APPENDIX 9-3

WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

HYDRO ENVIRONMENTAL SERVICES

22 Lower Main St
Dungarvan
Co.Waterford
Ireland

tel: +353 (0)58 44122
fax: +353 (0)58 44244
email: info@hydroenvironmental.ie
web: www.hydroenvironmental.ie

WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

MAUGHANACLEA RENEWABLE ENERGY DEVELOPMENT, CO. CORK

DRAFT REPORT

Prepared for:

MKO

Prepared by:

HYDRO-ENVIRONMENTAL SERVICES

DOCUMENT INFORMATION

Document Title:	**WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT MAUGHANACLEA RENEWABLE ENERGY DEVELOPMENT, CO. CORK**
Issue Date:	**24th March 2026**
Project Number:	**P1710-0**
Project Reporting History:	**P1710-0**
Current Revision No:	**P1710-0_WFD_D0**
Author:	**MICHAEL GILL** **DAVID BRODERICK** **NITESH DALAL**
Signed:	 _____ **Michael Gill B.A., B.A.I., M.Sc., MIEI** **Managing Director – Hydro-Environmental Services**

TABLE OF CONTENTS

FIGURES (IN TEXT)

TABLES IN TEXT

1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by MKO to complete a Water Framework Directive (WFD) Compliance Assessment for a planning application of the proposed Maughanaclea Renewable Energy Development (Proposed Project), Co. Cork.

The 'Proposed Wind Farm' refers to the 14 no. turbines and supporting infrastructure, including the proposed 110kV onsite substation (detailed description provided in Chapter 4 of this EIAR). The 'proposed turbines' refers to the 14 no. turbines associated with the Proposed Wind Farm

The 'Proposed Grid Connection' refers to the 110kV underground cabling connection and all ancillary works and apparatus from the proposed 110kV onsite substation to the existing Dunmanway 110kV substation which has a length of 20.5km.

Where 'the Site' is referred to, this relates to the primary study area for the Proposed Project EIAR, as delineated by the EIAR Site Boundary and includes both the Proposed Wind Farm and Proposed Grid Connection.

The 'Proposed Wind Farm site' refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route.

The purpose of this WFD assessment is to determine if any specific components or activities associated with the Proposed Project will compromise WFD objectives or cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status. This assessment will determine the water bodies with the potential to be impacted, describe the proposed mitigation measures and determine if the project is in compliance with the objectives of the WFD.

This WFD Assessment is intended to supplement the EIAR submitted as part of the Proposed Project planning application.

1.2 STATEMENT OF AUTHORITY

Hydro-Environmental Services (HES) are a specialist hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types including wind farms.

This WFD assessment was prepared by Michael Gill, David Broderick and Nitesh Dalal.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer/Hydrologist with over 24 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms in Ireland. He has also managed EIAR assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions. For example, Michael has worked on the EIS/EIARs for Glenard Wind Farm, Cahermurphy Wind Farm, and Seven Hills Wind Farm, and over 100 other wind farm related projects across the country.

David Broderick (P. Geo., BSc, H. Dip Env Eng, MSc) is a Hydrogeologist with over 19 years' experience in both the public and private sectors. Having spent two years working in the Geological Survey of Ireland working mainly on groundwater and source protection studies David moved into the private sector. David has a strong background in groundwater resource assessment and hydrogeological/hydrological investigations in relation to developments such as quarries and wind farms. David has completed numerous geology and water sections for input into EIARs for a range of commercial developments. David has completed numerous geology and water sections for input into EIARs for a range of commercial developments. David has worked on the EIS/EIARs for Carrigarierk Wind Farm, Curraglass Wind Farm, Esk Wind Farm and Shehymore Wind Farm, and over 60 other wind farm related projects across the country.

Nitesh Dalal (B.Tech, PG Dip., MSc) is an Environmental Scientist with over 8 years' experience in environmental consultancy and environmental management. Nitesh holds a M.Sc. in Environmental Science from University College Dublin (2024), a PG Diploma in Health, Safety and Environment from Annamalai University, India (2021) and B.Tech. in Environmental Engineering (2016) from Guru Gobind Singh Indraprastha University, India (2016).

1.3 WATER FRAMEWORK DIRECTIVE

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU ("**WFD**"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the WFD is not compromised.

The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, monitoring and setting environmental objectives. In Ireland the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021, and the third cycle covers the period from 2022 to 2027[1]. The RBMPs are forward looking.

The Water Action Plan 2024 is Ireland's 3rd River Basin Management Plan (2022 - 2027). The objectives of the Water Action Plan 2024 have been integrated into the design of the Proposed Project and include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration;
- Meet the water standards and objectives for designated protected areas;
- Protect high-status waters; and,
- Implement targeted action and pilot schemes in focus sub-catchments aimed at (i) targeting water bodies close to meeting their objective and (ii) addressing more complex issues that will build knowledge for future cycles.

Our understanding of these objectives is that water bodies, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed.

[1] *The WFD RBMP cycles are forward looking plans, so 2009-2015 (1st Cycle), 2016-2021 (2nd Cycle), and 2022-2027 (3rd Cycle) are the plans and they use status from the previous 6 years.*
The EPA updates status every three years, but they also complete an additional assessment mid-RBMP cycle. The mid-cycle status does not get reported to the Commission.
The linkage between the two is that the 2nd Cycle plan uses the 2009-2015 status, the 3rd Cycle plan uses the 2016-2021 status. The 2013-2018 status was not used in the RBMP and the 2019-2024 status will not be used in the next RBMP.

2. WATERBODY IDENTIFICATION CLASSIFICATION

2.1 INTRODUCTION

This section identifies those Surface Waterbodies (SWBs) and Groundwater Bodies (GWBs) with potential to be affected by the Proposed Project and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

Proposed Wind Farm

Regionally, the Proposed Wind Farm is located within the Dunmanus-Bantry-Kenmare surface water catchment within Hydrometric Area No. 21 of the South-Western River Basin District.

The majority of the Proposed Wind Farm site including 11 no. turbines (T1 to T9, T12 and T13) is located within the Coomhola_SC_010 sub-catchment with the southern portion including 3 no. turbines (T10, T11 and T14) is mapped within the Mealagh_SC_010 sub-Catchment.

Within the Coomhola_SC_010 sub-catchment, the majority of the Proposed Wind Farm site is mapped within the Owngar (Cork)_010 river sub-basin with small area in the north mapped within the Owvane (Cork)_010 river sub-basin. Within the Mealagh_SC_010 sub-Catchment, the Proposed Wind Farm Site is mapped within the Mealagh_010 river sub-basin.

Within the Owngar (Cork)_010 river sub-basin, several unnamed tributaries of the Owngar_010 rise within the Site Boundary. The tributaries rise to the south and southwest of the Proposed Wind Farm site, and flow south-westwards before converging with the Owngar_010 SWB. The Owngar River valley separates the northern and southern cluster of the Proposed Wind Farm site. The Owngar River flows into the Owvane River approximately 2km downstream of the Proposed Wind Farm site. Within the Owvane (Cork)_010 river sub-basin, a small unnamed tributary of the Owvane_010 rise within the Proposed Wind Farm site.

Within the Melagh_010 river sub-basin, the Site is drained by several small unnamed tributaries of the Mealagh_010 SWB, which is mapped within the Proposed Wind Farm. The Mealagh_010 flows south-westerly until it merges with the Mealagh_020, within the Mealagh_020 River Sub-basin. The River Mealagh continues to flow southwest where it discharges into the Inner Bantry Bay.

Table A presents the catchment area of each waterbody downstream of the Proposed Wind Farm as far as the Inner Bantry Bay, into which the Site ultimately drains towards. The catchment area for the waterbodies increases progressively downstream as more tributaries discharge into the Owvane, Owngar and Melagh Rivers. Therefore, those waterbodies which are located in close proximity to the Proposed Wind Farm are more susceptible to water quality impacts as a result of activities associated with the Proposed Project. The potential for the Proposed Wind Farm to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes.

Table A: Catchment Area Downstream of Proposed Wind Farm

WFD River Sub-Basin	Total downstream Catchment Area (km²)
Coomhola_SC_010	
Owngar (Cork)_010	18.53
Owvane (Cork)_010	17.62
Owvane (Cork)_020	72.45
Owvane (Cork)_030	78.27
Mealagh_SC_010	
Mealagh_010	24.54

Mealagh_020	55.05

Proposed Grid Connection

Regionally, the majority of the Proposed Grid Connection route is located within the Bandon River surface water catchment within Hydrometric Area No. 20 of the South-Western River Basin District while the far western end is mapped within the Dunmanus-Bantry-Kenmare surface water catchment within Hydrometric Area No. 21 of the South-Western River Basin District.

Within the Dunmanus-Bantry-Kenmare surface water catchment, the Proposed Grid Connection route is mapped within the Coomhola_SC_010 and Owngar (Cork)_010 river sub-basin. Within the Bandon-Ilen surface water catchment, the majority of the Proposed Grid Connection route is mapped within the Bandon_SC_010 sub-catchment and Bandon_020 river sub-basin with the eastern portion mapped within the Bandon_SC_020 and Bandon_SC_030 sub-catchment and Bandon_030 river sub-basin.

Table B presents the catchment area of each waterbody downstream of the Proposed Grid Connection as far as the Inner Bantry Bay and Upper Bandon Estuary transitional waterbody, to which the Site ultimately drains towards. The catchment area for the waterbodies increases progressively downstream as more tributaries discharge into the Owvane, Owngar and Bandon Rivers. Therefore, those waterbodies which are located in close proximity to the Proposed Grid Connection are more susceptible to water quality impacts as a result of activities associated with the Proposed Project. The potential for the Proposed Grid Connection to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes.

Table B: Catchment Area Downstream of Proposed Grid Connection

WFD River Sub-Basin	Total Upstream Catchment Area (km²)
Dunmanus-Bantry-Kenmare WFD Catchment	
Owngar (Cork)_010	18.53
Owvane (Cork)_020	72.45
Owvane (Cork)_030	78.27
Bandon-Ilen WFD Catchment	
Bandon_020	104.10
Bandon_030	151.62
Bandon_040	186.94
Bandon_050	282.71
Bandon_060	318.68
Bandon_070	370.72
Bandon_080	378.96
Bandon_090	418.50
Bandon_100	513.31

Biodiversity Management and Enhancement Plan Lands

A Biodiversity Management and Enhancement Plan (BMEP) is proposed for the Proposed Wind Farm. It is proposed to fell an area of young conifer plantation in the northern turbine cluster of the Proposed Wind Farm. Replanting with native woodland in an area of conifer forestry adjacent to the proposed 110kV onsite substation is proposed in the southern turbine cluster of the Proposed Wind Farm.

