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WATER FRAMEWORK DIRECTIVE ASSESSMENT REPORT

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 ASSESSMENT
PROPOSED KNOCKSHANVO WIND FARM, CO. CLARE

FINAL REPORT

Prepared for:

MKO

Prepared by:

HYDRO-ENVIRONMENTAL SERVICES

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Author:	**MICHAEL GILL CONOR MCGETTIGAN**
Signed:	 **Michael Gill B.A., B.A.I., M.Sc., MIEI Managing Director – Hydro-Environmental Services**

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by MKO on behalf of FuturEnergy Knockshanvo DAC, to complete a Water Framework Directive (WFD) Compliance Assessment for a planning application for the proposed wind farm at Knockshanvo in eastern County Clare.

The Proposed Development (i.e. Wind Farm Site and Grid Connection) will comprise of 9 No. turbines and all associated foundations and hardstanding areas, access roads and entrance(s) including upgrade of existing site roads and provision of new roads, 110kV electrical substation and wind farm control building(s), underground cabling, borrow pit(s), electrical cabling for 110kV grid connection, amenity works, temporary construction compounds, a permanent meteorological mast, temporary transition compound and upgrades to roads along the turbine delivery route. The land use at the Wind Farm Site currently comprises coniferous forestry plantations operated by Coillte.

The Wind Farm Site is located approximately 4km northeast of the village of Sixmilebridge, approximately 3km south of the small village of Broadford and approximately 3.5km southeast of Kilkishen in southeast Co. Clare. The Wind Farm Site is situated approximately 11km north of Limerick City. The Wind Farm Site is elongated along the crest of a hill and is located in the townland of Knockshanvo and adjacent townlands. The Wind Farm Site has a total area of 1,072hectares (ha).

The purpose of this WFD assessment is to determine if any specific components or activities associated with the Proposed Development 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 Wind Farm and Grid Connection planning applications.

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 and Conor McGettigan.

Michael Gill (P. Geo., B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer with over 18 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 Slievecallan WF, Cahermurphy (Phase I & II) WF, Carrownagowan WF, and Croagh WF and over 100 other wind farm related projects across the country.

Conor McGettigan (BSc, MSc) is an Environmental Scientist with over 3 years' experience in environmental consultancy in Ireland. Conor holds an M.Sc. in Applied Environmental Science (2020) and a B.Sc. in Geology (2016) from University College Dublin. Conor has prepared the Land, Soils and Geology and Hydrology and Hydrogeology Chapters for numerous wind farm EIAR projects. Conor routinely competes WFD Assessments for a wide variety of projects including wind farms, quarries and proposed residential developments.

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.

The River Basin Management Plan (2018 - 2021) objectives, which have been integrated into the design of the Proposed Development, include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2027;
- Ensure waters in protected areas meet requirements; and,
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Furthermore, the Department of Housing, Local Government and Heritage are currently reviewing the submissions made on the Draft River Basin Management Plan (2022 - 2027) which was out for public consultation in Q4 of 2021 and Q1 of 2022. As of June 2024, the plan has not been published while the draft plan is available to view at https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/.

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.

2. WATERBODY IDENTIFICATION AND CLASSIFICATION

2.1 INTRODUCTION

This section identifies those surface water and groundwater bodies with potential to be affected by the Proposed Development and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

Regionally, the Wind Farm Site is located across 2 no. surface water catchments. The west of the Wind Farm Site and a small section in the northeast are located in the Shannon Estuary North surface water catchment and Hydrometric Area 27. Meanwhile, the centre and east of the Wind Farm Site and, the entire Grid Connection are located in the Lower Shannon surface water catchment and Hydrometric Area 25D. Both of these surface water catchments are located in the Shannon River Basin District.

Within the Lower Shannon surface water catchment the Wind Farm Site is located in the Shannon[Lower]_100 sub-catchment and 3 no. WFD river sub-basins.

- The centre of the Wind Farm Site is located in the Blackwater(Clare)_010 WFD river sub-basin. The source of the Blackwater(Clare) River is mapped by the EPA ~2.7km to the south of the Wind Farm Site. From here the Blackwater River flows to the east and receives discharge from several 1st and 2nd order streams which flow southwards from the Wind Farm Site. These watercourses include the O'Neills River and the Sruffaunageeragh stream. All watercourses in this area of the site form part of the Blackwater(Clare)_010 surface waterbody (SWB).

- Further to the east the Wind Farm Site is mapped in the Mountrice_010 WFD river sub-basin. The Mountrice stream flows southwards from the area of the Wind Farm Site and discharges into the Blackwater(Clare) river ~3.3km to the south.

- Meanwhile, the east of the Wind Farm Site is located in the Glenomra Wood Stream_010 WFD river sub-basin. The Glenomra Wood Stream is mapped by the EPA to originate from coniferous forestry plantations situated ~500m east of the Wind Farm Site. From here the Glenomra Wood Stream flows to the south before discharging into the Blackwater (Clare) River (Blackwater(Clare)_020 SWB) ~3.5km south of the site.

Downstream of its confluence with the Glenomra Wood Stream_010 SWB, the Blackwater (Clare) River veers southwards and flows past Ardnacrusha Canal before discharging into the River Shannon (Shannon(Lower)_060) to the north of the University of Limerick and ~10km south of the Wind Farm Site. The River Shannon then discharges into Limerick Dock transitional waterbody in the vicinity of Limerick City and the Upper Shannon Estuary further downstream.

As stated above, the Grid Connection is also located in the Lower Shannon surface water catchment. The Grid Connection passes through a total of 4 no. WFD river sub-basins. The north of the Grid Connection is located in the Mountrice_010 sub-basin with a total of 2 no. watercourse crossings (over tributaries of the Mountrice stream). The route then passes into the Blackwater (Clare)_010 sub-basin with 1 no. crossing over the Blackwater River. The route then passes through the Blackwater (Clare)_020 sub-basin with an additional watercourse crossing over an unnamed watercourse. This watercourse is a tributary of the Blackwater River and is referred to by the EPA as the Glenlon south watercourse. Meanwhile, the southern section of the Grid Connection and Ardnacrusha substation located in the North Ballycannan_010 sub-basin. These watercourse crossings are situated at existing bridge and culvert crossings.

Within the Shannon Estuary North surface water catchment, the Wind Farm Site is located in 3 no. WFD river sub-basins.

- The northeast of the Wind Farm Site is mapped in the Broadford_030 sub-basin. Several tributaries flow northwards from the vicinity of the Wind Farm Site and discharge into the Broadford River ~1.2km to the north. The Broadford River flows to the northwest and discharges into Doon Lough lake waterbody. The Owenogarney River outfalls from this lake waterbody and flows to the southwest.

- The centre of the Wind Farm Site is mapped in the Owenogarney_030 sub-basin. This area of the Wind Farm Site is drained by several 1st and 2nd order streams which flow to the northwest and discharge into the Owenogarney River.

- The southwest of the Wind Farm Site is mapped in the Owenogarney_040 sub-basin. This area is also drained by several tributaries of the Owenogarney River.

Downstream of the Wind Farm Site, the Owenogarney_040 SWB discharges into Castle Lake SWB. Further downstream, the Owenogarney River continues to the south, flowing through the village of Sixmilebridge, and past Bunratty before eventually discharges into the Shannon Estuary ~10km to the southwest of the Wind Farm Site.

Further downstream the Upper Shannon Estuary transitions to the Lower Shannon Estuary. The Lower Shannon Estuary in turn discharges into the Mouth of the Shannon coastal waterbody.

Works are also proposed along the TDR in 3 no. WFD River sub-basins. In the vicinity of the Wind Farm Site, minor haul route works are proposed along the R465 in the Glenomra Wood Stream_010 and the Blackwater (Clare)_020 river sub-basins. A Temporary Transition Compound is also proposed along the N69 and is located in the Tonlegee_010 river sub-basin, directly upstream of the Maigue Estuary.

A local hydrology map is presented as **Figure A** below.

