APPENDIX 9-3

WATER FRAMEWORK DIRECTIVE 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 ASSESSMENT FOR BORRISBEG RENEWABLE ENERGY DEVELOPMENT, CO. TIPPERARY

FINAL

Prepared for:

MKO

Prepared by:

HYDRO-ENVIRONMENTAL SERVICES

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Author:	**MICHAEL GILL DAVID BRODERICK JENNY LAW**
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, to complete a Water Framework Directive (WFD) Compliance Assessment for the Proposed Project (Proposed Wind Farm and Proposed Grid Connection) which will form part of the EIAR that will accompany a planning application to the Board for the Proposed Wind Farm.

For the purposes of the EIAR:

- The 'Proposed Wind Farm' refers to the 9 no. turbines and supporting infrastructure which is the subject of this Section 37E application.
- The 'Proposed Grid Connection' refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- The 'Proposed Project' comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Study Boundary (the 'Site') and assessed together within the EIAR.

Please see section 1.1.1 of the EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 of the EIAR.

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 planning application for the Proposed Wind Farm.

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 David Broderick, Michael Gill and Jenny Law.

David Broderick P.Geo (BSc, H. Dip Env Eng, MSc) is a Hydrogeologist with over 17 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 worked on the EIS/EIARs for Derrykillew WF, Croagh WF, and Oweninny WF, and over 60 other wind farm related projects across the country.

Michael Gill P.Geo (B.A.I., MSc, Dip. Geol., MIEI) is an Environmental Engineer with over 22 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.

Jenny Law (BSc, Msc) is an Environmental Geoscientist with nearly 2 years' experience who has been involved in the preparation of Environmental Impact Assessment Reports (EIARs) for numerous projects including wind farms and commercial and housing developments. Jenny has also completed several Water Framework Directive Assessments and Flood Risk Assessments for various project types.

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 wind farm 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. The draft plan was to be updated with a view to finalisation and publication in Q3/Q4 of 2022. As of December 2023, 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/.

2. WATERBODY IDENTIFICATION CLASSIFICATION

2.1 INTRODUCTION

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

2.2 SURFACE WATERBODY IDENTIFICATION

Regionally the Site is located in the Suir WFD catchment in Hydrometric Area 16 and the Suir_010 sub-catchment which is a headwater sub-catchment of the River Suir.

Locally the Site is mapped within 3 no. WFD river sub-basins, the Suir_020 sub-basin, Eastwood_010 sub-basin (Eastwood River) and Clonmore Stream (Suir)_010 river sub basin. The majority of the Proposed Wind Farm lies within the Suir_020 sub-basin in the north, east and south, whilst the western portion of the Wind Farm is situated in the Eastwood_010 sub-basin.

Within the Suir_020 river sub basin the River Suir enters the Site from the north and continues southwards within the eastern portion of the Site. The Shanakill Stream enters the Site from the northeast. Within the Eastwood_010 river sub basin, the Eastwood River flows easterly, and enters the Site from the west.

The Proposed Grid Connection underground cabling route runs easterly within the southeast of the Site and across the Clonmore Stream (Suir)_010 river sub basin. The Clonmore Stream (Suir)_010 flows in a south-westerly direction and joins the River Suir within the southeast of the Site. An unnamed 2nd order tributary stream joins the Eastwood River, and at this point it continues southwards and discharges into the River Suir approximately 500m downstream of the Site. The River Suir continues south and eventually discharge into the Upper Suir Estuary approximately 56.8km southeast from the Site (as the crow flies), just west of Carrick on Suir.

To facilitate turbine delivery to the Site, minor temporary stoning up of verges at junction 22 on the M7 and the construction of a temporary abnormal load access track from the L-3248 road into the Site will be required. These works are located within the Nore_SC_010 and the Suir WFD catchments, respectively. These minor works in the Nore catchment have been excluded from the WFD assessment due to the lack of any potential to affect the WFD status.

All river watercourses in the immediate vicinity of the Site have current WFD Status classifications (2016-2021).

Error! Reference source not found. Presents the total upstream catchment area of the Suir River and its tributaries that drain the Site, and the total upstream catchment area of the Suir River downstream from the Site as far as Thurles (the Suir_070 river segment) approximately 15km as the crow flies from the Site. The total upstream catchment areas of the Eastwood_010 (12.27km²), Clonmore Stream (Suir)_010 (34.53km²) and the Suir_020 (95.01km²) rivers are significantly less than the total upstream catchments of their downstream counterparts along the River Suir (>156.25km²).

Therefore, the river waterbodies which are located in close proximity to the Site that have relatively smaller catchment areas (Eastwood_010, Clonmore Stream (Suir)_010 and Suir_020) will be more susceptible to water quality impacts as a result of the Proposed Project in comparison to the downstream river, transitional and coastal waterbodies located downstream of the Site.

Table A: Catchment Size for River Waterbodies

WFD River Sub-Basin	Total Upstream Catchment Area (km²)
Suir sub-catchment (Suir_SC_010)	
Eastwood_010	12.27
Clonmore Stream (Suir)_010	34.53
Suir_020	95.01
Suir_030	156.25
Suir_040	164.33
Suir_050	220.47
Suir_060	229.15
Suir_070	420.58

