see section 11.11), will limit the impact of access restrictions and that therefore, overall, any inter-related effect will not be of any greater significance than those already assessed in isolation. All inter-related effects result in a neutral significance of effect, which is not significant in EIA terms.

11.17 Transboundary statement

11.17.1 No transboundary effects have been identified in terms of MI&OU. This is because the predicted impacts on MI&OU receptors are not anticipated to be sufficient to influence transboundary receptors at this distance from the Project, i.e. they do not extend beyond the study area which is within Irish Waters.

11.18 Summary of effects

11.18.1 This chapter has investigated the potential effects on MI&OU receptors arising from Dublin Array. The impacts considered include those brought about directly (e.g. by the presence of infrastructure on the seabed), as well as indirectly. Potential impacts considered in this chapter are listed below in Table 35.

11.18.2 Cumulative impacts were also considered, and an assessment was carried out looking at the potential for interaction of impacts as a result of the combined activities of Dublin Array and other activities in the study area. These include the construction of other OWFs, subsea cables and dredge disposal activities.

11.18.3 These potential impacts have been investigated using a combination of methods including analytical techniques, the existing evidence base and numerical modelling. In accordance with the requirements of the Maximum Design Option approach to EIA, the worst-case characteristics of the proposed development have been considered thereby providing a highly conservative assessment.

11.18.4 Even adopting the conservative assessment approach described above, it has been found that for all of the MI&OU receptors included in this assessment, the level of effect significance is negligible to minor adverse (Table 35). The potential effects to MI&OU are therefore not significant in EIA terms.

11.18.5 Table 35 presents a summary of the effects of the proposed development during the construction, O&M and decommissioning phases on MI&OU at the Dublin Array site.

Table 35 Summary of predicted impacts of the Dublin Array Offshore Wind Farm

Description of Impact	Impact	Additional mitigation measures	Residual effect
Construction			
Impact 1	Direct disturbance and damage to assets and infrastructure	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 2	Restriction of access to assets	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 3	Increased burial of existing infrastructure as a result of increased sediment deposition	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 4	Impacts to DAS sites from increased sediment deposition	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Operation and maintenance			
Impact 5	Restriction of access to assets	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 6	Increased sediment deposition	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 7	Impacts upon Telecommunications	Additional engagement with telecommunications providers during detailed design stage.	No significant adverse residual effects
Decommissioning			
Impact 8	Direct disturbance and damage to assets and infrastructure	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 9	Restriction of access to assets	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 10	Increased burial of assets as a result of increased sediment deposition	Not Applicable – no additional mitigation identified	No significant adverse residual effects
Impact 11	Impacts to DAS sites from increased sediment deposition	N/A	No significant adverse residual effects
Cumulative effects			

Description of Impact	Impact	Additional mitigation measures	Residual effect
Impact 12	Cumulative restriction of access to assets	N/A	No significant adverse residual effects
Impact 13	Cumulative increases in SSC deposition	N/A	No significant adverse residual effects
Transboundary			
No transboundary effects have been identified.			

11.19 References

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Annex A: Marine Infrastructure and Other Users Policy

Legislation, Policy and Guidance

Policy/ Legislation	Key provisions	Section where provision is addressed
Legislation		
Convention on the International Regulations for Preventing Collisions at Sea 1972	Rules relating to: ▪ Lookouts; ▪ Safe speed; ▪ Risk of collision; ▪ Action to avoid collision; ▪ Narrow channels; ▪ Traffic separation schemes; ▪ Sailing vessels; ▪ Overtaking; ▪ Head-on situations; ▪ Crossing situations; ▪ Action by give-way vessels; ▪ Action by stand-on vessels; and ▪ Responsibilities between vessels. ▪ Conduct of vessels in restricted visibility; ▪ Visibility of lights; ▪ Power-driven vessels underway; ▪ Towing and pushing; ▪ Sailing vessels underway and vessels under oars; ▪ Fishing vessels; ▪ Vessels not under command or restricted in their ability to manoeuvre; ▪ Vessels constrained by their draught; ▪ Pilot vessels; ▪ Anchored vessels and vessels aground; and ▪ Seaplanes. ▪ Equipment four sound signals; ▪ Manoeuvring and warning signals; ▪ Sound signals in restricted visibility; ▪ Signals to attract attention;	Consideration of mitigation methods to avoid collisions between multiple vessels or vessels and infrastructure are considered throughout this chapter, and are described in Table 10, the Shipping and Navigation Chapter, and Aviation and Military Exercise Chapter.

