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Acronyms and Abbreviations

AA	Appropriate Assessment
ACP	An Coimisiún Pleanála
AWEA	American Wind Energy Association
BAI	Broadcasting Authority Ireland
CAP24	Climate Action Plan 2024
CDP	County Development Plan
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk Assessment and Management
CLO	Community Liaison Office
CRM	Collision Risk Model
CSO	Central Statistics Office
DCCAE	Department of Communications, Climate Action and Environment
DOEHLG	Department of the Environment Heritage and Local Government
DTM	Digital Terrain Model
EDs	Electoral Divisions
EHSRs	Essential Health and Safety Requirements
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ELF	Extremely Low Frequency
EMF	Electromagnetic Field
EMP	Emergency Response Plan
EPA	Environmental Protection Agency
EPS	Emergency Power Supply
ERP	Emergency Response Plan
ESB	Electricity Supply Board
EU	European Union
EWC	European Works Council
EWEA	European Wind Energy Association
FWD	Falling Weight Deflectometer survey
GCP	Grid Connection Point
GSI	Geological Survey Ireland
GVA	Gross Value Additional
GW	Gigawatt
HSA	Health and Safety Authority

HSE	Health Service Executive
HV	High Voltage
IARC	International Agency for Research on Cancer
ICNIRP	International Commission on Non-Ionising Radiation Protection
IFI	Inland Fisheries Ireland
IR	Infra-Red
IW	Irish Water
IWEA	Irish Wind Energy Association
km	kilometres
kV	Kilowatts
LVIA	Landscape and Visual Impact Assessment
MCC	Mayo County Council
MCDP	Mayo County Development Plan 2022 - 2028
MW	Megawatt
NDP	National Development Plan
NESC	National Economic and Social Council
NGO's	Non-Governmental Organisations
NIAH	National Inventory of Architectural Heritage
NIFM	National Indicative Fluvial Mapping
NIS	Natura Impact Statement
NM	Nautical Miles
NPWS	National Parks and Wildlife Service
NTS	Non-Technical Summary
OS	Ordnance Survey
PCE	Pre-Connection Enquiry
PCS	Pavement Condition Survey
pNHA	Proposed Natural Heritage Area
PPE	Personal Protective Equipment
PSO	Public Service Obligation levy
PWS	Public Water Scheme
RESS	Renewable Energy Support Scheme
SAC/cSAC	Special Area of Conservation/ candidate Special Area of Conservation
SEAI	Sustainable Energy Authority of Ireland
SEI	Sustainable Energy Ireland
SLR	SLR Consulting Limited
SPA/cSPA	Special Protection Area/ candidate Special Protection Area

SSE	SSE Renewable (Ireland) Limited
SuDS	Sustainable Drainage Scheme
SWMP	Surface Water Management Plan
TBC	To be Confirmed
TDR	Turbine Delivery Route
WEDG	Wind Energy Development Guidelines
WEG	Wind Energy Guidelines
WEI	Wind Energy Ireland
WFD	Water Framework Directive
WHO	World Health Organisation
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

7.0 WATER (HYDROLOGY AND HYDROGEOLOGY)

Introduction

Background

7.1 This chapter of the EIAR provides a description of the surface water and groundwater conditions in the Main Wind Farm Development Site within the context of the regional setting for surface water and groundwater, and assesses the potential impacts the Proposed Project will have on surface water and groundwater. Mitigation measures, if required, are proposed to reduce any potential negative effects associated with the construction, operation and decommissioning of the Proposed Project. Any residual and cumulative effects are also assessed.

7.2 Works within the public carriageway to facilitate a 110 kV Underground Grid Connection from the proposed on-site substation to Bellacorick Substation are also assessed as part of this chapter, however, these aspects form part of a separate application to An Coimisiún Pleanála (ACP).

7.3 See **Chapter 2** of this EIAR for a full detailed description of the Proposed Project **Chapter 1** of this EIAR provides a list of defined terminology.

7.4 The EIA has assessed all design permutations from the turbine dimensions set out in **Table 2-1** of this EIAR.

Statement of Authority

7.5 This chapter of the EIAR was prepared by SLR Consulting Ireland. The project team consists of:

- Dominica Baird BSc, MSc (Hydrogeology), CGeol, EurGeol, MIAH.
- Kristian Divjak BSc, MSc, MIEI.
- Michelle Sherry BSc (Environmental Biology), MIAH, GCIWEM.

7.6 Dominica Baird is Technical Director (Hydrogeology) and has over twenty years' experience in environmental consulting, specialising in hydrogeology and water. Dominica's areas of expertise cover hydrogeology, groundwater risk assessment and contaminated land with experience gained in London, Edinburgh and Dublin. Dominica has worked on various renewable projects, mainly wind farms, as well as cable routes in Ireland and Scotland as lead hydrogeologist and has undertaken field surveys including installation of groundwater monitoring wells, water supply surveys and peat surveys. Dominica has presented findings of hydrogeological assessments at oral hearings and prepared briefs of evidence in arbitration cases.

7.7 Kristian Divjak is a civil engineer with over 9 years of experience in flood risk assessments, hydraulics and drainage design. Throughout his career he has worked on projects in Croatia and Ireland. He has worked on numerous renewable energy projects, flood risk assessments and drainage design. He has inspected various sites for potential wind farm and solar farm developments. This allowed him to identify potential risks at early stage of the project and gave him the ability to communicate complex technical information to a range of project stakeholders.

7.8 Michelle Sherry is a Project Hydrogeologist and has worked on multiple scale renewables projects and has co-authored several EIAR Water and Land, Soil and Geology chapters and Water Framework Directive assessments for wind farm developments.

7.9 The aquatic ecology and fisheries reports were written by Ross Macklin PhD (in preparation) B.Sc. (Hons) MCIEEM., MIFM, HDip GIS, PDip IPM (Principal ecologist with Triturus Environmental Ltd). Ross is an ecologist with over 16 years' professional experience in Ireland. He specialises in freshwater fisheries ecology, biology and water quality. He has considerable experience in a wide range of ecological and environmental projects including EIAR, EcIA, AA/NIS, Construction and Environmental Management Plan (CEMP) reporting, as well as biodiversity, water quality monitoring, invasive species and fisheries management. He also has expert identification skills in macrophytes, freshwater invertebrates, protected aquatic habitats and protected aquatic species including freshwater pearl mussel.

Scope of Work

7.10 This chapter describes the local hydrological and hydrogeological environment at and around the Main Wind Farm Development Site. Existing information on the geology, hydrogeology, and hydrological features of the Muingmore area and its surrounds was collated and evaluated.

7.11 The study area comprises the Main Wind Farm Development Site and the surrounding area to a minimum of 2 km to reflect the sensitivity of the subsurface in the area (IGI EIS Guidelines, 2013). The study area can extend beyond a 2 km radius from the Planning Application Area in certain circumstances where there is a direct hydrological or hydrogeological link to a sensitive receptor and if it is considered that the Proposed Project has the potential to impact on a waterbody.

7.12 The scope of work will also investigate if there are any hydrological or hydrogeological links to sensitive water receptors along the length of the GCR, as well as the three Over-run Areas of the TDR.

7.13 The GCR will follow an existing road with minimal direct impact on the water environment.

7.14 The TDR will follow an existing road network with no likely direct interaction with water environment receptors, with the exception of Over-run Areas, which will require temporary construction works to ensure the safe delivery of the turbines to the Main Wind Farm Development Site.

7.15 The scope of this chapter includes:

- A desk study, in which existing data and relevant regional data sources for the area were examined;
- Site walkover, completed in 2023;
- Surface Water Sampling;
- Ground Investigation, detailed in **Chapter 6 of this EIAR**;
- Stage 1 Flood Risk Assessment;
- Water Framework Directive Assessment, appended to this chapter;
- An assessment of the existing water (hydrology and hydrogeology) within approximately 2 km of the Main Wind Farm Development Site including identification of sensitive surface water receptors, sensitive groundwater receptors, flood risk assessment and water dependent designated sites; and
- An assessment of the potential impact of the Proposed Project on sensitive water (hydrology and hydrogeology) receptors as identified above, including a cumulative assessment.

7.16 Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential adverse impacts.

Legislation, Guidance and Policy

Legislation

7.17 The key EU Legislation which applies to this chapter of the EIAR and the hydrology and hydrogeology assessment are presented herein.

7.18 Since 2000 water management in EU member states has primarily been directed by the Water Framework Directive (WFD) (Directive 2000/60/EC) and the associated 'daughter' Groundwater Directive (Directive 2006/118/EC). It establishes a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters and coastal waters) and groundwater throughout the EU. Under the WFD, surface waters are classified into five quality classes (Ecological status) under the WFD; High, Good, Moderate, Poor and Bad ecological status. Groundwater is classified into two quality classes, Good and Poor chemical and quantitative status. High ecological status is when the water is unpolluted, while Bad ecological status is when the water is highly polluted. The WFD requires all Member States to maintain waterbodies of Good or High status and improve water quality in all waters with a status less than Good status to achieve Good ecological and chemical status by 2027.

7.19 The WFD identifies where actions are required to achieve Good ecological and chemical status or maintain waterbodies which are already Good chemical status or High / Good ecological status. Waterbodies can be restored to Good and High ecological status by using targeted actions and measures to reduce the impact of human activities on them.

7.20 The chemical status of a waterbody is assessed based on certain chemical pollutants (Priority Substances and Certain Other Pollutants (Annex II, Environmental Quality Standards (EQS) Directive (2008/105/EC) as amended) while the ecological status is assessed based on Biotic Indices or Quality (Q) Values. These Q values, ranging from Q1 to Q5, are based on the relative proportion of pollution tolerant to pollution sensitive macroinvertebrates resident at a river site and are defined as part of the biological river quality classification system. The Q values correlate with the river's pollution and WFD status, see **Table 7-1** below.

Table 7-1: EPA Q Ratings Classification System

Biotic Index (Q Value)	WFD Status	Quality Status	Quality Class	Condition
Q5, Q4-5	High	Unpolluted	Class A	Satisfactory
Q4	Good	Unpolluted	Class A	Satisfactory
Q3-4	Moderate	Slightly Polluted	Class B	Unsatisfactory
Q3, Q2-3	Poor	Moderately Polluted	Class C	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously Polluted	Class D	Unsatisfactory

7.21 Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending ('EIA Directive').