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

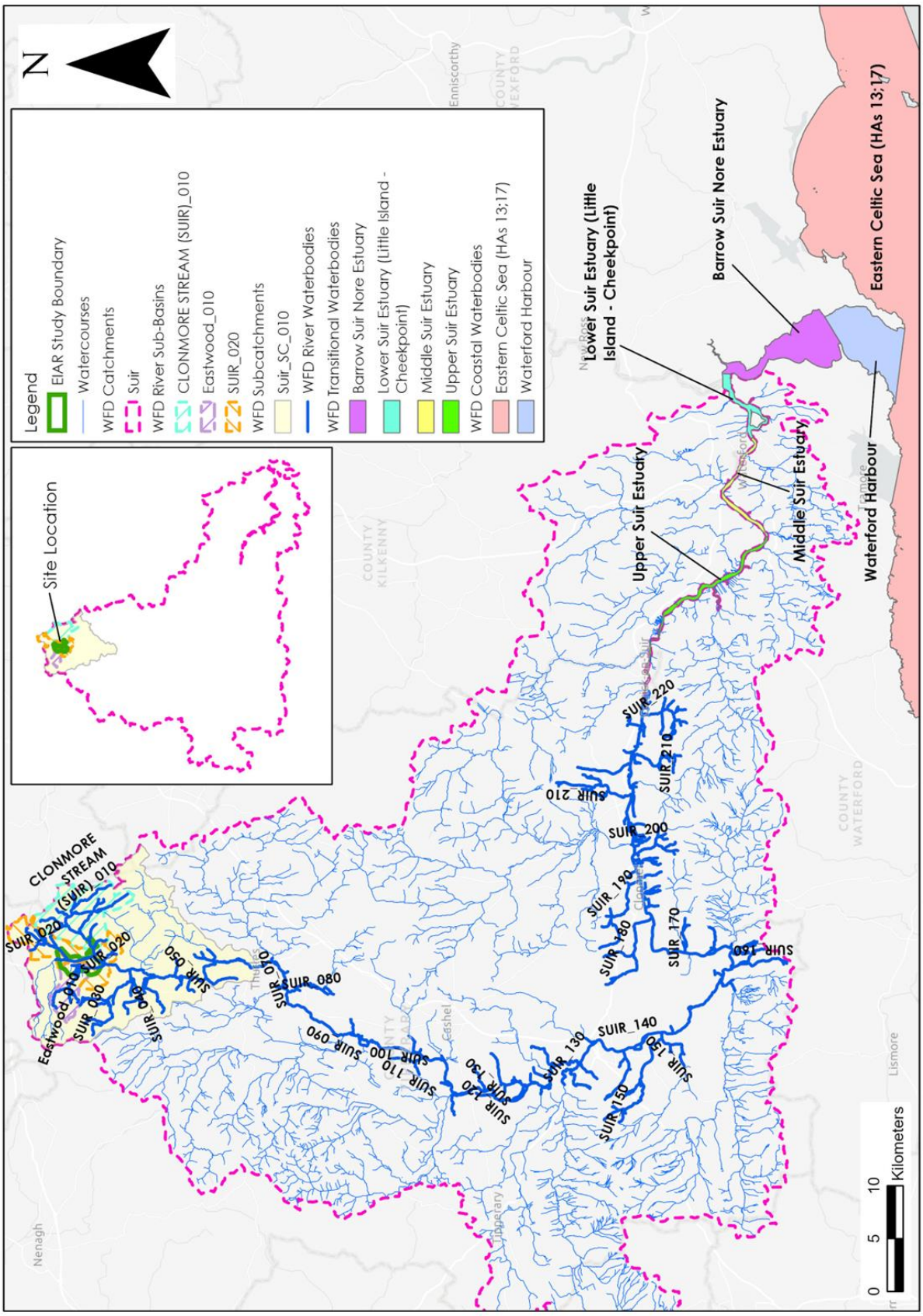

Figure A: Local Hydrology Map

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for Surface Water Bodies (SWBs) downstream of the Site are shown in **Table B**. The overall status of SWBs 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).

As stated above the Site is located in the Suir_SC_010 (16_22) sub-catchment. Within this sub-catchment, the majority of the Site is drained by the Suir_020 SWB, which achieved "Poor" Status in the latest WFD cycle (2016-2021), deteriorating since the 2013-2018 WFD cycle when it achieved "Moderate" status. The Suir_020 has been deemed to be "At risk" of failing to meet its WFD objectives in the future. Agriculture and hydromorphology have been listed as significant pressures identified for the Suir_020 SWB.

On-site tributaries of the Suir_020 SWB include the Eastwood_010 and the Clonmore Stream (Suir)_010 which both achieved "Moderate" status. The risk status of the Eastwood_010 SWB that drains the very western portion of the Site is currently under review, whereas the Clonmore Stream (Suir)_010 that drains the Proposed Grid Connection element of the Proposed Project has been classified as "At risk". Land drainage and extraction of peat is considered to be a significant pressure on the Clonmore Stream (Suir)_010 SWB.

Downstream of the Site the WFD status of the River Suir ranged between "Poor" (Suir_060), to "Moderate" (Suir_030, _040, _070 through to _100, _120, _130 & _200 through to _220 river segments) to "Good" (Suir_050, _110, _140 through to _160, _180 & _190 river segments) and "High" (Suir_170).

The majority of the downstream Suir river segments have been assessed as being "At risk" of failing to meet their WFD objectives in the future (Suir_030, _060 through to _100, _120, _130 & _200 through to _220 river segments). The main significant pressure listed for all the "At risk" Suir River segments downstream of the Site is agriculture. The Suir_050, Suir_110, Suir_160, Suir_170, Suir_180 and Suir_190 river segments downstream of the Site are all "Not at risk" of failing to meet their WFD objectives. The risk statuses for the Suir_040, Suir_140 and Suir_150 are currently under review.

In relation to the transitional waterbodies downstream of the Site, the Upper Suir Estuary downstream of the River Suir achieved "Bad" Status for the latest WFD 2016-2021 cycle. Further downstream the Middle Suir Estuary, the Lower Suir Estuary (Little Island - Cheekpoint) and the Barrow Suir Nore Estuary all achieved "Moderate" status. All of the transitional waterbodies downstream of the Site have been classified as being "At risk" of failing to meet their WFD objectives. Agricultural activities have been listed as a significant pressure on each of the transitional waterbodies downstream of the Site.

The Waterford Harbour coastal waterbody downstream of the Site achieved "Moderate" WFD status and is "At risk", whilst the Eastern Celtic Sea (HAs 13;17) coastal waterbody further downstream achieved "High" status and is "Not at risk". Agriculture & urban run-off are the significant pressures that are currently facing the Waterford Harbour coastal waterbody.

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

Figure B.