Policy/ Legislation	Key provisions	Section where provision is addressed
	▪ Distress signals; and ▪ Exemptions.	
Submarine Telegraph Act 1885 Article II	"It is a punishable offence to break or injure a submarine cable, willfully or by culpable negligence, in such manner as might interrupt or obstruct telegraphic communication, either wholly or partially, such punishment being without prejudice to any civil action for damages."	The potential impact of the proposed development on cables and pipelines is addressed within Sections 11.12 to 11.15 of this chapter.
The Foreshore and Dumping at Sea (Amendment) Act 2009	Dumping / disposal of material at sea requires a permit provided by the Environmental Licensing Programme of the Environmental Protection Agency.	Dumping licences and sites have been assessed within Sections 11.12 to 11.14 of this chapter.
Maritime Area Planning Act 2021	The Maritime Area Planning Act (MAPA) sets out the consents required for different types of Marine Infrastructure and Maritime Usages, and enforcement measures which may be exercised by the Maritime Area Regulatory Authority (MARA). It provides that the decision-making of MARA shall be consistent with the National Marine Planning Framework objectives and the Marine Strategy Framework Directive.	The relevant policies have been considered through this Chapter and within Volume 2, Chapter 2: Consents, Legislation, Policy and Guidance.
Local Government (Water Pollution) Act 1977, as amended	Trade and effluent discharges not subject to wastewater authorisations or emissions licences from the EPA are subject to a local authority licence requirement under section 4.	Wastewater treatment and locations have been discussed within Section 11.6 and assessed within Sections 11.12 to 11.14 of this chapter.
Guidelines and technical standards		
Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government (DHPLG), 2018a) (hereafter referred to as the EIA Guidelines).	The starting point for EIA is an assessment of the current state of the environment and how this is likely to evolve without the proposed project but having regard to existing and approved projects and likely significant cumulative effects – in other words the 'do nothing' scenario.	A full characterisation of the receiving environment is presented in Section 11.6. The findings of this characterisation have been summarised in this chapter for the ease of the reader.

Policy/ Legislation	Key provisions	Section where provision is addressed
Para 4.31		
Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018) Para 6.12.	The Directive requires that the EIAR describes the cumulation of effects[23]. Cumulative effects may arise from: ▪ The interaction between the various impacts within a single project; ▪ The interaction between all of the different existing and/or approved projects in the same area as the proposed project.	The interactions between various environmental aspects within the proposed developments are presented in Section 11.15 of this chapter. The interactions between Dublin Array and other plans and projects, for physical processes, ae presented in Section 11.15 of this EIAR chapter.
Guidelines and technical standards		
Guidance on Environmental Impact Statement (EIS) and Natura Impact Statement (NIS) Preparation for Offshore Renewable Energy Projects (Environmental Working Group of the Offshore Renewable Energy Steering Group and the Department of Communications, Climate Action and Environment, 2017)	"Cumulative impact assessments only need to take account of existing and/or approved projects and not other projects within the planning process."	A precautionary approach was undertaken to consider and plans or projects which could result in a cumulative effect. The cumulative assessment is presented in Section 11.15. To account for the uncertainty associated with projects and plans which have not yet been consented a tiering system was adopted. Further details of the approach are available in Volume 2, Chapter 4: Cumulative Effects Assessment Methodology.
DCCAE Guidance, 2017 Table 3	"Environmental protection by assessment of likely significant effects of projects to promote sustainable development"	An assessment of likely significant effects is presented in Sections 11.12 to 11.15.

[23] Annex IV, point 5(e) of the Directive. See also Schedule 6(2)(e)(i)(V) to the Regulations.

Policy/ Legislation	Key provisions	Section where provision is addressed
DCCAE Guidance, 2017 Table 4	"developers and competent authorities should have regard to when planning/assessing a project ▪ Oil and gas infrastructure "	An assessment of the potential changes to oil and gas infrastructure have been scoped out of this assessment, see Section 11.9 of this chapter.
DCCAE Guidance, 2017 Table 4	"developers and competent authorities should have regard to when planning/assessing a project – ▪ Cables and pipelines"	An assessment of the potential changes to cables and pipelines and the associated implications are presented within Sections 11.12 to 11.15 of this chapter.
DCCAE Guidance, 2017 Table 4	"developers and competent authorities should have regard to when planning/assessing a project – ▪ Aggregates, dredging and disposal areas"	An assessment of the potential changes to aggregates, dredging and disposal areas and the associated implications are presented within Sections 11.12 to 11.15 of this chapter.
DCCAE Guidance, 2017 Section 3.2	"All phases of the development should be considered in the assessment process. Each of these phases will have its own specific effects on the environment and will differ in duration. Considering all phases of the development will address full *lifecycle* effects of a proposed development."	All phases of the development have been considered within the physical processes EIA assessment. The assessment of effects in the construction phase are presented in Section 11.12. The assessment of effects in the operational phase (including maintenance) are presented in Section 11.13. The assessment of effects in the decommissioning phase are presented in Section 11.14.
DCCAE Guidance, 2017 Section 4.5.3	"The zones of influence may differ depending upon the topic under consideration (e.g. the visual zone will differ from the biodiversity zone). In establishing the zones of influence, the following should be identified: ▪ the physical footprint of the project;	The Zone of Influence (ZoI) for Dublin Array was developed through use of project specific modelling. Further details of the zone of influence and the development of the study area are presented in the Physical Processes Chapter.