7.22 Other EU Directives to which this EIAR makes reference, or has had regard, are listed in **Technical Appendix 7-1** found in Volume 3 of this EIAR.

7.23 National Legislation which applies to this chapter of the EIAR and the hydrology and hydrogeology assessment presented herein is also listed in **Technical Appendix 7-1** found in Volume 3 of this EIAR.

Planning Policy and Development Management Standards

7.24 The Planning Policy and Development Management Standards relating to water at the Main Wind Farm Development Site in this EIAR are set out in the Mayo County Development Plan (MCDP) 2022-2028, Volume 1. In Chapter 10, "Natural Environment", of the MCDP Volume 1, Section 10.4.9 provides a list of objectives relating to Water Quality, the Water Framework Directive, the "Blue Dot" Catchments Programme, Drinking Water Protected Areas and the protection of Source Protection Zones.

7.25 These objectives are set out under Water Quality Policies and Water Quality Objectives. The Water Quality Policies are as follows:

- Policy **NEP 17** states *"To promote public awareness of water quality issues and the measures required to protect surface water, coastal and transitional waters and groundwater bodies from inappropriate and damaging development."*
- Policy **NEP 18** states *"To co-operate with the EPA and other authorities in the continued implementation of the EU Water Framework Directive."*
- Policy **NEP 19** states *"To protect existing groundwater sources and aquifers in the county and to manage development in a manner consistent with the protection of these resources."*
- Policy **NEP 20** states *"To meet our targets to achieve 'good status' in all water bodies in compliance with the Water Framework Directive and to cooperate with the implementation of the National River Basin Management Plan 2018-2021, and subsequent plans."*
- Policy **NEP 21** states *"To manage, protect and enhance surface water and ground water quality to meet the requirements of the Water Framework Directive."*

7.26 In Chapter 10, under Sections 10.4.2 and 10.4.3, a list of water related objectives is outlined in relation to Biodiversity, Designated and Non-Designated Sites:

- Objective **NEO 6** states, *"To protect surface waters, aquatic and wetland habitats and freshwater and water-dependent species through the implementation of all appropriate and relevant Directives and transposed legislation and seek to protect and conserve the quality, character and features of inland waterways by controlling developments close to navigable and non-navigable waterways."*
- Objective **NEO 7** states, *"To seek the protection of the riparian zones of watercourses throughout the county, recognising the benefits they provide in relation to flood risk management, their protection of the ecological integrity of watercourse systems and the role they play in the enhancement of the county's natural heritage and biodiversity."*

7.27 The Water Quality Objectives are as follows:

- Objective **NEO 37** states *"To ensure that the Water Framework Directive, the River Basin Management Plan and any subsequent Water Management Plans are fully considered throughout the planning process."*

- Objective **NEO 38** states *"To ensure, through the implementation of the River Basin Management Plan(s) and the associated Programmes of Measures and any other associated legislation or revised plans, with all relevant stakeholders, the protection and improvement of all drinking waters, surface water, coastal and transitional waters and ground waters throughout the county."*
- Objective **NEO 39** states *"To manage in a sustainable manner, the existing groundwater sources and aquifers in the county and manage development in a manner consistent with the sustainable management of these resources, in conformity with the EU Environmental Objectives (Groundwater) Regulations 2010 and the second cycle National River Basin Management Plan 2018-2021, and any subsequent plans and the Groundwater Protection Scheme."*
- Objective **NEO 40** states *"To protect groundwater sources through the implementation of the Groundwater Protection Scheme and Source Protection Zones. Development proposals within these zones which have the potential to pose a risk to groundwater will be required to demonstrate that no reasonable alternative site is available, and that groundwater quality will be protected to the satisfaction of the Council."*
- Objective **NEO 41** states *"To protect both ground and surface water resources and to work with Irish Water to develop and implement Drinking Water Safety Plans, to protect sources of public water supply and their contributing catchment, and to work with the National Federation of Group Water Schemes, in respect of Source Protection Plans for Group Water Schemes to protect these sources."*
- Objective **NEO 42** states *"To comply with the Blue Dot Catchments Programme and protect and restore high status water bodies in County Mayo and ensure all proposed development which may have an impact on a high-status water quality site will require site specific assessment to determine localised pressures and demonstrate suitable mitigation measures, in order to protect these sites."*
- Objective **NEO 43** states *"To protect through its regulatory controls and in conjunction with the Local Authority Waters Programme, water bodies with 'high ecological status', to restore water bodies that have fallen below 'high ecological status', to maintain water bodies at 'Good Status' and to mitigate threats to water bodies identified as 'At Risk' i.e. 'Moderate and Poor Status'."*

7.28 Chapter 7, "Infrastructure", under Section 7.4.3 outlines the objectives associated with Surface Water and Flood Risk Management.

- Objective **INO 17** states, *"To require the use of SuDS to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks."*
- Objective **INO 18** states, *"To ensure new development is adequately serviced with surface water drainage infrastructure, which meets the requirements of the Water Framework Directive, associated River Basin Management Plans and Catchment Flood Risk Assessment Management (CFRAM) Plans."*
- Objective **INO 19** states, *"To ensure that a flood risk assessment is carried out for any development proposal where a flood risk is identified in accordance with the Planning System and Flood Risk Management (DoEHLG/OPW 2009) and Circular PL2/2014. This assessment shall be appropriate to the scale and nature of risk to the potential development."*

- Objective **INO 23** states, *"To ensure that where flood risk management works take place that natural heritage, cultural heritage, rivers, streams and watercourses are appropriately protected."*

Guidelines and Technical Standards

7.29 The following guidelines has been complied with in this hydrology and hydrogeology assessment:

- National Roads Authority (2008). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- DEHLG and OPW (2009). The Planning System and Flood Risk Management: Guidelines for Planning Authorities.
- Institute of Geologists of Ireland (April 2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.
- Coillte (2013). Forest Operations & Water Protection Guidelines.
- Environmental Protection Agency (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports: Environmental Protection Agency.

7.30 Additional guidelines and technical standards which apply to this chapter of the EIAR and the hydrology and hydrogeology assessment presented herein are listed in **Technical Appendix 7-1** found in Volume 3 of this EIAR.

7.31 The Planning Statement which accompanies this planning application assesses compliance with key policies.

Consultations

7.32 Consultation took place with a number of organisations including the following relevant bodies:

- Geological Survey Ireland (GSI).
- Environmental Protection Agency (EPA).
- Uisce Éireann.
- Inland Fisheries Ireland (IFI).
- Office of Public Works (OPW).

7.33 The complete list of consultees is presented in **Table 3-3** of **Chapter 3** of this EIAR. The OPW response states that the office has records of flooding or past flood events adjacent to the study area and recommends carrying out a review of historical flood risk using floodinfo.ie, as undertaken in the Surface Water – Hydrology section of this chapter (**7.46-7.48**). The GSI recommends using the groundwater maps on their Map viewer, as undertaken in Groundwater – Hydrogeology section of this chapter (**7.107-7.111**).

Baseline Conditions

Receiving Environment

7.34 The desk study involved the examination of several datasets to determine the hydrological, geological and hydrogeological setting of the area, as seen in **Table 7-2.**

Table 7-2: Regional Datasets

Data	Dataset
Soils	Irish Soils Information System – Teagasc (http://gis.teagasc.ie/soils/) EPA Soil Mapping (http://gis.teagasc.ie/soils/map.php).
Subsoil Geology	Teagasc/GSI/EPA Subsoil Mapping
Bedrock Geology	GSI Groundwater Data Viewer - Bedrock Geology (https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228).
Surface Water	OSi Discovery Series mapping; Environmental Protection Agency; Water Framework Directive OPW FloodInfo (https://www.floodinfo.ie/); OPW NIFM and CFRAM flood maps (https://www.floodinfo.ie/map/floodmaps/).
Groundwater	GSI Groundwater Data Viewer - bedrock and gravel aquifers, vulnerability, water supplies, groundwater recharge; GSI Groundwater body description documents (https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx); and Environmental Protection Agency water maps (https://gis.epa.ie/EPAMaps/Water).
Climate	Met Eireann
Protected Areas, Environmental Pressures	Environmental Protection Agency, National Parks and Wildlife Service

Site Walkover and Surface Water Drainage

7.35 On the 25th of May 2023, a walkover study was conducted to assess the hydrology and hydrogeology features of the Main Wind Farm Development Site and identify any constraints. The site walkover involved an initial review of available information gathered in the desk study. During the site visit, descriptions and photographs (provided in **Technical Appendix 7-2**) of hydrology features were recorded to develop a better understanding of hydrology and drainage process at the Main Wind Farm Development Site. No significant constraints for the proposed wind turbine locations were noted in terms of hydrology and hydrogeology during the site visit. A desk based constraints study was carried out for the GCR and TDR.

7.36 The Main Wind Farm Development Site is drained by a series of small peat and forestry drains connecting into the main peat drains which run along the existing access road, or the Main Wind Farm Development Site boundary.

7.37 The main peat drains at the northern part of the Main Wind Farm Development Site ultimately discharge into the Doolough Stream and An Mhoing Mhor Stream.

7.38 The main peat drains located at the central and southern part of the Main Wind Farm Development Site discharge into unnamed drains which drain into the sea.

7.39 The smaller peat drains are approximately 0.5 m wide and 0.75 m deep. The main peat drains are approximately 2 m wide at the top and about 1.5 m deep. Due to health and safety reasons, the bottom width of the channel could not be measured.

7.40 Approximately 0.3 km northwest of the proposed turbine T8, a pond has been identified. The area of the pond is approximately 0.35 hectares. The pond is not linked with the peat drains.

Development Site Topography

7.41 The Main Wind Farm Development Site predominately consists of cutover lowland blanket bog, forestry and peatland. The bog is extensively drained, is subject to scrub encroachment and there is the pervasive presence of invasive species such as rhododendron (Rhododendron ponteticum) and prickly heath (Gaultheria mucronate). Small areas of scrub and wet grassland are also present. Habitat within the immediate vicinity of the Main Wind Farm Development Site comprises conifer plantation and peatland. The Main Wind Farm Development Site is generally flat with levels ranging from c. 3 m above ordnance datum (AOD) to c. 33 m AOD.

Rainfall and Climate

7.42 The nearest synoptic weather station is Belmullet, located approximately 10 km northwest of the Main Wind Farm Development Site. The monthly precipitation amount (mm) for 2024 is available via Met Éireann's monthly data database and is shown in **Table 7-3** below.