Table B: Summary WFD Information for Surface Water Bodies

SWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	Risk Status (2013-2018)	Pressures
Suir Catchment					
Eastwood_010	Unassigned	Poor	Moderate	Review	-
Clonmore Stream (Suir)_010	Moderate	Moderate	Moderate	At risk	Peat
Suir_020	Poor	Moderate	Poor	At risk	Agriculture & hydromorphology
Suir_030	Moderate	Moderate	Moderate	At risk	Agriculture & urban wastewater
Suir_040	Unassigned	Good	Moderate	Review	-
Suir_050	Good	Good	Good	Not at risk	-
Suir_060	Moderate	Moderate	Poor	At risk	Other
Suir_070	Good	Moderate	Moderate	At risk	Agriculture, urban run-off & urban wastewater
Suir_080	Good	Moderate	Moderate	At risk	Agriculture & domestic wastewater
Suir_090	Good	Moderate	Moderate	At risk	Agriculture & hydromorphology
Suir_100	Good	Moderate	Moderate	At risk	Agriculture
Suir_110	Good	Good	Good	Not at risk	-
Suir_120	Good	Good	Moderate	At risk	Not identified
Suir_130	Good	Moderate	Moderate	At risk	Agriculture & forestry
Suir_140	Good	Moderate	Good	Review	-
Suir_150	Good	Moderate	Good	Review	-
Suir_160	Good	Good	Good	Not at risk	-
Suir_170	Good	Good	High	Not at risk	-

Suir_180	Good	Good	Good	Not at risk	-
Suir_190	Good	Moderate	Good	Not at risk	-
Suir_200	Good	Moderate	Moderate	At risk	Agriculture & forestry
Suir_210	Good	Moderate	Moderate	At risk	Agriculture
Suir_220	Good	Poor	Moderate	At risk	Agriculture
Upper Suir Estuary	Moderate	Poor	Bad	At risk	Agriculture
Middle Suir Estuary	Poor	Poor	Moderate	At risk	Agriculture
Lower Suir Estuary (Little Island - Cheekpoint)	Moderate	Good	Moderate	At risk	Agriculture
Barrow Suir Nore Estuary	Good	Moderate	Moderate	At risk	Agriculture
Waterford Harbour	Good	Moderate	Moderate	At risk	Agriculture & urban run-off
Eastern Celtic Sea (HAs 13;17)	Unassigned	Good	High	Not at risk	-

2.4 GROUNDWATER BODY IDENTIFICATION

The Waulstorian limestones in the north of the Site and the Ballysteen Formation that is mapped to underlie the majority of the Site are classified by the GSI (www.gsi.ie) as Locally Important Aquifers (LI), having bedrock which is moderately productive only in local zones. The band of the Lisduff Oolite Member that occupies the centre of the Site is classified as a Locally Important Aquifer (Lm) by the GSI and described as bedrock which is generally moderately productive.

The Site is mapped inside the Templemore (IE_SE_G_131) WFD groundwater body. The northern section of the TDR haul route is mapped within the Rathdowney GWB (IE_SE_G_114). The latter is ruled out for further assessment due to the lack of potential to affect the GWB status.

Based on data from GSI publication, Summary of Initial Characterisation of Templemore GWB, the majority of groundwater flow in this aquifer is considered to take place in the upper weathered zone (3m). Below this the amount of groundwater flow decreases gradually with depths and large flows are not expected below 10m except in isolated open fractures. Diffuse recharge to this groundwater body occurs, mostly where subsoil is thinnest or most permeable.

Groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. According to the GSI, owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Baseflow to rivers and streams is likely to be relatively low.

2.5 GROUNDWATER BODY CLASSIFICATION

The Templemore GWB (IE_SE_G_131) underlies the Site and is currently assigned "Good" Status, which is defined based on the quantitative status and chemical status of the GWB. The Templemore GWB is "at risk" of failing its WFD objectives. Significant pressures impacting on the GWB are not known.

The GWB status for the 2016-2021 WFD cycles are shown on **Figure B**.

Table C: Summary WFD Information for Groundwater Bodies

GWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	Risk Status (2013-2018)	Pressures
Templemore	Good	Good	Good	A risk	-

