Arklow Bank Wind Park 2

Environmental Impact Assessment Report

Volume III, Appendix 7.1: Water Framework Directive

sse Renewables

Version	Date	Status	Author	Reviewed by	Approved by
1.0	22/05/2024	Final (External)	GoBe Consultants	GoBe Consultants	Sure Partners Limited

Statement of Authority

Expert	Qualifications	Experience
Sammy Sheldon	MSci (Hons) Oceanography (2:1 Upper Class), University of Southampton	Sammy is an environmental consultant with thirteen years commercial experience, including project management, with a background in oceanography. Sammy has practical experience of field work, statistical analysis of data, report writing and mapping in ArcGIS. She has worked extensively across a range of marine sectors include renewables, oil and gas, ports and harbours and marine water quality. She has also contributed to technical chapters and reports for incorporation into Environmental Statements including physical processes, marine water and sediment quality and Water Framework Directive assessments. Furthermore, her experience of the production of post-consent compliance documentation includes drafting of pre-construction documents and environmental appraisals of revised construction methods to gain regulatory approval. In her previous employment she specialised as a numerical modeller in marine and coastal settings. This entailed the construction, calibration and application of hydrodynamic and wave models. These models were used for a range of applications including quantifying changes to physical process regimes and water quality. In addition, Sammy has undertaken numerous metocean studies for a range of marine sectors, including simple weather downtime assessments through to extreme value analysis of winds and waves.
Claire Hinton	BSc (Hons) Marine Sciences at Southampton University, Southampton Doctorate on the 'Decadal morphodynamic behaviour of the Holland shoreface'	Dr Claire Hinton has over 18 years' experience in marine environmental consultancy, specifically in the field of physical processes and numerical modelling. Her technical experience has been applied to a wide range of sectors, including offshore renewables and Oil & Gas. Of the former,

	from the Flood Hazard Research Centre, Middlesex University	she has been involved with Round 1 developments and the majority of Round 2 and 3 projects. Within the Oil & Gas sector, she has contributed to licensing, development and decommissioning projects. For both sectors, she has had particular focus on Environmental Impact Assessments and associated requirements, providing in-depth physical processes assessments for proposed developments. As a Principal Consultant, Claire has acted as Project Director, Project Manager and Technical Expert for the projects she has been involved in. In addition to providing sound knowledge to commercial developments, she has also led and contributed to guidance for regulators and decision-makers. Her wide project experience has afforded her with the opportunity to work on projects from conception to operation and involved interaction with project teams, stakeholder and regulators.
David Honey	PhD in Marine Biogeochemistry, University of Southampton Undergraduate Masters of Marine Biology, University of Southampton	Dr David Honey has over 10 years' experience in marine environmental consultancy, including project management, marine licensing/consents and a specialism in marine water and sediment quality. David has managed and supported a range of environmental and socio-economic impact assessments, Water Framework Directive (WFD) compliance assessments and Habitats Regulations Assessments (HRAs) as part of marine licence applications. This includes marine renewables, capital, maintenance and aggregate dredging projects, marine disposal site characterisation, subsea cables, port developments and managed realignments.
Ailish Cobban	BSc (Hons) Marine Biology (2:1) from Heriot-Watt University MSc International Marine Science from Heriot-Watt University (MSc with Merit)	Ailish joined GoBe in August 2022, having recently been awarded an MSc with Merit in International Marine Science from Heriot-Watt University. She completed her MSc dissertation in collaboration with GoBe Consultants, this dissertation was a review into select trace metal contaminants in the Humber region and possible impacts of this on past and future renewable energy developments. She brings technical capabilities in the fields of Water Framework Directive compliance assessments, and marine water and sediment quality to GoBe. Ailish has

	also provided technical input to multiple projects Environmental Impact Assessments, primarily in technical chapters and appendices relating to water quality. During her undergraduate degree, Ailish obtained a comprehensive understanding and appreciation for the anthropogenic activities occurring in the marine environment, and the implications of this on marine ecology. During her postgraduate degree she gained a broader understanding of the oceanography of the marine environment, and marine spatial planning.

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Glossary

Term	Meaning
Arklow Bank Wind Park 1 (ABWP1)	Arklow Bank Wind Park 1 consists of seven wind turbines, offshore export cable and inter-array cables. Arklow Bank Wind Park 1 has a capacity of 25.2 MW. Arklow Bank Wind Park 1 was constructed in 2003/04 and is owned and operated by Arklow Energy Limited. It remains the first and only operational offshore windfarm in Ireland.
Arklow Bank Wind Park 2 – Offshore Infrastructure	"The Proposed Development", Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements under the existing Maritime Area Consent.
Arklow Bank Wind Park 2 (ABWP2) (the Project)	Arklow Bank Wind Park 2 (ABWP2) (The Project) is the onshore and offshore infrastructure. This EIAR is being prepared for the Offshore Infrastructure. Consents for the Onshore Grid Infrastructure (Planning Reference 310090) and Operations Maintenance Facility (Planning Reference 211316) has been granted on 26th May 2022 and 20th July 2022, respectively. • Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements to be consented in accordance with the Maritime Area Consent. This is the subject of this EIAR and will be referred to as 'the Proposed Development' in the EIAR. • Arklow Bank Wind Park 2 Onshore Grid Infrastructure: This relates to the onshore grid infrastructure for which planning permission has been granted. • Arklow Bank Wind Park 2 Operations and Maintenance Facility (OMF): This includes the onshore and nearshore infrastructure at the OMF, for which planning permission has been granted. • Arklow Bank Wind Park 2 EirGrid Upgrade Works: any non-contestable grid upgrade works, consent to be sought and works to be completed by EirGrid.
Array Area	The Array Area is the area within which the Wind Turbine Generators (WTGs), the Offshore Substation Platforms (OSPs), and associated cables (export, inter- array and interconnector cabling) and foundations will be installed.
Cable Corridor and Working Area	The Cable Corridor and Working Area is the area within which export, inter-array and interconnector cabling will be installed This area will also facilitate vessel jacking operations associated with installation of WTG structures and associated foundations within the Array Area.
Competent Authority	The authority designated as responsible for performing the duties arising from the EIA Directive as amended. For this application, the Competent Authority is An Bord Pleanála.
Environmental Impact Assessment (EIA)	An Environmental Impact Assessment (EIA) is a statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council (EIA Directive).
EirGrid	State-owned electric power transmission system operator (TSO) in Ireland and Transmission Asset Owner (TAO) for the Project's transmission assets.
Intertidal area	The area between the high water mark (HWM) and the low water mark (LWM).
Landfall	The area in which the offshore export cables make landfall and is the transitional area between the offshore cabling and the onshore cabling.

Term	Meaning
Mitigation Measure	Measure which would avoid, reduce, or offset an impact.
Scour protection	A solution for preventing scour around subsea structures, typically comprised of rock or concrete mattresses.
The Developer	Sure Partners Ltd.
Trenchless techniques	Trenchless techniques include steerable direct pipe thrusting and Horizontal Directional Drilling (HDD) which allow cable ducts to be installed underground without the need to excavate trenches.

Acronyms

Term	Meaning
CA	Competent Authority
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EQS	Environmental Quality Standards
EQSD	Environmental Quality Standards Directive (2008/105/EC)
EU	European Union
HAB	Harmful Algal Bloom
HDD	Horizontal Directional Drilling
INIS	Invasive Non-Indigenous Species
MPCP	Marine Pollution Contingency Plan
NIS	Natura Impact Statement
NVZ	Nitrate Vulnerable Zone
O&M	Operation and Maintenance
OGI	Onshore Grid Infrastructure
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
RBMP	River Basin Management Plan
rBWD	Revised Bathing Water Directive (2006/7/EC)
SAC	Special Area of Conservation
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
UWWTD	Urban Waste Water Treatment Directive (91/271/EEC)
WFD	Water Framework Directive (2000/60/EC)
ZoI	Zone of Influence

Units

Unit	Description
km	Kilometre
nm	Nautical mile

1 Water Framework Directive

1.1 Introduction

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) seeks to demonstrate compliance with the objectives presented in the Directive of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2000/60/EC) (as amended), hereafter referred to as the 'WFD'. This ensures the Arklow Bank Wind Park 2 Offshore Infrastructure (hereafter referred to as 'the Proposed Development') will not lead to adverse effects to designated protected areas (including Natura 2000 protected sites, shellfish waters, bathing waters and nutrient sensitive areas). This document also demonstrates that the Proposed Development (offshore activities) will not jeopardise the potential for marine WFD designated water bodies (including bathing waters and coastal/transitional water bodies) to achieve 'Good' chemical and ecological status.