Table A presents the catchment area of each river waterbody downstream of the Wind Farm Site, Grid Connection and TDR. The catchment area for these river waterbodies increases progressively downstream as more tributaries discharge into the Owenogarney and the Blackwater (Clare) Rivers. The Mountrice_010 river sub-basin has the smallest total upstream catchment of any SWB draining the Wind Farm Site (~8km^2). Meanwhile, waterbodies further downstream of the Wind Farm Site have significantly larger catchment area with the Owenogarney_060 river having a catchment area of ~204km^2.

Therefore, those waterbodies which are located in close proximity to the Wind Farm Site are more susceptible to water quality impacts as a result of activities associated with the Proposed Development at Knockshanvo. The potential for the Proposed Development 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 WF Site

WFD River Sub-Basin	Total Upstream Catchment Area (km^2)
Shannon Estuary North Catchment	
Broadford_030	35
Owenogarney_030	141
Owenogarney_040	155
Owenogarney_050	162
Owenogarney_060	204
Lower Shannon Catchment	
Blackwater(Clare)_010	36
Mountrice_010	8
Glenomra Wood Stream_010	11
Blackwater(Clare)_020	59
North Ballycannan_010	27
Shannon(Lower)_060	1,041
Shannon Estuary South Catchment	
Tonlegee_010	15.8

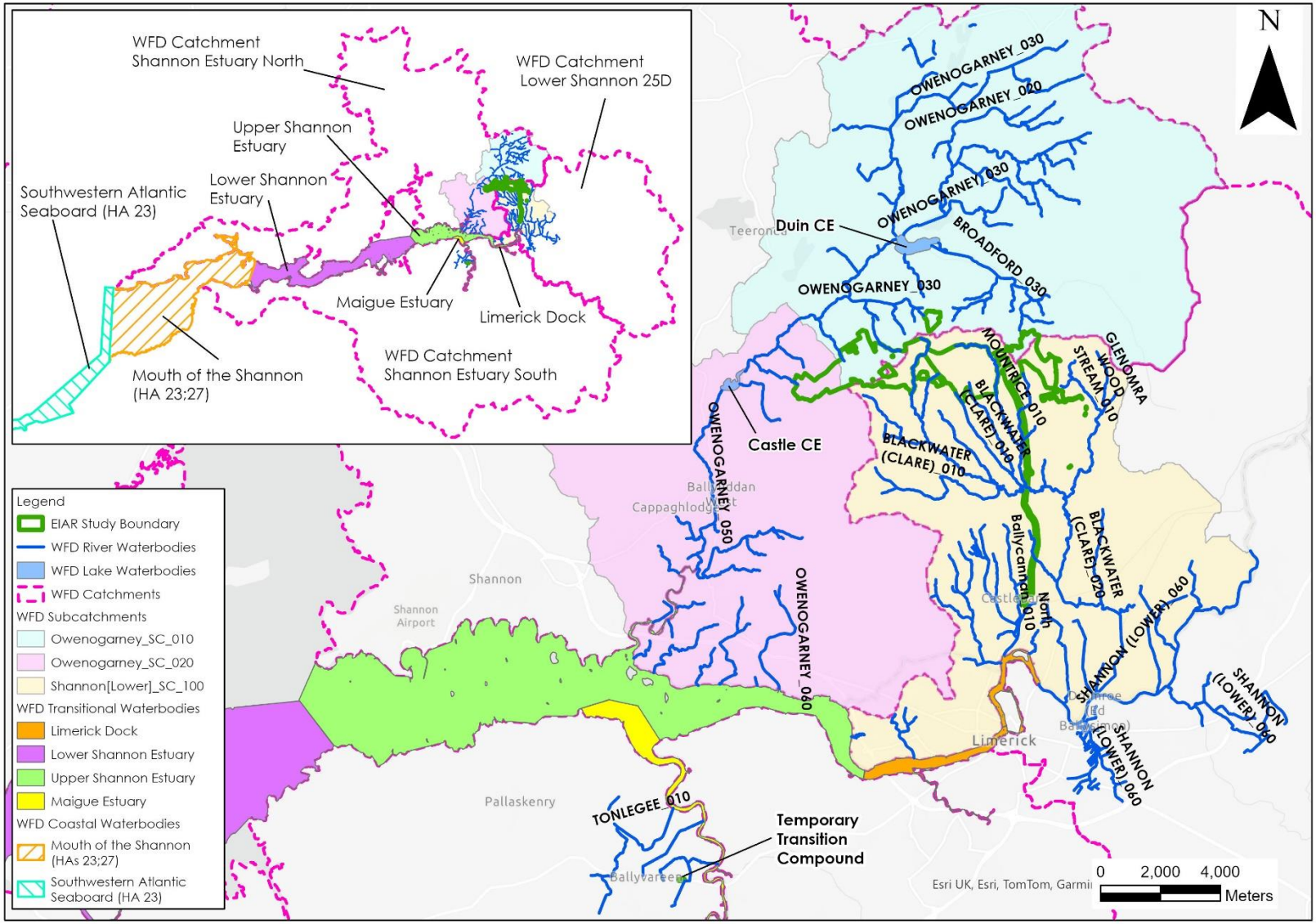

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for Surface Water Bodies (SWBs) downstream of the Proposed Development are shown in **Table B**. 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 Lower Shannon surface water catchment, the Blackwater (Clare)_010 and the Mountrice_010 SWBs in the vicinity of the Wind Farm Site achieved 'Good' status in the latest WFD cycle (2016-2021). Meanwhile, the Glenomra Wood Stream_010 SWB achieved 'High' status. Further downstream of the Blackwater (Clare)_020 SWB and the Lower Shannon_060 SWBs achieved 'Good' and 'Moderate' status respectively. The North Ballycannan_010 SWB along the Grid Connection also achieved "Good" status in the latest WFD cycle.

In the latest WFD cycle, a total of 3 no. SWBs within the Lower Shannon Catchment were found to be "at risk" of failing to meet their respective WFD objectives. These river waterbodies include the Blackwater (Clare)_010 and _020 SWBs and the Mountrice_010 SWB. The other river waterbodies downstream of the Proposed Development site were deemed to be 'not at risk' while the risk status of the Shannon (Lower)_060 SWB is currently under review.

The 3rd Cycle Lower Shannon and Mulkear Catchment Report (HA 25D) (EPA, 2021) states that excess nutrients and morphological impacts remain the most prevalent issues in this catchment. Agriculture is listed as a significant pressure on the Blackwater (Clare)_010 and Blackwater (Clare)_020 SWBs. In relation to agriculture the catchment report states that the issues relating to farming in this catchment are diffuse phosphorus loss to surface waters and sediment from land drainage works, bank erosion or stream crossings (EPA, 2021). Meanwhile, the Blackwater (Clare)_010 SWB is also listed as being under significant pressure from forestry activities. Significant issues relating to forestry can be a combination of general forestry practices such as road construction, planting and clear felling which have resulted in heavy siltation (EPA, 2021). Meanwhile, the Mountrice_010 SWB is under significant pressure from hydromorphology, with the catchment report stating that overgrazing is likely to have altered habitat through changes in river morphology (EPA, 2021).

Within the Shannon Estuary North surface water catchment, the Broadford_030 SWB achieved 'Moderate' status in the latest WFD cycle (2016-2021). Downstream of the Broadford River, the Duin lake waterbody also achieved "Moderate" status. Upstream of Castle Lake waterbody the Owenogarney River (Owenogarney_030 and _040) achieved "Good" status, while Castle Lake itself is of "Moderate" status.

In the latest WFD cycle, a total of 2 no. river and lake waterbodies downstream of the Wind Farm Site and within the Shannon Estuary North catchment were found to be "at risk" of failing to meet their respective WFD objectives. These "at risk" waterbodies include the Broadford_030 and Castle lake waterbodies. The risk status of the Duin lake waterbody and the Owenogarney_060 SWBs are currently under review.

The 3rd Cycle Shannon Estuary North Catchment Report (EPA, 2021) states that excess nutrients and morphological issues remain the most prevalent issues in this catchment. The Broadford_030 and Castle CE lake waterbodies are under significant pressure from agriculture. Meanwhile, Castle lake is also under significant pressure from invasive species in the form of zebra mussels while the Shannon/Sixmilebridge public water supply abstraction is also putting pressure on this SWB.