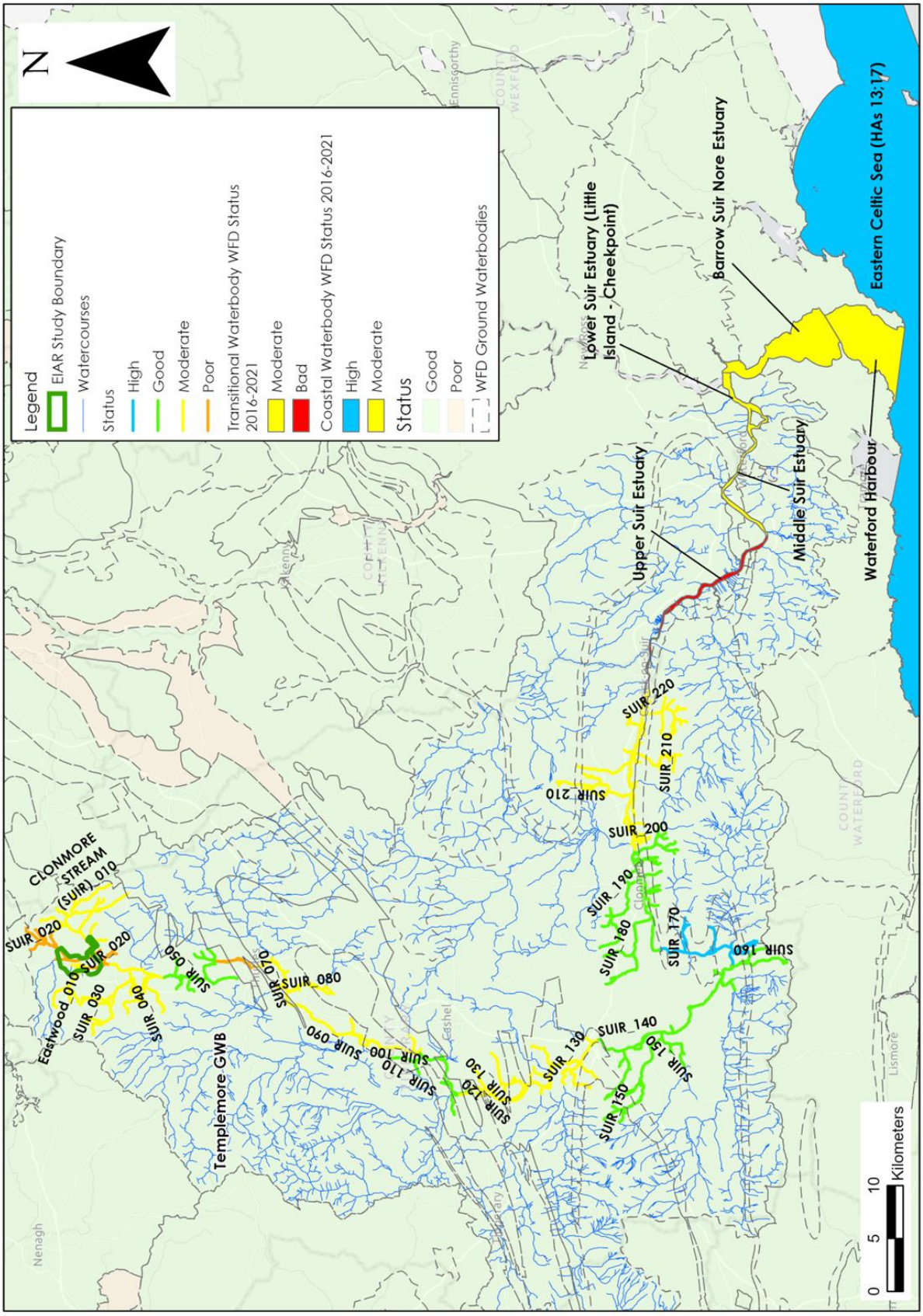

Figure B: WFD Groundwater and Surface Waterbody Status (2016-2021)

2.6 PROTECTED AREAS IDENTIFICATION

2.6.1 Nature Conservation Designations

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 Site is not located within any designated conservation site.

The nearest designated site is the Templemore Wood pNHA (Site Code: 000942) which is located directly north of Templemore town, approximately 2.10km southwest of the Site.

The Kilduff, Devilsbit Mountain pNHA and SAC (Site Code: 000934) is located approximately 5.9km west from the Site.

Designated sites that are hydrologically connected to the Site include the Lower River Suir SAC (Site Code: 002137) situated ~17km to the south and downstream of the Site along the Suir River. Further downstream the River Suir discharges into the River Barrow and River Nore SAC (Site Code: 002162) approximately 80km southeast of the Site.

Cabragh Wetlands pNHA is located 21.5km to the south of the Site and adjacent to the River Suir. Typically, drainage is from the wetland towards the River Suir and not vice versa. However, during extreme flood events, the River Suir may briefly flood the wetland area.

The nearest Natural Heritage area to the Site is the Nore Valley Bogs NHA (001853), which is located approximately 7.5km to the north of the Site.

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 bathing waters in or directly adjacent to the catchment identified under the Bathing Water Regulations 2008.

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.

The EPA carried out a review of Nutrient Sensitive Areas (NSAs) downstream of large urban wastewater discharges in 2020. Once the regulations are in place, and nutrient sensitive areas have been identified, additional nutrient removal must be applied (if not already applied) to wastewater treatment plants discharging to the sensitive area. If this treatment was in place the objective was deemed to have been met.

There are 4 no. NSAs downstream of the Site. The NSA's are located along and downstream of the Suir River and include the following:

- Suir River (_080 & _090) associated with the Thurles urban wastewater agglomeration.
- Suir River (_190 - _180) associated with the Clonmel urban wastewater agglomeration.

- Suir Estuary (Upper Suir Estuary) associated with the Clonmel urban wastewater agglomerations.
- Middle Suir Estuary associated with the Waterford urban wastewater agglomerations.

NSA objectives are not being met within the Middle Suir Estuary NSA. However, objectives are being met for all other 3 no. NSAs downstream of the Site.

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.

There are no Shellfish protected area sites within the vicinity of the Proposed Project. The closest Shellfish protected areas is the Waterford Harbour (Cheekpoint/Arthurstown/Creadan) (IE_SE_100_0100) shellfish area, ~80km downstream from the Site, mapped within the Lower Suir Estuary and the Barrow Suir Nore Estuary transitional waterbodies.

2.6.5 Drinking Water

There are no DWPA's in the immediate vicinity of the Site. DWPA's downstream of the Site include the Suir_140 DWPA (IEPA1_SE_16S021930), the Suir_190 DWPA (IEPA1_SE_16S022600) and the Suir_210 DWPA (IEPA1_SE_16S022750).

Meanwhile all GWB's in Ireland are considered as Drinking water protected areas. The Templemore GWB (IE_SE_G_131) that underlies the Site, is the source for Templetuohy public supply (2800PUB1013). However, the Site is not located inside the Source Protection Area.

3. WFD SCREENING

As discussed in **Section 2**, there are a total of 23 no. river water bodies that are located in the vicinity or downstream of the Site. In addition, there are 4 no. transitional waterbodies and 2 no. coastal waterbodies located downstream. Furthermore, the Site is underlain by 1 no. groundwater body. Protected Areas downstream of the Site include the Lower River Suir SAC and potentially Cabragh Wetlands pNHA.

3.1 SURFACE WATER BODIES

As shown in **Figure** A above, there are 23 no. SWBs located in the vicinity or downstream of the Site.

With consideration for the construction, operational and decommissioning phases of the Proposed Project, it is considered that the Eastwood_010, the Clonmore Stream (Suir)_010 and the Suir_020 rivers have been screened in due to the occurrence of proposed infrastructure within their respective catchments.

Furthermore, the downstream segments of the River Suir as far as Thurles town (Suir_030, Suir_040, Suir_050 and Suir_060 rivers) 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. The Proposed Project works 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 the remaining downstream river segments of the Suir River (Suir_070 – Suir_220) have been screened out due to the distal locations of these SWB's from the proposed works (>17km). Also, as outlined in Error! Reference source not found. the catchment area for the Suir_070 river segment (420.58km^2) immediately downstream of the Suir_060 (229.15km^2) increases dramatically which decreases the potential for the proposed project to impact a waterbody due to its relatively large catchment area, making it less susceptible to potential water quality impacts associated with the Proposed Project. The Proposed Project has no potential to cause a deterioration in status of these SWBs and/or jeopardise the attainment of good surface water status in the future.

The Upper Suir Estuary, the Middle Suir Estuary, the Lower Suir Estuary (Little Island - Cheekpoint) and the Barrow Suir Nore Estuary transitional SWBs have been screened out due to the large volumes of water within these SWBs and the saline nature of these waters. The Proposed Project has no potential to cause a deterioration in status of these SWBs and/or jeopardise the attainment of good surface water status in the future.