Table 7-3: Average Monthly Rainfall (mm) 2024 for Belmullet

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
117.1	115.4	91.8	95.2	46.5	55.6	80.6	208.1	45.5	132.1	75.6	133.5

7.43 The Long-Term Average (LTA) annual rainfall in the area at the Belmullet weather station is 1,240.8 mm/yr for the period 1991-2020 (Met Eireann, 2023). The LTA monthly rainfall for the period 1991-2020 is shown in **Table 7-4** below.

Table 7-4: LTA (1991-2020) Monthly Rainfall (mm) for Belmullet Weather Station

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
134.3	109.9	90.6	74	70.8	73	85.9	100.5	102.6	131.2	137	131

7.44 According to the GSI spatial resources map viewer, the effective rainfall across the Main Wind Farm Development Site is calculated to be 897.40 mm/yr. Based on groundwater recharge coefficient estimates from the GSI map database, an estimate of 35.90 mm/year average annual recharge is given across the Main Wind Farm Development Site (groundwater recharge coefficient of 4%). A recharge cap does apply to this site.

Soils and Geology

7.45 The soils are discussed in detail in **Chapter 6** of this EIAR. The soil underlaying the Main Wind Farm Development Site is classified as blanket peat. The Main Wind Farm Development Site is entirely underlain by the Annagh Division (undifferentiated), comprising Precambrian age orthogneisses.

Surface Water – Hydrology

7.46 The receiving waters are classified as per the Water Framework Directive (WFD). There are five categories of surface water status: 'High; 'Good', 'Moderate', 'Poor' and 'Bad'. In

accordance with the Surface Water Regulations, water classified as 'High' or 'Good' must not be allowed to deteriorate. Water classified as less than good must be restored.

7.47 Watercourses in the northern area of the Main Wind Farm Development Site are classified as 'At Risk' with a water quality status of 'Poor', while those in the southern area are 'Under Review' with a 'Good' status.

7.48 WFD water quality status and river waterbody risk associated with the Main Wind Farm Development Site are provided in **Table 7-5** below. WFD status and risk for river bodies associated with the Grid Connection Route (GCR) and Turbine Delivery Route (TDR) are presented in **Technical Appendix 7-3** found in Volume 3 of this EIAR**.**

Surface Waterbodies

7.49 The EPA Water database details the name and flow direction of all watercourses within Ireland. Small fields drains and handmade drains are not included in the database, however these were noted during the site walkover (see details above). The EPA surface water bodies are shown in **Figure 7-2**.

7.50 The An Mhoing Mhór stream (WFD ID DOOLOUGH STREAM_010) begins to the west of T7 and flows in a westerly along the northern border of the Main Wind Farm Development Site before it meets the Doolough stream north of T3 and continues to flow along the northern boundary. The Doolough stream then continues to run in a westerly direction into the northwest section of the site where there will be peat restoration works and ultimately discharges into the Blacksod Bay, roughly 0.7 km west of the Main Wind Farm Development Site. Under the WFD, the Doolough stream achieved Poor WFD status and is classified as "At risk" of not meeting its WFD targets by 2027 due to excess sediment and nutrients from agriculture and peat drainage / extraction.

7.51 An unnamed stream on the EPA water database, but with a WFD ID (WFD ID AN_RÁITH_010) begins in the middle of the Main Wind Farm Development Site, to the east of T9, and flows in a southerly direction along the southeast border before it drains into Blacksod Bay. The unnamed stream received a Good WFD status and was deemed "Not at risk" of achieving its WFD targets by 2027.

7.52 Another unnamed stream (WFD ID TRISTIA_010) flows in a southerly direction along the eastern border of the Main Wind Farm Development Site and into Tullaghan Bay. This stream has three small tributaries, two of which are located within the centre of the Main Wind Farm Development Site halfway between T8 and T13 and immediately south of T4. It flows in a north easterly direction through the Main Wind Farm Development Site and proceeds to flow out from the Main Wind Farm Development Site in a south easterly direction. This stream received a Good WFD status and was deemed "Not at risk" of achieving its 2027 targets.

7.53 The Doolough Stream drains into the Mullet/Blacksod Bay Complex SAC (ID 000470). The unnamed streams (WFD ID AN_RÁITH_010) at the southern area of the Main Wind Farm Development Site discharge into the Blacksod Bay/Broad Haven SPA (ID 004037) and the other unnamed stream (WFD TRISTIA_010) drains into the Tullaghan Bay And Bog NHA (ID 001567).

7.54 A list of waterbodies associated with the Main Wind Farm Development Site and their respective WFD classifications and risk status is seen down below in **Table 7-5** below**.**

7.55 The surface water bodies associated with three Over-run Areas of the TDR, as shown in **Figure 7-8a-d**, are below:

- Over-run Area 1 is located c. 94 m west of the Tristia 33 river (WFD ID TRISTIA_010) which is of Good WFD status and is still Under Review for its WFD risk status.
- Over-run Area 2 intersects with the Moneynierin river (WFD ID MUING_010) which achieved a Good WFD status and is labelled as Not at risk of achieving its WFD targets by 2027.
- Over-run Area 3 is located within 50 m of an unnamed stream (WFD ID OWENMORE (MAYO)_060). This river received a High WFD status during the Fourth WFD Cycle (2019-2024) and is labelled as Not at risk.

7.56 The list of surface water bodies (SWBs) located along the GCR is seen presented in **Technical Appendix 7-3**. The Water Framework Directive water quality status and river waterbody risk associated with the GCR and TDR are also provided in **Technical Appendix 7-3**.

Water Crossings

7.57 The proposed wind turbine layout will utilise in total four watercourse crossings as shown on **Figure 7-1b**. The two existing and two proposed crossings are listed in **Table 7-5** below.

Table 7-5: On Site Water Crossings

Crossing Point	Existing / Proposed	X coordinate (ITM)	Y coordinate (ITM)	Surface Water Body Name	WFD Surface Water Body Name
WCX1	Proposed	476064	823774	Doolough Stream	DOOLOUGH_STREAM_010
WCX2	Proposed	476880	822463	Unnamed	TRISTIA_010
WCX3	Existing	477113	822549	Unnamed	TRISTIA_010
WCX4	Existing	477286	822437	Unnamed	TRISTIA_010

7.58 There is only one water crossing associated with the TDR Over-run Areas. Over-run Area 2 will cross the Moneynierin (WFD ID MUING_010), seen in **Figure 7-10c**.

7.59 Over-run Area 3 is located within 50 m of an unnamed stream (WFD ID OWENMORE (MAYO)_060) due to constraints associated with land access, see **Figure 7-10d**. As there will be proposed construction or infrastructure located within 50 m of the stream, further mitigation measures will be proposed to facilitate the turbine delivery with minimal impact to nearby water receptors.

7.60 The proposed (WCX 1 and WCX 2) and existing water crossings associated with the GCR are shown in **Figure 7-1b-e**. The GCR is approximately 25.5 km in length and, consists of 32 existing watercrossings, all located on public roads. The TDR is approximately 200 km in length and crosses c95 river waterbodies.

Catchments

7.61 The Main Wind Farm Development Site falls within the boundary Blacksod-Broadhaven Catchment (ID 33). The surface waterbodies in the vicinity of the Main Wind Farm Development Site drain to the Blacksod Bay to the west and to Tullaghan Bay to the south, see **Figure 7-2**.

7.62 The Blacksod-Broadhaven Catchment includes the area drained by all streams entering tidal water in Blacksod and Broadhaven Bays and between Corraun Point and Benwee Head, Co. Mayo, draining a total area of 1,302 km². The catchment contains many upland areas including the north Mayo coast and the northern part of the Nephin Beg range. The catchment is underlain mostly by metamorphic rocks (schist and gneiss) with sandstones and shales underlying the flat expanses to the east of Bangor. This catchment includes part of mainland County Mayo, the Belmullet Peninsula and Achill Island.

7.63 The Main Wind Farm Development Site is situated within two sub-catchments. As shown in **Figure 7-2**, these are:

- Glencastle_SC_010.
- Owenmore [Mayo]_SC_030.
- The GCR crosses four sub-catchments, and these are:
  - Glencastle_SC_010.
  - Owenmore [Mayo]_SC_030.
  - Owenmore [Mayo]_SC_020.
  - Munhin_SC_010.

7.64 The three Over-run Areas of the TDR, as shown in **Figure 7-10a-d**, are also situated within the Blacksod-Broadhaven (ID 33) catchment and cross the following sub-catchments:

- Over-run Areas 3 and 1 are within the Owenmore[Mayo]_SC_030 subcatchment; and
- Over-run Area 2 is within the Owenmore[Mayo]_SC_020 subcatchment

7.65 The list of catchments and sub-catchments that the TDR crosses is presented in **Technical Appendix 7-3.**

Table 7-6: WFD Classification for Surface Water Bodies associated with the Main Wind Farm Development Site

Catchment (Catchment ID)	WFD Sub-catchment (Sub-catchment ID)	EPA Water Maps Name	River Network EPA Name (Segment Code)	River Waterbody WFD Status 2010-2015	River Waterbody WFD Status 2013-2018	River Waterbody WFD Status 2016-2021	River Waterbody WFD Risk 2016-2021
Blacksod-Broadhaven (33)	Glencastle_SC_010 (33_2)	AN_MHOING_MHÓR / Doolough (Stream)	DOOLOUGH STREAM_010 (IE_WE_33D020100)	Poor	Moderate	Poor	At risk due to excess sediment and nutrients from agriculture and peat drainage / extraction.
		Unnamed	AN_RÁITH _010 (IE_WE_33R010800)	Unassigned	Good	Good	Under review
	Owenmore [Mayo]_SC_030 (33_11)	Unnamed	TRISTIA_010 (IE_WE_33T070130)	Unassigned	Good	Good	Under review

EPA Surface Water Quality

7.66 The EPA regularly monitors water bodies in Ireland as part of their remit under the WFD (2000/60/EC), which requires that rivers are maintained or restored to good/ favourable status. They carry out biological water quality surveys at monitoring stations across Ireland as part of their water quality monitoring programme as described in the EPA publication 'Water Quality in Ireland, 2003'and assign a Q value to each location they monitor.