In terms of transitional and coastal waterbodies downstream of the Wind Farm Site and the Grid Connection, 2 no. waterbodies (Limerick Dock and Upper Shannon Estuary) achieved "Poor status" in the latest WFD cycle. The Lower Shannon Estuary and the Mouth of the Shannon are

of "Good" status, while the Southwestern Atlantic Seaboard is of "High" status. The Limerick Dock and Upper Shannon Estuary transitional waterbodies have been deemed to be "at risk" of failing to meet their respective WFD objectives.

Downstream of the Temporary Transition Compound along the TDR, the Tonlegee_010 SWB and the Maigue Estuary SWB are of 'Poor' and 'Moderate' status respectively.

The SWB status for the 2016-2021 WFD cycle are shown on Figure B.

Table B: Summary WFD Information for River Water Bodies

SWB	Overall Status 2010-2015	Overall Status 2013-2018	Overall Status 2016-2021	3rd Cycle Risk Status	Pressures
Shannon Estuary North Catchment					
Broadford_030	Good	Good	Moderate	At risk	Agriculture
Owenogarney_030	Good	Good	Good	Not at risk	None
Duin CE	Unassigned	Good	Moderate	Under Review	None
Owenogarney_040	Good	Good	Good	Not at risk	None
Castle CE	Moderate	Poor	Moderate	At risk	Agriculture & other
Owenogarney_050	Good	Good	Good	Not at risk	None
Owenogarney_060	Unassigned	Moderate	Good	Under Review	None
Lower Shannon Catchment					
Blackwater(Clare)_010	Good	Good	Good	At risk	Agriculture & forestry
Mountrice_010	High	Good	Good	At risk	Hydromorphology
Glenomra Wood Stream_010	Good	High	High	Not at risk	None
Blackwater(Clare)_020	Good	Good	Good	At risk	Agriculture
Shannon (Lower)_060	Unassigned	Moderate	Moderate	Under Review	None
North Ballycannan_010	Unassigned	Moderate	Good	Not at risk	None
Shannon Estuary South					
Tonlegee_010	Unassigned	Good	Poor	Under Review	None
Transitional and Coastal Waterbodies					
Limerick Dock	Moderate	Good	Poor	At risk	Hydromorphology
Upper Shannon Estuary	Poor	Poor	Poor	At risk	Agriculture
Lower Shannon Estuary	Moderate	Good	Good	Not at risk	None
Mouth of the Shannon (HA 23;27)	Moderate	Good	Good	Not at risk	None

SWB	Overall Status 2010-2015	Overall Status 2013-2018	Overall Status 2016-2021	3rd Cycle Risk Status	Pressures
Southwestern Atlantic Seaboard (HA 23)	Unassigned	High	High	Not at risk	None
Maigue Estuary	Moderate	Moderate	Moderate	At risk	Agriculture

2.4 GROUNDWATER BODY IDENTIFICATION

The Wind Farm Site is predominantly underlain by Devonian Old Red Sandstones with some Ordovician Metasediments and Silurian Metasediments and Volcanics (www.gsi.ie). The GSI classify the Ordovician Metasediments, Silurian Metasediments and Volcanics as a Poor Aquifer (Pl) - Bedrock which is Generally Unproductive except for Local Zones. Meanwhile, the Devonian Old Red Sandstones are classified as a Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones.

In terms of WFD Groundwater Bodies (GWBs), the Wind Farm Site lies on the boundary between 2 no. GWBs, the Tulla-Newmarket-on-Fergus GWB in the west and north and the Lough Graney GWB in the south and east.

Meanwhile, the Grid Connection is predominantly underlain by the Lough Graney GWB with the southern section being underlain by the Ardnacrusha GWB.

In terms of the TDR, the works along the R465 are underlain by the Lough Graney GWB. Meanwhile, the Temporary Transition Compound is underlain by the Kildimo GWB and a Regionally Important Aquifer – karstified (conduit).

The GWB status for the 2016-2021 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 is presented in **Table C**.

The 4 no. GWBs achieved 'Good' status in all 3 no. WFD cycles which is defined based on the quantitative status and chemical status of the GWB. These GWBs have been deemed to be 'not at risk' of failing to meet their respective WFD objectives. No significant pressures have been identified on these GWBs.

Table C: Summary WFD Information for Groundwater Bodies

GWB	Overall Status 2010-2015	Overall Status 2013-2018	Overall Status 2016-2021	3rd Cycle Risk Status	Pressures
Lough Graney	Good	Good	Good	Not at risk	None
Tulla-Newmarket on Fergus	Good	Good	Good	Not at risk	None
Ardnacrusha	Good	Good	Good	Not at risk	None
Kildimo	Good	Good	Good	Not at risk	None

2.6 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.

2.6.1 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 Wind Farm Site is not located within any designated conservation site, however there are several designated sites in close proximity and downstream of the Proposed Development.

Within the Shannon Estuary North surface water catchment:

- Gortacullin Bog NHA (Site Code: 002401) is located immediately to the north of the Wind Farm Site boundary.
- Doon Lough NHA (Site Code: 000337) is located ~2.4km to the north of the Wind Farm Site.
- Danes Hole, Poulnalecka SAC/pNHA (Site Code: 00030) ~600m north of the Wind Farm Site.
- Castle Lake pNHA (Site Code: 000239) is located ~520m west of the Wind Farm Site.
- The Ratty River Cave SAC (Site Code: 002316) is located ~2.5km to the west of the Wind Farm Site.
- The Lower River Shannon SAC (Site Code: 002165) is located ~8.2km to the southwest.
- The Fergus Estuary and Inner Shannon, North Shore pNHA (Site Code: 002048) is located ~9.6km from the Wind Farm Site.
- The River Shannon and Fergus Estuary SPA (Site Code: 004077) is located ~9.6km from the Wind Farm Site.

Within the Lower Shannon surface water catchment:

- Gortacullin Bog NHA (Site Code: 002401) is located immediately to the north of the Wind Farm Site Boundary.
- The Glenomra Wood SAC/pNHA is located ~1.8km to the southeast of the Wind Farm Site.
- The Lower River Shannon SAC (Site Code: 002165) is located ~8.7km to the south of the Wind Farm Site and is also downstream of the Grid Connection.

In terms of the TDR, the Lower River Shannon SAC (Site Code: 002165), the River Shannon and River Fergus Estuaries SPA (Site Code: 004077) and the Inner Shannon Estuary – South Shore pNHA (Site Code: 000435) are located downstream of the Temporary Transition Compound on the Maigue Estuary.

2.6.2 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 immediately downstream of the Proposed Development.

The closest designated bathing water is located at Kilrush and is located in the Mouth of the Shannon coastal waterbody.

2.6.3 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.

There are no NSA located downstream of the Proposed Development. The closest NSA is Lough Dery NSA. However, this is located upstream of the Proposed Development on the River Shannon.

2.6.4 Shellfish Areas

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

The closest mapped designated shellfish areas are the West Shannon Ballylongford and West Shannon Poulnasherry Bay shellfish areas. These shellfish areas are located in the Mouth of the Shannon coastal waterbody.

2.6.5 Drinking Water Protected Areas

The 3rd Cycle Shannon Estuary North Catchment Report (EPA, 2021) states that there are a total of 6 no. SWBs in the catchment which are identified as Drinking Water Protected Areas (DWPA). However, only 1 of these is located downstream of the Proposed Development. This designated DWPA is located at Castle Lake and is downstream of the Wind Farm Site via the Owenogarney River.

The 3rd Cycle Lower Shannon Catchment Report (EPA, 2021) states that there are a total of 3 no. SWBs in the catchment which are identified as DWPAs. The Shannon (Lower)_060 SWB has been identified as a DWPA and is located downstream of the Wind Farm Site and the Grid Connection.

Meanwhile, the underlying GWBs are also listed as DWPAs but there are no public or private water schemes in the area of the Proposed Development.