The Waterford Harbour and the Eastern Celtic Sea (HAs 13;17) coastal waterbodies have also been screened out due to the large volumes of water within these SWBs and the saline nature of these waters. The Proposed Project has no potential to cause a deterioration in status of these SWBs and/or jeopardise the attainment of good surface water status in the future.

3.2 GROUNDWATER BODIES

With respect to groundwater bodies, the Templemore GWB has been screened in due to its location directly underlying the Site. The Proposed Project works must not in any way result in a deterioration in the status of this GWB and/or prevent it from meeting the biological and chemical characteristics for good status in the future.

3.3 PROTECTED AREAS

The Templemore Wood pNHA has no hydrological linkage to the Site, which is located approximately 2.10km to the northeast of the pNHA. Features of interest within the site mainly include its birdlife. Impacts on the pNHA can be discounted given the lack of impact pathways, the intervening lands and the distance separating the site from the Proposed Project. Therefore, there is no potential for the Proposed Project to impact the pNHA and thus the Templemore Wood pNHA has been screened out.

The upland designated site of Kilduff, Devilsbit Mountain pNHA/ SAC is situated approximately 6 km north-west of Templemore in Co. Tipperary. It comprises the summit of Devilsbit Mountain and much of the eastern side of the ridge which extends northwards to Kilduff Mountain. Most of the site lies above 250mOD and the highest point is 480mOD. Impacts on the Site can be discounted given the lack of hydrological pathways, the intervening lands, the differences in elevation and the distance separating the site from the Proposed Project. Therefore, there is no potential for the Proposed Project to impact the site and thus the Kilduff, Devilsbit Mountain pNHA/SAC has been screened out.

The Lower River Suir SAC consists of the freshwater stretches of the River Suir immediately south of Thurles and the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford. The site is of particular conservation interest for the presence of a number of Annex II animal species, including Freshwater Pearl Mussel (both Margaritifera margaritifera and M. margaritifera subsp. durrovensis occur), White-clawed Crayfish, Salmon, Twaite Shad (Alosa fallax fallax), three species of Lampreys - Sea Lamprey, Brook Lamprey and River Lamprey, and Otter.

The Lower River Suir SAC however has been screened out due to its distal location downstream of the site (22km). Also, as outlined in Error! Reference source not found. the catchment area for the River Suir increases dramatically downstream which decreases the potential for the Proposed Project to impact a waterbody due to its relatively large catchment area, making it less susceptible to potential water quality impacts associated with the Proposed Project. The Proposed Project has no potential to cause a deterioration in status of these SWBs and/or jeopardise the attainment of good surface water status in the future. Similarly, the River Barrow and River Nore SAC has been screened out as it is located even further downstream from the site (>80km).

The Nore Valley Bogs NHA consists of an area of raised bog approximately 7.5km to the north of the Site. It includes areas of high bog and cutover, divided in two by a road and adjoining the channelled River Nore. The dome of the western high bog features a pool/hummock complex and some flush systems. Impacts on the NHA can be discounted given the lack of impact pathways, the intervening lands and the distance separating the site from the Proposed Project. Therefore, there is no potential for the Proposed Project to impact the NHA and thus the Nore Valley Bogs NHA has been screened out.

Cabragh Wetlands pNHA is also potentially located downstream of the Site. However, drainage from the wetland is generally towards the River Suir and not vice versa and therefore affects on status are not likely.

The NSA's downstream of the Site, within the River Suir, (Suir River (_080 & _090), Suir River (_190 - _180), Suir Estuary and Middle Suir Estuary) have all been screened out due to their to distal locations downstream of the site (>21.5km) and also, as outlined in Error! Reference source not found., the catchment area for the River Suir increases dramatically downstream which decreases the potential for the Proposed Project to impact a waterbody and its corresponding NSA.

The DWPA's downstream of the Site, within the River Suir, (Suir_140 DWPA, the Suir_190 DWPA and the Suir_210 DWPA) have all been screened out due to their to distal locations downstream of the Site and also, as outlined in Error! Reference source not found., the

catchment area for the River Suir increases dramatically downstream which decreases the potential for the Proposed Project to impact a waterbody and its corresponding DWPA.

3.4 WFD SCREENING SUMMARY

A summary of WFD Screening discussed above is shown in **Table D**.

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

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Water Body	River	Eastwood_010	**Yes**	The western section of the Proposed Project including ~3 no. of turbines, are mapped within the catchment area of the Eastwood_010 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Clonmore Stream (Suir)_010	**Yes**	The very southeastern section of the Proposed Project is mapped within the Clonmore Stream (Suir)_010 catchment area. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Suir_020	**Yes**	The majority of the Proposed Project including ~7 no. of turbines, are mapped within the catchment area of the Suir_020 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Suir_030	**Yes**	The Suir_030 SWB is located directly downstream of the Suir_020 SWB where the majority of proposed infrastructure for the Proposed Project is situated. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Suir_040	**Yes**	The Suir_040 SWB is in close proximity to the Site and is located directly downstream of the Suir_030 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Suir_050	**Yes**	The Suir_050 SWB is in close proximity to the Site and is located directly downstream of the Suir_040 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Suir_060	**Yes**	The Suir_060 SWB is in close proximity to the Site and is located directly downstream of the Suir_050 SWB. An assessment is required to consider the potential impacts of the Proposed Project on this SWB.
	River	Suir_070	No	The Suir_070 SWB has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_080	No	The Suir_080 SWB has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_090	No	The Suir_090 SWB has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_100	No	The Suir_100 SWB has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_110	No	The Suir_110 SWB has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_120	No	The Suir_120 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_130	No	The Suir_130 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_140	No	The Suir_140 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_150	No	The Suir_150 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.