7.67 There is one operational water quality monitoring station (RS33D020100) located c. 0.6 km west of the Main Wind Farm Development Site boundary, downstream of the Doolough Stream and owned by Mayo County Council. Historic and recent Biological Water Quality Ratings at this station are outlined in **Table 7-7**. The Q rating ranged from Q2-3 to Q3-4 at this station, which indicates the Doolough Stream has a "moderately polluted" to "slightly polluted" status.

Table 7-7 EPA Biological Water Quality Ratings

Station ID	RS33D020100
Station Name	Bridge S. of Lough Nahelly
Watercourse	Doolough Stream
Distance	c. 0.6 km east of Main Wind Farm Development Site
Year	**Q rating**
1990	3-4
1994	3
1997	3
1999	3-4
2003	3-4
2005	3-4
2008	3
2011	2-3
2014	3
2017	3-4
2020	3
2023	3

7.68 There are no EPA monitoring stations upstream or downstream of Over-run Area 1 of the TDR. There is one monitoring station, RS33O040400, c. 1.9 km downstream of Over-run Area 3, on the Owenmore (Mayo) river which received a Q value of Q4-5 in its most recent survey in 2005. A more recent survey was done in 2023 on the Owenmore (Mayo) at monitoring station RS33O040500, c. 3.8 km downstream of Over-run Area 1, which shows the river received a Q score of Q4-5.

7.69 For Over-run Area 2, there are no EPA monitoring stations upstream of the temporary construction activities but there are several downstream. EPA station RS33M010100, located c. 671.91 m west of the Over-run Area, received a Good (Q4) Q score in 2021 and

EPA monitoring station RS33O040150, located c. 1.44 km west of the Over-run Area, received a Q score of Q5 in 2023. The GCR runs along the same roads as the TDR from Node 1 to Node 4. Hence, the EPA stations described above for Over-run Areas 1, 2 and 3 of the TDR are also in proximity of the GCR.

7.70 Additional EPA river monitoring stations are located along the GCR between the Over-run Areas of the TDR. Some of these stations have been omitted from discussion as they have not been monitored in recent years and therefore, do not accurately represent the current water status of the river.

7.71 There are 4 EPA monitoring stations located along the GCR on the Owenmore River which haven't been referenced above. EPA station RS33O040325, located c. 895.91 m southwest of Bangor Erris, recorded a Q value of Q4-5 (High status) in 2020 and EPA station RS33O040300 located c. 261.34 m south of Bangor Erris recorded a Q4 (Good) in 2020. Two stations situated downstream and west of Bellacorick Power Station- RS33O040270 located c. 6.2 km west and RS33O040250 c. 3.07 km west - recorded a Q value of Q5 in 2021.

7.72 A detailed baseline aquatic survey was conducted in the area of the Main Wind Farm Development Site and along the GCR and TDR in September 2023 by Triturus Ltd. In total, 54 sites for selected for detailed aquatic assessment, including biological water quality (Q-sampling). The details of the survey are summarised in **Chapter 5** of this EIAR and in the WFD Assessment listed in **Technical Appendix 7-4.**

7.73 According to the EPA maps database, there are no facilities within 2 km of the Main Wind Farm Development Site with EPA licences (IEL, IPC, Section 4 Discharge).

Site specific Surface Water Quality Sampling

7.74 Surface water quality sampling was undertaken at 15 locations associated with the Main Wind Farm Development Site on 28th August 2023. by SLR Consulting. Where it was safe and accessible to do so, the sampling points, see **Figure 7-3**, were selected to correspond with those identified in an aquatic survey report prepared by Triturus Ltd. for the Main Wind Farm Development Site. This aquatic survey report is summarised in **Chapter 5** of this EIAR, see **Technical Appendix 5-4**. Samples SW1 to SW5 are located along the GCR and the TDR and samples SW6 to SW15 are located in or around the Main Wind Farm Development Site. These sampling locations are listed below in **Table 7-8**.

Table 7-8: Surface Water Sampling Locations

Sampling Location ID	Watercourse	Triturus Ltd. Location ID	
SW1	Unnamed Stream*	D25	GCR/TDR
SW2	Briska Stream*	D8	GCR/TDR
SW3	Srahanarry Stream*	D6	GCR/TDR
SW4	Munhin Stream*	D3	GCR/TDR
SW5	Goolamore Stream*	D2	GCR/TDR
SW6	Unnamed Stream*	B6	Site boundary
SW7	Unnamed Stream*	A2	Site boundary
SW8	Unnamed Stream*	B5	Site boundary
SW9	Unnamed Stream	c.0.06 km downstream of B3	Site boundary

Sampling Location ID	Watercourse	Triturus Ltd. Location ID	
SW10	Unnamed Stream	c. 0.1 km downstream of B1	Site boundary
SW11	An Mhoing Mhor Stream	c.0.08 km downstream of C1	Site boundary
SW12	Doolough Stream*	C2	Site boundary
SW13	Unnamed Stream*	c. 0.15 km upstream of C3	Site boundary
SW14	Unnamed Stream*	N/A	Site boundary
SW15	Doolough Stream*	C5	Site boundary
*water crossings			

7.75 Samples were collected using laboratory-supplied containers appropriate for the required analyses. Each container was filled with minimum air space and securely sealed to prevent the loss of volatile components and to avoid separation of sample constituents. All containers were clearly and uniquely labelled with relevant details, including sample ID and collection date.

7.76 Once the grab samples were collected, they were placed in a cooler box with ice packs to maintain a temperature at 5°C (± 3°C). A Chain Of Custody record, which documented the analyses required for each sample, accompanied the samples. Samples were subsequently sent to ALS laboratories for analysis.

7.77 The following parameters were tested for:

- Suspended Solids, phosphorus, COD total, BOD 5 day total, pH, turbidity, ammonia as NH3, nitrate as NO3, orthophosphate, nitrite as NO2, total oxidised nitrogen, conductivity and petroleum hydrocarbons.

Surface Water Quality

7.78 The surface water quality results were compared to environmental quality standards (EQS) for Inland Surface Water SI No. 272 of 2009 and SI No. 77 of 2019. The laboratory results are presented in **Technical Appendix 7-5** and the screened results are presented in **Table 7-9** below.

7.79 For all 15 monitoring locations, all hydrocarbons and volatiles were reported at less than detection limit. Hence, they were not reported in **Table 7-9** below.

7.80 Monitoring locations SW1, SW4 and SW5, situated along the GCR, did not achieve the Good WFD status threshold value for phosphorus as per the SW Regulations (S.I. No 77 of 2019). Adjacent to the site boundary, SW8 (located northeast of T13) and SW13 (located west of the BESS and substation) also did not achieve Good WFD status for their phosphorus conditions. It should be noted that the laboratory limit of detection (LOD) for phosphorus, <0.10 mg/l, also exceeds this threshold limit of <0.025 mg/l.

7.81 Grab sampling locations SW3 and SW5 on the GCR recorded pH levels below the lower threshold pH limit of pH 6. Additionally, all grab sampling locations situated along the Main Wind Farm Development Site boundary were below pH6, with the exception of SW7 at the southernmost tip of the Main Wind Farm Development Site boundary and SW13, situated west of the BESS and substation. The lowest pH was observed in SW3 on the GCR with a pH of 4.6.

7.82 The Good WFD status threshold value for BOD, ≤1.5 mg/l, was not achieved in all monitoring locations.

7.83 Ammonia (as NH3) exceeded the threshold value of ≤0.02 mg/l as set out in the Salmonid Water Regulations (SI. No. 293 of 1988) at all monitoring locations adjacent to the Main Wind Farm Development Site boundary, with the exception of SW6 (located downstream of T12), and SW12 and SW14 on the Doolough Stream. The highest concentration recorded was 0.32 mg/l at sample location SW7 which is situated downstream of the Main Wind Farm Development Site and south of T10.

Table 7-9: Surface Water Quality for 28th August 2023

Parameter	Units	SW Regulations (S.I. No. 272 of 2009/S.I. No. 77 of 2019)	Salmonid Water Regulations (S.I. No. 293 of 1988)	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12	SW13	SW14	SW15
Inorganics																		
Suspended Solids	mg/l	-	≤ 25	6	<5	<5	22	<5	<5	9	<5	<5	8	<5	<5	15	<5	7
Phosphorous	mg/l	High status ≤ 0.010 (mean) Good status ≤ 0.025 (mean)	-	**0.17**	<0.10	<0.10	**0.12**	**0.12**	<0.10	<0.10	**0.17**	<0.10	<0.10	<0.10	<0.10	**0.16**	<0.10	<0.10
COD Total	mg/l	-	-	54	35	37	49	78	81	1190	90	118	99	66	61	86	67	61
pH	pH units	Soft Water 4.5< pH < 9.0, Hard Water 6.0< pH < 9.0	≥ 6 ≤ 9	6.5	6.2	**4.6**	6.5	**5.9**	**5.5**	7.9	**5.4**	**5.2**	**5.3**	**5.2**	**5.7**	6.4	**5.1**	**5.1**
Turbidity	NTU	-	-	3.18	1.99	0.94	13	2.07	1.27	2.23	1.57	1.06	1.06	1.12	1.98	9.94	0.74	1.89
BOD 5 day Total	mg/l	High status ≤ 1.3 (mean) or ≤ 2.2 (95%ile), Good status	≤ 5	**5**	**5**	**4**	**4**	**4**	**3**	**3**	**4**	**3**	**3**	**3**	**2**	**3**	**2**	**3**

Parameter	Units	SW Regulations (S.I. No. 272 of 2009/S.I. No. 77 of 2019)	Salmonid Water Regulations (S.I. No. 293 of 1988)	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12	SW13	SW14	SW15
		≤ 1.5 (mean) or ≤ 2.6 (95%ile)																
Ammonia as NH3	mg/l	-	≤ 0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02	**0.32**	**0.03**	**0.03**	**0.04**	**0.03**	0.02	**0.03**	<0.02	**0.03**
Nitrate	mg/l	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Orthophosphate	mg/l	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite	mg/l	-	≤ 0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Oxidised Nitrogen	mg/l	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Conductivity @ 20°C	µs/cm	-	-	64	41	41	100	95	106	44	112	172	86	93	93	180	103	114

Yellow indicates exceedance of SW Regs S.I. No. 272 of 2009/S.I. No. 77 of 2019
Green indicates exceedance of Salmonid Water Regulations S.I. No. 293 of 1988

Flooding

7.84 A Stage 1 Flood Risk Assessment has been undertaken and is presented below.

Fluvial Flooding

7.85 Fluvial flooding occurs when rivers overflow their banks due to excessive rainfall or snowmelt.

7.86 Available fluvial flood maps for the Main Wind Farm Development Site are National Indicative Fluvial Maps (NIFM), which can be accessed via the OPW web site[1]. The flood mapping is shown in **Figure 7-2**.