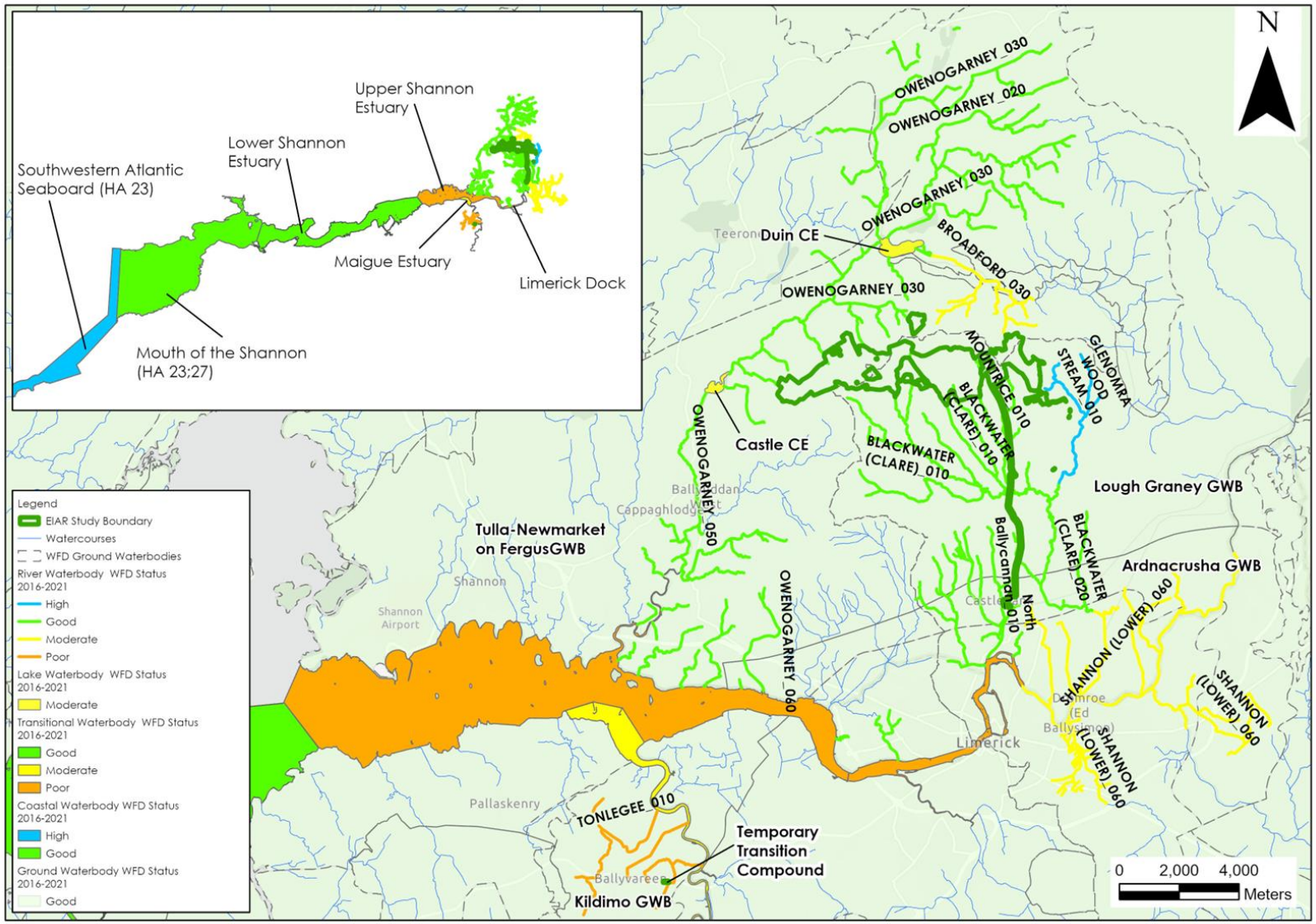

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

3. WFD SCREENING

As discussed in **Section 2**, there are a total of 20 no. surface waterbodies which are located in the vicinity and downstream of the Wind Farm Site (which includes the proposed biodiversity enhancement lands), Grid Connection and TDR work areas. These include a total of 12 no. river waterbodies, 2 no. lake waterbodies, 4 no. transitional waterbodies and 2 no. coastal waterbodies. In addition, 4 no. groundwater bodies underlie the Proposed Development.

3.1 SURFACE WATER BODIES

The SWBs in the immediate vicinity and downstream of the Proposed Development 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 Development, it is considered that within the Shannon Estuary North Catchment that the Broadford River (Broadford_030) and the Owenogarney River (Owenogarvey_030, _040 and _050) in the vicinity and downstream of the Wind Farm Site are carried through into the WFD Impact Assessment. The Broadford and Owenogarney_030 SWBs are included in the assessment due to the occurrence of proposed works within each of these river sub-basins. In addition, the Owenogarney_040 SWB is included due to its location immediately downstream of the Owenogarney_030 SWB. Furthermore, the Duin and Castle lake waterbodies downstream of the Wind Farm Site are carried through into the WFD Impact Assessment due to their proximal location to the Wind Farm Site. Within the Lower Shannon surface water catchment the Blackwater (Clare)_010, _020, Mountrice_010, Glenomra Wood Stream_010 and North Ballycannan_010 SWBs have also carried through into the WFD Impact Assessment due to the occurrence of proposed works in each of these river sub-basins. The Proposed Development 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.

Meanwhile, within the Shannon Estuary North catchment the lower reaches of the Owenogarney River (Owenogarney_050 and _060) have been screened out due to its distant location from the Wind Farm Site and the increasing volumes of water within this SWB. Within the Lower Shannon Catchment, the Lower Shannon River (Shannon(Lower)_060) has also been screened out due to the large volumes of water within this SWB. As outlined in **Table A** the catchment area of river waterbodies increases downstream of the site. Therefore, the potential for the Proposed Development to impact a waterbody decreases further downstream due to the increasing catchment area to the surface waterbody and resulting increase in flow volumes. There is no potential to cause a deterioration in the status of this screened out SWB and/or jeopardise their attainment of good surface water status.

The Tonlegee_010 will be included in the impact assessment due to the location of the Temporary Transition Compound within this river sub-basin.

Additionally all transitional and coastal waterbodies downstream of the Proposed Development site have been screened out due to the large volumes of water within these SWBs, their distal location from the Proposed Development and the saline nature of the waters within these SWBs. There is no potential to cause a deterioration in the status of this screened out SWB and/or jeopardise their attainment of good surface water status.

3.2 GROUNDWATER BODIES

With respect to groundwater bodies, the Lough Graney, Tulla-Newmarket on Fergus, Ardnacrusha and Kildimo GWBs are carried through to the WFD Impact Assessment due to their location directly underlying the proposed work areas. The Proposed Development must not in any way prevent these GWBs from achieving "Good" status in the future.

3.3 PROTECTED AREAS

3.3.1 Nature Conservation Designations

In terms of protected areas only those designated sites which are hydrologically linked with the Proposed Development will be included in the impact assessment. Furthermore, several designated sites which are distal to the Proposed Development will not be included in the assessment due to the large volumes of water within the SWBs within which these designated sites are located.

- Gortacullin Bog NHA will not be included in the impact assessment as no works are proposed upstream or upgradient of this designated site. The Proposed Development has no potential to effect this NHA.
- Doon Lough NHA will be included in the impact assessment as this designated its hydrologically connected to the Wind Farm Site via the Broadford River and its tributaries. It is worth noting that the potential for this designated site to be impacted is limited due to the small scale of the works proposed in the catchment of the Broadford River - comprising solely of ~150m of new proposed access road.
- Danes Hole, Poulnalecka SAC/pNHA is not included in the compliance assessment as the bat roosts are not hydrologically dependent. There is no potential for hydrologically impacts to effect this designated site.
- Castle Lake pNHA (Site Code: 000239) will be included in the impact assessment as it is hydrologically connected with the Wind Farm Site via the Owenogarney River and its tributaries.
- The Ratty River Cave SAC (Site Code: 002316) is located downstream of Castle Lake and will not be included in the impact assessment as the lake acts as a hydrological buffer between the SAC and the Proposed Development. There is no potential for the Proposed Development to effect this SAC.
- The Glenomra Wood SAC/pNHA is connected with the Wind Farm Site via the Glenomra Wood Stream. However, this site is designated due to the presence of a terrestrial woodland and has no potential to be impacted by water quality. This designated site will not be included in the compliance assessment.
- The Lower River Shannon SAC (Site Code: 002165) is located in close proximity to the Proposed Development (Temporary Transition Compound). The SAC is located at a distant location downstream of the Wind Farm Site. Due to the large flow volumes and saline nature of the waters in the Shannon Estuary the Proposed Development has limited no potential to impact this designated site. However, it will be included in the assessment due to its proximal location to the Temporary Transition Compound.
- The Fergus Estuary and Inner Shannon, North Shore pNHA (is located a significant distance from the Proposed Development. Due to the large flow volumes and saline nature of the waters in the Shannon Estuary the Proposed Development has no potential to impact this designated site.
- The River Shannon and Fergus Estuary SPA (Site Code: 004077) is located a significant distance from the Wind Farm Site and Grid Connection. Due to the large flow volumes and saline nature of the waters in the Shannon Estuary the Proposed Development has no potential to impact this designated site. However, the SPA is located proximal to the Temporary Transitional Compound and will therefore be included in the assessment.
- The Inner Shannon Estuary South Shore pNHA is located downstream of the Temporary Transition Compound and will be included in the impact assessment.