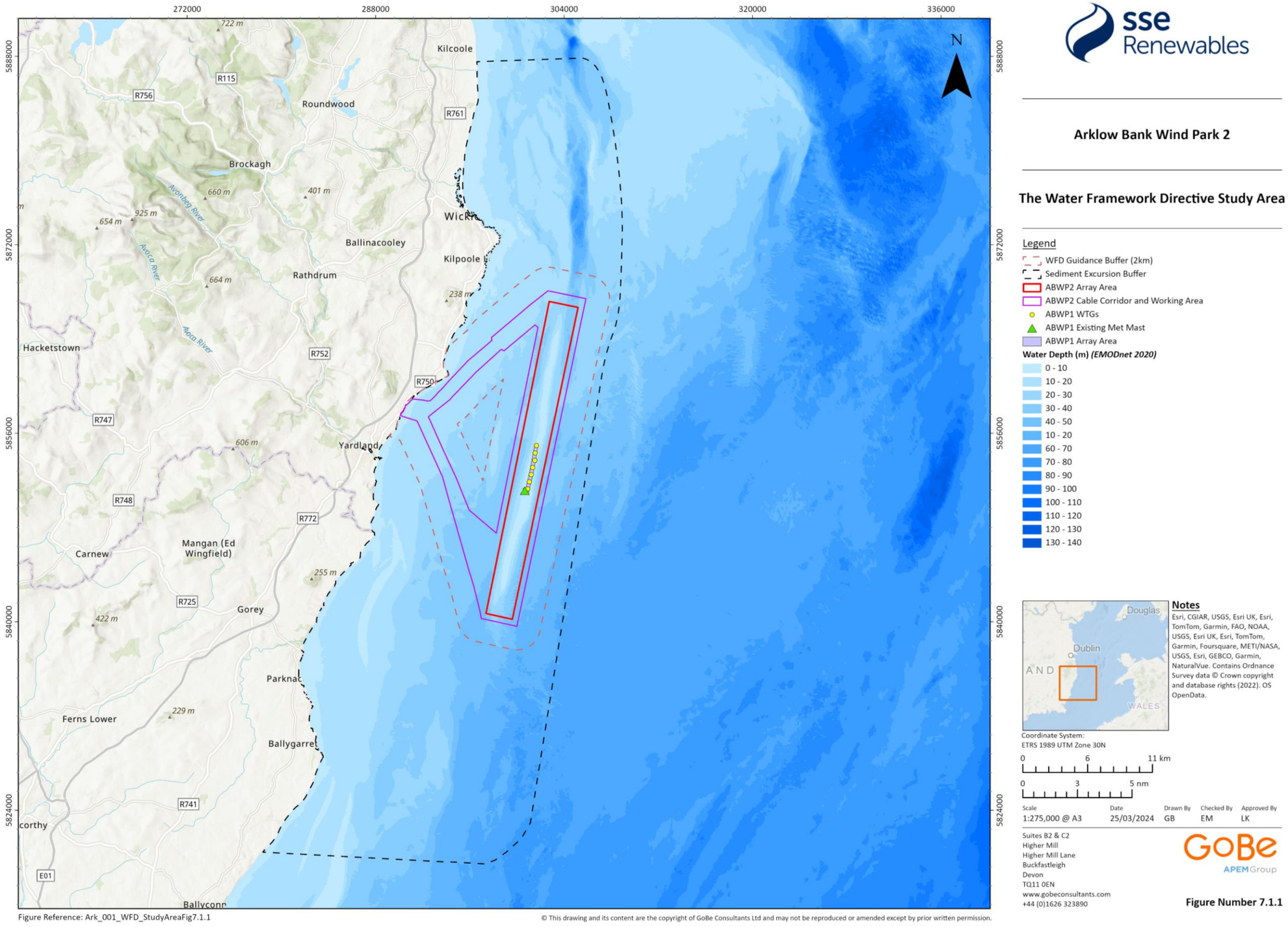
1.1.1.2 The Proposed Development is an offshore wind farm situated on and around Arklow Bank in the Irish Sea, which will be located approximately 6 to 15 kilometres (km) to the east of Arklow in County Wicklow. The Array Area comprises, approximately, 63.4 km^2, with the total footprint of the Proposed Development being 139.4 km^2 (as presented in Figure 7.1.1). The purpose of this assessment is to demonstrate the Proposed Development's compliance with the WFD by ensuring that the Proposed Development will not result in a deterioration in a designated water body (or protected area) and will not jeopardise the attainment of 'Good' status (or the potential to achieve good ecological and chemical status). Only activities associated with the Landfall and Cable Corridor and Working Area will be considered within this assessment. The WFD Study Area is defined based on the 'Clearing the Waters for All' guidance (Environment Agency, 2023), with impacts to onshore receptors considered within the OGI EIAR (Arklow Bank Wind Park Phase 2, 2021). The impacts to onshore receptors from the Proposed Development are not considered within this WFD assessment.

1.1.1.3 This document seeks to draw from (and signpost to) relevant information within the EIAR), demonstrating compliance with the WFD (rather than duplicating assessment). Information relating to Natura 2000 protected sites has been summarised from the Natura Impact Statement (NIS). This assessment has taken into account the information in the following EIAR chapters:

- Volume I, Chapter 4: Description of the Development;
  - This chapter provides a detailed description of the proposed design parameters, construction, operational, and decommissioning activities.
- Volume II, Chapter 6: Coastal Processes;
  - This chapter provides an overview of surficial sediment properties, suspended particulate matter, seabed features, and metocean conditions. This chapter presents an assessment of all potential impacts on coastal processes receptors.
- Volume II, Chapter 7: Marine Water and Sediment Quality;
  - This chapter provides a characterisation of the water and sediment quality of the receiving environment. This chapter also presents an assessment of all potential impacts on water and sediment quality receptors.
- Volume II, Chapter 9: Benthic Subtidal and Intertidal Ecology;
  - This chapter provides an overview of the benthic subtidal and intertidal ecology features of relevance. This chapter presents an assessment of all potential impacts on the benthic subtidal and intertidal ecology receptors of relevance.

- Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology; and
  - This chapter provides a baseline characterisation for fish, shellfish and sea turtle ecology, presenting an assessment of all potential impacts to the receptors of relevance,
- Volume III, Annex 6.1: Coastal Processes Technical Report.
  - This technical appendix provides project-specific modelling outputs, undertaken to support baseline sedimentology and metocean regimes assessment (including tidal excursion and sediment plume modelling).

1.1.1.4 This document considers the potential effects on coastal and transitional water bodies. The study area for this WFD compliance assessment is presented in Figure 7.1.1.



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Arklow Bank Wind Park 2

The Water Framework Directive Study Area

Legend

- WFD Guidance Buffer (2km)
- Sediment Excursion Buffer
- ABWP2 Array Area
- ABWP2 Cable Corridor and Working Area
- ABWP1 WTGs
- ABWP1 Existing Met Mast
- ABWP1 Array Area

Water Depth (m) *(EMODnet 2020)*

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 10 - 20
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140

Figure 7.1.1: The Water Framework Directive Study Area

1.2 Regulatory Background

1.2.1.1 The assessment of potential impacts upon WFD receptors has been made in compliance with the relevant legislation and guidance, presented in Table 7.1.1.Full details are provided in Volume II, Chapter 2: Policy and Legislation.

Table 7.1.1: Summary of regulatory background relevant to the WFD.

Publisher	Name of document incl. reference	Key provisions
Statutory		
Legislation		
Oireachtas, 2011	European Communities (Marine Strategy Framework) Regulations 2011 (S.I. No. 249 of 2011); Subsequently amended: European Communities (Marine Strategy Framework) (Amendment) Regulations 2017 (S.I. No. 265 of 2017); Subsequently amended: European Communities (Marine Strategy Framework) (Amendment) Regulations 2018 (S.I. No. 648 of 2018):	Transposes EU Directive 2008/56/EC (Marine Strategy Framework Directive: MSFD) into Irish law. The MSFD is similar to the WFD in that it required all EU member states, including Ireland, to reach good environmental status in the marine environment by 2020. The Directive is implemented in six-year cycles and is currently in its second cycle; at the time of writing the Marine Strategy Part 2: Monitoring Programme is being updated (Department of Housing, Local Government and Heritage, 2021). The purpose of the MSFD Regulations is to help develop Ireland's ocean economy whilst protecting and preserving the marine environment. The MFSD Regulations consider the following: Physical and chemical features, such as: • Topography and bathymetry of the seabed features; • Annual and seasonal temperature regime, turbidity, current velocity, upwelling, wave exposure, mixing characteristics, residence time; and • Spatial and temporal distribution of salinity. Pressures and Impacts – Contamination of hazardous substances: Introduction of synthetic compounds, for example: priority hazardous substances under Directive 2000/60/EC which are relevant for the marine environment such as pesticides, antifoulants pharmaceuticals resulting from losses from diffuse sources, pollution by ships, atmospheric deposition, and biologically active substances; and Introduction of non-synthetic substances and compounds, for example: heavy metals and hydrocarbons resulting from pollution by ships and oil, gas and mineral exploration and exploitation, atmospheric deposition, and riverine inputs.