7.87 The NIFM dataset has been produced nationally for catchments greater than 5 km^2 in areas for which flood maps were not produced under the National CFRAM Programme. The NIFM dataset are 'predictive' flood maps showing indicative areas predicted to be inundated during a theoretical fluvial flood event with an estimated probability of occurrence.

7.88 The NIFM identifies some minor flooding at the northwestern boundary of the Main Wind Farm Development Site for both the 1% AEP and 0.1% AEP event. The source of flooding is the Doolough Stream. The extent of the flooding is shown in **Figure 7-2** and does not impact on the proposed infrastructure.

7.89 According to the Flood Risk Guidelines, the Proposed Project is appropriate for this flood zone, and the Justification Test is not required.

7.90 The NIFM maps reveal that the TDR Over-run Areas 1 and 3 are not within areas at risk of flooding during a low (0.1% AEP) or medium (1% AEP) probability event, see **Figure 7-10b**, **Figure 7-10c** and **Figure 7-10d**. The River Muing, located downstream of the Moneynierin and c. 314.5 m north of Over-run Area 2, is predicted to be at risk of flooding during both a low probability and medium probability flooding event. However, the flooding extent does not reach the Over-run Area.

7.91 Two small sections of the GCR are identified as being at risk of flooding during a medium (1% AEP) and low (0.1% AEP) probability event. One section is a small part of the L1206, c. 700 m directly northeast where the Minhin River joins the Oweniny River. The second section is 900 m northeast along the L1206. There has not been any historical flooding within these flood zones and therefore the impact of flooding to the GCR is low.

Pluvial Flooding

7.92 Pluvial flooding occurs when rainfall intensity exceeds the infiltration capacity of the ground. Intense rainfall events can result in ponding in low areas or upstream of physical obstructions. Overland flow is most likely to occur following periods of sustained and intense rainfall when the ground surface becomes saturated.

7.93 There are no available pluvial flood maps for the Main Wind Farm Development Site, TDR or GCR.

7.94 During the site walkover detailed in **Section 7.35**, no significant local low points were identified where the surface runoff could pond to. The Main Wind Farm Development Site

[1] https://www.floodinfo.ie/map/floodmaps/# (accessed: 17/10/2025)

has an extensive network of drains to collect the rainfall and discharge it into the local streams.

7.95 Based on the site walkover, pluvial flood risk for the Proposed Project is considered to be low.

Coastal Flooding

7.96 Coastal flooding occurs when seawater inundates dry land, primarily due to storm surges and rising sea levels.

7.97 National Coastal Flood Hazard Mapping (NCFHM) 2021[2] shows a minor flooding within the southern boundary of the Main Wind Farm Development Site for the 0.1% AEP and 0.5% AEP flood events. No infrastructure is proposed within that area. The proposed infrastructure will be located within the area of the low risk of flooding (Flood Zone C).

7.98 The three Over-run Areas of the TDR are not within areas at risk of coastal flooding.

7.99 According to the NCFHMs, the GCR is not within an area at risk to coastal flooding.

Groundwater Flooding

7.100 Groundwater flooding occurs when the water table rises above the surface, leading to the inundation of low-lying areas.

7.101 There is no evidence from GSI mapping to suggest that groundwater is a potential source of flood risk to the Main Wind Farm Development Site or the Over-run Areas of the TDR.

7.102 According to the GSI historical flooding maps there has been no recorded groundwater flooding along the GCR.

Historical Flooding

7.103 According to the OPW database[3], there are no recorded historical or recurring flood incidents within the Main Wind Farm Development Site. The closest flood incident is approximately 5.4 km north of the Main Wind Farm Development Site and in a different sub-catchment. Therefore, these flood events are not considered relevant for the Main Wind Farm Development Site.

7.104 There are no reports of past flooding events within or near any of the three Over-run Areas of the TDR.

7.105 According to the OPW database, there has been one historical flooding event along the GCR which occurred in July 1997 and caused severe damage to the Glencullen Bridge, south of Bangor Erris, Co. Mayo. There have been no subsequent flooding events at this location.

7.106 **Table 7-10** below summarises the results of the Stage 1 initial flood risk assessment. As the flood risk is low for the Proposed Project, a Stage 2 risk assessment is not required.

[2] https://www.floodinfo.ie/map/coastal_map (accessed: 17/10/2025)

[3] https://www.floodinfo.ie/map/floodmaps/ (accessed: 17/10/2025)

Table 7-10 Stage 1 Flood Risk Assessment Summary

Flooding Source	Data Source	Flood Risk
Fluvial	National Indicative Flood Maps	Low
Pluvial	Site Walkover	Low
Coastal	National Coastal Flood Hazard Mapping	Low
Groundwater	Geological Survey Ireland Groundwater Flooding	Low

Groundwater - Hydrogeology

Ground Investigation Monitoring Boreholes

7.107 A ground investigation was conducted from September 23rd 2024 to November 20th 2024 at the Main Wind Farm Development Site to provide factual geotechnical information of the underlying ground conditions at the Main Wind Farm Development Site.

7.108 Detailed information on the site investigation is documented in **Chapter 6** of this EIAR and in the Ground Investigation Factual Report provided in **Technical Appendix 6-1** of **Volume 3** of this EIAR.

7.109 The site investigation was conducted across the Main Wind Farm Development Site, as detailed in **Technical Appendix 6-1** which consisted of 32 no. machine-excavated trial pits and 16 no. rotary boreholes. Bedrock was proven across the Main Wind Farm Development Site and consisted of the Annagh Division and was generally described as medium strong to very strong Orthogneiss. The bedrock was encountered underlying the superficial material between 3.55 to 13.9 mbgl. Bedrock was proven to a maximum depth of 20.3 mbgl in BH-07. Groundwater was encountered at the Main Wind Farm Development Site within trial excavations between 1.1 to 3.7 mbgl.

7.110 Boreholes BH01 and BH02 are located in the northwest corner of the Main Wind Farm Development Site, beside the proposed T1 and T2 locations. Both boreholes were drilled to a depth of 13.1 m. The ground conditions at these two locations consisted of coarse quartz/granite and quartzite gravel which was underlain by very strong and medium grained orthogneiss. There was no peat observed at the BH01 location but there was a layer of silty sand.

7.111 Borehole BH07 is located along the northeast border of the Main Wind Farm Development Site where the proposed location for T7 will be. The borehole had a final depth of 20.3 m and conditions consisted of layers of peat, silty sand and gravel which were underlain by weathered and very strong orthogneiss.

Aquifer Classification

7.112 According to the GSI groundwater resources maps and classification system 4, the aquifer underlying the study area is a Poor Aquifer (Pl), which is a bedrock aquifer that is generally unproductive except for local zones. This refers to the Annagh Divion (undifferentiated) bedrock of foliated orthogneisses, see **Figure 6-3** found in **Chapter 6** of this EIAR.

7.113 The GCR runs over three aquifers. The main aquifer present is a Pl, bedrock which is generally unproductive except for local zones. Approximately 3.5 km east of Bangor is a strip of a Locally Important bedrock Aquifer (Ll) that is moderately productive in local zones only and a Locally Important bedrock Aquifer (Lm) that is moderately productive.

7.114 All three Over-run Areas of the TDR, as shown in **Figure 7-11a-d**, overly a Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones (Pl).

7.115 The TDR overlies several aquifers, presented in **Technical Appendix 7-3**.

Groundwater Vulnerability

7.116 The GSI has developed a groundwater vulnerability classification for Ireland, refer to **Table 7-11** below. Groundwater vulnerability at a particular point is controlled by the natural geological and hydrogeological characteristics at that point. Vulnerability depends on the nature of the subsoils (i.e. their permeability characteristics), the type of recharge (point or diffuse) and the thickness of the unsaturated zone (depth to groundwater).

7.117 The GSI's national groundwater vulnerability map has indicated the groundwater vulnerability in the Main Wind Farm Development Site as "Low" to "Moderate". All the proposed turbines and associated site facilities are classified as "Moderate", see **Figure 7-5**. The groundwater vulnerability rating is summarised in **Table 7-11** below**.**

Table 7-11: GSI Groundwater Vulnerability Rating

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand / gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/Gravel aquifers only)	(< 30 m radius)
Extreme (E)	0-3.0 m	0-3.0 m	0-3.0 m	0-3.0 m	-
High (H)	>3.0 m	3.0-10.0 m	3.0-5.0 m	>3.0 m	N/A
Moderate (M)	N/A	>10.0 m	5.0-10.0 m	N/A	N/A
Low (L)	N/A	N/A	>10.0 m	N/A	N/A
Notes: (i) N/A= not applicable (ii) Precise permeability value cannot be given at present. (iii) Release point of contaminants is assumed to be 1-2 m below ground surface.					

7.118 The groundwater vulnerability ratings underling each of the water crossings under the GCR, are listed in **Technical Appendix 7-3**.

7.119 The groundwater vulnerability ratings underling each of the three TDR Over-run Areas, seen in **Figure 7-14a-d** are listed below:

- Over-run Areas 2 and 1 both have a groundwater vulnerability rating of Low (L)
- The groundwater vulnerability rating underlying Over-run Area 3 ranges from Low-High vulnerability but mostly has a rating of Low (L).

7.120 The groundwater vulnerability ratings along the TDR are also listed in **Technical Appendix 7-3.**

Groundwater Bodies

7.121 A Groundwater Body (GWB) is a designated groundwater management unit to which the environmental objectives of the WFD must apply. The Main Wind Farm Development Site is underlain by the Belmullet Groundwater Body.

7.122 The GSI has issued a Summary of Initial Characterisation report4 for the Belmullet GWB. The GSI online database indicates that 99% of the GWB is composed of poorly productive bedrock aquifer which is generally unproductive except for local zones (Pl), including the bedrock aquifer underlying the Main Wind Farm Development Site. The bedrock across the Main Wind Farm Development Site was proven to consist of Annagh Division bedrock, as expected.