The BMEP lands are mapped within the Dunmanus-Bantry-Kenmare surface water catchment within Hydrometric Area No. 21 of the South-Western River Basin District. More locally, the Habitat Enhancement Lands are mapped within the Coomhola_SC_010 and Owngar (Cork)_010 river sub-basin.

Table C presents the catchment area of each waterbody downstream of the Habitat Enhancement Lands as far as the Inner Bantry Bay, to which the site ultimately drains towards.

Table C: Catchment Area Downstream of BMEP Lands

WFD River Sub-Basin	Total downstream Catchment Area (km²)
Coomhola_SC_010	
Owngar (Cork)_010	18.53
Owvane (Cork)_020	72.45
Owvane (Cork)_030	78.27

Figure A below is a local hydrology map of the area.

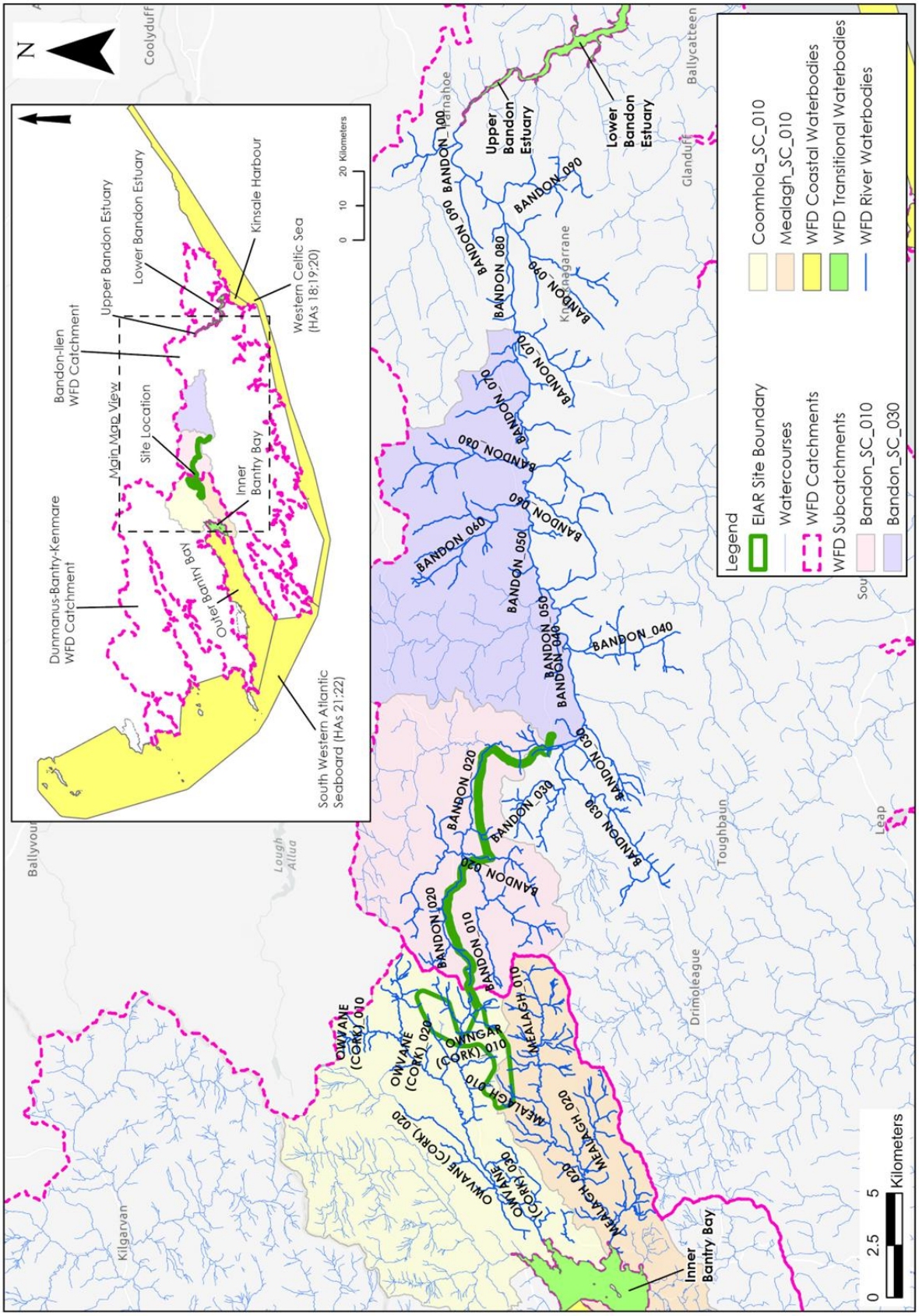

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for SWBs downstream of the Site are shown in **Table D**. The overall status is based on the ecological, chemical and quantitative status of each SWB.

Local Groundwater Body (GWB) and Surface water Body (SWB) status information is available from (www.catchments.ie).

Within the Dunmanus-Bantry-Kenmare WFD Catchment, the Owngar (Cork)_010 and Owvane (Cork)_010 have achieved "High" status in the latest WFD cycle (2019-2024) and is 'not at risk' of failing to achieve its WFD objectives. Downstream of these SWBs, Owvane (Cork)_020 have achieved "Poor" status while Owvane (Cork)_030 have achieved "Moderate" status in the latest WFD cycle and are 'not at risk' of failing to achieve its WFD objectives. The Mealagh_010 and Mealagh_020 have achieved "High" status in the latest WFD cycle and are 'not at risk' of failing to achieve its WFD objectives.

In terms of transitional water bodies, the Reenydonagan Lough have achieved "Moderate" status in the latest WFD cycle and is 'under review' while the Inner Bantry Bay have achieved "High" status in the latest WFD cycle and is 'not at risk' of failing to achieve its WFD objectives. In terms of coastal water bodies, the Outer Bantry Bay and the SouthWestern Atlantic Seaboard (Has 21;22) have achieved "High" status in the latest WFD cycle and is 'not at risk' of failing to achieve its WFD objectives.

Within the Bandon-Ilen WFD Catchment, the Bandon_020 and the Bandon_030 have achieved "Moderate" status in the latest WFD cycle and is 'at risk' of failing to achieve its WFD objectives with Agriculture as identified significant pressure on the Bandon_020 river and the Agriculture and Urban wastewater as identified significant pressure on the Bandon_030 river. Further downstream, the Bandon_040 to 050 and Bandon_070 to 100 have achieved "Good" status in the latest WFD cycle while the Bandon_060 have achieved "Moderate" status in the latest WFD cycle. The Bandon_040, 070, 090 and 100 is 'not at risk' of failing to achieve its WFD objectives, the Bandon_050 and 080 is 'under review' while the Bandon_060 is 'at risk' of failing to achieve its WFD objectives. Anthropogenic is identified as significant pressure identified on the Bandon_060 SWB.

In terms of transitional water bodies, the Upper Bandon Estuary and the Lower Bandon Estuary have achieved "Poor" status in the latest WFD cycle and is 'at risk' of failing to achieve its WFD objectives with agriculture as identified significant pressure on these SWB. In terms of coastal water bodies, the Kinsale Harbour have achieved "Good" status in the latest WFD cycle while the Western Celtic Sea (Has 18;19;20) have achieved "High" status in the latest WFD cycle. The coastal waterbodies are 'not at risk' of failing to achieve its WFD objectives with no significant pressure identified on these SWBs.

The SWB status for the 2019-2024 WFD cycle are shown on **Figure** B.

Table D: Summary WFD Information for Surface Water Bodies

SWB	Overall Status 2013-2018	Overall Status 2016-2021	Overall Status 2019-2024	Risk Status 3rd Cycle	Pressures
Dunmanus-Bantry-Kenmare WFD Catchment (Proposed Wind Farm & Proposed Grid Connection)					
Owngar (Cork)_010	High	High	High	Not at risk	None
Owvane (Cork)_010	High	High	High	Not at risk	None
Owvane (Cork)_020	Good	Good	Poor	Not at risk	None
Owvane (Cork)_030	High	Good	Moderate	Not at risk	None
Mealagh_010	High	High	High	Not at risk	None
Mealagh_020	High	High	High	Not at risk	None
Reenydonagan Lough	Poor	Moderate	Moderate	Review	-
Inner Bantry Bay	Good	High	High	Not at risk	None
Outer Bantry Bay	High	High	High	Not at risk	None
South Western Atlantic Seaboard (HAs 21;22)	High	High	High	Not at risk	None
Bandon-Ilen WFD Catchment (Proposed Grid Connection only)					
Bandon_020	Good	Moderate	Moderate	At Risk	Agriculture
Bandon_030	Moderate	Moderate	Moderate	At Risk	Agriculture and Urban wastewater
Bandon_040	Good	Good	Good	Not at risk	None
Bandon_050	Good	Good	Good	Under Review	-
Bandon_060	Moderate	Moderate	Moderate	At Risk	Unknow
Bandon_070	Good	Good	Good	Not at risk	None
Bandon_080	Moderate	Good	Good	Under Review	-
Bandon_090	Moderate	Good	Good	Not at risk	None
Bandon_100	Moderate	Good	Good	Not at risk	None
Upper Bandon Estuary	Poor	Poor	Poor	At Risk	Agriculture
Lower Bandon Estuary	Moderate	Poor	Poor	At Risk	Agriculture
Kinsale Harbour	Good	Good	Good	Not at risk	None
Western Celtic Sea (HAs 18;19;20)	High	High	High	Not at risk	None

2.4 GROUNDWATER BODY IDENTIFICATION

Proposed Wind Farm:

The Proposed Wind Farm is located in the Beara Sneem (IE_SW_G_019) Groundwater Body (GWB) which is described by the WFD as 'poorly productive bedrock'.

Proposed Grid Connection:

The western section of the Proposed Grid Connection route is also located in the Beara Sneem GWB (IE_SW_G_019), but with the majority of the route is located in the Bandon GWB (IE_SW_G_086). The Bandon GWB is also described by the WFD as 'poorly productive bedrock'. Within the Bandon GWB the underlying bedrock is mapped mainly as Devonian Old Red Sandstones (ORS).

The GWB status for the 2019-2024 WFD cycle are shown on **Figure B.**

2.5 GROUNDWATER BODY CLASSIFICATION

The GWBs are assigned a status based on the assessment of groundwater chemical and quantitative figures. Summary WFD information for GWBs underlying the Proposed Project is presented in **Table E**.

The Beara Sneem (IE_SW_G_019) and Bandon (IE_SW_G_086) GWBs have achieved 'Good' status in the latest WFD cycle and are 'not at risk' of failing to achieve its WFD objectives. There is no significant pressure identified in these GWBs.

The GWB status for the 2019-2024 WFD cycles are shown on **Figure B**.