Publisher	Name of document incl. reference	Key provisions
		Nutrient and organic matter enrichment: • Inputs of fertilisers – and other nitrogen and phosphorus rich substances – including inputs from point and diffuse sources, for example: agriculture, aquaculture and atmospheric deposition.
Oireachtas, 2003	European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). Subsequently, the European Union (Water Policy) Regulations 2014 (S.I. 350 of 2014).	Gives further effect to EU Directive 2000/60/EC (WFD) into Irish law. The WFD was established to provide a single framework for the protection of surface waterbodies (including rivers, lakes, coasts and estuaries) and groundwater. Coastal waters between the coast and one nautical mile offshore are designated for ecological status under the WFD. Each waterbody has an assigned ecological status. The ecological status is assigned by considering the biological, hydromorphological, chemical and specific contaminants. The different ecological statuses are: • High; • Good; • Moderate; • Poor; or • Bad. The WFD requires that management plans are prepared on a river basin basis of which the second River Basin Management Plan (RBMP) (Department of Housing, Planning and Local Government, 2018) was published in 2018, to cover the period of 2018 to 2021. The draft Third Round River Basin Management Plan for Ireland 2022-2027 was issued for public consultation in 2022, but at the time of writing has not been issued in final form. The RBMPs outline the approach to protect waters in Ireland, identifies the water bodies which are 'at risk' of not achieving their status objective and sets out actions required to achieve 'good' ecological status.

Publisher	Name of document incl. reference	Key provisions
Oireachtas, 2009 Oireachtas, 2022	European Communities Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009). Subsequently amended: European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012) Subsequently amended: European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (S.I. No. 386 of 2015) Subsequently amended: European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 Subsequently, the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2022 (S.I. 288 of 2022).	These Regulations give statutory effect to the Environmental Quality Standards Directive to Directive 2008/105/EC on environmental quality standards (EQS) in the field of water policy. The Regulations also give further effect to the WFD establishing a framework for Community action in the field of water policy and Directive 2006/11/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. The Regulations apply to all surface waters and provide, inter alia: • The establishment of legally binding quality objectives for all surface waters and environmental quality standards for pollutants; • The examination and where appropriate, review of existing discharge authorisations by Public Authorities to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards; • The classification of surface water bodies by the EPA for the purpose of the WFD; • The establishment of inventories of priority substances by the EPA; and • The drawing up of pollution reduction plans by coordinating local authorities (in consultation with EPA) to reduce pollution by priority substances and to cease and/or phase out discharges, emissions or losses of priority hazardous substances. The Environmental Quality Standards Directive includes measures establishing EQS for priority substances and certain other pollutants as provided for in Article 16 of the Water Framework Directive that are to apply in calculating the chemical status of bodies of surface water. These prescribed measurements include: • The annual average which is an arithmetic mean; and • The maximum allowable concentration which is an upper threshold which should not be breached.

Publisher	Name of document incl. reference	Key provisions
Oireachtas, 2008 Oireachtas, 2011	Bathing Water Quality Regulations 2008 (S.I. 79 of 2008). Subsequently, the Bathing Water Quality (Amendment) Regulations 2011 (S.I. 351 of 2011).	Transposes EU Directive 2006/7/EC (revised Bathing Water Directive: rBWD) into Irish law. The rBWD has four different classifications of performance, these are: • Excellent – the highest, cleanest classification; • Good – generally good water quality; • Sufficient – the water meets minimum standards; and • Poor – the water has not met the minimum required standards. The rBWD was transposed into Irish law by means of the Bathing Water Quality Regulations 2008 (S.I. No. 79 of 2008) and subsequently, the Bathing Water Quality (Amendment) Regulations 2011 (S.I. No. 351 of 2011) (hereafter referred to as the Bathing Water Regulations). Under the Bathing Water Regulations, local authorities measure, and monitor the number of certain types of bacteria which may indicate the presence of pollution, mainly from sewage or animal faeces, these are Escherichia coli and intestinal enterococci. An increase in the concentrations of these bacteria indicates a decrease in water quality. The Environmental Protection Agency (EPA) is responsible for compiling this bathing waters information and its submission to the European Commission.
Oireachtas, 2006 Oireachtas, 2009	European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. 268 of 2006). Subsequently, the European Communities (Quality of Shellfish Waters) (Amendment) Regulation 2009 (S.I. 55 of 2009). Further amended to the European Communities (Quality of Shellfish Waters) (Amendment) (No. 2) Regulation 2009 (S.I. 464 of 2009).	Transposes EU Directive 2006/113/EC (Shellfish Water Directive) into Irish law. These Regulations prescribe quality standards for shellfish waters and designate the waters to which they apply, together with sampling and analysis procedures to be used to determine compliance with the standards. The Shellfish Water Regulations applied to 12 designated shellfish waters. The Shellfish Water Regulations were amended in 2009 to include the addition of a further 49 shellfish waters by the European Communities (Quality of Shellfish Waters) (Amendment) Regulation 2009 (S.I. No. 55 of 2009). A further shellfish water (in Cork Harbour at

Publisher	Name of document incl. reference	Key provisions
		Rostellan) was protected under European Communities (Quality of Shellfish Waters) (Amendment) (No.2) Regulation 2009 (S.I. No. 464 of 2009).
Oireachtas, 2001	Urban Waste Water Treatment Regulations 2001 (S.I. 254 of 2001).	Transposes EU Directive 91/271/EC (Urban Waste-Water Treatment Directive: UWWTD) into Irish law and updated the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 1994 (as amended in 1999) to list nutrient sensitive waters. EU member states are required under the UWWTD (91/271/EEC) to identify nutrient-sensitive areas. These have been defined as “natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken”.
European Commission, 1991	Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC).	The Nitrates Directive (91/676/EEC) was adopted by the EU member states with the aim of reducing water pollution from agricultural sources and to promote the use of good farming practice. Under the Nitrates Directive surface waters are identified where the concentration of dissolved nitrogen has altered the plant growth, impacting the organisms reliant on the water body. In areas where nitrate concentration in the water body exceeds the levels set in the Nitrates Directive, they are designated as Nitrate Vulnerable Zones (NVZs). In designated NVZs there are mandatory rules enforced to reduce the nitrate pollution from agricultural land, protecting vulnerable resources against water pollution.

Publisher	Name of document incl. reference	Key provisions
Oireachtas, 2023	European Union (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations 2023 (S.I. 62/2023).	Transposes the Nitrate Directives (91/676/EEC) into Irish law. This Directive seeks to reduce water pollution from agricultural sources, by imposing tighter restrictions in runoff. These Regulations establish the requirement to identify surface waters where nitrogen concentration has impacted plant growth. An increased nitrogen concentration in water bodies may lead to increased algal growth (potentially resulting in algal blooms). These Regulations present nitrate concentrations for comparison against surface water bodies, if exceeded the water body is designated as a NVZ. These designated NVZs are considered within the WFD as a sensitive area.
Oireachtas, 2011	European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).	Transposes European Communities (Habitats Directive, 2011) into Irish law. The Habitats Directive aims to protect over a thousand species, including aquatic invertebrates, and 230 characteristic habitat types which include benthic habitats. The overall objective is to ensure that these species and habitat types are maintained, or restored, to a favourable conservation status.
Non-Statutory		
Guidelines and technical standards		
Environment Agency, 2023	Water Framework Directive assessment: estuarine and coastal waters (also known as 'Clearing the Waters for All' guidance). https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters	This guidance presents the standard, best-practice for conducting WFD assessments. It is applicable in England and Wales, but due to the lack of Irish/Scottish specific guidance it is commonly implemented in other jurisdictions.

Publisher	Name of document incl. reference	Key provisions
		The guidance is applicable for activities in the marine environment up to 1 nm out to sea. This guidance updates and replaces the previous 'Clearing the Waters' guidance on WFD assessments for dredging and disposal activities in coastal and estuarine waters. This guidance summarises the key stages of a WFD impact assessment (screening, scoping, and impact assessment) and key considerations at each stage. **Screening** This stage seeks to filter out low risk activities from further assessment, such as removing blockages, replacing existing pipelines or cables, and bridge/pier/jetty repairs. **Scoping** This stage identifies the proposed activities risks to WFD receptors, including hydromorphology, biology (habitats and fish), water quality, protected areas, and invasive species. **Impact assessment** An impact assessment must be carried out on each receptor identified during the 'Scoping' stage. This involves identifying potential impact pathways to receptors, and determining the risk of deterioration if impact pathways are found. Proposed mitigation and management measures may reduce the potential for deterioration in water bodies, with which impact pathways are identified.
National Roads Authority, 2021	Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. https://www.tii.ie/technical-services/environment/planning/Guidelines-on-	This document provides guidance on the assessment of geological, hydrological and hydrogeological impacts from the planning and design of national road schemes in Ireland. They outline the approach

Publisher	Name of document incl. reference	Key provisions
	Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf	to be undertaken for the constraints study, route corridor selection phase, preliminary design and EIA phases. This document provides a standardised definition for 'extremely high sensitivity' water bodies, which is included in this assessment. This WFD assessment is not conducted in accordance with this guidance (due to its focus on national road infrastructure), but the standard definitions have been applied.