7.123 The GWB comprises northwest Mayo from Broadhaven to, and including, Achill Island. The northern, western and southern boundaries of the GWB are bounded by coastline. The eastern boundary of the GWB is an upland area dividing water draining to the west to the Atlantic from water draining east to Killala Bay and L. Conn. The land surface is characterised by steep slopes and mountainous terrain (Nephin Beg range) in the central portion of the GWB, flattening east and west. Elevations range from 10-720 mAOD. On the easterly side of the Nephin Beg range elevations are higher than those on the west side, thus overall surface water flow is predominantly to the west, cutting through the mountains.

7.124 Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Generally, water levels are 0-8 m below ground level. Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to nearby streams and small springs. There are observed deep water strikes, indicating that there is a component of deep groundwater flow, however shallow groundwater flow is dominant. Groundwater flow directions are expected to follow topography – overall in a westerly direction.

7.125 Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops. Due to the low permeability of much of the subsoil (blanket peat) in the groundwater body and the poor productivity of the aquifers, a high proportion of the available recharge will discharge to the streams. In addition, the steep slopes in the mountainous areas promote surface runoff. The stream density is high indicating the high proportion of surface runoff.

7.126 The Belmullet GWB underlaying the Main Wind Farm Development Site, the three Over-run Areas of the TDR and the majority of the GCR achieved Good WFD status under the WFD and is classified as “Not at risk”, see **Figure 7-15a-d**.

7.127 The GCR is mostly based in the Belmullet GWB but it runs briefly through the Bangor GWB which is also of Good WFD status and is classified as “Not at risk”, see **Table 7-12** below. The GWBs that the TDR runs through and their respective WFD and risk status is listed in **Technical Appendix 7-3**.

Table 7-12: WFD Classification for Groundwater Bodies associated with the Main Wind Farm Development Site, GCR and Over-run Areas of the TDR

Groundwater Body Name	WFD 3rd Cycle Status	Risk Status
Belmullet GWB	Good	Not at risk
Bangor GWB	Good	Not at risk

Karst

7.128 According to the GSI groundwater karst database, there are no identified karst features within a 2 km zone from the Main Wind Farm Development Site, cable route and the three

Over-run Areas of the TDR, pictured in **Figure 7-11a-d.** From Node 1 to Node 4 of the Turbine Delivery Route (TDR), there are also no karst features present. The Nodes are as shown on **Figure 2-4a**.

7.129 The nearest mapped karst features to the Main Wind Farm Development Site are located over 30 km to the east of the Main Wind Farm Development Site boundary at Crossmolina, in the bedrock of the Ballina Limestone Formation. This is located at Node 5 along the TDR. There is a cluster of karst formations here, mostly consisting of enclosed depressions with scarce swallow holes and springs.

7.130 From Node 6 to Node 12, along the N59, there is a scattering of roughly 13 karst features within 2 km of the TDR. From Node 12 to Node 13, there is only one spring located along the N15 but from Node 13 to Node 16, several large clusters of karst features can be found north and south of Ballyshannon with a few more isolated features found along the N15 towards Donegal Town.

7.131 For the remaining nodes along the TDR (Node 16 to Node 27), no karst features are located within 2 km of the TDR.

Public Water Scheme (PWS) Areas

7.132 A review of the EPA, GSI and National Federation of Group Water Schemes (NFGWS) databases show that there are no public water schemes within 2 km of the Main Wind Farm Development Site (**Figure 7-7**). Schemes at a distance from the Main Wind Farm Development Site include an unnamed NFGWS GWS located c. 5.08 km southwest of the Main Wind Farm Development Site which has 80 domestic connections and the Drum Binghamstown Group Water Scheme (GWS), located 11.5 km northwest and supplied by a spring and a dug well (0533SEW001) which is reported to have a good yield and an average abstraction rate of 250 m3/day. There is another GWS called Curraunboy GWS, located 17.8 km north of the Main Wind Farm Development Site, which is supplied by two springs.

7.133 There are no GWS or Public Water Supply (PWS) schemes within the vicinity of the GCR and the three Over-run Areas of the TDR. However, there are eight water supply schemes located within 2 km of the TDR. There are two GWS schemes located near Node 5, Killeen Errew GWS (exactly 2 km from the TDR) and Crossmolina Eskeragh GWS (located along the TDR). The next GWS, called Beltra is c320 m from the TDR and is located along the N59, roughly 10 km west of Node 9. There are two GWSs located c.8 km north of Sligo along the N15. These are Castletown (c.1.98 km) and Benbulben (c. 950 m). There is also a PWS in this area called North Sligo PWS Ardanglass, located exactly 2 km from the TDR.

7.134 Lastly, there is a PWS located c. 2.5 km north of Ballyshannon/Node 15 called Ballyshannon PWS.

Groundwater Supply Wells

7.135 GSI has an online database of wells and springs in Ireland (see **Table 7-2** for details); however it should be noted this database is not extensive. Although the database is not categorical, the data is considered to be useful.

7.136 According to the GSI well database, there is one well within 2 km of the Main Wind Farm Development Site. This well (0531SEW001) has a depth of 28 m with a 4.3 m depth to bedrock. It's used for both agricultural and domestic purposes. However, its yield has been classed as a failure with a source yield of only 2.7 m3/day. This well is shown on **Figure 7-8** with a location accuracy estimated to be within a 2.5 km radius. The next closest well is reported as being 11.5 km north of the Main Wind Farm Development Site, which is the well that supplies the Drum Binghamstown GWS.

7.137 There is one well situated at the end of the GCR at the Bellacorick Power Station. Bellacorick Power Station is located c. 700 m west of Over-run Area 2 of the TDR, hence, this is also the closest well to this section of the TDR, see **Figure 7-16c**. This borehole (0831SEW005) has a depth of 160 m and a 19.8 m depth to bedrock. It is used for industrial purposes and its yield has been classed as good with a source yield of 218 m^3/day.

7.138 The other two Over-run Areas of the TDR have no mapped wells within the vicinity.

7.139 Along the 27 Nodes, over 150 wells were identified within 2 km of the TDR.

Water Framework Directive

7.140 A WFD Assessment report has been prepared to support the Planning Application and EIAR for the Proposed Project and is provided in **Technical Appendix 7-4** found in Volume 3 of this EIAR. In summary, the report includes three stages, a screening stage, a scoping stage and an assessment stage.

7.141 Based on the findings from the WFD screening, scoping and assessment, it is considered that the Proposed Project, with the mitigation measures in place, will not result in a deterioration of the existing status of the identified WFD receptors and it will not be a factor in the receptors failing to achieve their status objectives.

Protected Areas

7.142 As outlined in **Section 7.11,** the study area comprises the Main Wind Farm Development Site and the surrounding area to a minimum of 2 km which can extend beyond a 2 km radius in certain circumstances where there is a direct hydrological or hydrogeological link to a sensitive receptor and if it is considered that the Proposed Project has the potential to impact on a waterbody.

7.143 The following protected sites are within 2 km of the Main Wind Farm Development Site (**Figure 7-7**), and are detailed in **Chapter 5**:

- Blacksod Bay/Broad Haven SPA (site code 004037) and Mullet/Blacksod Bay Complex SAC/pNHA (site code 000470), located c. 1.1 km downstream of the Doolough Stream and the c. 370 m downstream of the unnamed stream at the very southern tip of the Main Wind Farm Development Site boundary.
- Tullaghan Bay and Bog NHA located c. 1.1 km downstream of the Main Wind Farm Development Site.
- Protected Areas that are greater than 2 km are detailed in **Chapter 5**. These have been assessed and are considered not to have a direct hydrological or hydrogeological link due to being located at distance (>5 km) from the Main Wind Farm Development Site.

7.144 It is noted that for the Blacksod Bay, the alkaline fen and machair Qualifying Interests (QI) habitats are groundwater dependent terrestrial ecosystem(s).

7.145 Over-run Areas 1 and 3 are not located within or near a protected conservation area. Over-run Area 2 is located immediately north of Bellacorick Bog Complex SAC (site code 001922). The N59 acts as boundary between the SAC and the Over-run Area and the proposed temporary construction activities will not be located inside the SAC.

7.146 The GCR is not located in and does not intersect with any protected conservation areas. The GCR briefly runs north of the Tullaghan Bay And Bog NHA (site code 001566), however the L1206 road acts as barrier between the GCR and the NHA. The GCR then proceeds to run along the N59 where the Carrowmore Lake Complex SAC / pNHA (site code 000476)

is located directly north and the Owenduff/Nephin Complex SAC / pNHA (site code 000534) and Owenduff/Nephin Complex SPA (site code 004098) is located directly south of the N59. The Bellacorick power station, where the GCR ends, is located directly north of the Bellacorick Bog Complex SAC / pNHA (site code 001922).

Water Environment Receptors

7.147 From the baseline study undertaken here, the following water environment sensitive receptors within 2 km of the Main Wind Farm Development Site have been identified in the receiving environment:

- Local surface waterbodies, An Mhoing Mhór, Doolagh Stream and other unnamed streams within and downstream of the Main Wind Farm Development Site.
- Mullet/Blacksod Bay Complex SAC / pNHA (site code 000470) and Blacksod Bay/Broad Haven SPA (site code 004037), located c. 1.1 km downstream of Site
- Tullaghan Bay and Bog NHA (site code 001567) located c. 1.1 km downstream from the Main Wind Farm Development Site.
- Belmullet GWB and Poorly productive bedrock aquifer beneath the Main Wind Farm Development Site.

7.148 Protected Areas that are greater than 2 km from the Main Wind Farm Development Site have been assessed and are considered not to have a direct hydrological or hydrogeological link due to being located at distance (>5 km) from the Main Wind Farm Development Site.

7.149 For each identified receptor, the significance and sensitivity of the receptor is assessed in **Table 7-13** below and a rating (High/Medium/Low/Negligible) applied, based on the methodology outlined in existing guidance and reproduced in **Technical Appendix 7-6** found in Volume 3 of this EIAR.