Table E: Summary WFD Information for Groundwater Bodies

GWB	Overall Status 2013-2018	Overall Status 2016-2021	Overall Status 2019-2024	Risk Status 3rd Cycle	Pressures
Beara Sneem	Good	Good	Good	Not at risk	None
Bandon	Good	Good	Good	Not at risk	None

2.6 ZONE OF INFLUENCE

The Zone of Influence (ZoI) of the Proposed Project extends to the following SWBs and GWBS:

- River SWBs – Owngar (Cork)_010, Owvane (Cork) (010 to 030), Mealagh (010 and 020) and Bandon (020 to 100) rivers;
- GWBs – Beara Sneem and Bandon GWBs; and,
- Transitional and Coastal Waterbodies – Reenydonagan Lough, Inner Bantry Bay, Upper Bandon Estuary, Lower Bandon Estuary, Outer Bantry Bay, South Western Atlantic Seaboard (HAs 21;22), Kinsale Harbour and Western Celtic Sea (HAs 18;19;20).

2.7 PROTECTED AREA IDENTIFICATION

The WFD requires that activities are also in compliance with other relevant legislation, as considered below. Nature conservation designations, bathing waters, nutrient Sensitive areas (NSA), shellfish areas and drinking water protected area's (DWPA) are looked at as part of the assessment.

2.7.1 Nature Conservation Designations

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs).

Ramsar sites are wetlands of international importance designated under the Ramsar Convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resources.

The Proposed Wind Farm is not mapped within any designated conservation site while the eastern part of the Proposed Grid Connection route is mapped within the Bandon River SAC (Site Code: 002171), albeit within the carriageway of a public road.

The nearest designated site to the Proposed Find Warm is Carriganass Castle, Near Kealkill pNHA (Site Code: 002099), which is located ~2.5km northwest of the Southern section of the Site. The pNHA is not a water dependant designated site and therefore cannot be affected by the Proposed Wind Farm.

The Hydrologically connected designated sites located downstream of the Proposed Project are:

- The Cusroe, Whiddy Island pNHA (Site Code: 000110) is located downstream and ~12km southwest of the Proposed Wind Farm Site. The Cusroe, Whiddy Island pNHA is hydrologically connected to the Proposed Wind Farm site via Mealagh river;
- The Bandon Valley South of Dunmanway pNHA (Site Code: 001035) is located downstream and ~1km south of the eastern portion of the Proposed Grid Connection route and is hydrologically connected via Bandon river;
- The Bandon Valley West of Bandon pNHA (Site Code: 001034) is located downstream and ~20km east of the eastern portion of the Proposed Grid Connection route and is hydrologically connected via Bandon river;
- The Bandon Valley above Inishannon pNHA (Site Code: 001740) is located downstream and ~26.5km east of the eastern portion of the Proposed Grid Connection route and is hydrologically connected via Bandon river; and,
- The Bandon Valley below Inishannon pNHA (Site Code: 001515) is located downstream and ~31km east of the eastern portion of the Proposed Grid Connection route and is hydrologically connected via Bandon River.

2.7.2 Bathing Waters

Bathing waters are those designated under the Bathing Water Directive (76/160/EEC) or the later revised Bathing Water Directive (2006/7/EC).

There are no designated bathing waters located in the vicinity or downstream of the Site.

2.7.3 Nutrient Sensitive Areas

Nutrient Sensitive Areas (NSA) comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Wastewater Treatment Directive (UWWTD)(91/271/EEC). Sensitive areas under the UWWTD are water bodies affected by eutrophication associated with elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

Within the Dunmanus-Bantry-Kenmare WFD catchment, there are no NSA downstream of the Site. Within the Bandon-Ilen WFD catchment, the Bandon_100, Upper Bandon Estuary, Lower Bandon Esturay and the Kinsale Harbour are mapped as NSA downstream of the Proposed Grid Connection.

2.7.4 Shellfish Areas

The Shellfish Waters Directive (2006/113/EC) aims to protect or improve shellfish waters in order to support shellfish life and growth.

There are 3 no. Shellfish protected area sites downstream of the Proposed Wind Farm.

- Bantry Bay
- League Point
- Bantry Bay South

While the Kinsale Shellfish protected area is mapped downstream of the Proposed Grid Connection.

The Bantry Bay (IE_SW_170_0100) Shellfish protected area is located ~6.7km southwest of the Proposed Wind Farm, within the Inner Bantry Bay transitional SWB. The League Point (IE_SW_170_0000) Shellfish protected area is ~16km southwest of the Proposed Wind Farm and is located within the Outer Bantry Bay Costal Waterbody.

The Bantry Bay South (IE_SW_170_0000) Shellfish Protection is mapped ~21.7km southwest of the Proposed Wind Farm and is located in the Outer Bantry Bay Coastal Waterbody. The Kinsale (IE_SW_080_0100) Shellfish protected area is mapped ~37km east of the Proposed Grid Connection and is located in the Lower Bandon Estuary transitional water body.

2.7.5 Salmonid Waters

There is no Salmonid Waters mapped in the vicinity or downstream of the Proposed Project.

2.7.6 Drinking Water Protected Areas

The 3rd Cycle Dunmanus-Batry-Kenmare Catchment Report (EPA, 2024) states that there are 19 no. SWBs in the catchment which have been identified as Drinking Water Protected Areas (DWPAs). The Owngar (Cork)_010 river waterbody DWPA is mapped at the Site. This relates to the Kealkill Public Water Supply (PWS) river abstraction.

Downstream of the Proposed Wind Farm, the Mealagh_020 river waterbody is also mapped as DWPA. This relates to the Bantry Cahernacrin PWS river abstraction.

The 3rd Cycle Bandon-Ilen Catchment Report (EPA, 2024) states that there are 15 no. SWBs in the catchment which have been identified as Drinking Water Protected Areas (DWPAs). The Bandon_020 river waterbody DWPA is mapped at the Proposed Grid Connection. This DWPA relates to the Bandon Regional Water Supply river abstraction.

Downstream of the Proposed Grid Connection, the Bandon_050, the Bandon_070 and the Bandon_100 river waterbodies are also mapped as DWPA.

Meanwhile all GWB's in Ireland are considered as Drinking water protected areas. The Beara Sneem GWB (IE_SW_G_019) and the Bandon GWB (IE_SW_G_086) underlie the Site.

No Public Water Supply (PWS) or Group Water Scheme (GWS) supply groundwater protection areas overlap the Site boundary. The nearest mapped groundwater source protection area relates to the Carraignadoura GWS, which is located ~ 10km north of the Site.

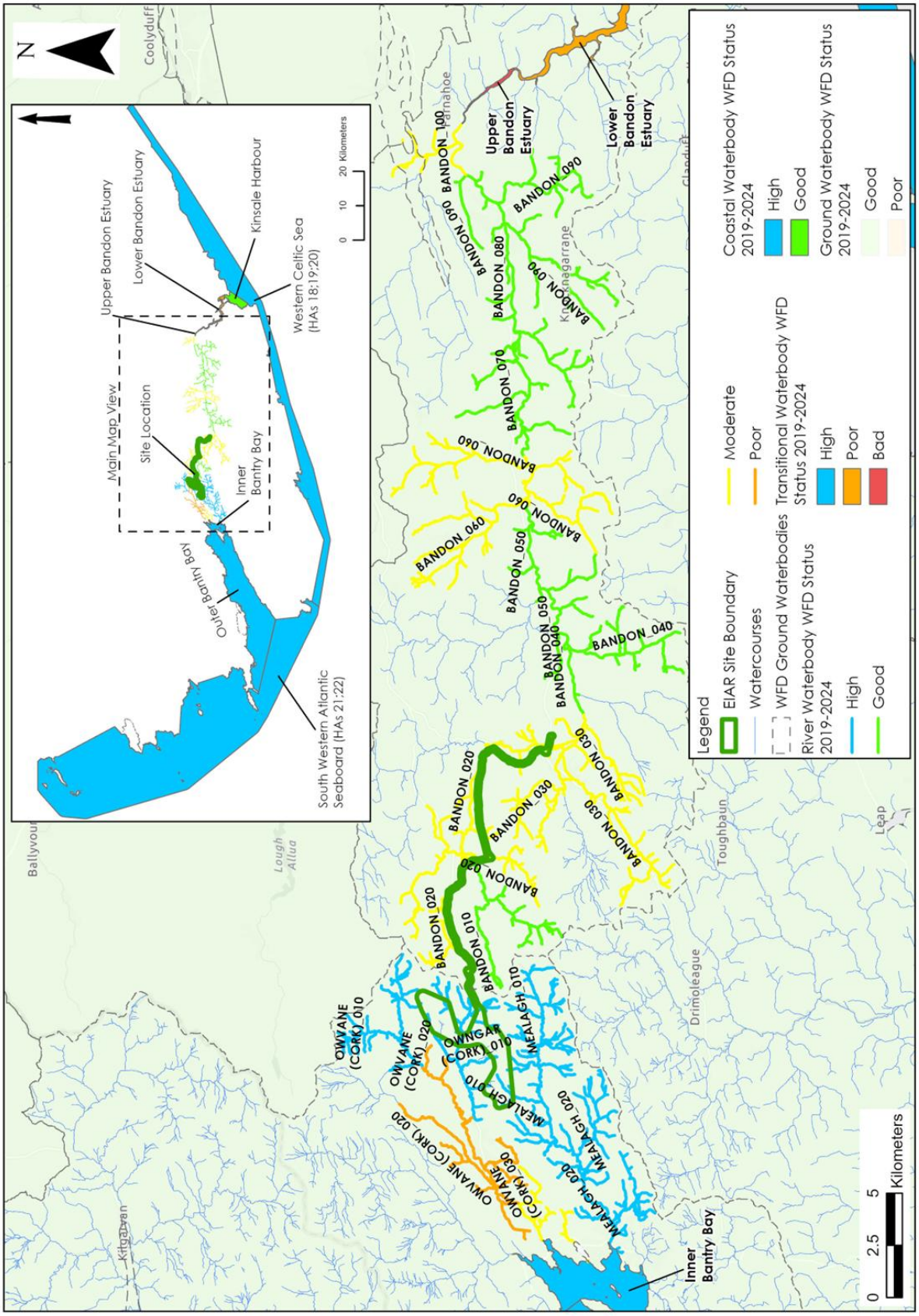

Figure B: WFD Groundwater and Surface Waterbody Status (2019-2024)

3. WFD SCREENING

As discussed in **Section 2,** there are a total of 23 no. SWBs which includes 15 no. river water bodies, 4 no. transitional water bodies and 4 no. coastal water bodies that are located in the vicinity or downstream of the Site. Furthermore, the Site is underlain by 2 no. groundwater body.