1.3 Study area

1.3.1.1 In accordance with the 'Clearing the Waters for All' guidance (Environment Agency, 2023) the WFD Study Area is defined as within 2 km of the Landfall and Cable Corridor and Working Area. The Array Area is sufficiently distanced that it is outwith the Zone of Influence (ZoI) for potential impacts resulting in deterioration of WFD water bodies.

1.3.1.2 There is not anticipated to be impacts to onshore waterbodies as a result of the Proposed Development due to the parallel properties of the tidal flow. Disturbed sediment will typically be carried in the direction of the tidal flow and travel parallel to the coast, thus there will be no impacts to onshore waterbodies. The impacts to onshore waterbodies have not been considered further within this assessment, with the potential impacts to marine receptors from onshore activities assessed within the Onshore Grid Infrastructure (OGI) EIAR (Arklow Bank Wink Park Phase 2, 2021). This WFD Study Area is presented in Figure 7.1.1.

1.4 Methodology

1.4.1 Methodology to inform the baseline

1.4.1.1 This document uses information provided in the EIAR and NIS. This information has been contextualised for the WFD, specifically assessing compliance rather than duplicating assessments. This approach will ensure all relevant information is included in a concise and digestible format.

Guidance

1.4.1.2 At the time of document preparation, there is no Irish guidance published on undertaking WFD compliance assessments for marine projects. However, there are various guidance documents published from other jurisdictions (which have established marine renewable energy sectors), which are specific to marine water quality. In the absence of published Irish-specific guidance, the 'Clearing the Waters for All' guidance has been applied (as is standard practice in other jurisdictions) (Environment Agency, 2023). This UK guidance on conducting WFD compliance assessments has been chosen to supplement the unavailable Irish guidance due to the close geographic proximity, and proven implementation across numerous offshore wind developments.

Desktop studies

1.4.1.3 Information on the marine receptors within the WFD Study Area was collected through a detailed desktop review of existing studies and datasets. These reports are summarised in Table 7.1.2.

Table 7.1.2: Summary of key desktop reports and data resources.

Title	Source	Year	Author
National Marine Planning Framework e.g., Water Quality Policy 1 (page 49); Non-indigenous Species Policy 1 (page 46); and	https://www.gov.ie/en/publication/60e57-national-marine-planning-framework/ [Accessed: March 2024].	2021	Department of Housing, Planning and Local Government

Title	Source	Year	Author
Protected Marine Sites Policy 1 (page 42).			
Ireland's National Water Framework Directive Monitoring Programme 2022-2027	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/irelands-national-water-quality-monitoring-programme-20222027.php#:~:text=Summary%3A%20The%20main%20purpose%20of,and%20chemical%20status%20of%20groundwaters. [Accessed: March 2024].	2023a	Environmental Protection Agency
Water Quality in Ireland 2016-2021 Summary Report	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/water-quality-in-ireland-20162021-summary-report.php [Accessed: March 2024].	2022	Environmental Protection Agency
Radioactivity Monitoring of the Irish Environment 2014-2015	https://www.epa.ie/publications/compliance--enforcement/radiation/radioactivity-monitoring-20142015.php [Accessed: March 2024].	2017	Environmental Protection Agency
Water Quality in 2022 – an indicators report	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/water-quality-in-2022-indicator-report.php [Accessed: March 2024].	2023b	Environmental Protection Agency

Title	Source	Year	Author
Urban Waste Water Treatment in 2022	https://www.epa.ie/publications/compliance--enforcement/waste-water/urban-waste-water-treatment-in-2022.php [Accessed: March 2024].	2023e	Environmental Protection Agency
Draft River Basin Management Plan for Ireland 2022-2027	https://www.gov.ie/pdf/?file=https://assets.gov.ie/199144/7f9320da-ff2e-4a7d-b238-2e179e3bd98a.pdf#page=null [Accessed: March 2024].	2018	Department of Housing, Planning and Local Government
Water Framework Directive GIS Map Application	https://gis.epa.ie/EPAMaps [Accessed: March 2024].	2023d	Environmental Protection Agency (online)
Bathing Water Quality in Ireland in 2022	https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/bathing-water-quality-in-ireland-in-2022.php [Accessed: March 2024].	2023c	Environmental Protection Agency
Marine Strategy Framework Directive 2008/56/EC. Article 17 update to Ireland's Marine Strategy Part 3: Programme of Measures (Article 13)	https://www.gov.ie/pdf/?file=https://assets.gov.ie/242799/a4113e2f-66a8-4490-81a8-d74ebb3ffa0f.pdf#page=nul [Accessed: March 2024].	2022	Government of Ireland

Site specific surveys

1.4.1.4 In order to inform the EIAR, site-specific surveys were undertaken. A summary of those used to inform the WFD compliance assessment is outlined in Table 7.1.3.

Table 7.1.3: Site specific surveys of relevance to this WFD compliance assessment.

Data source	Date(s) of survey	Overview of survey	Survey contractor	Reference to further information
Arklow Bank Offshore Windfarm Environmental Monitoring. Benthic Ecology Survey Report	09 September 2021 – 10 September 2021	Sediment samples were collected in the vicinity of the Array Area and Cable Corridor and Working Area via anchor dredge. Due to issues with mixed ground, grab samples could not be collected. There have been several surveys undertaken using grab sample analysis, which show good validation against the INFOMAR predictive substrate model. It is therefore considered that the evidence base is sufficiently robust to support this WFD assessment, with a high confidence is the baseline characterisation. Further information on this data limitation is presented in Volume II, Chapter 7: Marine Water and Sediment Quality (Section 7.5.4). Samples were sent to a lab for analysis, where they were dried and sieved. Samples were assigned a Folk sediment classification (1954).	Aquatic Services Unit MS210201	Further information can be found in: Volume II, Chapter 6: Coastal Processes; and Volume II, Chapter 7: Marine Water and Sediment Quality.

1.4.2 WFD Compliance Assessment Elements

1.4.2.1 The activities proposed for the marine environment are considered highly unlikely to adversely impact freshwater WFD water bodies or freshwater protected areas. This is due to the parallel tidal flow, which will carry suspended sediment parallel to the coastline. Therefore, there will be no direct interaction with the freshwater waterbodies. This document therefore only considers coastal and transitional water bodies, and the freshwater environment is excluded from further assessment. The potential impacts of proposed onshore activities on freshwater and marine receptors is assessed within the OGI EIAR (Arklow Bank Wind Park Phase 2, 2021).

1.4.2.2 In accordance with the 'Clearing the Waters for All' guidance (Environment Agency, 2023), elements which require consideration under the WFD include:

- Hydromorphology;
  - The physical characteristics of the water body (i.e., size, shape and structure of the water body, and flow/quantity of water and sediment). Potential impacts to hydromorphology include changes to morphological conditions and tidal patterns.
- Intertidal and subtidal habitats;
  - If certain criteria are met, then an impact assessment will be required. These criteria differ slightly for higher and lower sensitivity habitats.
- Fish;
  - If certain criteria are met, then an impact assessment will be required. These criteria mainly relate to effects on estuaries, and fish dependent on them.
- Water quality;
  - The turbidity[1], temperature, salinity, dissolved oxygen levels, nutrients, microbial patterns, phytoplankton status, and history of Harmful Algal Blooms (HAB).
- Protected areas;
  - Any marine designated protected areas within 2 km of the Cable Corridor and Working Area will be scoped in for further assessment. Protected areas include Special Areas of Conservation (SAC), Special Protection Areas (SPA), shellfish waters, bathing waters, and nutrient sensitive areas.
- Invasive and Non-Indigenous Species (INIS).
  - If there is potential for proposed activities to introduce or spread INIS, an impact assessment will be required. Potential risks can be associated with materials/equipment traveling through or from another water body, and activities that spread existing INIS within immediate or adjacent water bodies.

1.4.2.3 This WFD compliance assessment will give due consideration to each stage of the development process.

1.4.3 Baseline environment

Water bodies

1.4.3.1 Under the WFD, there is a requirement to determine if any proposed activities are expected to be carried out within 2 km of any designated protected areas (such as bathing waters, shellfish waters, nutrient-sensitive areas). The designated protected areas within 2 km of the Proposed Development are summarised here (as well as their relevant status/classifications). The relevant protected areas are presented in Figure 7.1.2.