	River	Suir_160	No	The Suir_160 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_170	No	The Suir_170 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_180	No	The Suir_180 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_190	No	The Suir_190 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_200	No	The Suir_200 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_210	No	The Suir_210 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	River	Suir_220	No	The Suir_220 River waterbody has been screened out due to its distal location from the Site and the large volume of water within the river.
	Transitional	Upper Suir Estuary	No	The Upper Suir Estuary transitional waterbody has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
	Transitional	Middle Suir Estuary	No	The Middle Suir Estuary transitional waterbody has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
	Transitional	Lower Suir Estuary	No	The Lower Suir Estuary transitional waterbody has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
	Transitional	Barrow Suir Nore Estuary	No	The Barrow Suir Nore Estuary transitional waterbody has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
	Coastal	Waterford Harbour	No	The Waterford Harbour coastal waterbody has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
	Coastal	Eastern Celtic Sea (HAs 13;17)	No	The Eastern Celtic Sea (HAs 13;17) coastal waterbody has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
Groundwater Body	Groundwater	Templemore GWB	**Yes**	The Templemore GWB underlies the Site. An assessment is required to consider potential impacts of the Proposed Project on this GWB.
Protected Area	Nature Conservation Site	Templemore Wood pNHA	No	Impacts on the Templemore Wood pNHA can be discounted given the lack of flow pathways, the intervening lands and the distance separating the site from the Proposed Project. The Proposed Project has no potential to impact this pNHA.
		Kilduff, Devilsbit Mountain pNHA/ SAC	No	Impacts on the Kilduff, Devilsbit Mountain pNHA/ SAC can be discounted given the lack of impact pathways, the intervening lands, the differences in elevation and the distance separating the site from the Proposed Project. Therefore, there is no potential for the Proposed Project to impact the pNHA/SAC.

		Lower River Suir SAC	No	The Lower River Suir SAC has been screened out due to its distal location downstream from the Site (21.5km) and the large volume of water within the river at this point. There is no potential for the Proposed Project to impact the SAC.
		River Barrow and River Nore SAC	No	The River Barrow and River Nore SAC has been screened out due to its distal location downstream from the Site (>80km) and the large volume of water within the river at this point.
		Nore Valley Bogs NHA	No	Impacts on the Nore Valley Bogs NHA can be discounted given the lack of flow pathways, the intervening lands and the distance separating the site from the Proposed Project. The Proposed Project has no potential to impact this NHA.
		Cabragh Wetlands pNHA	No	Cabragh Wetlands pNHA is also potentially located downstream of the Site. However, drainage from the wetland is generally towards the River Suir and not vice versa and therefore affects on status are not likely.
	Nutrient Sensitive Areas	Suir River (_080 & _090)	No	The Suir River (_080 & _090) NSA has been screened out due to its distal location downstream from the Site and the large volume of water within the river at this point.
		Suir River (_190 - _180)	No	The Suir River (_190 - _180) NSA has been screened out due to its distal location downstream from the Site and the large volume of water within the river.
		Suir Estuary	No	The Suir Estuary NSA has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
		Middle Suir Estuary	No	The Middle Suir Estuary NSA has been screened out due to its distal location from the Site, the large volumes of water within the surface waterbody and the saline nature of its water.
	Shellfish Waters	Waterford Harbour (Cheekpoint/Arthurstown/Creadan)	No	The Waterford Harbour (Cheekpoint/Arthurstown/Creadan) 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.
	DWPA	Suir_140 DWPA	No	The Suir_140 DWPA has been screened out due to its distal location downstream from the Site and the large volume of water within the river at this point.
		Suir_190 DWPA	No	The Suir_150 DWPA has been screened out due to its distal location downstream from the Site and the large volume of water within the river at this point.
		Suir_210 DWPA	No	The Suir_210 DWPA has been screened out due to its distal location downstream from the Site and the large volume of water within the river at this point.

4. WFD COMPLIANCE ASSESSMENT

4.1 PROPOSALS

The 'Proposed Project' refers to the 9 no. turbines and supporting Wind Farm infrastructure, 110kV substation, along with underground cabling route and 2 no. end masts. Other notable elements of the Proposed Project include 1 no. borrow pit, spoil management areas, temporary construction compounds, met mast and biodiversity enhancement area.

Due to the nature of wind farm developments and associated grid connection infrastructure being near surface construction activities, impacts on groundwater are generally not significant and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risks to groundwater at the Site would be from cementitious materials, hydrocarbon spillage and leakages, potential piling and borrow pit works. These are potential common risks on all construction sites.

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 cement-based compounds.

The Proposed Project includes works over and in close proximity to waterbodies. There are a number of potential adverse effects to both surface and groundwater.

The primary risks of degradation of surface water bodies include:

- Changes in surface runoff flow volumes and flow patterns;
- Entrainment of suspended solids in surface waters; and,
- Chemical pollution of surface waters by concrete, oil and or fuels.

The primary risks of degradation of groundwaters include:

- Chemical pollution of groundwaters by concrete, oils and fuels.

4.2 POTENTIAL EFFECTS

4.2.1 Construction Phase (Unmitigated)

4.2.1.1 Potential Surface Water Quality Effects from Works within the Site

Site construction phase activities including access road construction, turbine base/hardstanding construction, construction compound, met mast construction, borrow pit opening and River Restoration works will require varying degrees of earthworks resulting in excavation of soil and mineral subsoil where present. The main earthworks along the Grid Connection will be related to the cabling, substation, access road and end masts.

The main risk will be from surface water runoff from bare soil, spoil storage areas and borrow pit drainage/dewatering during construction works.

Hydrocarbons and cement-based compounds will also be used during the construction phase. The release of effluent from the on-site wastewater treatment systems also has the potential to impact on surface water quality.

These 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 of downstream water bodies such as the Suir River.

These contaminants have the potential to cause a deterioration in the overall status of the Eastwood_010, Clonmore Stream (Suir)_010, Suir_020, Suir_030 and the Suir_040 Rivers due to their proximal location to the Site. Further downstream the status of the Suir_050 and the Suir_060 river waterbodies are unlikely to be impacted even in an unmitigated scenario due to the distal location of the SWB from the Site and the large volume of water within the river.

A summary of potential status change to SWBs arising from surface water quality impacts from earthworks during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table E**.

Table E: Surface Water Quality Impacts during Construction Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Eastwood_010	IE_SE_16E170590	Moderate	Poor
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Poor
Suir_020	IE_SE_16S020200	Poor	Bad
Suir_030	IE_SE_16S020300	Moderate	Poor
Suir_040	IE_SE_16S020400	Moderate	Poor
Suir_050	IE_SE_16S020500	Good	Good
Suir_060	IE_SE_16S020600	Poor	Poor

4.2.1.2 Potential Groundwater Quality/Quantity Effects

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. These sources of contamination have the potential to impact on groundwater quality in the underlying groundwater bodies in the area of the Site.