3.1 SURFACE WATER BODIES

The river waterbodies in the immediate vicinity and downstream of the Site are shown in **Figure A** and described in **Section 2.2** above.

With consideration for the construction, operational and decommissioning phases of the Proposed Project, it is considered that the Owvane (Cork)_010, Owngar (Cork)_010, Mealagh_010, and several small unnamed tributaries of the Owvane (Cork)_010, Owngar (Cork)_010, and Mealagh_010 rivers within the vicinity and downstream of the Site are carried through into the WFD Impact assessment. These SWBs have been screened in due to their proximity to the Site and the proposed works within the Owvane (Cork)_010, Owngar (Cork)_010, and Mealagh_010 river sub-basins. The Proposed Project must not in any way result in a deterioration in the status of these SWBs and/or prevent them from meeting the biological and chemical characteristics for good status in the future.

The Owvane River (Owvane (Cork)_010 to _030), and the River Mealagh (Mealagh_010 to Mealagh_020) in the vicinity and downstream of the Site are also carried through into the WFD Impact Assessment. These SWBs have been included for further assessment due to their proximal location to the Proposed Project works. The Proposed Project works within the Site must not in any way result in a deterioration in the status of these river waterbodies and/or prevent them from meeting the biological and chemical characteristics for good status in the future.

Downstream of these SWBs, the transitional water bodies (Reenydonagan Lough and Inner Bantry Bay) and the coastal water bodies (Outer Bantry Bay and South Western Atlantic Seaboard (HAs 21;22)) has been screened out due to distant location from the Site and increased volume of water within the SWB associated with increased upstream catchment area.

Similarly, with consideration for the construction, operational and decommissioning phases of the Proposed Grid Connection route, the Bandon_020, the Bandon_030 and the Bandon_040 within the vicinity and downstream of the Proposed Grid Connection are carried out through into the WFD Impact assessment.

Downstream of these SWBs, the river water bodies (Bandon_050 to Bandon_100), the transitional water bodies (Upper Bandon Estuary and Lower Bandon Estuary) and the coastal water bodies (Kinsale Harbour and Western Celtic Sea (HAs 18;19;20)) has been screened out due to distant location from the Proposed Grid Connection and increased volume of water within the SWB associated with increased upstream catchment area.

3.2 GROUNDWATER BODIES

With respect to GWBs, the Beara Sneem and the Bandon GWBs has been screened in due to its location directly underling the Site. The Proposed Project works must not in any way result in a deterioration in the status of these GWBs and/or prevent it from meeting the biological and chemical characteristics for good status in the future.

3.3 PROTECTED AREAS

Bandon River SAC: The eastern part of the Proposed Grid Connection is located within the Bandon River SAC. This SAC is hydrologically connected to Proposed Grid Connection. With consideration for the construction and operation activities associated with the Proposed Project, it is considered that the Bandon River SAC is carried through into the WFD Impact Assessment.

Bandon Valley South of Dunmanway pNHA: The Bandon Valley South of Dunmanway pNHA is located directly downstream is hydrologically connected to Proposed Grid Connection via Bandon River. With consideration for the construction and operation activities associated with the Proposed Project, it is considered that the Bandon Valley South of Dunmanway pNHA is carried through into the WFD Impact Assessment.

Owngar (Cork) 010 DWPA: The Proposed Wind Farm and Proposed Grid Connection is located within the Owngar (Cork)_010 river sub-basin. This DWPA (Kealkill PWS) is hydrologically connected to the Site. With consideration for the construction and operation activities associated with the Proposed Project, it is considered that the Owngar (Cork)_010 DWPA is carried through into the WFD Impact Assessment.

Mealagh 020 DWPA: The Mealagh_020 DWPA (Bantry Cahernacrin PWS) is located in close proximity and directly downstream of the Proposed Wind Farm. This DWPA is hydrologically connected to Proposed Wind Farm. With consideration for the construction and operation activities associated with the Proposed Project, it is considered that the Mealagh_020 DWPA is carried through into the WFD Impact Assessment.

Bandon 020 DWPA: The Proposed Grid Connection route located within the Bandon_020 river sub-basin. This DWPA (Bandon Regional Water Supply) is hydrologically connected to Proposed Grid Connection. With consideration for the construction and operation activities associated with the Proposed Project, it is considered that the Bandon_020 DWPA is carried through into the WFD Impact Assessment.

All other designated sites have been screened out due to distant location, increased volume of water within associated SWB or lack of hydrological connection between the designated site and the Proposed Project.

3.4 WFD SCREENING SUMMARY

A summary of WFD Screening for SWBs and GWBs discussed above is shown in **Table F** below.

Table F: Screening of WFD water bodies located within the study area

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Water Body	**Drunmanus-Bantry-Kenmare WFD Catchment**			
	River	Owngar (Cork)_010	**Yes**	The Proposed Wind Farm, Proposed Grid Connection and the BMEP Lands are mapped within the Owngar (Cork)_010 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Owvane (Cork)_010	**Yes**	The Proposed Wind Farm is mapped within the Owvane (Cork)_010 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Owvane (Cork)_020	**Yes**	The Owvane (Cork)_020 is located proximally to the Proposed Wind Farm and directly downstream of the Owvane (Cork)_010 and Owngar (Cork)_010 SWBs. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Owvane (Cork)_030	**Yes**	The Owvane (Cork)_030 is located proximally to the Proposed Wind Farm and directly downstream of the Owvane (Cork)_020 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Mealagh_010	**Yes**	The Proposed Wind Farm is mapped within the Mealagh_010 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Mealagh_020	**Yes**	The Mealagh_020 is located proximally to the Proposed Wind Farm and directly downstream of the Mealagh_010 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	Transitional	Reenydonagan Lough	No	The Reenydonagan Lough transitional waterbody has been screened out due to its distal location from the Proposed Wind Farmand the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Transitional	Inner Bantry Bay	No	The Inner Bantry Bay transitional waterbody has been screened out due to its distal location from the Proposed Wind Farmand the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Coastal	Outer Bantry Bay	No	The Outer Bantry Bay coastal waterbody has been screened out due to its distal location from the Proposed Wind Farmand the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Coastal	SouthWestern Atlantic Seaboard (HAs 21;22)	No	The South Western Atlantic Seaboard (HAs 21;22)coastal waterbody has been screened out due to its distal location from the Proposed Wind Farm Site and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Bandon-Ilen WFD Catchment			
	River	Bandon_020	**Yes**	The Proposed Grid Connection is mapped within the Bandon_020 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Bandon_030	**Yes**	The Proposed Grid Connection is mapped within the Bandon_030 river sub-basin. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Bandon_040	**Yes**	The Bandon_040 is located proximally to the Proposed Grid Connection and directly downstream of the Bandon_030 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Bandon_050	No	The Bandon_050 has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (282.71 km^2). Therefore, the Proposed Project has no potential to

				affect the status of this SWB.
	River	Bandon_060	No	The Bandon_060 has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (318.68 km^2). Therefore, the Proposed Project has no potential to affect the status of this SWB.
	River	Bandon_070	No	The Bandon_070 has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (370.72 km^2). Therefore, the Proposed Project has no potential to affect the status of this SWB.
	River	Bandon_080	No	The Bandon_080 has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (378.96Therefore, the Proposed Project has no potential to affect the status of this SWB.
	River	Bandon_090	No	The Bandon_090 has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (418.50 km^2). Therefore, the Proposed Project has no potential to affect the status of this SWB.
	River	Bandon_100	No	The Bandon_100 has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (513.31 km^2). Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Transitional	Upper Bandon Estuary	No	The Upper Bandon Estuary transitional waterbody has been screened out due to its distal location from the Proposed Grid Connection route and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Transitional	Lower Bandon Estuary	No	The Lower Bandon Estuary transitional waterbody has been screened out due to its distal location from the Proposed Grid Connection route and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Coastal	Kinsale Harbour	No	The Kinsale Harbour coastal waterbody has been screened out due to its distal location from the Proposed Grid Connection route and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
	Coastal	Western Celtic Sea (HAs 18;19;20)	No	The Western Celtic Sea (HAs 18;19;20) coastal waterbody has been screened out due to its distal location from the Proposed Grid Connection route and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this SWB.
Groundwater Bodies				
Groundwater Body	Groundwater	Beara Sneem	**Yes**	The Proposed Wind Farm and the Proposed Grid Connection is mapped to overlie the Beara Sneem GWB. An assessment is required to consider the potential impacts of the Proposed Project on this GWB.
		Bandon	**Yes**	The Proposed Grid Connection is mapped to overlie the Bandon GWB. An assessment is required to consider the potential impacts of the Proposed Project on this GWB.
Protected Areas				
Protected Areas	Nature Conservation Designations	Bandon River SAC	**Yes**	The Proposed Grid Connection is mapped with the Bandon River SAC. An assessment is required to consider the potential impacts of the Proposed Project on this SAC.
		Cusroe, Whiddy Island pNHA	No	The Cusroe, Whiddy Island pNHA has been screened out due to distant location and increase volume of water within the associated SWB. The Proposed Project has no potential to impact this pNHA.
		Bandon Valley South of Dunmanway pNHA	**Yes**	The Bandon Valley South of Dunmanway pNHA is mapped downstream of the Proposed Grid Connection and is hydrologically connected to the Proposed Grid Connection via Bandon river. An assessment is required to consider the potential impacts of the Proposed Project on this pNHA.