1.4.3.2 The status of relevant waterbodies is presented below in Table 7.1.4. The overall status of the Southwestern Irish Sea – Brittas Bay (HA 10) coastal water body is ‘High’, with both biological and chemical status achieving the same classification. The overall status of the Southwestern Irish Sea – Killiney Bay (HA10) coastal water body is also ‘High’. The biological and chemical status are also both currently designated as ‘High’. An assessment of the marine water and

[1] The WFD presents the requirement to assess ‘turbidity’ in water bodies, whereas the ‘Clearing the Waters for All’ guidance refers to ‘clarity’. This document will assess turbidity in line with the WFD, although it is noted that an increased turbidity (particulate matter suspended in the water column) will be associated with a decreased water clarity.

sediment quality receptors within the 20 km buffer is presented in Volume II, Chapter 7: Marine Water and Sediment Quality.

1.4.3.3 Under the available Irish guidance on hydrology and hydrogeology assessments for national road schemes (NRA, 2008), the designated water bodies and protected areas are classified as 'Extremely High Sensitivity' if the "*Attribute has a high quality or value on an international scale*". Examples of 'Extremely High Sensitivity' site attributes include "*River, wetland or surface water body, ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations,1988*."

1.4.3.4 A detailed characterisation of the receiving environment receptors is presented in the following:

- Volume II, Chapter 6: Coastal Processes;
- Volume II, Chapter 7: Marine Water and Sediment Quality;
- Volume III, Appendix 9.1: Benthic, Subtidal and Intertidal Ecology Technical Report; and
- Volume III, Appendix 10.1: Fish, Shellfish and Sea Turtle Ecology Technical Report.

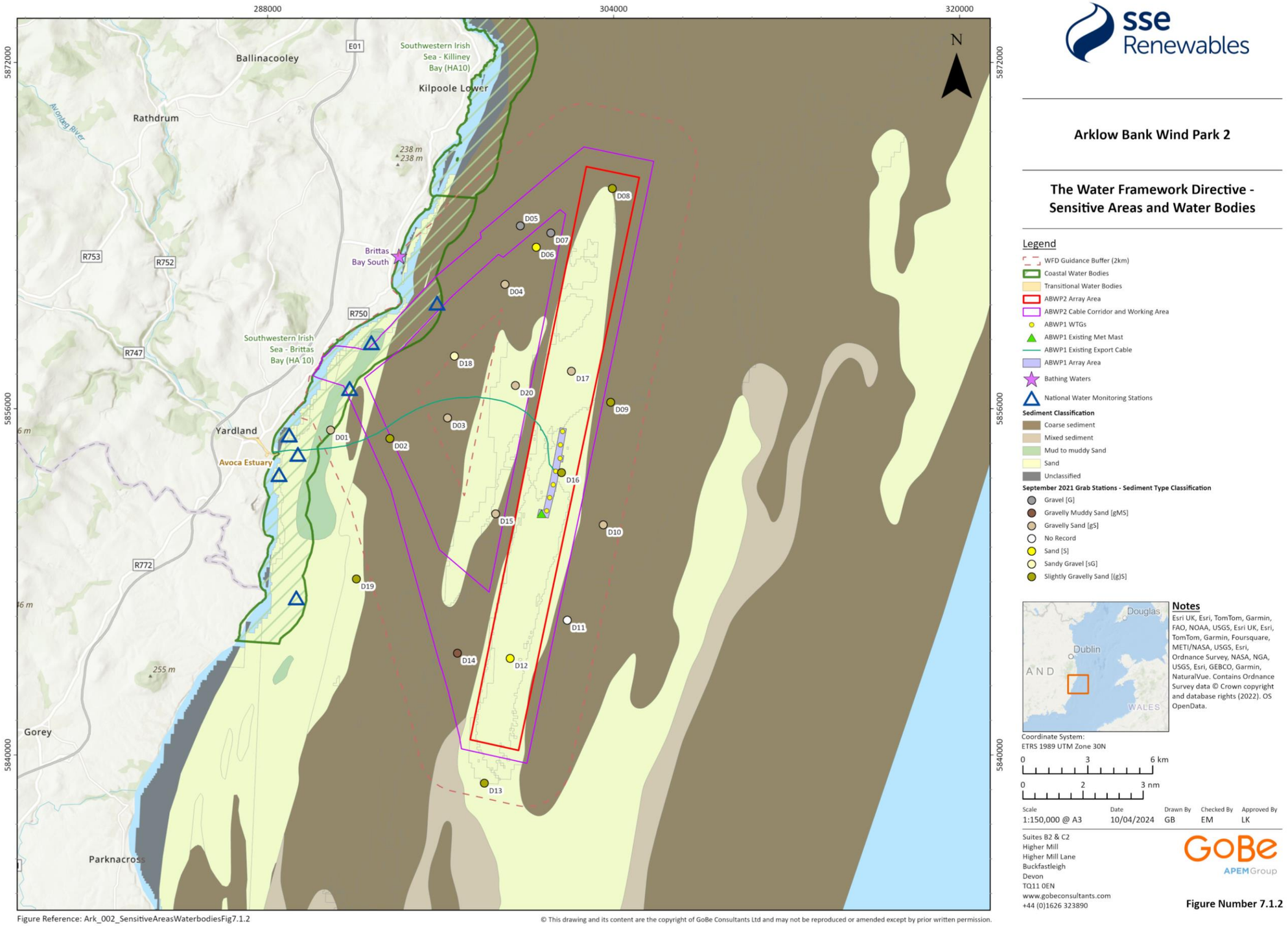

Figure Reference: Ark_002_SensitiveAreasWaterbodiesFig7.1.2

sse Renewables

Arklow Bank Wind Park 2

The Water Framework Directive - Sensitive Areas and Water Bodies

Legend

- WFD Guidance Buffer (2km)
- Coastal Water Bodies
- Transitional Water Bodies
- ABWP2 Array Area
- ABWP2 Cable Corridor and Working Area
- ABWP1 WTGs
- ABWP1 Existing Met Mast
- ABWP1 Existing Export Cable
- ABWP1 Array Area
- Bathing Waters
- National Water Monitoring Stations

Sediment Classification

- Coarse sediment
- Mixed sediment
- Mud to muddy Sand
- Sand
- Unclassified

September 2021 Grab Stations - Sediment Type Classification

- Gravel [G]
- Gravelly Muddy Sand [gMS]
- Gravelly Sand [gS]
- No Record
- Sand [S]
- Sandy Gravel [sG]
- Slightly Gravelly Sand [(g)S]

Notes

Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Esri, Ordnance Survey, NASA, NGA, USGS, Esri, GEBCO, Garmin, NaturalVue. Contains Ordnance Survey data © Crown copyright and database rights (2022). OS OpenData.

Coordinate System:
ETRS 1989 UTM Zone 30N

0 3 6 km

0 2 3 nm

Scale	Date	Drawn By	Checked By	Approved By
1:150,000 @ A3	10/04/2024	GB	EM	LK

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Higher Mill
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Figure Number 7.1.2

Figure 7.1.2: Water Framework Directive Sensitive Areas and Water Bodies

Table 7.1.4: Water Framework Directive relevant marine water bodies within 2 km of the Cable Corridor and Working Area (Source: Environmental Protection Agency 2021a,b).

Parameters	Coastal/Transitional Water Body	
Name	Southwestern Irish Sea – Brittas Bay (HA 10)	Southwestern Irish Sea – Killiney Bay (HA 10)
ID and Area (km^2)*	IE_EA_140_0000	IE_EA_100_0000
Water Body category	Coastal	Coastal
Supporting Chemistry Condition	High	High
Ecological Status Potential	High	High
Overall Status	High	High
Hydromorphology	N/A**	Good
Dissolved Oxygen	N/A**	N/A**
Nutrient Condition	High	High
Phytoplankton	N/A**	N/A**
Specific Pollutants	N/A**	N/A**
Heavily Modified	N/A	N/A
Identifies as 'at risk'?	Not at risk	Not at risk

*Area (km^2) not available

**Not assigned

Bathing Waters

1.4.3.5 There is one bathing water located within 2 km of the Cable Corridor and Working Area, as presented in Table 7.1.5.

Table 7.1.5: The Status of Screened In Bathing Waters (Source: Beaches.ie, 2023).

Name	ID	2023	2022	2021	2020
Brittas Bay South	IEEABWC140_0000_0200	Excellent	Excellent	Excellent	Excellent

Shellfish Waters

1.4.3.6 There are no designated shellfish waters within 2 km of the Cable Corridor and Working Area, as shown in Figure 7.1.2. The nearest (Wexford Harbour Outer) is located approximately 43.9 km away. Therefore, this element is excluded from further assessment.