3.3.2 Bathing Waters

The designated bathing waters at Kilrush are located in the Mouth of the Shannon coastal waterbody. This SWB has been screened out of the impact assessment due to the large volumes of water within the SWB, the saline nature of the waters and its distant locations from the Proposed Development. Therefore, the Proposed Development has no potential to effect the bathing waters at Kilsrush.

3.3.3 Nutrient Sensitive Areas

There are no NSA which have the potential to be impacted by the Proposed Development.

3.3.4 Shellfish Areas

The West Shannon Ballylongford and West Shannon Poulnasherry Bay shellfish areas are located in the Mouth of the Shannon coastal waterbody. This SWB has been screened out of the impact assessment due to the large volumes of water within the SWB, the saline nature of the waters and its distant locations from the Proposed Development. Therefore, the Proposed Development has no potential to effect these shellfish areas.

3.3.5 Drinking Water Protected Areas

There are 2 no. surface water abstraction mapped downstream of the Proposed Development. Within the Shannon Estuary North Catchment Report, there is a surface water abstraction located downstream of the Proposed Development at Castle Lake. Meanwhile, within the Lower Shannon Catchment the Shannon (Lower)_060 SWB is located downstream of the Proposed Development. The Proposed Development must no in any way effect these DWPAs.

3.4 WFD SCREENING SUMMARY

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

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

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
River Waterbody	Shannon Estuary North WFD catchment			
	River	Broadford_030	**Yes**	The Wind Farm Site, including a small section of access road, is mapped within the Broadford_030 river sub-basin. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	River	Owenogarney_030	**Yes**	The Wind Farm Site, including 3 no. turbines and a borrow pit, is mapped within the Owenogarney_030 river sub-basin. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	River	Duin CE	**Yes**	The Duin CE SWB is located immediately downstream of the Broadford_030 SWB. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	River	Owenogarney_040	**Yes**	The Owenogarney_040 is located immediately downstream of the Owenogarney_030 SWB. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	Lake	Castle CE	**Yes**	The Castle CE lake waterbody is located downstream of the Wind Farm Site and directly downstream of the Owenogarney_040 SWB. An assessment is required to consider the potential effects of the Proposed Development on this SWB.
	River	Owenogarney_050	No	The Owenogarney_050 SWB has been screened out due to its distant location from the Wind Farm Site. This SWB is located downstream of the Castle Lake waterbody which will act as a hydrological buffer between the Proposed Development and this SWB. The Proposed Development has no potential to impact the status of this SWB.
	Lake	Owenogarney_060	No	The Owenogarney_060 SWB has been screened out due to its distant location from the Wind Farm Site. This SWB is located downstream of the Castle Lake waterbody which will act as a hydrological buffer between the Proposed Development and this SWB. The Proposed Development has no potential to impact the status of this SWB.
	Lower Shannon WFD Catchment			
	River	Blackwater (Clare)_010	**Yes**	The Wind Farm Site, including 1 no. turbines and 2 no. borrow pits, is mapped within the Blackwater (Clare)_010 river sub-basin. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	River	Mountrice_010	**Yes**	The Wind Farm Site, including 3 no. turbines, 1 no. borrow pit and the onsite substation, is mapped within the Mountrice_010 river sub-basin. The Grid Connection is also mapped within this sub-basin. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	Lake	Glenomra Wood Stream_010	**Yes**	The Wind Farm Site, including 2 no. turbines and 1 no. borrow pit, is mapped within the Glenomra Wood Stream_010 river sub-basin. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
	River	Blackwater (Clare)_020	**Yes**	The Blackwater (Clare)_020 SWB has been screened in as it is located directly downstream of the Blackwater (Clare)_010 SWB and the and Glenomra Wood Stream_010 SWBs. The Grid Connection also passes through this sub-basin. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this SWB.
	River	Shannon (Lower)_060	No	The Shannon (Lower)_060 SWB has been screened out due to its distal location from the Proposed Development and the large volumes of water within the Shannon (Lower) River. Therefore, the Proposed Development has no potential to effect the status of this SWB.
	Shannon Estuary North			
	River	Tonlegee_010	**Yes**	The Temporary Transition Compound along the TDR route is located within this river sub-basin.
Transitional and Coastal Waterbodies				
Transitional and Coastal Waterbodies	Transitional	Limerick Dock	No	The Limerick Dock transitional waterbody has been screened out due to the saline nature of its waters and the large volumes of water within the Dock. The Proposed Development has no potential to effect the status of this SWB.
	Transitional	Upper Shannon Estuary	No	The Upper Shannon Estuary has been screened out due to its distal location from the site, the large volume of water within this SWB and the saline nature of its waters. The Proposed Development has no potential to effect the status of this SWB.
	Transitional	Lower Shannon Estuary	No	The Lower Shannon Estuary has been screened out due to its distal location from the site, the large volume of water within this SWB and the saline nature of its waters. The Proposed Development has no potential to effect the status of this SWB.
	Transitional	Maigue Estuary	No	The Maigue Estuary has been screened out due to the minor nature of the upstream works, comprising solely of a Temporary Transition Compound along the TDR. These works have no potential to effect the status of this waterbody due to the large volumes of water and the saline nature of these waters.
	Coastal	Mouth of the Shannon (HA's 23;27)	No	The Mouth of the Shannon (HA's 23;27) has been screened out due to the saline nature of its waters and the large volumes of water here. The Proposed Development has no potential to effect the status of this SWB.
	Coastal	Southwestern Atlantic Seaboard (HA 23)	No	The Southwestern Atlantic Seaboard (HA 23) has been screened out due to the saline nature of its waters and the large volumes of water here. The Proposed Development has no potential to effect the status of this SWB.
Groundwater Bodies				
Groundwater Body	Groundwater	Lough Graney	**Yes**	The Wind Farm Site and Grid Connection are mapped to overlie the Lough Graney GWB. Therefore, An assessment is required to consider the potential effects of the Proposed Development on this GWB.
	Groundwater	Tulla-Newmarket on Fergus	**Yes**	The Wind Farm Site is mapped to overlie the Tulla-Newmarket on Fergus GWB. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this GWB.

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
	Groundwater	Ardnacrusha	**Yes**	The Grid Connection is mapped to overlie the Ardnacrusha GWB. Therefore, an assessment is required to consider the potential effects of the Proposed Development on this GWB.

4. WFD COMPLIANCE ASSESSMENT

4.1 PROPOSALS

The Proposed Development (i.e. Wind Farm Site and Grid Connection) will comprise of 9 No. turbines and all associated foundations and hardstanding areas, access roads and entrance(s) including upgrade of existing site roads and provision of new roads, 110kV electrical substation and wind farm control building(s), underground cabling, borrow pit(s), electrical cabling for 110kV grid connection, amenity works, temporary construction compounds, a permanent meteorological mast, temporary transition compound and upgrades to roads along the turbine delivery route.

Due to the nature of wind farm developments (and associated grid connections and TDR works), being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risks to groundwater at the site will be chemical pollution of groundwater from cementitious materials, hydrocarbon spillage and leakages. Potential piling works also have the potential to impact groundwater levels.