Table 7-13: Existing Environment - Significance and Sensitivity / Importance

No.	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
1	Water courses at the Main Wind Farm Development Site	Mhoing Mhór and Doolagh Streams on the northern site boundary. “Poor” WFD status, and “At Risk”. Tristia, An Raith and unnamed streams in central area with “Good” WFD Status and “In Review”.	Directly upstream of Designated Site. Tristia and An Raith streams flow through and downstream from site	**Medium** - Attribute has a medium quality or value on a local scale
2	Water courses at the TDR Over-run Areas	Moneynierin river at Over-run Area 2 and Tristia 33 at Over-run Area 1 have “Good” WFD status and are Not at risk.	Over-run Area 2 crosses over the Moneynierin river. Over-run Area 3 is within the 50 m buffer from the OWENMORE_060 stream.	**Medium -** Attribute has a medium quality or value on a local scale

No.	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
		OWENMORE_060 stream has a "High" WFD status and is Not at risk.		
3	Designated Sites	Blacksod Bay Complex SAC/pNHA, site code 000470. Blacksod Bay/Broad Haven SPA, site code 004037 Tullaghan Bay and Bog NHA site code 001567 Bellacorick Bog Complex SAC (site code 001922)	Located directly downstream of water courses on site. Potentially located in a hydrogeological continuity area within the Main Wind Farm Development Site. Bellacorick Bog Complex SAC north of N59 from Over-run Area 2	**High** - Attribute has a high quality or value on an international l scale with SAC and SPA status and on a national scale with pNHA/NHA status.
4	Belmullet GWB / Bedrock aquifer beneath the Main Wind Farm Development Site	Bedrock aquifer is classified as poorly productive. Belmullet GWB has "Good" WFD status is labelled as "Not At Risk"	Bedrock aquifers may be in hydraulic continuity with surface water courses through groundwater - surface water interactions (recharge and discharge).	**Low -** Attribute has a low quality or value on a local scale as it is a Poor Bedrock Aquifer.

Receiving Environment: Baseline Summary

7.150 The Main Wind Farm Development Site is entirely underlain by Precambrian age foliated orthogneisses of the Annagh Division (undifferentiated) and by blanket peat (BktPt) subsoils.

7.151 The bedrock aquifer underlying the Main Wind Farm Development Site is classified as poor and generally unproductive except for local zones (Pl). The subsoil is of moderate permeability.

7.152 The Main Wind Farm Development Site is within the WFD Blacksod-Broadhaven (ID 33) Catchment and is split between two Sub-Catchments, Glencastle_SC_010 (ID 33_2) and Owenmore[Mayo]_SC_030 (ID 33_11).

7.153 Several streams interact with the Main Wind Farm Development Site. The An Ráith stream runs in a southerly direction through the centre of the Main Wind Farm Development Site until it reaches Blacksod Bay. The Doolough stream / AN_MHOING_MHÓR stream flows in a westerly direction, in the northern half of the Main Wind Farm Development Site, until it reaches Blacksod Bay. The Tristia stream flows in southerly direction along the eastern border of the Main Wind Farm Development Site until it reaches Tullaghan Bay.

7.154 Under the WFD classification (see Section 7.15 for more detail on the requirements under the WFD) legislation and more , both the An Ráith and Tristia stream are classified as "Good" status and "Under Review". The Doolough stream / AN_MHOING_MHÓR stream was classified as "At risk" due to sediment and nutrients.

7.155 The GCR is approximately 25.5 km in length and crosses 34 river waterbodies. The TDR is approximately 200 km in length and crosses approximately 95 river waterbodies. The waterbodies have been investigated to identify their WFD quality and risk status, see **Technical Appendix 7-4**.

7.156 There are three Over-run Areas along the TDR. Over-run Area 1 will have a 50 m surface water buffer in place but Over-run Area 2 crosses the Moneynierin river, which is of Good WFD status and Not at risk and Over-run Area 3 will have construction works located within the 50 m buffer from the OWENMORE_060 stream, which is of High WFD status and Not at risk.

7.157 There are no recorded flood events at or near the Main Wind Farm Development Site, nor is there risk of potential flooding as a result of the Main Wind Farm Development Site.

7.158 The Main Wind Farm Development Site and the Over-run Areas of the TDR are located within the Belmullet Groundwater Body (GWB). This GWB is classified as being "Good status" under the WFD classification. The aquifer underlying the study area and Over-run Areas is a Poor Aquifer (Pl), which is bedrock which is generally unproductive except for local zones.

7.159 Two GWBs were identified along the GCR, Belmullet and Bangor. They are both of "Good" WFD status and "Not at Risk". Thirty GWBs were identified along the TDR. All of them were identified as "Good" WFD status and "Not at risk" except for Carrowmore East, which is at risk of a decline in water quality due to forestry related pressures, and Waste Facility (W0024-03), which is at risk due to waste related pressures.

7.160 The groundwater vulnerability at the Main Wind Farm Development Site is classed as Moderate (M). The groundwater vulnerability rating at the three Over-run Areas of the TDR is Low (L). Groundwater vulnerability ratings along the GCR vary from Low (L) to Extreme (E).

7.161 There are no identified karst features within a 2 km zone from the Main Wind Farm Development Site, the three Over-run Areas of the TDR and the GCR. Several clusters of karst features were noted within the 2 km zone of the TDR.

7.162 There is no Group Water Scheme (GWS) and Public Water Supply (PWS) within a 2 km radius of the Main Wind Farm Development Site, the Over-run Areas or the GCR. Eight water supply schemes are located along the TDR route, six GWS and two PWS.

7.163 A Ground Investigation (GI) was conducted across the Main Wind Farm Development Site (see **Technical Appendix 6-1: Factual Report**). Groundwater was encountered at the Main Wind Farm Development Site with trial excavations between 1.1 to 3.7 mbgl.

7.164 On the GSI well database, there is one well within 2 km of the study area. This well (0531SEW001) is used for both agricultural and domestic purposes. However, its yield has been classed as a failure with a source yield of only 2.7 m^3/day.

Approach and Evaluation Methodology

Potential Impacts

7.165 The turbine range outlined in **Chapter 1, Table 1-1** of this EIAR has been assessed, with a tip height range from 179 m – 180 m and a hub height range from 98.5 m – 105 m.

7.166 The impacts on the surface water and groundwater environment of the Proposed Project are assessed in this section without any mitigation measures in place. The potential impacts are evaluated in accordance with the EPA EIAR Guidance 2022 and the IGI Environmental Impact Guidance 2013.

7.167 The assessment of risk is based on a matrix on importance of attributes and magnitude of impacts. The criteria tables outline the assessments for the likelihood and magnitude of hydrological and hydrogeological impacts.

7.168 Criteria tables from the IGI 2013 Guidance are presented in **Technical Appendix 7-6**. The IGI guidance states that the significance of any impact should be determined based on the importance of the feature to be protected and the magnitude of the impact on the receiving geological / hydrogeological environment, with particular reference to the definitions in Appendix C of the guidance, as detailed in **Technical Appendix 7-6**.

7.169 Criteria tables from the EPA EIAR guidance 2022 are presented in **Technical Appendix 7-7** (Description of Effects) and **Technical Appendix 7-8** (Classification of the Significance of Impacts). The criteria for the assessment of effects require that likely significant effects are described with respect to their magnitude, frequency, extent, complexity, probability, duration, reversibility, etc. Significance of effects is usually understood to mean the importance of the outcome of the effects (the consequences of the change). Figure 3.4 of the EPA 2022 guidance is presented in **Technical Appendix 7-8** and shows how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.

7.170 The methodology applied here is a qualitative risk assessment methodology in which the nature of the potential impacts is described in terms of the character, magnitude, duration, probability and consequence of the impact are considered.

7.171 The magnitude of the potential impact is assessed against the significance and sensitivity of the receiving environment to determine the significance of the resulting effect.

7.172 This approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the Proposed Project.

7.173 In addition to their nature and significance, the potential effects will be assessed in terms of their duration, whether they are direct or indirect.

7.174 The following sections identify potential impacts of the Proposed Project on the hydrogeological and hydrological environments. It also assesses the likelihood of occurrence of each identified impact in accordance with the above. As noted above, the impacts are initially assessed with no mitigation or design measures incorporated to reduce the effects.

Future Baseline

7.175 If the Proposed Project does not proceed, the Main Wind Farm Development Site will remain as cutover lowland blanket bog, which is extensively drained. The associated pressures on the local water quality to the north of the Main Wind Farm Development Site will continue without separate intervention. The GCR will not be installed following an existing road with minimal direct impact with water environment receptors. The TDR will not follow the existing road network with no excavation required and temporary construction works will not be required to ensure the safe delivery of the turbines to the Main Wind Farm Development Site.

Potential Impacts: Construction

7.176 The potential impacts during construction of the Main Wind Farm Development Site, GCR and TDR Over-run Areas are detailed in this section and summarised below. The description and significance of effects are in accordance with the EPA 2022 guidance, as

presented in **Technical Appendix 7-6** and **Technical Appendix 7-7**. The significance and sensitivity of the identified receptors has been assessed in **Table 7-13.**

7.177 For the Proposed Project, the construction sequence will be as follows:

- peat restoration works in the northwest area of the Main Wind Farm Development Site as per the **Peat Restoration Plan and Habitat Management Plan** outlined in **Technical Appendix 5-5** of **Volume 3** of this EIAR;
- off-site temporary Over-run Areas of the TDR works;
- mobilisation & site set up;
- site clearance and tree felling;
- site access and construction of internal access tracks:
- construction of proposed watercourse crossings WCX1 & WCX2 culverts as per **Planning Drawing 501.065301.00001.D17**;
- construction of turbine foundation and hardstands;
- turbine delivery & installation;
- on site electrical works;
- on-site substation, BESS and GCR cable works (including foundations);
- off-site GCR cable works as per **Planning Drawing 501.065301.00001.D20**;
- construction of attenuation basins, refer to **Planning Drawing 501.065301.00001.D12**;
- wind farm commissioning and testing; and
- Landscaping, reinstatement and demobilisation.

7.178 The turbine foundations are expected to require piling due to ground conditions across the Main Wind Farm Development Site as the majority of the turbine locations have a peat depth of greater than 2 m. Piling methods may include bored piles with temporary casing and continuous flight auger. Piling shall be carried out in accordance with the detailed foundation design and the appointed piling contractor's method statement. The final pile type and installation method shall be determined by ground investigation results, accounting for peat characteristics, underlying strata and environmental constraints.

7.179 The procedure will consist of installing a temporary stone and geotextile working platform at the designed level. The platform will be excavated to the required, designed depth and will have temporary ditches, collector drains and a dry working cell, if deemed necessary, based on ground conditions. For bored piles, a casing will be installed through the peat layer to prevent collapse and contamination followed by boring to the designed depth to a competent bearing layer. Reinforcement will be installed prior to concrete pouring. Once the piles have set and gained sufficient strength, the piles will be cut to ensure the required level is achieved. The pile cap, foundation or concrete platform will then be constructed upon the piles.