Nutrient Sensitive Areas

1.4.3.7 The EPA previously identified numerous areas where sewage discharges pose a pollution risk to water bodies. 'At risk of pollution' is defined as being at risk of not achieving specific environmental targets set for distinct water bodies, such as achieving 'Good' ecological status. As shown in Figure 7.1.2, there are no designated sensitive areas within 2 km of the Cable Corridor and Working Area. The nearest nutrient sensitive area (Lower Slaney Estuary) is located approximately 44.7 km away. Therefore, this element is excluded from further assessment.

Drinking Water Protected Areas

1.4.3.8 Within the Avoca-Vartry Catchment (the WFD catchment area onshore within which the export cables will make landfall), there are no drinking water abstraction areas associated with surface waters (Environmental Protection Agency, 2023d). All groundwaters are nationally designated as Drinking Water Protected Areas. There are no pathways identified from offshore activities which may impact these designated areas, so they are excluded from further assessment.

Natura 2000 Protected Areas

1.4.3.9 There is one Natura 2000 site within 2 km of the Cable Corridor and Working Area (the Buckroney-Brittas Dunes and Fen SAC), as presented in Figure 7.1.3. This protected site is onshore (above High Water Mark) and is therefore not considered further in this assessment. Cable installation at Landfall will be carried out via trenchless techniques (such as Horizontal Directional Drilling (HDD)), limiting impacts in the intertidal area. The increased elevated subtidal sediment resulting from trenchless cable installation will disperse and be carried by the tidal flow, parallel to the coastline. Therefore, there is not an impact pathway for this onshore protected area from the Proposed Development. This protected area is considered within the NIS, and OGI EIAR submitted previously (Arklow Bank Wind Park Phase 2, 2021).

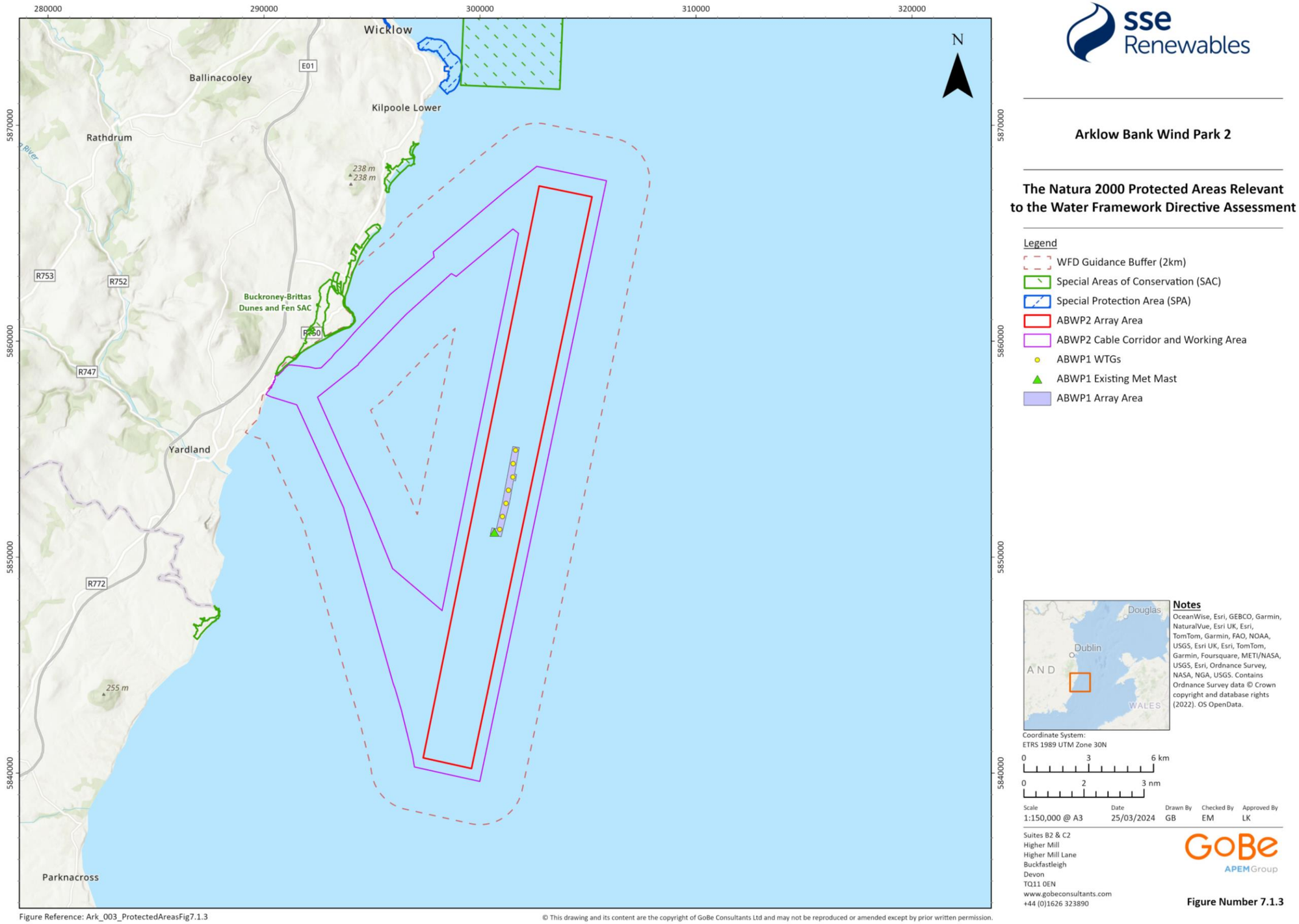

Figure 7.1.3: The Natura 2000 Protected Area Relevant to the Water Framework Directive Assessment

1.4.4 'Do nothing' scenario

1.4.4.1 Annex IV of the EIA Directive sets out the information required to be included in an EIAR. This includes "*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*". In the event that the Proposed Development does not proceed, an assessment of the future baseline conditions has been carried out and is described within this section.

1.4.4.2 The baseline environment is ever-evolving, due to naturally occurring cycles and processes, as well as impacts caused from climate change. In undertaking impact assessments, it is necessary that potential impacts be assessed in the context of this natural variation.

1.4.4.3 Previous monitoring work conducted in the region has highlighted some environmental trends, Chemical conditions have been observed as suffering alterations as a result of climate change (such as a reduction in salinity and pH). There is evidence of trends toward increased input of freshwater in coastal waters (due to increased winter precipitation), although there is low confidence in these salinity projections and inter-annual variability (Nolan *et al.,* 2010). Further information is presented in Volume II, Chapter 7: Marine Water and Sediment Quality. Climate change has also been linked to trends of deoxygenation, with a measurable decline in dissolved oxygen content in response to sea temperature rising (Mahaffey *et al*., 2020). There is predicted to be a further 7% decrease in dissolved oxygen by the year 2100 (Intergovernmental Panel on Climate Change, 2013).

1.4.4.4 The ongoing impacts of climate change are also documented to be affecting fish and shellfish populations. The biological and physical influence of climate change has the potential to affect key life-cycle stages. Variability in the physical environment may bring direct or indirect changes to fish and shellfish communities in the future. Should distribution patterns of species shift, there is potential for species dependent on select habitats (such as estuaries) to be displaced and be at risk. Further information on how climate change is affecting fish and shellfish receptors is presented in Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology.

1.4.4.5 Should the Proposed Development not be constructed, it is considered unlikely that the baseline will show variation outwith this natural variation.

1.5 Assessment of WFD Elements

1.5.1 Supporting Information

1.5.1.1 This document seeks to draw from, and signpost to, relevant information provided within the EIAR.

1.5.2 Project Activities

1.5.2.1 The activities proposed to be conducted in association with the Proposed Development (which may impact WFD water bodies) are presented in Volume I, Chapter 4: Description of Development. The parameters for all of the options set out in Chapter 4: Description of Development have been assessed in this WFD assessment, in line with the assessment of waterbodies in other chapters, as follows:

- Volume II, Chapter 6: Coastal Processes;
- Volume II, Chapter 7: Marine Water and Sediment Quality;
- Volume II, Chapter 9: Benthic Subtidal and Intertidal Ecology; and
- Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology.

1.5.2.2 All mitigation measures (factored in (embedded) and additional) are presented in Volume III, Chapter 25; Summary of Factored in Measures, Mitigation and Monitoring. The factored in measures relevant to the WFD include:

- Construction techniques and programme are included in Volume II, Chapter 4: Description of Development;
- Vessel Management Plan (Volume III, Appendix 25.7);
- Environmental Management Plan (Volume III, Appendix 25.1);
- Invasive Non-Indigenous Species Management Plan (Volume III, Appendix 25.4); and
- Marine Pollution Contingency Plan (MPCP) – included within the Environmental Management Plan (Volume III, Appendix 25.1).