The primary risk to surface waters will be entrained suspended sediments (peat and soil particles) in site runoff during earthworks and tree felling along with release cement-based compounds and/or hydrocarbons. The Proposed Development may also result in changes to surface water runoff volumes and flow patterns. The Proposed Development also includes works over and in close proximity to watercourses.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Effects from Works within Wind Farm Site

Construction phase activities including tree felling, site levelling/construction and building turbine foundation excavation and the borrow pit 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 bare soil/peat, spoil storage 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.

Within the Wind Farm Site, there are a total of 6 no. crossings over EPA mapped watercourses. 5 of these crossings are new proposed crossings whilst 1 is located along an existing forestry track which will be upgraded as part of the Proposed Development. The upgrade of existing crossings and the construction of new watercourse crossings has the potential to significantly interfere with water quality and flows during the construction phase.

Clear felling of coniferous forestry plantations is also proposed over 107.65ha (~5.69ha of temporary felling, ~48.89ha of permanent felling for the proposed infrastructure and ~52.98ha of permanent felling as part of the Hen Harrier/Biodiversity Management and Enhancement

Plan). 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.

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 SWBs likely to be impacted by these activities include the Broadford_030, Owenogarney_030, Blackwater (Clare)_010 and Mountrice_010 SWBs due to the occurrence of proposed works within these river sub-basins. We note that the Broadford_030 SWB is less susceptible to potential effects due to the small scale of the proposed works in this sub-basin. Further downstream, the potential for water quality effects will decrease downstream due to the increasing volumes of water within the respective SWBs.

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

Table E: Surface Water Quality Effects Downstream of Wind Farm Site during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford_030	IE_SH_27B020800	Moderate	Moderate
Owenogarney_030	IE_SH_27O010600	Good	Moderate
Duin CE	IE_SH_27_121	Good	Good
Owenogarney_040	IE_SH_27O010900	Good	Good
Castle CE	IE_SH_27_74	Moderate	Moderate
Blackwater (Clare)_010	IE_SH_25B060120	Good	Moderate
Mountrice_010	IE_SH_25M030300	Good	Moderate
Glenomra Wood Stream_010	IE_SH_25G120100	High	Good
Blackwater (Clare)_020	IE_SH_25B060250	Good	Good

4.2.1.2 Potential Surface Water Quality Effects Along the Grid Connection

Based on the WFD mapping, there will be a requirement for 4 no. watercourse crossings over EPA mapped waterbodies along the Grid Connection. These are located over existing bridges and culverts along the local road network.

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 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 Grid Connection have the potential to adversely impact the status of the Mountrice_010, Blackwater (Clare)_010 and _020 and North Ballycannan_010 SWBs.

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

Table F: Surface Water Quality Effects along the Grid Connection During Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Blackwater (Clare)_010	IE_SH_25B060120	Good	Moderate
Mountrice_010	IE_SH_25M030300	Good	Moderate
Blackwater (Clare)_020	IE_SH_25B060250	Good	Good
North Ballycannan_010	IE_SH_25N170970	Good	Moderate

4.2.1.3 Potential Surface Water Quality Effects along TDR

Minor earthworks are required for turbine delivery works and for the construction of the Temporary Transition Compound along the haul route. However, due to the minor nature of the works, and the short-construction period, there is limited potential for the works to change the status of the entire SWB.

A summary of potential status change to SWBs arising from works along the TDR during the construction phase of the Proposed Development in the unmitigated scenario are outlined in **Table G**.

Table G: Surface Water Quality Effects along the TDR During Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Blackwater (Clare)_010	IE_SH_25B060120	Good	Good
Mountrice_010	IE_SH_25M030300	Good	Good
Tonlegee_010	IE_SH_24T240890	Poor	Poor

4.2.1.4 Potential Groundwater Quality/Quantity Effects at Wind Farm Site

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 Wind Farm Site.

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.

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

Table H: Groundwater Quality Impacts during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Lough Graney	IE_SH_G_157	Good	Moderate
Tulla-Newmarket on Fergus	IE_SH_G_229	Good	Moderate

4.2.1.5 Potential Groundwater Quality/Quantity Effects along Grid Connection

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 along the Grid Connection.

Some minor groundwater/surface water seepages will likely occur in trench excavations which will impact local groundwater quantity.

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

Table I: Groundwater Quality Effects along Grid Connection during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Lough Graney	IE_SH_G_157	Good	Moderate
Ardnacrusha	IE_SH_25170970	Good	Moderate

4.2.1.6 Potential Groundwater Effects along TDR

The accidental spillage of hydrocarbons have the potential to negatively impact on groundwater water quality along the TDR.

A summary of potential status change to GWBs arising from works along the TDR during the construction phase of the Proposed Development in the unmitigated scenario are outlined in **Table J.**

Table J: Groundwater Quality Effects along TDR during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Lough Graney	IE_SH_G_157	Good	Moderate
Kildimo	IE_SH_G_119	Good	Moderate

4.2.1.7 Potential Effects on Protected Areas

The surface water connections from the Proposed Development 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 Development include:

Doon Lough NHA:
Doon Lough NHA is hydrologically connected to the Wind Farm Site via the Broadford River and its tributaries. The potential for the Proposed Development to affect this NHA is limited due to the minor nature of the works proposed in the catchment of the Broadford River.

Castle Lake pNHA:
This pNHA is hydrologically connected with the Wind Farm Site via the Owenmore River and its tributaries. Any surface water quality/quantity effects have the potential to effect the status of this designated site.

Lower River Shannon SAC:
This designated site is hydrologically connected with the Wind Farm Site, the Grid Connection and the TDR. Due to the large flow volumes within the Lower River Shannon and the saline nature of these waters downstream of the Proposed Development site, there is limited potential for effects to occur. Where the Proposed Development is located in close proximity to the SAC (i.e. the Temporary Transition Compound), the minor and temporary nature of the works and the volume of water in the Maigue Estuary limit the potential for effects.

River Shannon and River Fergus Estuaries SPA:
This designated site is hydrologically connected with the Wind Farm Site, the Grid Connection and the TDR. Due to the large flow volumes within the Shannon Estuary and the saline nature of these waters downstream of the Proposed Development site, there is limited potential for effects to occur. Where the Proposed Development is located in close proximity to the SPA (i.e. the Temporary Transition Compound), the minor and temporary nature of the works and the volume of water in the Maigue Estuary limit the potential for effects.

Inner Shannon Estuary – South Shore pNHA:
This pNHA is located downstream of the Temporary Transition Compound along the Maigue Estuary.

4.2.2 Operational Phase (Unmitigated)

4.2.2.1 Surface Water Quantity Effects Downstream of Wind Farm Site

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 Development and increase flood risk downstream of the development.

During storm rainfall events, additional runoff coupled with increased velocity of flow could increase hydraulic loading, resulting in erosion of watercourses and causing hydromorphological effects.

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

Table K: Potential Effect on Surface Water Quantity (Wind Farm) during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford_030	IE_SH_27B020800	Moderate	Moderate
Owenogarney_030	IE_SH_27O010600	Good	Moderate
Duin CE	IE_SH_27_121	Good	Good
Owenogarney_040	IE_SH_27O010900	Good	Good
Castle CE	IE_SH_27_74	Moderate	Moderate
Blackwater (Clare)_010	IE_SH_25B060120	Good	Moderate
Mountrice_010	IE_SH_25M030300	Good	Moderate
Glenomra Wood Stream_010	IE_SH_25G120100	High	Good
Blackwater (Clare)_020	IE_SH_25B060250	Good	Good

4.2.2.2 Surface Water Quality Effects Downstream of Wind Farm Site

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 Development in the unmitigated scenario are outlined in **Table L**.

Table L: Surface Water Quality Impacts (WF Site) during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Broadford_030	IE_SH_27B020800	Moderate	Moderate
Owenogarney_030	IE_SH_27O010600	Good	Moderate
Duin CE	IE_SH_27_121	Good	Good
Owenogarney_040	IE_SH_27O010900	Good	Good
Castle CE	IE_SH_27_74	Moderate	Moderate
Blackwater (Clare)_010	IE_SH_25B060120	Good	Moderate
Mountrice_010	IE_SH_25M030300	Good	Moderate
Glenomra Wood Stream_010	IE_SH_25G120100	High	Good

SWB	WFD Code	Current Status	Assessed Potential Status Change
Blackwater (Clare)_020	IE_SH_25B060250	Good	Good

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 designated sites 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 Development. These are outlined below.