The dewatering of borrow pits and other deep excavations such as turbine bases have the potential to impact local groundwater levels.

However, during the early design phase, site investigations and groundwater level monitoring were carried out at the area of the proposed borrow pit to establish the depth of unsaturated bedrock that could be extracted above the underlying groundwater table.

The proposed final extraction depth/floor level at the proposed borrow pit is 112.5m OD. Groundwater level monitoring shows that the groundwater level at the proposed borrow pit will rarely exceed 112.5m OD. There were brief spikes in water levels above 112.5m OD due to very heavy rainfall events that were experienced during October/November 2023.

The maximum recorded groundwater level was 112.61m OD which is approximately 0.10m above the proposed borrow pit floor level. In the rare event of the base of the borrow pit being flooded to a level of 112.61m OD during its operation, there will be no requirement to pump water (i.e. dewater) due to the shallow depth of water which will only be present temporarily.

In order to avoid excavation and dewatering of alluvial deposits at certain turbine locations, it is proposed that a piled foundation design will be considered at turbine locations T1, T2, T3 and T8. Ground conditions at proposed turbine location T9 will be determined by additional site investigations at the detailed design phase. If deep, groundwater saturated alluvial deposits are present at T9, the piled turbine base option will also be considered.

A summary of potential status change to GWBs arising from potential groundwater quality/quantity impacts during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table F**.

Table F: Groundwater Body Impacts during Construction Phase (Unmitigated)

GWB	WFD Code	Current Status	Assessed Potential Status Change
Templemore GWB	IE_SE_G_131	Good	Moderate

4.2.1.3 Potential Surface Water Quality Effects during Watercourse Works at the Proposed Site

It is proposed that 1 no. new clear span stream crossing (Eastwood River) will be required to facilitate the Proposed Wind Farm infrastructure as well as Horizontal Directional Drilling under an existing bridge over the River Suir on L-70391.

There is a total of 16 no. proposed drain crossings along the Proposed Wind Farm infrastructure.

The Proposed Grid Connection requires watercourse crossings on the Clonmore Stream (Horizontal Directional Drilling under an existing bridge on L7039) and the Strogue Stream (proposed new clear span stream crossing). Field drains (3 in total) will also require culverting.

These 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 of downstream water bodies such as the Eastwood_010, Clonmore Stream (Suir)_010, Suir_020, Suir_030 and the Suir_040 Rivers. Further downstream the status of the Suir_050 and the Suir_060 river waterbodies are less at risk.

A summary of potential status change to SWBs arising from surface water quality impacts from watercourse crossing works during the construction phase of the Proposed Project in the unmitigated scenario are outlined in **Table G**.

Table G: Surface Water Quality Impacts during Watercourse Crossing Work at the Site (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Eastwood_010	IE_SE_16E170590	Moderate	Poor
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Poor
Suir_020	IE_SE_16S020200	Poor	Bad
Suir_030	IE_SE_16S020300	Moderate	Poor
Suir_040	IE_SE_16S020400	Moderate	Poor

Suir_050	IE_SE_16S020500	Good	Good
Suir_060	IE_SE_16S020600	Poor	Poor

4.2.2 Operational Phase (Unmitigated)

4.2.2.1 Increased Site Runoff and Hydromorphology Effects on River Water Bodies

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 Site and increase flood risk downstream of the development.

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 2,808 m^3/month. This represents a potential increase of approximately 0.7% in the average daily/monthly volume of runoff from the Site area in comparison to the baseline pre-development site runoff conditions. This is a very small increase in average runoff and results from the naturally high surface water runoff rates and the relatively small area of the Site being developed, the Proposed Project footprint being approximately 8.47ha, representing 1.3% of the Site (650ha).

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 H**.

Table H: Potential Impact on Surface Water Flows during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Eastwood_010	IE_SE_16E170590	Moderate	Moderate
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Moderate
Suir_020	IE_SE_16S020200	Poor	Poor
Suir_030	IE_SE_16S020300	Moderate	Moderate
Suir_040	IE_SE_16S020400	Moderate	Moderate
Suir_050	IE_SE_16S020500	Good	Good
Suir_060	IE_SE_16S020600	Poor	Poor

4.2.2.2 Surface Water Quality Impacts from Operational 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 I**.

Table I: Surface Water Quality Impacts during Operational Phase (Unmitigated)

SWB	WFD Code	Current Status	Assessed Potential Status Change
Eastwood_010	IE_SE_16E170590	Moderate	Moderate
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Moderate
Suir_020	IE_SE_16S020200	Poor	Poor
Suir_030	IE_SE_16S020300	Moderate	Moderate
Suir_040	IE_SE_16S020400	Moderate	Moderate
Suir_050	IE_SE_16S020500	Good	Good
Suir_060	IE_SE_16S020600	Poor	Poor

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 Protect Surface Water Quality during Felling Operations

All felling of coniferous plantations will be done in accordance with the current best practice methods.

A suite of mitigation measures relating to clear felling of coniferous plantations are summarised in **Table J** below. These include avoidance controls and mitigation by design which includes source controls, in-line controls, water treatment controls, and outfall controls.

In addition to these mitigation measures, drains in the vicinity and downstream of the proposed felling areas will be subject to frequent inspection both pre and post-felling. Additionally, surface water quality monitoring shall be completed before, during (if the operation is conducted over a protracted time period) and after felling operations and until the water quality has returned to pre-activity status if an impact has occurred. Daily surface water monitoring forms will also be utilised at every works location in close proximity to a watercourse.