1.5.2.3 There are no additional measures proposed which are relevant to the WFD, as concluded by the pertinent EIAR chapters.

1.5.2.4 The Array Area is sufficiently distanced from all WFD designated water bodies (e.g., bathing waters, shellfish waters, coastal/transitional water bodies) that deterioration in these designated areas is not anticipated. The Array Area is sufficiently distanced from other WFD protected areas (e.g., greater than 2 km away) that no impacts are expected. Therefore, this WFD assessment will focus on the Cable Corridor and Working Area. A full assessment of all receptors within the Study Area has been included in the EIAR.

1.5.3 Hydromorphology

1.5.3.1 This section should be read alongside Volume II, Chapter 6: Coastal Processes, which presents a detailed assessment of potential changes to the physical environment as a result of activities associated with the Proposed Development. The Cable Corridor and Working Area directly transects the Southwestern Irish Sea – Brittas Bay (HA 10) coastal water body, with the 2 km WFD guidance buffer transecting the Southwestern Irish Sea – Killiney bay (HA 10) coastal water body.

1.5.3.2 As presented in Volume I, Chapter 4: Description of Development, there is no permanent infrastructure proposed to be installed at Landfall. This assessment will therefore focus on

temporary infrastructure (e.g., installation, maintenance, and removal activities associated with the export cables).

1.5.3.3 The installation of cable protection measures in the Cable Corridor and Working Area has the potential to impact wave and tidal regimes. These structures will be deployed in instances where burial alone is insufficient protection for the cabling. Theoretically, cable protection measures in shallow waters should behave similarly to submerged offshore breakwater, affecting waves in the nearshore area. Further information is presented in Volume II, Chapter 6: Coastal Processes. Due to the limited locations where cable protection may be implemented (as a result of insufficient protection afforded by burial alone), it is considered unlikely that cable protection will significantly affect hydromorphology.

1.5.3.4 Therefore, it is not anticipated there will be a deterioration in the hydromorphology status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies, nor jeopardise the future attainment of at least 'Good' status.

1.5.4 Benthic Habitats

1.5.4.1 This Section should be read alongside Volume II, Chapter 9: Benthic, Subtidal and Intertidal Ecology, which presents a characterisation of the baseline and assessment of the benthic habitats relevant to the Proposed Development.

1.5.4.2 Activities associated with the area intersecting with the two designated coastal water bodies mainly consist of cable installation activities. There is potential for disruptive activities to be carried out during the construction and Operation and Maintenance (O&M) phases, including cable installation and re-burial.

1.5.4.3 The habitats present within the Southwestern Irish Sea – Brittas Bay (HA 10) and Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies are considered to be low sensitivity to physical disturbance (e.g., increased SSC) due to their inherent adaptations to high energy environments. The faunal communities are characterised by burrowing bivalves and mobile species. The recoverability of these species is rapid, due to adult migration and larval settlement life stages.

1.5.4.4 The habitats situated within the intertidal area are typically widespread and not geographically limited. The potential area of habitat loss or disturbance as a result of Proposed Development activities is anticipated to be small in comparison to the wider area. Areas colonised by opportunistic species are expected to recover rapidly, following the recovery of the habitat disturbed.

1.5.4.5 The works proposed are short-term and spatially limited in nature. Floral and faunal communities currently colonising the area are anticipated to recover quickly from disturbance, due to influence from in-affected adjacent communities. The proposed maintenance activities are expected to be of lesser magnitude than the proposed construction activities, so impacts are considered less significant.

1.5.4.6 The benthic and intertidal ecology assessment (presented in full in Volume II, Chapter 9: Benthic, Subtidal and Intertidal Ecology) concluded there were no likely significant residual effects on benthic receptors (from the construction, O&M, or decommissioning phases). Therefore, the ecological status of both the Southwestern Irish Sea – Brittas Bay (HA 10) and Southwestern Irish Sea – Killiney Bay (HA10) coastal water bodies is not anticipated to deteriorate (or jeopardise potential to reach 'Good' status in the future). The Proposed Development is therefore considered compliant with the WFD objectives relating to benthic habitats.

1.5.5 Fish

1.5.5.1 This Section should be read alongside Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology, which presents a characterisation of the baseline and assessment of the fish and shellfish receptors relevant to the Proposed Development.

1.5.5.2 The western Irish Sea is home to a number of diadromous fish species that migrate between the sea and freshwater at different stages of their lifecycle. Atlantic salmon *Salmo salar* and sea trout *Salmo trutta* are two commercially important species in the region. The rivers Slaney, Boyne, Dargle and Avoca on the east coast of Ireland are key rivers for migratory fish species (Celtic Sea Trout Project, 2016; Inland Fisheries Ireland, 2022). Sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, and twaite shad *Alosa fallax* are known to occur in inshore waters off the coast of county Wicklow (Inland Fisheries Ireland, 2018).

1.5.5.3 The Slaney River Valley SAC, River Barrow and River Nore SAC, River Boyne and River Blackwater SAC and Lower River Suir SAC are all within the Western Irish Sea Fish, Shellfish and Sea Turtle Study Area and have been designated for the protection of migratory fish species. However, only the Slaney River Valley SAC is within the Fish, Shellfish and Sea Turtle ZoI, which is designated for sea lamprey, river lamprey, twaite shad and Atlantic salmon. European eel *Anguilla anguilla* have also been found to occur within the Rivers Slaney and Boyne (Inland Fisheries Ireland, 2015), and may interact with the Proposed Development and coastal water bodies during their annual migration out to sea to their spawning grounds.

1.5.5.4 The proposed activities (such as seabed clearance, vessel operation, installation of infrastructure, trenchless cable installation operations) are likely to result in the generation of underwater noise operations.

1.5.5.5 Generally, fish are capable of adapting to increased underwater noise, due to their mobility. The species reliant on specific substrates for spawning activities are considered to have reduced sensitivity to noise impacts (during these biologically significant activities) but are less capable of adapting to increased underwater noise. Affected species are anticipated to be capable of rapid re-colonisation from adjacent areas, with lost numbers being replaced by the wider population.

1.5.5.6 The assessment presented in Volume II, Chapter 10: Fish, Shellfish and Sea Turtle Ecology concluded no significant adverse residual effects on fish and shellfish receptors within the Study Area (as a result of noise generation). Therefore, there is not anticipated to be a deterioration in the ecological status of either the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies (in relation to fish receptors).

1.5.6 Water Quality

1.5.6.1 This Section should be read alongside Volume II, Chapter 7: Marine Water and Sediment Quality, which presents a characterisation of the MW&SQ baseline, and assessment of potential changes to relevant receptors. Volume II, Chapter 6: Coastal Processes presents an assessment of impacts associates with increased SSC.

1.5.6.2 There are no chemical discharges associated with the Proposed Development. However, there is potential for substances to be accidentally released during planned construction, maintenance or decommissioning activities. The Developer is committed to implementing standard, best-practice guidance throughout the Proposed Developments' lifetime. This commitment (as referenced in Volume II, Chapter 25: Summary of Factored in Measures, Mitigation and Monitoring) will serve as factored in mitigation.

1.5.6.3 The Cable Corridor and Working Area transects the Southwestern Irish Sea – Brittas bay (HA 10) coastal water body (with the 2 km buffer crossing the Southwestern Irish Sea – Killiney bay (HA 10) coastal water body), as shown in Figure 7.1.2. There is a requirement under the WFD to consider the potential deterioration of water body quality elements due to this direct interaction. This requirement is particularly significant for effects which are expected to extend for a period greater than one spring-neap tidal cycle (approximately two weeks).

1.5.6.4 The proposed development activities which are expected to disturb the sediment are expected to have the greatest impact on turbidity. This seabed disturbance also has the potential to release contaminants bound to the sediment into the water column. As presented in Volume II, Chapter 7: Marine Water and Sediment Quality, the turbidity levels in the area are considered to be generally low. There is expected to be seasonal variation associated with turbidity, with spikes also associated with extreme weather events.

1.5.6.5 Project-specific modelling was undertaken on tidal flows and sediment transport. This modelling concluded that suspended sediment plumes resulting from the proposed development activities will disperse quickly, returning to background concentration levels. Following suspension, coarser material is typically deposited closer to the source, with finer materials dispersing (decreasing exponentially as distance from the source increases). These finer materials are typically widely dispersed, and form part of the background SSC in the nearshore area. Due to the temporary nature of the proposed activities, SSC impacts are considered spatially limited, reversible and temporally restriction (within one tidal excursion). The SSC are expected to return to background concentrations naturally upon cessation of disruptive activities. Further information on numerical modelling simulations can be found in Volume III, Appendix 6.1: Coastal processes technical Report.