4.3.1 Construction Phase

4.3.1.1 Mitigation Measures to Protect Surface Water Quality

A suite of general Sustainable Drainage Systems (SuDS) drainage controls available for surface water management are summarised (along with their application) in **Table M** below. These include avoidance controls, source controls, in-line controls, water treatment controls, and outfall controls.

During the construction phase of the Proposed Development, excavations will be limited to minimise the generation of spoil. Sediment will be generated where excavations are required (turbine foundations) and dirty water from these work areas will be routed via drains to settlement ponds for treatment and removal of suspended solids prior to release into the existing drainage network. There will be no direct or untreated discharge from construction work areas into the existing drainage network.

Finally, regular inspection and maintenance for the on-site drainage system will be completed regularly during the construction phase. This will be a particular importance following periods of heavy rainfall to check for blockages in any drains and any excess build-up of silt within settlement ponds which will decrease the effectiveness of the drainage system unless removed.

Table M: Summary of Drainage Mitigation and Their Application

Management Type	Description of SuDs drainage control method	Applicable Works Area
Avoidance Controls:	• Application of buffer zones to natural watercourses where possible to avoid excavations in close proximity to watercourses and avoid the release of suspended sediment into watercourses; • Using small working areas; and, • Working in appropriate weather and suspending certain work activities in advance of forecasted wet weather.	Construction work areas where sediment is being generated.
Source Controls:	• Use of upstream interceptor drains and downstream collector drains, vee-drains, diversion drains, flumes and culvert pipes.	Construction work areas where sediment is being generated.

Management Type	Description of SuDs drainage control method	Applicable Works Area
	• Using small working areas; • Covering stockpiles; • Weathering off / sealing stockpiles and promoting vegetation growth.	Stockpiles areas
In-Line Controls:	• Interceptor drains, vee-drains, oversized swales/collector drains; • Erosion and velocity control measures such as: o sand bags; o oyster bags filled with gravel; o filter fabrics; o straw bales; o flow limiters; o weirs or baffles; o and/or other similar/equivalent or appropriate systems. • Silt fences, filter fabrics; • Collection sumps, temporary sumps, pumping systems; • Attenuation lagoons; • Sediment traps, stilling / settlement ponds.	Interceptor and collection drainage systems
Water Treatment Controls:	• Temporary sumps; • Attenuation ponds; • Temporary storage lagoons; • Sediment traps, Stilling / Settlement ponds, silt bags; • Proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.	Surface water treatment locations
Outfall Controls:	• Levelspreaders; • Buffered outfalls; • Vegetation filters; • Silt bags; • Flow limiters and weirs.	Drainage run outfalls and overland discharge points

Each element of the Wind Farm Development (*i.e.,* access roads, turbines and borrow pits) will have an array of drainage control measures to ensure protection of downstream watercourses. Each drainage control element is not stand alone but occurs as part of a treatment train of control systems (i.e., check dams, silt traps, settlement ponds etc).

4.3.1.2 Mitigation Measures to Protect Against Release of Hydrocarbons

The potential pollution of groundwater during the construction phase will be mitigated by the provision of appropriate controls and working methods. These include best practice methods for storage and handling of fuels and chemicals and are as follows:

- All plant will be inspected and certified to ensure that they are leak free and in good working order prior to use at the Proposed Development site.
- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser.
    - The fuel bowser, a double axel custom-built refuelling trailer will be re-filled off site, and will be towed around the site by a 4x4 jeep to where machinery is located.
    - The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages.
    - The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site.
    - Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.

- Onsite refuelling will be carried out by trained personnel only.
- A permit to fuel system will be put in place.
- Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and 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.
- An emergency plan for the construction phase to deal with accidental spillages will be included within the CEMP (Appendix 4-3). Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area.

4.3.1.3 Mitigation Measures to Prevent Release of Wastewater

The best practice methods for wastewater management at the proposed on-site construction compound during the construction phase are as follows:

- During the construction phase, temporary port-a-loo toilets located within staff portacabins will be used;
- The wastewater will be directed to a sealed underground storage tank, with all wastewater being tankered off site by a permitted waste collector to wastewater treatment plants; and,
- No water or wastewater will be sourced on the site, nor discharged at the Wind Farm Site.

4.3.1.4 Mitigation Measures to Prevent Release of Cement-Based Products

Best practice methods for cement-based compounds are as follows:

- No batching of wet-concrete 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 concrete 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 concrete washout ponds;
- Weather forecasting will be used to plan dry days for pouring concrete; and,
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

4.3.1.5 Mitigation Measures for Clear-Felling

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, to ensure that felling, planting and other forestry operations result in minimal potential negative effects to the receiving environment.

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" will be adhered to during felling operations. The setback distance from sensitive hydrological features means that adequate room is maintained for the proposed mitigation measures (discussed below) to be properly installed and operate effectively.

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 will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance. The harvester and the forwarder are designed specifically for the forest environment and are low ground pressure machines;
- All machinery will be operated by suitably qualified personnel;
- Checking and maintenance of roads and culverts will be on-going through any felling operations. 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;
- These machines will traverse the site along specified off-road routes (referred to as racks);
- The location of racks will be chosen to avoid wet and potentially sensitive areas;
- Brash mats will be placed on the racks to support the vehicles on soft ground, reducing peat and mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal should take place when they become heavily used and worn. Provision should 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;
- Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully disposed of at pre-selected peat disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;
- In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed on site during construction;
- Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses;
- 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;
- Timber will be stacked in dry areas, and outside watercourse buffer zones. 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 runoff;
- Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; and,
- 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.

In addition felling works will only be completed during periods of low rainfall and all drains will be inspected and maintained before, during and after the proposed felling works.

4.3.1.6 Mitigation Measures to Prevent Morphological Changes to Surface Watercourses

The Proposed Development design has been optimised to utilise the existing infrastructure (roads and hardstands) where practicable. This design prevents the unnecessary disturbance of the existing site drainage network prevents the requirement for widespread instream works.

Mitigation for windfarm culvert upgrades are as follows:

- The proposed new natural stream crossing will be a bottomless culvert and the existing banks will remain undisturbed as much as possible;
- Any guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland will be incorporated into the design of the proposed crossings;
- As a further precaution 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", that is, 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;
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed on-site; and,
- All access road river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

When instream works are required in minor watercourses, the following mitigation will be employed:

- In-stream works at natural watercourses will only be done over a dry period during the months of July, August and September (as required by IFI for in-stream works) to avoid the salmon spawning season;
- Firstly, the crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation;
- A minimum 10 metre vegetative buffer zone will be maintained (if present) between disturbed areas and the watercourse bank. There will be no storage of material / equipment, excavated material (see below) or overnight parking of machinery inside the 10m buffer zone;
- Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse. The silt fencing will have removable "gates" as required to allow access of excavator while maintaining ease of replacement for overnight or during periods of heavy rainfall. The silt fencing will be extended at least 10m upstream and downstream of the crossing location works;
- Bog mats will be used underneath the excavator, inside the 10 metre vegetative buffer zone, to prevent soil erosion/rutting and potential surface water quality impacts from localised surface water runoff;
- A temporary sump will be constructed in the watercourse bed upstream of the proposed dam location if a natural pool does not already exist. The sump will be lined with clean rockfill to prevent scouring and erosion during pumping at the intake;
- An energy dissipater (such as clean rock fill or splash plates) will be placed on the watercourse bed downstream of the dam at the pump outfall. This will prevent scouring and erosion of the watercourse bed at the outfall during pumping;
- Dams are to be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill. Poorly sorted material will not be used as it would be a potential source of fine sediment;
- Watercourse bed excavation works will only commence once the stream flow is isolated from the proposed trench excavation area;
- Temporary storage of excavated material will be undertaken outside of the 10m buffer on flat ground or within a local hollow area. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse;
- Any pumped water from trench dewatering will be discharged onto a well vegetated, flat, dry area at least 50m from a watercourse via a straw bale dewatering structure or

geotextile filter bag (i.e. silt bag). Silt fencing will also be placed downslope of the outfall;
- If there is no suitable area for discharge onto ground, temporary settlement ponds will be used where necessary and will be put in place prior to commencement of preparation works;
- Sediment laden water from trench dewatering will not be discharged directly to a watercourse;
- Clay bunds will be placed within the trench backfill on either side of the watercourse to prevent the trench acting as a drain towards the watercourse, thus preventing potential water quality impacts;
- Once the lean mix concrete is in place in the trench, a layer of fine sand (5 – 10cm) will be over the cement prior to backfilling. This will prevent release of cement into the watercourse when flow is restored;
- Upon completion of the in-stream work, the watercourse crossing will be restored to its original configuration and stabilised to prevent bank erosion by means of timber stakes, timber planks and geotextiles as required;
- Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance;
- Disturbance of bankside soils and watercourse sediments will be kept to the minimum required for the cable laying process to avoid any unnecessary impact on the watercourse morphology;
- There will be no batching or storage of cement allowed at the watercourse crossing;
- There will be no refuelling allowed within 100m of the watercourse crossing;
- All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing; and,
- Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted.