Table J: Summary of Mitigation Measures Associated with Proposed Felling Operations

Management Type	Description of drainage control method	Applicable Works Area
Avoidance Controls:	• A self-imposed 50m buffer will be maintained where possible for all streams with the exception of existing road crossings and proposed stream	Felling areas where sediment is being generated.

	crossings; • No felling is required inside 50m buffer zone; • The large separation distance between the proposed felling areas and sensitive aquatic zones means that potential poor runoff can be adequately managed and attenuated prior to reaching sensitive watercourses; • Works will be completed during periods of no or low rainfall	
Mitigation by Design	• Machine combinations will be chosen to minimise soil disturbance; • Crossing of streams will not be permitted; • Removing soil from roads during wet periods and dust suppression during dry periods; • Ditches draining from the proposed felling area towards existing watercourses will be blocked and temporary silt traps constructed i.e. no direct discharge to surface watercourses will occur. • Double silt traps will be installed where felling is inside the 50m aquatic buffer zone; • Discharge channels will taper out before entering 50m buffer zone allowing for further sediment filtration by ground vegetation' • All drains and sediment traps will be maintained during the felling works; • Brash mats will be used to support vehicles on soft ground; • Timber will be stacked in dry areas outside of the buffer zone with straw bales and check dams places downstream of these storage areas; • Trees will be cut manually from along streams and using machinery to extract the tree; • Travel will only be permitted perpendicular to and away from a watercourse; and,	Felling areas where sediment is being generated.
	• Using small working areas; • Covering stockpiles; and, • Timber will be stacked in dry areas outside of the buffer zone with straw bales and check dams places downstream of these storage areas.	Timber stockpile areas

4.3.1.2 Mitigation Measures to Protect Surface Water Quality during Earthworks

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

Table K: Summary of Drainage Mitigation & 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.

	• 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 Proposed Project (*i.e.,* Wind Farm and Grid Connection) 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).

4.3.1.3 Mitigation Measures to 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 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 a final line of defense if needed.

4.3.1.4 Mitigation Measures to Protect Against the Release of Hydrocarbons

Mitigation measures proposed to avoid the release of hydrocarbons at the Site include:

- Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles.
- On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site.
- Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis.
- Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use.
- All refuelling will be carried out outside designated watercourse buffer zones.
- 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 used during refuelling operations as required.
- All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage.

4.3.1.5 Mitigation Measures to Prevent the Release of Cement-Based Products

Best practice methods for cement-based compounds:

- 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.

4.3.1.6 Mitigation Measures to Prevent Morphological Changes to Surface Water Crossing and Drainage Patterns

The proposed mitigation measures include:

- All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location;
- All proposed drain crossing culverts will be minimum 900mm in diameter;
- New access roads in mapped flood zones will be placed close to ground level to maintain the hydrology of the Site. Culverts will be placed along access roads accordingly (i.e. low points and depressions) to facilitate drainage of flood waters;
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland1 is 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", 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);
- 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; and,
- All new 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.

4.3.1.7 Mitigation Measures to Prevent Surface Quality Effects Biodiversity Enhancement / River Restoration Works

The following measures will be employed to reduce release of sediment to downstream waters:
- All stream work to be performed "in the dry" either by pump-around or stream diversion with silt curtain;
- Impervious dikes or sand bags are to be used to isolate work from stream flow;
- The contractor shall not disturb more area than can be stabilised the same working day;
- Maintenance of stream flow operation shall be incidental to the work. This includes pumps and hoses;
- Pumps and hoses shall be of sufficient size to dewater the work area;
- Graded stream banks shall be stabilised, with matting, prior to predicted rain fall events;

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

- Silt bags and stilling basins shall be used to collect silt and sediment from work area dewatering;
- coir fibre matting shall be installed on the outside of all meander bends where shear stress is likely to be highest, and in other locations where erosion control may be necessary;
- Live willow cuttings (live stakes) shall be installed through the coir fibre matting along both sides of the stream channel following the installation of coir fibre matting to provide bank stability through the establishment of fast-growing native willows; and,
- Installation of cross vanes to prevent erosion of the river banks.

4.3.1.8 Mitigation Measures to Prevent Surface Quality Effects during Watercourse Crossing works

- No stock-piling of construction materials will take place along at the crossing;
- No refuelling of machinery or overnight parking of machinery is permitted in this area;
- No concrete truck chute cleaning is permitted in this area;
- Works will not take place at periods of high rainfall, and will be scaled back or suspended if heavy rain is forecast;
- Local road drainage, culverts and manholes will be temporarily blocked during the works;
- Machinery deliveries will be arranged using existing structures along the public road;
- All machinery operations will take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur;
- Any excess construction material will be immediately removed from the area and sent to a licenced waste facility;
- No stockpiling of materials will be permitted in the constraint zones;
- Spill kits will be available in each item of plant required to complete the stream crossing; and,
- Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required.
- The area around the Clear Bore™ (or similar alternative) batching, pumping and recycling plants will be bunded using terram and sandbags in order to contain any spillages;
- One or more lines of silt fences will be placed between the works area and adjacent rivers and streams on both banks;
- Accidental spillage of fluids will be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.

4.3.1.9 Mitigation Measures to Protect Groundwater Quality

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 as outlined in Sections 4.3.1.4, **Error! Reference source not found.** and 4.3.1.5 above.

4.3.2 Operational Phase

4.3.2.1 Increased Site Runoff and Hydromorphology Effects

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:

- Interceptor drains will be installed 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 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 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 have been designed in consideration of the greenfield runoff rate.

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 Project are the same as those outlined in **Section 4.3.1.2** above.

Mitigation measures for oils and fuels during the operational phase of the Proposed Project are the same as those outlines in **Section 4.3.1.4** 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.

4.3.1 Decommissioning Phase

The potential impacts associated with decommissioning of the Proposed Project 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.

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

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 L** below.

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

SWB	WFD Code	Current Status	Assessed Potential Status Change- Unmitigated	Assessed Status with Mitigation Measures
Eastwood_010	IE_SE_16E170590	Moderate	Poor	Moderate
Clonmore Stream (Suir)_010	IE_SE_16C111000	Moderate	Poor	Moderate
Suir_020	IE_SE_16S020200	Poor	Bad	Poor
Suir_030	IE_SE_16S020300	Moderate	Poor	Moderate
Suir_040	IE_SE_16S020400	Moderate	Poor	Moderate
Suir_050	IE_SE_16S020500	Good	Good	Good
Suir_060	IE_SE_16S020600	Poor	Poor	Poor
Templemore GWB	IE_SE_G_131	Good	Moderate	Good

5. WFD ASSESSMENT 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 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 of the development. 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.

In the event where the current status of the waterbody is Moderate or Poor (i.e. Eastwood_010, Suir_020 and Clonmore Stream (Suir)_010 Rivers) the Proposed Project will not prevent them from achieving Good Status in the future.

As such, the Proposed Project will not impact upon any surface water or groundwater body as it will not cause a deterioration of the status of the body and/or it will not jeopardise the attainment of good status.

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 the EIAR).

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