1.5.6.6 Sediment disruption has the potential to lead sediment-bound nitrate to partition into the water column. Nitrogen conditions for both the Southwestern Irish Sea – Brittas Bay (HA 10) and Southwestern Irish Sea – Killiney Bay (HA 10) are currently classified as ‘High’. This classification indicates nitrogen levels are consistently low in the designated water bodies.

1.5.6.7 The phytoplankton and dissolved oxygen status of the designated water bodies are not anticipated to be affected by proposed activities, as no nutrients are expected to be released in significant concentrations. The proposed activities are not expected to result in significant effects to dissolved oxygen or eutrophication.

1.5.6.8 There is a potential for there to be increased turbidity as a result of increased SSCs. The activities resulting in increased SSC are considered to be temporary and spatially restricted. Therefore, turbidity in both the Southwestern Irish Sea – Brittas Bay (HA 10) and Southwestern Irish Sea – Killiney Bay (HA 10) is not expected to be reduced.

1.5.6.9 As presented in Volume II, Chapter 7: Marine Water and Sediment Quality, previous surveys at the Avoca Estuary have found significant sediment contaminant concentrations. Subsequent surveys found sediment contaminant concentrations to have reduced over time and are now generally considered to be low in the vicinity of the Cable Corridor and Working Area. Minute concentrations of sediment-bound contaminants partition into the dissolved phase under normal/baseline conditions, with the majority remaining sediment-bound. Partition coefficients can be applied to estimate the concentration of contaminants which may enter the dissolved phase. A small uplift of dissolved concentrations of priority substances resulting from sediment disturbance is anticipated to be short-term, with concentrations returning to background levels quickly. The supporting chemistry conditions of both the Southwestern Irish Sea – Brittas Bay (HA 10) and Southwestern Irish Sea – Killiney Bay (HA 10) coastal water body are both ‘High’. Considering this current classification alongside the short-term nature of the proposed works, it is not anticipated that the chemical status of these designated coastal water bodies would be significantly affected.

1.5.6.10 Therefore, it is not anticipated that there will be a deterioration in the status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies (or potential to jeopardise the future attainment of 'Good' status). The Proposed Development is considered to be compliant with the WFD objectives regarding water quality.

1.5.7 Protected Areas

1.5.7.1 The proposed activities have the potential to result in a reduction in water quality of designated bathing waters (within 2 km of the Cable Corridor and Working Area). A short-term increase in SSC may result in increased bacterial counts within the water column. Bacterial mortality is influenced by the concentration of ultra-violet light penetrating the water column. During periods of increased SSC, there will be a reduction in the amount of ultra-violet light capable of penetrating the water column, indirectly resulting in a reduction in bacterial mortality. The proposed activities (and resulting sediment disturbance) may suspend the bacteria within superficial sediment and transport it to nearby designated bathing waters (via wave and tidal regimes).

1.5.7.2 The recurring high performance of the relevant bathing water (Brittas Bay South) indicates the sedimentary bacterial levels present in the bathing water are not significant enough to impact bathing water quality during naturally occurring storm events. Given the temporary nature associated with SSC, any bacterial uplift will be temporary (and considered negligible to bathing water compliance objectives). No deteriorations in the designated bathing water nutrient conditions are expected resulting from the proposed activities.

1.5.7.3 The potential increase in turbidity as a result of the proposed activities may lead to decreased bacterial mortality, and hence a higher bacterial count. These increased bacterial counts could lead to a deterioration in water quality for nearby bathing waters but given the dilution and dispersion of the re-suspended sediment the elevated bacterial counts would be in the magnitude of days. The anticipated increase in bacterial counts is anticipated to be similar to naturally occurring storm events and is therefore not anticipated to result in a reduction in water quality (outwith baseline conditions). Therefore, it is not expected there will be a deterioration in the performance of designated bathing waters.

1.5.7.4 There are no designated nutrient sensitive zones within the WFD Study Area, as shown in Figure 7.1.2. This impact pathway is therefore not considered within this assessment.

1.5.7.5 There are no offshore Natura 2000 protected areas within 2 km of the Landfall and Cable Corridor and Working Area (as shown in Figure 7.1.3). This impact pathway is therefore not considered further in this assessment.

1.5.7.6 The Proposed Development is therefore considered compliant with the objectives of the WFD and would not result in a deterioration of the current status of the relevant WFD elements or jeopardise the potential to attain 'Good' status in the future.

1.5.8 Marine Invasive and Non-Indigenous Species

1.5.8.1 This Section should be read alongside Volume II, Chapter 10: Benthic, Subtidal and Intertidal Ecology, (which provides a detailed assessment of the introduction and spread of INIS in association with the Proposed Development) and the Invasive Non-Indigenous Species Management Plan (Volume III, Appendix 25.1, Annex 3). There is potential for the accidental introductions/spread of INIS due to vessel movements and subsea cabling.

1.5.8.2 The Project is committed to adhering to industry best-practice guidance, through the implementation of the Invasive Non-Indigenous Species Management Plan (Volume III, Appendix 25.1, Annex IV). Any vessels utilised for the transporting materials to and from the site will adhere to industry legislation, codes of conduct, and best practice to reduce the

opportunity for INIS. Further information on the relevant legislation and best practice related to vessels is presented in Volume II, Chapter 15: Shipping and Navigation).

1.5.8.3 The introduction of any artificial structure provides a vector that new organisms can colonise, invading areas they were not originally present in. The proposed works involves the introduction of new, hard substrate into the benthic/subtidal ecology area. Whilst consequential impacts can be long-lasting, it is considered that the footprint will be negligible on a regional scale.

1.5.8.4 The movement of commercial vessels is considered common in the area (as shown in Volume II, Chapter 15: Shipping and Navigation), providing an existing method for the introduction of INIS. The potential introduction and spread of INIS is mitigated through the implementation of an Invasive Non-Indigenous Species Management Plan and Vessel Management Plan. With these mitigation measures (and implementation of industry best practice), it is considered the Proposed Development contribution would be negligible in comparison to impacts from other marine users.

1.5.8.5 There is not predicted to be a deterioration in the Brittas Bay South (HA 10) bathing water with respect to benthic ecology and diversity, nor is it predicted that the proposed activities jeopardise the potential for the water body to attain 'Good' status in the future. It is therefore considered that the Proposed Development is WFD compliant.

1.6 Conclusions

1.6.1.1 This WFD compliance assessment has considered the potential effects of the Proposed Development to ensure that the proposed activities will not cause or contribute to the deterioration of waterbodies status under the WFD or jeopardise the potential for water bodies to achieve 'Good' status. The conclusion of the different elements of the WFD assessment are presented below in Table 7.1.6.

1.6.1.2 The conclusions reached through this WFD assessment are also applicable for the Marine Strategy Framework Directive. The activities associated with the Proposed Development are not considered to hinder the achievement of 'Good Environmental Status', as prescribed under the water quality policies. The Proposed Development will not result in a deterioration of the current status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies, nor jeopardise the attainment of 'Good' status.

1.6.1.1 The cumulative impact assessments conducted within the relevant technical EIA topic chapters concluded cumulative effects were not significant in EIA terms for relevant impacts (such as accidental release of chemicals, increases suspended sediment concentration and deposition, hard structure colonisation, INIS introduction and spread, and decreased water quality from increased SSC). Therefore, this WFD assessment concludes the cumulative impacts of the Proposed Development with other projects are not anticipated to result in the deterioration of current status, nor jeopardise attainment of 'Good' status for the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies.

Table 7.1.6: Conclusions of the WFD Assessment.

Receptor	Conclusion
Hydromorphology	The Proposed Development will not result in a deterioration of the current status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern

Receptor	Conclusion
	Irish Sea – Killiney Bay (HA 10) coastal water bodies, nor jeopardise the attainment of 'Good' status in future.
Benthic Habitats	The Proposed Development will not result in a deterioration of the current ecological status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies, nor jeopardise the attainment of 'Good' status in future.
Fish	The Proposed Development will not result in a deterioration of the current ecological status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies (regarding fish receptors), nor jeopardise the attainment of 'Good' status in future.
Water Quality	The Proposed Development will not result in a deterioration of the current status of the Southwestern Irish Sea – Brittas Bay (HA 10) or Southwestern Irish Sea – Killiney Bay (HA 10) coastal water bodies , nor jeopardise the attainment of 'Good' status in future.
Protected Areas	The Proposed Development is not located within 2 km of any offshore Natura 2000 designated site, and as such will not result in a deterioration of the current status of water bodies or jeopardise the attainment of 'Good' status in future.
Marine INIS	The Proposed Development will not result in a deterioration of the current benthic ecology and diversity of the Brittas Bay South (HA 10) bathing water, nor jeopardise the attainment of 'Good' status in future.

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