4.3.1.7 Mitigation Measures to Protect Water Quality During Excavation Dewatering

Management of groundwater seepages 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 Siltbuster unit;
- 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 should immediately be stopped and a geotechnical assessment undertaken; and,
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site 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 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 a final line of defence if needed.

4.3.1.8 Mitigation Measures for Protected Areas

The potential for material to enter the downstream protected areas is negligible as mitigation controls as described above will be implemented. These measures include the use of silt fences,

silt traps and check dams. Emphasis will also be placed on prevention of hydrocarbon releases to local watercourses.

It can be concluded that with best practice methods adhered to during the construction of the Proposed Development, the potential for the project to impact upon the qualifying interests of designated sites is not significant.

4.3.2 Operational Phase

4.3.2.1 Increased Site Runoff and Hydromorphology Effects

The Proposed Development footprint (18.5ha) accounts for 1.7% of the Wind Farm Site Area (1,072ha). Therefore, the potential for effects will be limited. Furthermore, the baseline hydrological regime is characterised by high rates of surface water runoff and low rates of groundwater recharge. Therefore the Proposed Development is unlikely to significantly alter surface water runoff rates.

The operational phase drainage system of the Proposed Development will be installed and constructed in conjunction with the road and hardstanding construction work as described below:

- Interceptor drains will be installed up-gradient of all 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 can be re-distributed over the ground by means of a level spreader;
- Swales/road side drains will be used to collect runoff from access tracks, turbine hardstanding areas and substation compound areas which may contain entrained suspended sediment, and channel it to settlement ponds for sediment settling;
- Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains;
- Check dams will be used along sections of access tracks drains to intercept silts at source. Check dams will be constructed from a 40mm non-friable crushed rock or similar;
- Settlement ponds, emplaced downstream of track swale sections, turbine locations and the selected substation option, 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 accordance the greenfield runoff rate requirements; and,
- The operation of the underground grid connection will not result in any likely hydrological or water quality effects and therefore do not require mitigation measures.

4.3.2.2 Mitigation Measures to Protect Surface Water Quality

The mitigation measures to protect against poor quality runoff during the operational phase of the Proposed Development are the same as those outlined in **Section 4.3.1** above.

Mitigation measures for oils and fuels during the operational phase of the Proposed Development are the same as those outlined in **Section 4.3.1** above.

4.3.2.3 Mitigation Measures to Protect Groundwater Quality

It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. It is not proposed to treat wastewater on-site.

The proposed wastewater storage tank will be fitter with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the site's turbines, wind measurement devices

and electricity substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007(as amended), will be employed to transport wastewater away from the site.

4.3.2.4 Mitigation for Protected Areas

The mitigation measures to protect against poor quality runoff during the operational phase of the Proposed Development are the same as those outlined above.

Mitigation measures for oils and fuels during the operational phase of the Proposed Development are the same as those outlined in **Section 4.3.1.2** above.

It can be concluded that with best practice methods adhered to during the operation phase of the Proposed Development, the potential for the project to impact upon the qualifying interests of the local designated sites is not significant.

4.3.1 Decommissioning Phase

The potential effects associated with decommissioning of the Proposed Development will be similar to those associated with the construction phase but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works.

During decommissioning, it will be possible to reverse or at least reduce some of the potential effects caused during construction, and to a lesser extent operation, by rehabilitating constructed areas such as turbine bases and hard standing areas. This will be done by covering with vegetation to encourage vegetation growth and reduce run-off and sedimentation.

The Wind Farm Site roadways will be kept and maintained following decommissioning of the Wind Farm infrastructure, as these will be utilised by ongoing forestry works and by other participating landowners.

The electrical cabling connecting the site infrastructure to the on-site substation will be removed, while the ducting itself will remain in-situ rather than excavating and removing it, as this is considered to have less of a potential environmental impact, in terms of soil exposure, and thus on the possibility of the generation of suspended sediment which could enter nearby watercourses.

The turbines will be removed by disassembling them in a reverse order to their erection. This will be completed using the same model cranes as used in their construction. They will then be transported off-site along their original delivery route. The disassembly and removal of the turbines will not have an impact on the hydrological/hydrogeological environment at the Wind Farm Site.

Other impacts such as possible soil contamination by fuel leaks will remain but will be of reduced magnitude than the construction phase because of the smaller scale of the works and reduced volumes on-site. Similar mitigation implemented during the construction phase will be utilised during the decommissioning phase to ensure no impacts of receiving waters.

Some of the potential effects water bodies will be avoided by leaving elements of the Proposed Development in place where appropriate. The 110kV electrical substation will be retained by EirGrid as a permanent part of the national grid. The turbine bases will be rehabilitated by covering with local topsoil in order to regenerate vegetation which will reduce runoff and sedimentation effects. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.

With the implementation of the mitigation measures outlined above no significant effects on the hydrological and hydrogeological environment will occur during the decommissioning phase of the Proposed Development.

4.3.2 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
Shannon Estuary North WFD catchment				
Broadford_030	IE_SH_27B020800	Moderate	Poor	Moderate
Owenogarney_030	IE_SH_27O010600	Good	Moderate	Good
Duin CE	IE_SH_27_121	Moderate	Moderate	Moderate
Owenogarney_040	IE_SH_27O010900	Good	Good	Good
Castle CE	IE_SH_27_74	Moderate	Moderate	Moderate
Owenogarney_050	IE_SH_27O011100	Good	Good	Good
Lower Shannon WFD Catchment				
Blackwater (Clare)_010	IE_SH_25B060120	Good	Moderate	Good
Mountrice_010	IE_SH_25M030300	Good	Moderate	Good
Glenomra Wood Stream_010	IE_SH_25G120100	High	Good	High
Blackwater (Clare)_020	IE_SH_25B060250	Good	Moderate	Good
North Ballycannan_010	IE_SH_25N170970	Good	Moderate	Good
Shannon Estuary South Catchment				
Tonlegee_010	IE_SH_24T240890	Poor	Poor	Poor

SWB	WFD Code	Current Status	Assessed Status - Unmitigated	Assessed Status with Mitigation Measures
Groundwater Bodies				
Lough Graney	IE_SH_G_157	Good	Moderate	Good
Tulla-Newmarket on Fergus	IE_SH_G_229	Good	Moderate	Good
Ardnacrusha	IE_SH_25170970	Good	Moderate	Good

5. SUMMARY

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

The Proposed Development 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 Development.

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

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

Furthermore, with the implementation of the prescribed mitigation measures, and as described in the submitted EIAR, there is no potential for significant cumulative effects with other developments on the hydrological/hydrogeological environment. Therefore, there is no potential for cumulative effects with other developments to impact the WFD status of any receiving waterbody.

There will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the Proposed Development. 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 Development:

- 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).

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22 Lower Main Street, Dungarvan, Co. Waterford, X35 HK11
T: +353-(0)58-441 22 **F:** +353-(0)58-442 44 **E:** info@hydroenvironmental.ie

www.hydroenvironmental.ie