Policy/ Legislation	Key provisions	Section where provision is addressed
	▪ the measures required to determine the overall zones of influence of a project (i.e. the area impacted by the development with reference to the of likely significant effects); and ▪ the study area (i.e. that selected for the review)"	
DCCAE Guidance, 2017 Section 4.6.3	"A description of the existing environment is required to allow for a prediction of significant likely effects of a development. "	A characterisation of the receiving environment is presented in Section 11.6 of this chapter.
Guidelines on the Information to be contained in Environmental Impact Assessment reports (Environmental Protection Agency, 2022)	"The Guidelines have been drafted with the primary objective of improving the quality of EIARs with a view to facilitating compliance (with the [EIA] Directive). By doing so they contribute to a high level of protection for the environment through better informed decision-making processes. They are written with a focus on the obligations of developers who are preparing EIARs." "The Guidelines emphasise the importance of the methods used in the preparation of an EIAR to ensure that that the information presented is adequate and relevant."	The methodology presented within the Guidelines was utilised in the development of the EIA methodology applied within this EIAR.

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Annex B: Wastewater Assets

Table B1 Wastewater Discharge Locations and information

Emission ID	Name	Registration Number	Wastewater Treatment Level	Closest distance to Offshore ECC (km)
TPEFF3900D0038SW018	Shanganagh-Bray	D0038-02	Storm Water Overflow	0.2
TPEFF1000D0038SW002	Shanganagh-Bray	D0038-02	Storm Water Overflow	0
TPEFF1000D0038SW001	Shanganagh-Bray	D0038-02	Primary Treatment	0
TPEFF0700D0034SW001	Ringsend	D0034-01	Primary Treatment	0.23
TPEFF3900D0038SW016	Shanganagh-Bray	D0038-02	Storm Water Overflow	0.65
TPEFF3900D0038SW017	Shanganagh-Bray	D0038-02	Storm Water Overflow	0.71
TPEFF0700D0034SW213	Ringsend	D0034-01	Storm Water Overflow	0.74
TPEFF3900D0038SW019	Shanganagh-Bray	D0038-02	Storm Water Overflow	0.94
TPEFF0700D0034SW005	Ringsend	D0034-01	Storm Water Overflow	0.97
TPEFF3900D0038SW028	Shanganagh-Bray	D0038-02	Storm Water Overflow	1.16
TPEFF3900D0038SW025	Shanganagh-Bray	D0038-02	Storm Water Overflow	1.17
TPEFF0700D0034SW006	Ringsend	D0034-01	Storm Water Overflow	1.27
TPEFF0700D0034SW007	Ringsend	D0034-01	Storm Water Overflow	1.44
TPEFF0700D0034SW010	Ringsend	D0034-01	Storm Water Overflow	1.77

Emission ID	Name	Registration Number	Wastewater Treatment Level	Closest distance to Offshore ECC (km)
TPEFF0700D0034SW008	Ringsend	D0034-01	Storm Water Overflow	1.85
TPEFF0700D0034SW147	Ringsend	D0034-01	Storm Water Overflow	1.91
TPEFF0700D0034SW003	Ringsend	D0034-01	Storm Water Overflow	1.96
TPEFF3900D0038SW026	Shanganagh-Bray	D0038-02	Storm Water Overflow	2
TPEFF0700D0034SW002	Ringsend	D0034-01	Storm Water Overflow	2.12
TPEFF0700D0034SW283	Ringsend	D0034-01	Storm Water Overflow	2.12
TPEFF0700D0034SW279	Ringsend	D0034-01	Storm Water Overflow	2.14
TPEFF0700D0034SW274	Ringsend	D0034-01	Storm Water Overflow	2.25
TPEFF0700D0034SW009	Ringsend	D0034-01	Storm Water Overflow	2.3
TPEFF0700D0034SW275	Ringsend	D0034-01	Storm Water Overflow	2.3
TPEFF0700D0034SW189	Ringsend	D0034-01	Storm Water Overflow	2.31
TPEFF0700D0034SW150	Ringsend	D0034-01	Storm Water Overflow	2.32
TPEFF0700D0034SW138	Ringsend	D0034-01	Storm Water Overflow	2.44
TPEFF0700D0034SW117	Ringsend	D0034-01	Storm Water Overflow	2.51