		Bandon Valley West of Bandon pNHA	No	The Bandon Valley West of Bandon pNHA has been screened out due to distant location and increase volume of water within the associated SWB. The Proposed Project has no potential to impact this pNHA.
		Bandon Valley above Inishannon pNHA	No	The Bandon Valley above Inishannon pNHA has been screened out due to distant location and increase volume of water within the associated SWB. The Proposed Project has no potential to impact this pNHA.
		Bandon Valley below Inishannon pNHA	No	The Bandon Valley below Inishannon pNHA has been screened out due to distant location and increase volume of water within the associated SWB. The Proposed Project has no potential to impact this pNHA.
		James Fort pNHA	No	The James Fort pNHA has been screened out due to distant location and increase volume of water within the associated SWB. The Proposed Project has no potential to impact this pNHA.
		Conigar Bog NHA	No	The Conigar Bog NHA has been screened out due to lack of hydrological connection. The Proposed Project has no potential to impact this NHA.
		Derryclogher (Knockboy) Bog SAC and pNHA	No	The Derryclogher (Knockboy) Bog SAC and pNHA has been screened out due to lack of hydrological connection. The Proposed Project has no potential to impact this SAC and pNHA.
		Gouganebarra Lake pNHA	No	The Gouganebarra Lake pNHA has been screened out due to lack of hydrological connection. The Proposed Project has no potential to impact this pNHA.
		Ballagh Bog pNHA	No	The Ballagh Bog pNHA has been screened out due to lack of hydrological connection. The Proposed Project has no potential to impact this pNHA.
		Lough Allua pNHA	No	The Lough Allua pNHA has been screened out due to lack of hydrological connection. The Proposed Project has no potential to impact this pNHA.
	Nurtient Sensitive Areas	Bandon_100	No	The Bandon_100 NSA has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (513.31 km^2). Therefore, the Proposed Project has no potential to affect the status of this NSA.
		Upper Bandon Estuary and Lower Bandon Esturay	No	The Upper Bandon Estuary and Lower Bandon Estuary NSAs have been screened out due to its distal location from the Proposed Grid Connection route and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of these NSAs.
		Kinsale Harbour	No	The Kinsale Harbour NSA has been screened out due to its distal location from the Proposed Grid Connection route and the increasing volumes of water within SWB. Therefore, the Proposed Project has no potential to affect the status of this NSA.
	Shellfish Area	Bantry Bay	No	The Bantry Bay shellfish waters have been screened out due to its distal location from the Proposed Wind Farm Site and increasing volumes of water within Bantry Bay. The Proposed Project has no potential to impact these Shellfish Waters.
		League Point	No	The League Point shellfish waters have been screened out due to its distal location from the Site. The

				Proposed Project has no potential to impact these Shellfish Waters.
		Bantry Bay South	No	The Bantry Bay South shellfish waters have been screened out due to its distal location from the Site. The Proposed Project has no potential to impact these Shellfish Waters.
		Kinsale	No	The Kinsale shellfish waters have been screened out due to its distal location from the Proposed Grid Connection. The Proposed Project has no potential to impact these Shellfish Waters.
	Drinking Water Protected Areas	Owngar (Cork)_010	**Yes**	The Owngar (Cork)_010 DWPA has been screened in due to its close proximity and hydrological connections to the Site. An assessment is required to consider the potential impacts of the Proposed Project on this DWPA.
		Mealagh_020	**Yes**	The Mealagh_020 DWPA has been screened in due to its close proximity and hydrological connections to the Proposed Wind Farm. An assessment is required to consider the potential impacts of the Proposed Project on this DWPA.
		Bandon_020	**Yes**	The Bandon_020 DWPA has been screened in due to its close proximity and hydrological connections to the Proposed Grid Connection. An assessment is required to consider the potential impacts of the Proposed Project on this DWPA.
		Bandon_050	No	The Bandon_050 DWPA has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (282.71 km^2). Therefore, the Proposed Project has no potential to affect the status of this DWPA.
		Bandon_070	No	The Bandon_070 DWPA has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (370.72 km^2). Therefore, the Proposed Project has no potential to affect the status of this DWPA.
		Bandon_100	No	The Bandon_100 DWPA has been screened out due to distant location and increased volume of water associated with increase upstream catchment area (513.31 km^2). Therefore, the Proposed Project has no potential to affect the status of this DWPA.

4. WFD COMPLIANCE ASSESSMENT

4.1 PROPOSALS

Please refer to Section 4.1 of the EIAR for a description of the Proposed Project (i.e. Proposed Wind Farm and Proposed Grid Connection).

The main characteristics of the Proposed Wind Farm that could impact on hydrology and hydrogeology are:

- Construction of 14 no. turbine foundations, which will be of gravity foundation design;
- Establishment of 3 no. temporary construction compounds, which will involve minor regrading of peat/soil/subsoil and the emplacement of hardstand. Welfare facilities will be provided at the primary temporary construction compounds. Wastewater effluent will be collected in a wastewater holding tank and periodically emptied by a licenced contractor;
- Construction of the proposed 110kV onsite substation with a subsoil bearing foundation. Welfare facilities will be provided at the substation along with a temporary construction compound;
- Construction of the site access tracks will use the floating technique as well as the excavate and replace technique. This will involve the use of aggregate from 4 no. proposed on-site borrow pits and imported from local quarries where required;
- Construction of the crane hardstand areas and turbine assemblage areas will utilise ground bearing foundations;
- Settlement ponds where constructed will be volume neutral, i.e. all material excavated will be used to form side bunds and landscaping around the ponds. There will be no excess material from settlement pond construction. The material will also be reinstated during decommissioning;
- Grey water will be supplied by rainwater harvesting and water tankered to site where required. Bottled water will be used for potable supply;
- Cabling between turbine locations and the proposed 110kV onsite substation will involve the excavation of a shallow trench (approximately 1.2m deep), placement of ducting and backfilling;
- Construction of 5 no. new watercourse crossing (clear span bridge design);
- Tree felling (approximately 44ha) for the purposes of turbine and access road construction clearance which will be carried out under felling licence;
- Establishment of peat repositories areas;
- Establish Biodiversity Management and Enhancement Areas (peatland habitat, native tree planting and Kerry slug enhancement measures) and,
- Turbine haul route upgrade works.

The main characteristics of the Proposed Grid Connection that could impact on hydrology and hydrogeology are:

- Approx 20.5km of an underground cabling route between the proposed 110kV onsite substation and the existing 110kV Dunmanway substation involving the excavation of a double shallow trench (approximately 1.2m deep), placement of ducting and backfilling with aggregate, lean-mix concrete, and excavated material, as appropriate (depending on the location of the cable trench); and;
- Passing of the cable over/under 11 no. watercourse crossing using the existing bridge structure or by Horizontal Directional Drilling (HDD). No instream works are required at the Proposed Grid Connection crossing locations.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Effects from Works within the Proposed Wind Farm

Construction phase activities including tree felling, site levelling/construction, building turbine foundation excavation, borrow pits and peat and spoil management management areas will require earthworks resulting in removal of vegetation cover and excavation of peat, soil and subsoils. The main risk will be from surface water runoff from exposed soil/peat, peat and spoil management areas and borrow pit drainage during construction works.

Hydrocarbons and cement-based compounds will be used during the construction phase. Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to surface waters at all construction sites. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in the death of aquatic organisms.

Release of effluent from wastewater treatment systems also has the potential to impact on surface waters if site conditions are not suitable for an on-site percolation unit.

Clear felling of coniferous forestry plantations is also proposed over 44ha. Potential surface water quality effects from felling include the release of elevated concentrations of suspended solids and nutrient release which has the potential to effect downstream surface water quality.

There are also 5 no. new proposed crossings over mapped watercourses in the Proposed Wind Farm Site. Works have the potential to result in morphological changes to watercourses.

Construction phase activities can result in the release of suspended solids and pollutants in runoff water and could result in an increase in the suspended sediment load, resulting in increased turbidity, increased pH and contamination which in turn could affect the water quality and fish stocks in the downstream SWBs.

The SWB's potentially affected by these activities is the Owngar (Cork), Owvane (Cork) and Mealagh SWB's. Further downstream, the potential for water quality effects will decrease downstream due to the increasing volumes of water within the respective SWBs.

The proposed BMEP works have no potential to affect WFD status.

A summary of potential status change to SWBs arising from works within the Proposed Wind Farm Site during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table G**.

Table G: Potential Surface Water Quality Effects Downstream of the Proposed Wind Farm during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Dunmanus-Bantry-Kenmare WFD Catchment			
Owngar (Cork)_010	IE_SW_21O040400	High	Good
Owvane (Cork)_010	IE_SW_21O070200	High	Good
Owvane (Cork)_020	IE_SW_21O070400	Poor	Bad
Owvane (Cork)_030	IE_SW_21O070500	Moderate	Poor
Mealagh_010	IE_SW_21M010200	High	Good
Mealagh_020	IE_SW_21M010400	High	Good
Reenydonagan Lough	IE_SW_170_0300	Moderate	Moderate
Inner Bantry Bay	IE_SW_170_0100	High	High
Outer Bantry Bay	IE_SW_170_0000	High	High
South Western Atlantic Seaboard (HAs 21;22)	IE_SW_150_0000	High	High

4.2.1.2 Potential Surface Water Quality Effects Along the Proposed Grid Connection

Along the Proposed Grid Connection route there are 11 no. EPA mapped watercourses. This includes no. 2 existing crossings in the Owngar River catchment and 9 no. in the Bandon River catchment.

Due to the close proximity of local waterbodies to the at the crossing locations, there is a potential for surface water quality impacts during trench excavation work due to runoff from the road surface. This runoff may contain elevated concentrations of suspended sediment, cementitious runoff and/or hydrocarbons.

Some minor groundwater/surface water seepages will likely occur in trench excavations and substation foundation excavations and this will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments.

Construction activities along the Proposed Grid Connection only have the potential for short term effects due to the minor and transient nature of the works. The limits the potential for the Proposed Project to alter the overall status of a SWB.

A summary of potential status change to SWBs arising from works along the Proposed Grid Connection during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table H.**

Table H: Potential Surface Water Quality Effects along the Proposed Grid Connection during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Dunmanus-Bantry-Kenmare WFD Catchment			
Owngar (Cork)_010	IE_SW_21O040400	High	High
Owvane (Cork)_020	IE_SW_21O070400	Poor	Poor
Owvane (Cork)_030	IE_SW_21O070500	Moderate	Moderate
Bandon-Ilen WFD Catchment			
Bandon_020	IE_SW_20B020200	Moderate	Moderate
Bandon_030	IE_SW_20B020300	Moderate	Moderate
Bandon_040	IE_SW_20B020400	Good	Good
Bandon_050	IE_SW_20B020550	Good	Good
Bandon_060	IE_SW_20B020600	Moderate	Moderate
Bandon_070	IE_SW_20B020700	Good	Good
Bandon_080	IE_SW_20B020780	Good	Good
Bandon_090	IE_SW_20B020800	Good	Good
Bandon_100	IE_SW_20B020900	Good	Good
Upper Bandon Estuary	IE_SW_080_0300	Poor	Poor
Lower Bandon Estuary	IE_SW_080_0100	Poor	Poor
Kinsale Harbour	IE_SW_080_0000	Good	Good
Western Celtic Sea (HAs 18;19;20)	IE_SW_010_0000	High	High

4.2.1.3 Potential Groundwater Quality/Quantity Effects at Proposed Wind Farm

The accidental spillage of hydrocarbons, the release of effluent from wastewater treatment systems and the release of cement-based products have the potential to negatively impact on groundwater water quality at the Proposed Wind Farm.

In addition, groundwater seepages may occur in turbine base excavations, particularly those on lower elevations and this will create additional volumes of water to be treated by the drainage management system.

Furthermore, temporary dewatering of excavations (borrow pit, turbine base etc) may drawdown the local groundwater table.

However due to the low permeability of the bedrock aquifer and the shallow nature of the proposed works, there is limited potential for the Proposed Project to change the overall status of the underlying GWBs.

A summary of potential status change to GWBs arising from works at the Proposed Wind Farm during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table I**.