Emission ID	Name	Registration Number	Wastewater Treatment Level	Closest distance to Offshore ECC (km)
TPEFF0700D0034SW187	Ringsend	D0034-01	Storm Water Overflow	2.58
TPEFF0700D0034SW188	Ringsend	D0034-01	Storm Water Overflow	2.81
TPEFF0700D0034SW142	Ringsend	D0034-01	Storm Water Overflow	3.85
TPEFF0700D0034SW134	Ringsend	D0034-01	Storm Water Overflow	4.56
TPEFF0700D0034SW300	Ringsend	D0034-01	Storm Water Overflow	5.88
TPEFF0700D0034SW011	Ringsend	D0034-01	Secondary Treatment	5.92
TPEFF0700D0034SW299	Ringsend	D0034-01	Storm Water Overflow	6.16
TPEFF0700D0034SW302	Ringsend	D0034-01	Storm Water Overflow	7.25
TPEFF0700D0034SW289	Ringsend	D0034-01	Storm Water Overflow	7.33
TPEFF3400D0010SW002	Greystones	D0010-01	Storm Water Overflow	7.54
TPEFF0700D0034SW304	Ringsend	D0034-01	Storm Water Overflow	7.76
TPEFF0700D0034SW294	Ringsend	D0034-01	Storm Water Overflow	8.1
TPEFF0700D0034SW291	Ringsend	D0034-01	Storm Water Overflow	11.08
TPEFF3400D0010SW001	Greystones	D0010-01	Primary Treatment	7.09

Emission ID	Name	Registration Number	Wastewater Treatment Level	Closest distance to Offshore ECC (km)
TPEFF0900D0021SW006	Malahide	D0021-01	Storm Water Overflow	12.6
TPEFF0900D0021SW003	Malahide	D0021-01	Storm Water Overflow	12.61
TPEFF0900D0119SW002	Rush	D0119-01	Storm Water Overflow	12.78
TPEFF0900D0021SW001	Malahide	D0021-01	Primary Treatment	13.17
TPEFF0900D0021SW002	Malahide	D0021-01	Storm Water Overflow	13.21
TPEFF0900D0114SW001	Portrane, Donabate, Rush, Lusk	D0114-01	Primary Treatment	16.56
TPEFF0900D0114SW004	Portrane, Donabate, Rush, Lusk	D0114-01	Storm Water Overflow	16.57
TPEFF0900D0114SW005	Portrane, Donabate, Rush, Lusk	D0114-01	Storm Water Overflow	16.84

Table B2– Additional Treatment Plant Information

Description	Name	Registration Number	Agglomeration Size (people)	Wastewater Treatment Level	Closest distance to Offshore ECC (km)
Treatment Centre for < 500 people	Shanganagh	D0038-01	> 10,000	Secondary Treatment	0.22
Treatment Centre for < 500 people and Raw Sewage Plant	Ringsend	D0034-01	>10,000	Secondary Treatment	0.32
Treatment Centre for < 500 people	Greystones	D0010-01	> 10,000	Secondary Treatment	7.83
Treatment Centre for < 500 people	Kilcoole	D0087-01	2,001 to 10,000	Tertiary Phosphate Removal	11.08
Treatment Centre for < 500 people	Malahide	D0021-01	> 10,000	Secondary Treatment	12.49
Treatment Centre for < 500 people	Swords	D0024-01	> 10,000	Tertiary Nitrate & Phosphate Removal	14.13
Treatment Centre for < 500 people	Newcastle	D0410-01	500 to 1,000	Secondary Treatment	14.53
Treatment Centre for < 500 people	Portrane-Donabate	D0114-01	2,001 to 10,000	Secondary Treatment	16.65

Table B3 – Section 4 Existing trade effluent discharge locations

Local Authority Reference Number	Local Authority	Licence Holder Name	Facility Address	Closest distance to Offshore ECC (km)
LDW/001/93	Dublin City Council	ESB	Poolbeg, Irishtown, D4	0.37
PCLW/02/99	Dublin City Council	The Honorary Secretary, St Annes Golf Club	North Bull Island, Dollymount, D5	4.59
WPW/F/043	Fingal County Council	Portmarncok Golf Club	Portmarnock Co Dublin	8.21
ESS/14/14/284	Wicklow County Council	Clonmannon House	Clonmannon House, Ashford	19.91

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