Table I: Potential Groundwater Effects at Proposed Wind Farm during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Beara Sneem	IE_SW_G_019	Good	Good

4.2.1.4 Potential Groundwater Quality/Quantity Effects along Proposed Grid Connection

The Proposed Grid Connection is located in both the Beara Sneem and Bandon GWBs.

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a major pollution risk to groundwater. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Chemicals such as cement-based compounds also pose a threat to the groundwater environment. Runoff from concrete works can impact on groundwater quality. Release of effluent from site welfare wastewater treatment systems has the potential to impact on groundwater and surface waters.

These sources of contamination have the potential to impact on groundwater quality in the underlying groundwater body.

However, Due to the shallow, short-term and transient nature of the Proposed Grid Connection works, there is no potential for any effects during earthworks and excavation works on the GWBs.

A summary of potential status change to GWBs arising from potential groundwater quality impacts along the Proposed Grid Connection during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table J**.

Table J: Potential Groundwater Effects Along Proposed Grid Connection during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Beara Sneem	IE_SW_G_019	Good	Good
Bandon	IE_SW_G_086	Good	Good

4.2.1.5 Potential Effects on Protected Areas

The surface water connections from the Proposed Project could transfer poor quality surface water that may affect the conservation objectives of these designated sites. The designated site included in this assessment and deemed to be hydrologically connected to the Proposed Project include:

Bandon River SAC: The eastern part of the Proposed Grid Connection route is located within the Bandon River SAC. This SAC is hydrologically connected to Proposed Grid Connection Route. The surface water connections from the Proposed Grid Connection to the SAC could transfer poor quality surface water that may affect the conservation objectives of the Bandon River SAC.

However, due to the shallow, short-term and transient nature of the Proposed Grid Connection works within the Bandon River catchment no significant effects on the Bandon River SAC are expected.

, there is no potential for any effects during earthworks and excavation works on the GWBs.

Bandon Valley South of Dunmanway pNHA: The Bandon Valley South of Dunmanway pNHA is located directly downstream is hydrologically connected to Proposed Grid Connection Route via Bandon River. The surface water connections from the Proposed Grid Connection to pNHA could transfer poor quality surface water that may affect the conservation objectives of the Bandon Valley South of Dunmanway pNHA.

However, due to the shallow, short-term and transient nature of the Proposed Grid Connection works within the Bandon River catchment no significant effects on the Bandon River SAC are expected.

Owngar (Cork) 010 DWPA: The Site is located within the Owngar (Cork)_010 river sub-basin. This DWPA is hydrologically connected to Proposed Wind Farm and Proposed Grid Connection. The surface water connections from the Site to DWPA could transfer poor quality surface water that may affect the conservation objectives of the Owngar (Cork)_010 DWPA.

Mealagh_020 DWPA: The Mealagh_020 DWPA is located in close proximity and directly downstream of the Proposed Wind Farm. This DWPA is hydrologically connected to Proposed Wind Farm. The surface water connections from the Proposed Wind Farm to DWPA could transfer poor quality surface water that may affect the conservation objectives of the Mealagh_020 DWPA.

Bandon_020 DWPA: The Proposed Grid Connection is located within the Bandon_020 river sub-basin. This DWPA is hydrologically connected to Proposed Grid Connection. The surface water connections from the Proposed Grid Connection to DWPA could transfer poor quality surface water that may affect the conservation objectives of the Bandon_020 DWPA.

However, due to the shallow, short-term and transient nature of the Proposed Grid Connection works within the Bandon River catchment no significant effects on the Bandon_020 DWPA will occur.

4.2.2 Operational Phase (Unmitigated)

Potential effects associated with the operational phase of the Proposed Project will be significantly reduced in comparison to the construction phase. Any effects will occur at the Proposed Wind Farm and will be associated with minor maintenance works.

No maintenance works will be required along the Proposed Grid Connection and therefore there is no potential to impact on the status of downstream SWBs or underlying GWBs.

4.2.2.1 Potential Hydromorphological Effects Downstream of Proposed Wind Farm due to Increased Runoff

Progressive replacement of the soil or vegetated surfaces with impermeable surfaces could potentially result in an increase in the proportion of surface water runoff reaching the surface water drainage network. This could potentially increase runoff from the Proposed Project and increase flood risk downstream of the development.

Hardstand emplacement will only be required at the Proposed Wind Farm and not the Proposed Grid Connection. The water balance assessment does not include the Proposed Grid Connection cable route as it follows public roads and therefore the underground cabling cannot alter the hydrological regime along the route which is already a hardstand surface.

The emplacement of the Proposed Project footprint, as described in Chapter 4 of the EIAR, (assuming emplacement of impermeable materials as a worst-case scenario) could result in an average total site increase in surface water runoff of approximately 4,333m^3/month or 140m^3/day.

This represents a potential increase of approximately 0.29% in the average daily/monthly volume of runoff from the Proposed Wind Farm site area in comparison to the baseline pre-development site runoff conditions.

This is a very small increase in average runoff and results from a relatively small area of the overall Proposed Wind Farm site being developed. Specifically, the Proposed Wind Farm permanent footprint is approximately 14.67ha, representing 1.25% of the overall Site.

The additional volume is low due to the fact that the runoff potential from the Site is naturally high (87%). Also, this calculation assumes that all hardstanding areas will be impermeable which considered to be a worst-case scenario. The increase in runoff from most of the development catchment will therefore be imperceptible and this is before mitigation measures will be put in place

A summary of potential status change to SWBs arising from increased runoff during the operation stage of the Proposed Project in the unmitigated scenario are outlined in **Table K**.

Table K: Potential Hydromorphological Effects Downstream of Proposed Wind Farm during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Dunmanus-Bantry-Kenmare WFD Catchment			
Owngar (Cork)_010	IE_SW_21O040400	High	High
Owvane (Cork)_010	IE_SW_21O070200	High	High
Owvane (Cork)_020	IE_SW_21O070400	Poor	Poor
Owvane (Cork)_030	IE_SW_21O070500	Moderate	Moderate
Mealagh_010	IE_SW_21M010200	High	High
Mealagh_020	IE_SW_21M010400	High	High
Reenydonagan Lough	IE_SW_170_0300	Moderate	Moderate
Inner Bantry Bay	IE_SW_170_0100	High	High
Outer Bantry Bay	IE_SW_170_0000	High	High
South Western Atlantic Seaboard (HAs 21;22)	IE_SW_150_0000	High	High

4.2.2.2 Potential Surface Water Quality Effects from Operational Proposed Wind Farm Site Drainage

During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Some minor maintenance works may be completed, such as maintenance of site entrances, internal roads and hardstand areas. These works would be of a very minor scale and would be very infrequent.

Potential sources of sediment laden water would only arise from surface water runoff from small areas where new material is added during maintenance works.

A summary of potential status change to SWBs arising from surface water quality impacts during the operation stage of the Proposed Project in the unmitigated scenario are outlined in **Table L**.

Table L: Potential Surface Water Quality Effects Downstream of Proposed Wind Farm Site during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Dunmanus-Bantry-Kenmare WFD Catchment			
Owngar (Cork)_010	IE_SW_21O040400	High	High
Owvane (Cork)_010	IE_SW_21O070200	High	High
Owvane (Cork)_020	IE_SW_21O070400	Poor	Poor
Owvane (Cork)_030	IE_SW_21O070500	Moderate	Moderate
Mealagh_010	IE_SW_21M010200	High	High
Mealagh_020	IE_SW_21M010400	High	High
Reenydonagan Lough	IE_SW_170_0300	Moderate	Moderate
Inner Bantry Bay	IE_SW_170_0100	High	High
Outer Bantry Bay	IE_SW_170_0000	High	High
South Western Atlantic Seaboard (HAs 21;22)	IE_SW_150_0000	High	High

4.2.2.3 Potential Effects on Protected Areas

During the operational phase, the potential for silt-laden runoff is much reduced compared to the construction phase. In addition, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete.

Therefore, the risk of any operational phase activities that may affect the conservation objectives of the protected areas is greatly reduced.

4.3 MITIGATION MEASURES

In order to mitigate against the potential negative effects on surface and groundwater quality, quantity and flow patterns, mitigation measures will be implemented during the construction and operational phases of the Proposed Project. These are outlined below.

4.3.1 Construction Phase

4.3.1.1 Mitigation Measures to Clear Felling of Coniferous Plantation

All felling operations will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM guidance documents, including the specific guidelines listed below, to ensure that felling, planting and other forestry operations result in minimal potential negative effects to the receiving environment.

- Forestry Standards Manual (Forest Service, 2015)
- Environmental Requirements for Afforestation (Forest Service, 2016a)
- Land Types for Afforestation (Forest Service, 2016b)
- Forest Protection Guidelines (Forest Service, 2002)
- Forest Operations and Water Protection Guidelines (Coillte, 2013)
- Forestry and Water Quality Guidelines (Forest Service, 2000b)
- Forestry and the Landscape Guidelines (Forest Service, 2000c)
- Forestry and Archaeology Guidelines (Forest Service, 2000d)
- Forest Biodiversity Guidelines (Forest Service, 2000e)
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018)
- Coillte Planting Guideline SOP
- A Guide to Forest Tree Species Selection and Silviculture in Ireland (Horgan et al., 2003)
- Management Guidelines for Ireland's Native Woodlands. Jointly published by the National Parks & Wildlife Service (Cross and Collins, 2017)
- Native Woodland Scheme Framework (Forest Service, 2018)
- Code of Best Forest Practice (Forest Service, 2000)

Mitigation by Avoidance:
There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "*Forestry and Water Quality Guidelines*" are shown in **Table M**.

Table M: Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		**Buffer zone width on either side of the aquatic zone**	**Buffer zone width for highly erodible soils**
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

During the Proposed Project construction phase a self-imposed buffer zone of minimum 50 metres will be maintained for all natural watercourses where possible. These buffer zones are shown on **Error! Reference source not found.** of the EIAR. Of the 44ha to be felled, only approximately 2ha is located inside the 50m watercourse buffer.

The large distance between the proposed felling areas and sensitive aquatic zones means that potential poor quality (sediment laden) runoff from felling areas will be adequately managed and attenuated prior to even reaching the aquatic buffer zone and primary drainage routes.

Mitigation by Design:
Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows:

- Machine combinations (i.e., handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance;
- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;

- Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and will avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;
- All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;
- Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall;
- Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites;
- Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;
- Checking and maintenance of roads and culverts will be on-going through the felling operation;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required;
- A permit to refuel system will be adopted;
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors;
- Crossing of streams will not be permitted;
- Trees will be cut manually from along streams and using machinery to extract whole tree; and,
- Travel only perpendicular to and away from stream.

Silt Traps:
Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.

Drain Inspection and Maintenance:
The following items shall be carried out during pre-felling inspections and after:

- Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines;
- Inspection of all areas reported as having unusual ground conditions;

- Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches shall be identified. Ideally the pre-felling inspection shall be carried out during rainfall;
- Following tree felling all main drains shall be inspected to ensure that they are functioning;
- Extraction tracks nears drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground;
- Culverts on drains exiting the site will be unblocked; and,
- All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.

Surface Water Quality Monitoring:
Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown).

Criteria for the selection of water sampling points include the following:

- Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses;
- Select sampling points upstream and downstream of the forestry activities;
- It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry;
- Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and,
- The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.

Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.

4.3.1.2 Mitigation Measures to Earthworks resulting in Suspended Solids Entrainment in Surface Waters

Mitigation by Avoidance:
The key mitigation measure during the construction phase of the Proposed Project is the avoidance of sensitive aquatic areas where possible. From **Error! Reference source not found.** of the EIAR it can be
seen that all of the key areas of the Proposed Project infrastructure are actually significantly away from the 50m delineated buffer zones with the exception of existing road upgrades, new roads, proposed stream crossings and existing stream crossings requiring upgrading.

Additional control measures, which are outlined further on in this section, will be undertaken at these locations. Proposed turbine locations T1 to T5, T7 to T11, T13 and T14 are actually setback more than 75m from a watercourse.

The additional large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operated effectively. The proposed buffer zone will:

- Avoid physical damage to watercourses, and associated release of sediment;
- Avoid excavations within close proximity to surface water courses;
- Avoid the entry of suspended sediment from earthworks into watercourses; and,
- Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Mitigation by Design:

- Source controls:
  - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
  - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
  - Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems:
  - Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.

It should be noted for this Site is that an existing network of forestry, bog, field and roadside drains already exists, and these will be integrated and enhanced as required and used within the Proposed Project drainage system. The integration of the existing drainage network and the Proposed Project network is relatively simple. The key elements being the upgrading and improvements to water treatment elements, such as in line controls and treatment systems, including silt traps, stilling ponds and buffered outfalls.

The main elements of interaction with existing drains will be as follows:

- Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the Proposed Project drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion;
- Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area;
- Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces;
- Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; and,
- Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters.

Pre-commencement Temporary Drainage Works

Prior to the commencement of road upgrades (or new road/hardstand) the following key temporary drainage measures will be installed:

- All existing dry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using temporary check dams/silt traps;
- Clean water diversion drains will be installed upgradient of the works areas;
- Check dams/silt fence arrangements (silt traps) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zones and at watercourse crossings.

Water Treatment Train:
A final line of defence will be provided by a water treatment train such as a "Siltbuster". If the discharge water from construction areas fails to be of a high quality during regular inspections, then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train (sequence of water treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase.

Silt Fences:
Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to water courses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be placed within drains down-gradient of all construction areas inside the 50m hydrological buffer zones and at watercourse crossings.

Silt Bags:
Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Settlement Ponds:
The Proposed Project footprint has been divided into drainage catchments (based on topography, outfall locations, and catchment size) and stormwater runoff rates based on the 10-year return period rainfall event were calculated for various catchment areas in order to size the settlement ponds.

The settlement ponds are designed to accommodate a 10-year return period event which was a recommendation by Inland Fisheries Ireland (IFI) on other wind farm developments such as Cahermurphy Wind Farm, Co. Clare (Clare Co. Co. planning ref: P20/658 and Croagh in County Leitrim/Sligo (Leitrim Co. Co. planning ref: P20/120).

These flows were then used to design settlement ponds for each drainage catchment. The settlement ponds are designed for 11hr or 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006).

The supporting design calculations for all settlement ponds are included on Drawing D501 included in Appendix 4-4 of the EIAR.

Level Spreaders and Vegetation Filters:
The purpose of level spreaders is to release treated drainage flow in a diffuse manner, and to prevent the concentration of flows at any one location thereby avoiding erosion. Level spreaders are not intended to be a primary treatment component for development surface water runoff. They are not stand-alone but occur as part of a treatment train of systems that will reduce the velocity of runoff prior to be released at the level spreader. In the absence of levelspreaders, the potential for ground erosion is significantly greater than not using them.

Vegetation filters are essentially end-of-line polishing filters that are located at the end of the treatment train. In fact, vegetation filters are ultimately a positive consequence of not discharging directly into watercourses which is one of the mitigation components of the drainage philosophy. This makes use of the natural vegetation of the Site to provide a polishing filter for the Proposed Wind Farm drainage prior to reaching the downstream watercourses.

Again, vegetation filters are not intended to be a single or primary treatment component for treatment of works area runoff. They are not sand alone but are intended as part of a treatment train of water quality improvement/control systems (i.e. source controls→check dams→silt traps→settlement ponds→level spreaders →silt fences→vegetation filters).

Pre-emptive Site Drainage Management
The works programme for the entire construction stage of the Proposed Project will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of peat/subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provides a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests either of the following is likely to occur:
- >10 mm/hr (i.e., high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures will be completed:
- Secure all open excavations;

- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

Management of Runoff from Peat and Spoil Management Areas:
It is proposed that excavated peat and spoil will be used for landscaping where required. The excess material will then be placed in 10 no. dedicated peat and spoil management areas.

Also, once the required volume of rock has been extracted from the 4 no. borrow pit areas, it is intended to reinstate these areas with any surplus peat and spoil excavated from the works areas of the Proposed Wind Farm.

All proposed peat and spoil management areas as well as borrow pits are located outside of 50m watercourse buffers.

During the initial construction, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from works areas.

Where applicable, the vegetative top-soil layer of the peat and spoil management areas will be rolled back to facilitate placement of excavated spoil, following which the vegetative-top soils layer will be reinstated. Where reinstatement is not possible, peat and spoil management areas will be sealed with a digger bucket and seeded as soon possible to reduce sediment entrainment in runoff.

Drainage from the peat and spoil management areas and the reinstated borrow pits will ultimately be routed to an oversized swale and a number of stilling ponds pond with appropriate storage and settlement designed for a 1 in 10-year return period before being discharged to the on-site drains.

Peat and spoil management areas and the reinstated borrow pits will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised these areas will no longer be a potential source of silt laden runoff.

Timing of Site Construction Works:
Construction of the site drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.

Monitoring:
An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Inspections will also be undertaken after tree felling.

Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. Checks will be carried out on a daily basis.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for each primary watercourse and specifically following heavy rainfall events (as per the CEMP is included in Appendix 4-3 of this EIAR).

Allowance for Climate Change

Climate change rainfall projections are typically for a mid-century (2050) timeline. The projected effects of climate change on rainfall are therefore modelled towards the end of the life cycle of the Proposed Wind Farm, as the proposed turbines have a life span of 35 years. It is likely that the long-term effects of climate change on rainfall patterns will not be observed during the lifetime of the Proposed Wind Farm. As outlined in the above sections we have designed settlement ponds for a 1 in 10-year return flow. This approach is conservative given that the Proposed Project will likely be built over a much shorter period (18-24 months), and therefore this in-built redundancy in the drainage design more than accounts for any potential short term climate change rainfall effects.

However, the settlement ponds are designed for 1 in 10 years flows with built in redundancy (+20%) to account for climate change effects on rainfall.

4.3.1.3 Mitigation Measures to Excavation Dewatering and Impacts on Surface Water Quality

Management of excavation inflows and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters;
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a silt bags or silt buster;
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;
- Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken;
- At the borrow pit adequately sized settlement ponds will be constructed to treat pumped water prior to discharge into a local manmade drain;
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be made available at the borrow pit location for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

4.3.1.4 Mitigation Measures to Prevent Release of Hydrocarbons during Construction and Storage

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station;
- On-site re-fuelling will be undertaken using a refuelling truck with spill kits kept on site for accidental leakages or spillages;
- Only designated trained operatives will be authorised to refuel plant on-site;
- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an

appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuels stored on-site will be minimised. All storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- The transformer within the proposed 110kV onsite substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency response plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan (which is contained in Appendix 4-3 of the EIAR).

4.3.1.5 Mitigation Measures for Groundwater and Surface Water Contamination from Wastewater Disposal

- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds (and along the Proposed Grid Connection as required), maintained by the providing contractor, and removed from site on completion of the construction works;
- Water supply for the site office and other sanitation will be brought to Site and removed after use from the Site to be discharged at a suitable off-site treatment location; and,
- No water or wastewater will be sourced on the Site, nor discharged to the Site.

4.3.1.6 Mitigation Measures to Prevent Release of Cement-Based Products

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible pre-cast elements for culverts and concrete works will be used;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds;
- Weather forecasting will be used to plan dry days for pouring concrete;
- The pour site will be kept free of standing water and plastic covers will be ready in case of a sudden rainfall event; and,
- At proposed turbine foundations, sand blinding, DPM, and lean-mix blinding are used to vertically contain the concrete. While the concrete is contained laterally by temporary/permanent shuttering. The concrete cures within 72hrs.

4.3.1.7 Mitigation Measures to Prevent Morphological and Hydrological Effects due to Watercourse Crossing Works

- The proposed 5 no. new stream crossings at the Proposed Wind Farm site will be clear span watercourse crossings, and the existing banks will remain undisturbed. No in-stream excavation works are proposed at these locations and therefore there will be

no direct impact on the stream at the proposed crossing locations. Abutments will be constructed from precast units combined with in-situ foundations;
- All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)2 is incorporated into the design of the proposed crossings;
- All drainage measures will be installed in advance of the works;
- Plant and equipment will not be permitted to track across the watercourse;
- Once the foundations have been completed at both sides of the watercourse, the pre-cast concrete box culvert will be installed using a crane and there will be no contact with the watercourse;
- Where the box culvert is installed in sections, the joint will be sealed to prevent granular material entering the watercourse;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document "Guidelines on protection of fisheries during construction works in and adjacent to waters", i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- Where works are necessary inside the 50m buffer double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase;
- At the proposed culvert upgrade locations temporary damming and over pumping will be undertaken to manage flows in the watercourse; and,
- All new river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

The watercourse crossings will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Confirmatory inspections of the proposed new watercourse crossing location will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

In relation to the new proposed culverts and proposed culvert upgrades at field drain crossings, the culverts will be suitably sized for the expected peak flows in the relevant drain. All culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

4.3.1.8 Mitigation Measures to Surface Water Quality of the Proposed Grid Connection Earthworks and Watercourse Crossings

Pre-commencement Temporary Drainage Works:
Prior to the commencement of proposed 110kV onsite substation, cable trenching, access road or end mast works the following key temporary drainage measures will be installed:

[2] Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters

- All existing roadside drains (where present) that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps;
- Culverts, manholes and other drainage inlets (where present) will also be temporarily blocked;
- A double silt fence perimeter will be placed along the road verge on the down-slope side of works areas that are located inside the watercourse 50m buffer zone on the Levally Stream tributary.

The following mitigation measures are proposed for the underground cabling watercourse crossing works:

- Near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance;
- There will be no storage of material / equipment or overnight parking of machinery inside the hydrological buffer zone;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channels;
- Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards the watercourse;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;
- The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages;
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;
- Spills of drilling fluid will be cleaned up immediately and contained in an adequately sized skip before been taken off-site;
- If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works);
- This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed settlement pond area at least 50m from the watercourse;
- The discharge of water onto vegetated ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain;
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;
- Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;
- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;

- On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated and re-seeded at the soonest opportunity to prevent soil erosion;
- The silt fencing upslope of the river will be left in place and maintained until the disturbed ground has re-vegetated;
- There will be no batching of cement along the Proposed Grid Connection;
- There will be no refuelling allowed within 100m of the watercourse crossing; and,
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.

Fracture Blow-out (Frac-out) Prevention and Contingency Plan:

- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e. Clear Bore Drilling Fluid or similar will be used);
- The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage;
- One or more lines of silt fencing will be placed between the works area and the adjacent river;
- Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility;
- Adequately sized skips will be used where temporary storage of arisings are required;
- The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;
- The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and,
- If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.

4.3.1.9 Mitigation Measures to Potential Hydrological Effects on Designated Sites (Proposed Grid Connection)

Bandon River SAC is located downstream of the Proposed Grid Connection cable route only. The Proposed Grid Connection cable intercepts the Bandon River SAC where it runs near the Bandon River, albeit the route is within the carriageway of regional roads at this location and does not directly affect the SAC.

Drainage mitigation measures for surface water quality protection during the construction phase are summarised again below: (Relevant sections are shown for the full description of these measures and how they will be applied).

- Avoidance of instream works at the proposed 11 no. EPA watercourse crossing locations (Section 4.3.1.8);
- Pre-commencement temporary drainage works (Section 4.3.1.8);
- Management of spoil during earthworks along the cable route trenching works (Section 4.3.1.8); and,
- Best practice measures with regard use of oils, fuels (Section 4.3.1.4) and cement based compounds (Section 4.3.1.6).

4.3.1.10 Mitigation Measures for WFD Status of Downstream Waterbodies

Comprehensive surface water mitigation and drainage controls are outlined in Section 4.3.1.1 (Felling of Coniferous Plantations), Section 4.3.1.2 (Earthworks), Section 4.3.1.3 (Excavation Dewatering), Section 4.3.1.4 (Hydrocarbons), Section 4.3.1.6 (Cement-based Products) and Sections 4.3.1.7 and 4.3.1.8 (Morphological Changes to Watercourses).

These will ensure the protection of surface water quality and flows in all downstream receiving watercourses.

4.3.1.11 Mitigation Measures for Use of Siltbuster and impacts on Downstream Surface Water Quality

Measures employed to prevent overdosing and potential chemical carryover:

- The siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding reagents, so overdosing cannot occur;
- Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system;
- Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment;
- Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover; and,
- Use of biodegradable chemical agents can be used at very sensitive sites (i.e. upstream of SACs).

4.3.1.12 Mitigation Measures for Hydrological/Water Quality Effects on Drinking Water Supply Surface Water Abstraction

The mitigation measures detailed in the EIAR are tried and tested, best-practice mitigation measures for the protection of the hydrological (surface water) and hydrogeological (groundwater) environment. These mitigation measures are used at construction sites across the country and have been used in the construction of the countless existing wind farm developments. Note that similar mitigation measures for the protection of the receiving water environment were proposed in the EIARs for the recently permitted Glenard Wind Farm (ABP Case No: 312659), Seven Hills Wind Farm (ABP Case No. 313750) and Curraglass Wind Farm (Cork County Council planning Ref: 25/6398).

In recent years many wind farms have been constructed using similar mitigation measures (as proposed for the Proposed Project) with respect to suspended solids, hydrocarbons, cement-based products, and wastewater during their construction and operational phases. These mitigation measures, the same of those detailed in the accompanying EIAR for the Proposed Project, have proven to be successful in the protection of the hydrological and hydrogeological environment.

These proposals are "best in class" and in line with current best practice approaches for surface water quality protection on wind farm and forestry sites.

4.3.2 Operational Phase

4.3.2.1 Mitigation Measures to Removal of Vegetation Cover and Progressive Replacement of Natural Surface with Low Permeability Surfaces

Proposed Mitigation by Design:
The proposed drainage philosophy states that runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the Proposed Project. The first being 'keeping clean water clean' and the second involving the collection of any drainage waters from work area and to route them towards stilling ponds prior to controlled diffuse release over vegetated surfaces. The second method relates to proposed design measures that will prevent road surface and other hardstand areas acting as preferential flowpaths. All development site runoff will be collected, attenuated, treated and then released in a diffuse and regular manner that does not significantly change the natural drainage regime/hydrology of the site.

The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the drainage drawings (Appendix 4-4) submitted with this planning application:

- Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it will be re-distributed over the ground by means of a level spreader;
- Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling;
- On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains;
- Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock;
- Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and,
- Settlement ponds will be designed in consideration of the greenfield runoff rate.

These measures will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstands and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, check dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.

4.3.2.2 Mitigation Measures to Suspended Solids Entrainment in Surface Waters

The mitigation measures outlined in Sections 4.3.1.2 & 4.3.2.1 will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.

It is proposed that bedrock won from the on-site borrow pit (i.e. limestone) will be used to construct the sub-base layer of proposed upgraded and new access roads, hardstand areas and turbine base areas. Once installed the subbase layer will be overlain by a clean capping layer of high-grade stone material which will be sourced from the borrow pit or local quarries.

4.3.2.3 Mitigation Measures for Hydrological/Water Quality Effects on Drinking Water Supply Surface Water Abstraction

During the operational phase, there will be no potential for significant effects on the Kealkill PWS abstraction, Zone 1 Bantry Cahernacrin abstraction or the Bandon RWS abstraction on the Bandon River.

There will be no direct discharge from the Proposed Project to downstream receiving waters during the operational phase. All Proposed Wind Farm site drainage measures will be in place.

Peat and spoil management areas and reinstated borrow pits will be sealed, re-vegetated and will not be a potential source of silt laden runoff or organic carbon.

The mitigation measures outlined in Sections 4.3.1.2 & 4.3.2.1 will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release

4.3.3 Decommissioning Phase

The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works. A description of the decommissioning works is contained in Chapter 4 of this EIAR.

No significant effects on the hydrological and hydrogeological environment are envisaged during the decommissioning stage of the Proposed Project.

4.3.4 Potential Effects with the Implementation of Mitigation

In all instances, the mitigation measures described in **Section 4.3** are sufficient to meet the WFD Objectives. The assessment of WFD elements for the WFD waterbodies is summarised in **Table N** below.

Table N: Summary of WFD Status for Unmitigated and Mitigated Scenarios

SWB	WFD Code	Current Status	Assessed Status - Unmitigated	Assessed Status with Mitigation Measures
Surface Water Bodies				
Dunmanus-Bantry-Kenmare WFD Catchment				
Owngar (Cork)_010	IE_SW_21O040400	High	Good	High
Owvane (Cork)_010	IE_SW_21O070200	High	Good	High
Owvane (Cork)_020	IE_SW_21O070400	Poor	Bad	Poor
Owvane (Cork)_030	IE_SW_21O070500	Moderate	Poor	Moderate
Mealagh_010	IE_SW_21M010200	High	Good	High
Mealagh_020	IE_SW_21M010400	High	Good	High
Reenydonagan Lough	IE_SW_170_0300	Moderate	Moderate	Moderate
Inner Bantry Bay	IE_SW_170_0100	High	High	High
Outer Bantry Bay	IE_SW_170_0000	High	High	High
South Western Atlantic Seaboard (HAs 21;22)	IE_SW_150_0000	High	High	High
Bandon-Ilen WFD Catchment				
Bandon_020	IE_SW_20B020200	Moderate	Moderate	Moderate
Bandon_030	IE_SW_20B020300	Moderate	Moderate	Moderate
Bandon_040	IE_SW_20B020400	Good	Good	Good

Bandon_050	IE_SW_20B020550	Good	Good	Good
Bandon_060	IE_SW_20B020600	Moderate	Moderate	Moderate
Bandon_070	IE_SW_20B020700	Good	Good	Good
Bandon_080	IE_SW_20B020780	Good	Good	Good
Bandon_090	IE_SW_20B020800	Good	Good	Good
Bandon_100	IE_SW_20B020900	Good	Good	Good
Upper Bandon Estuary	IE_SW_080_0300	Poor	Poor	Poor
Lower Bandon Estuary	IE_SW_080_0100	Poor	Poor	Poor
Kinsale Harbour	IE_SW_080_0000	Good	Good	Good
Western Celtic Sea (HAs 18;19;20)	IE_SW_010_0000	High	High	High
Groundwater Bodies				
Beara Sneem	IE_SW_G_019	Good	Good	Good
Bandon	IE_SW_G_086	Good	Good	Dood

5. SUMMARY AND CONCLUSION

WFD status for SWBs (Surface Water Bodies) and GWBs (Groundwater Bodies) hydraulically linked to the Site are defined in **Section 2** above.

The Proposed Project does not involve any abstraction of groundwater or alteration of drainage patterns. Therefore, the quantitative status (i.e., the available quantity (volume) of groundwater and surface water locally) to the receiving waters will remain unaltered during the construction and operational phase of the Proposed Project.

There is no direct discharge from the Proposed Wind Farm site to downstream receiving waters. Mitigation for the protection of surface water during the construction, operation and decommissioning phases of the development will ensure the qualitative status of the receiving waters will not be altered by the Proposed Project.

There is also mitigation proposed to protect groundwater quality within the Proposed Project scheme during the construction, operational and decommissioning phases. These mitigation measures will ensure the qualitative status of the underlying GWB will not be altered by the Proposed Project.

There will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the Proposed Project. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB and downstream SWBs are protected from any potential deterioration.

As such, the Proposed Project:

- will not cause a deterioration in the status of all surface and groundwater bodies assessed;
- will not jeopardise the objectives to achieve 'Good' surface water/groundwater status;
- does not jeopardise the attainment of 'Good' surface water/groundwater chemical status;
- does not jeopardise the attainment of 'Good' surface water/groundwater quantity status;
- does not permanently exclude or compromise the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- is compliant with the requirements of the Water Framework Directive (2000/60/EC); and,
- is consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) (Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 9.1.4 of EIAR Chapter 9).

* * * * * * * * * * * * * *