7.180 Any drainage water from works areas that might carry silts or sediments will be routed towards attenuation basins prior to controlled diffuse release over vegetated natural surfaces. Discharges from the built compounds and turbine hardstands will be directed to a network of associated attenuation basins, which will be connected by a series of underground pipes, as shown on **Planning Drawing 501.065301.00001.D14.**

7.181 The GCR will follow an existing road with minimal direct impact with water environment receptors. Water crossings associated with the GCR are shown in **Figure 7-1b-e**. Crossing methodology will be either by a standard trenched crossing technique or by utilising incline Horizontal Direction Drilling (HDD) methodology. Typical trenched method can be utilised for watercourse crossings with a likely requirement for HDD at bridge crossings.

7.182 Laying of the GCR cable will involve trench excavation or incline HDD, the installation and compaction of a bedding layer of sand or 15 Newtown concrete. PVC ducts and capped couplers will be installed on top of this. When trenching and ducting is complete, the installation of the cable route cable will commence between the onsite sub-stations to the Bellacorick 110kV substation. The finished surface above each cable joint bay is reinstated to its original condition, and the construction work area removed.

7.183 The GCR will require the construction of two new watercrossings to facilitate the crossing of watercourses by infrastructure associated with the Proposed Project, see WCX 1 and WCX 2 on **Figure 7-1b.** These new crossings will be provided as culverts, as outlined in **Planning Drawing 501.065301.00001.D17.**

7.184 The TDR will follow an existing road network with no excavation required and no likely direct interaction with water environment receptors, with the exception of the three Over-run Areas, which will require temporary construction works to ensure the safe delivery of the turbines to the Main Wind Farm Development Site. These works are temporary and will not involve any modification of the river channel or obstruction of flow. Upon completion of works, the site will be restored to its existing land use without delay.

7.185 Over-run Area 3 temporary construction works will be located within the i 50 m buffer applied to the unnamed stream (WFD ID OWENMORE (MAYO)_060 due to constraints associated with land access. The stream is of High WFD status and is labelled as Not at risk.

7.186 Over-run Area 2 temporary construction works will cross over the Moneynierin river (WFD ID MUING_010) which achieved a Good WFD status and is labelled as Not at risk of achieving its WFD targets by 2027.

7.187 Over-run Area 1 temporary construction works is located c. 94 m west of the Tristia 33 river (WFD ID TRISTIA_010) and outside of the 50 m buffer applied to it.

7.188 Construction of the substation and internal cable network in conjunction with offsite GCR works to the National Grid will be carried out in tandem with the wind farm element of the Proposed Project in sequenced activities. A Construction and Environmental Management Plan (CEMP) is contained in **Technical Appendix 2-1** found in Volume 3 of this EIAR. The CEMP sets out the key environmental management measures associated with the construction, operation, and decommissioning of the Proposed Project, to ensure that during these phases of the development, the environment is protected, and any potential impacts are minimised.

7.189 To the northwest of the Main Wind Farm Development Site, there will be peat enhancement works as outlined in **Peat Restoration Plan and Habitat Management Plan** (**Technical Appendix 5-5** of Volume 3 of this EIAR). These works will involve scrub clearance, ground/surface smoothing, ditch blocking and hag reprofiling. It is anticipated that the restoration works will have a positive impact on nearby water receptors by raising the groundwater levels in the peat and improving the groundwater baseflow to the Doolough Stream.

Erosion and Sediment

7.190 Construction phase activities of the Proposed Project will require earthworks resulting in the removal of vegetation cover and excavation of subsoils and cut peat. Exposed and disturbed ground, particularly peat, may increase the risk of erosion and subsequent sediment laden surface water runoff. The release of suspended solids is primarily a consequence of the physical disturbance of the ground during the construction phase, if not correctly compacted.

7.191 The construction phase of the Proposed Project will involve tree felling and earthworks activities outlined above that could have potential impacts on surface water and groundwater conditions.

7.192 Potential sources of sediment laden water include:

- Soil stripping, if necessary, to construct the access tracks, site compounds, turbine foundations, hardstands, turbines/hardstanding/tracks and substation.
- Run-off and erosion from soil stockpiles (prior to reinstatement/profiling/side casting).
- Drainage and seepage water resulting from infrastructure excavation and piling of turbine foundations.
- Construction of the cable trench resulting in entrainment of sediment from the excavations during construction; and Erosion of sediment from emplaced/upgraded site drainage channels and at proposed water crossings.

7.193 These activities can result in the release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality of downstream water bodies.

Pollution Risk

7.194 During the construction phase, there is the potential for a pollution event to affect surface water and local groundwater bodies impacting on their water quality, particularly water bodies which flow through and adjacent to the Main Wind Farm Development Site and waterbodies located within or adjacent to the Over-run Areas of the TDR.

7.195 Contamination of surface water runoff from machinery, leakage and spills of chemicals from vehicle use and the construction of hardstanding also have the potential to affect surface water bodies. Potential pollutants include oil, fuels and cement.

7.196 This would have a negative effect on the receptor and the resulting degradation of the water quality. It could further impact on the Doolough stream or the Mhoing Mhor stream which has a WFD classification of "At Risk" due to sediment and nutrients caused by a number of significant pressures such as nearby agricultural activity and peat drainage and extraction.

7.197 The works at Over-run Area 3 may impact on the High WFD status OWENMORE_060 stream as the temporary works will be within the 50 m of the stream. Specific mitigation measures will be embedded to ensure that the works at this Over-run Area will comply with the Blue Dot Catchments Programme as outlined Mayo County Development Plan 2022-2028. Objective **NEO 42** states *"To comply with the Blue Dot Catchments Programme and protect and restore high status water bodies in County Mayo and ensure all proposed development which may have an impact on a high-status water quality site will require site specific assessment to determine localised pressures and demonstrate suitable mitigation measures, in order to protect these sites."*

7.198 Tree felling, access track construction, construction of the proposed water crossing culverts, attenuation basin construction, peat enhancement works, construction of the turbine foundations and other new, hard surfaces have the potential to result in a small increase in surface water run-off in the catchment. An increase in run-off has the potential to result in soil erosion and consequently sediment release into nearby receiving watercourses due to flooding.

Groundwater Levels & Flow

7.199 Dewatering excavations for turbine bases has the potential to impact on local groundwater levels. Groundwater level impacts are not anticipated to be significant due to the local hydrogeological regime, as the bedrock aquifer is classified as a Poorly Productive aquifer with few private water supply wells registered.

7.200 Groundwater inflows may need to be pumped, resulting in short term localised drawdown of the water table and discharges to the nearest available drainage channels. This could have a localised impact on groundwater levels. Discharge from the built compounds and turbine hardstandings will be directed to a network of associated attenuation basins, which will be connected by a series of underground pipes, as shown on **Planning Drawing Number 501.065301.00001.D14.**

Table 7-14: Construction Stage Description of Effects and Impact Rating (No Mitigation)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
Surface Water (Direct)				
1	Reduction in surface water quality from sediment release during construction	**Medium** - Potential to affect surface water quality in the local streams at the boundary and onsite during soil stripping and construction and piling of turbine foundations (bored piles with temporary casing / continuous flight auger), hardstands, site access tracks, substation, underground cabling, attenuation ponds, peat enhancement works, water crossings and two water crossing culvert works. Mhoing Mhór and Doolagh Streams on the northern site boundary. "Poor" WFD status, and "At Risk". Tristia, An Raith and unnamed streams in central area with "Good" WFD Status and "In Review".	Temporary, short term, unlikely, moderate, negative (Main Wind Farm Development Site)	**Moderate** (Main Wind Farm Development Site)
		Low – Negligible Potential to affect surface water quality in the local streams along the GCR during trench excavation or incline HDD at bridge crossings.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Slight to Not Significant** (GCR)
		Low – Negligible Potential to affect surface water quality during temporary works for three Over-run Areas of the TDR. Over-run Area 2 intersects with the Moneynierin river with "Good" WFD status and is "Not at risk". Over-run Area 3 is located within 50 m of an unnamed stream with High WFD status and is Not at risk.	Temporary, short term, unlikely, slight, negative (TDR Over-run Areas)	**Slight** (TDR Over-run Areas)
2	Reduction in surface water quality from accidental spillage of oil, fuels and cement during construction	**Medium** - Potential to affect surface water quality in the local streams at the boundary and onsite ponds during soil stripping and construction and piling of turbine foundations (bored piles with temporary casing / continuous flight auger), hardstands, site access tracks, substation, underground cabling, attenuation ponds, peat enhancement works, water crossings and two water crossing culvert works.	Temporary, short term, unlikely, moderate, negative (Main Wind Farm Development Site)	**Moderate** (Main Wind Farm Development Site)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
		Mhoing Mhór and Doolagh Streams on the northern site boundary. "Poor" WFD status, and "At Risk". Tristia, An Raith and unnamed streams in central area with "Good" WFD Status and "In Review".		
		Low – Negligible Potential to affect surface water quality in the local streams along the GCR during trench excavation or incline HDD at bridge crossings.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Slight to Not Significant** (GCR)
		Low – Negligible Potential to affect surface water quality during temporary works for three Over-run Areas. Over-run Area 2 intersects with the Moneynierin river with "Good" WFD status and is "Not at risk" Over-run Area 3 is located within 50m of an unnamed stream with High WFD status and is Not at risk.	Temporary, short term, unlikely, slight, negative (TDR Over-run Areas)	**Slight** (TDR Over-run Areas)
3	Increase in risk of flooding due to increase in surface water run-off	**Low – Negligible** Risk of an increase in downstream flooding is considered to be low due to the small increase in run-off from surfaced and hard stand areas for the Main Wind Farm Development Site relative to overall catchment areas	Temporary, short term, unlikely, slight – not significant, negative (Main Wind Farm Development Site)	**Slight to Not Significant** (Main Wind Farm Development Site)
		Negligible Potential to increase flooding in the local streams along the GCR during trench excavation due to negligible increase in run-off.	Temporary, short term, unlikely, not significant, negative (GCR)	**Not Significant** (GCR)
		Negligible Potential to increase flooding during temporary works for three Over-run Areas due to negligible increase in run-off.	Temporary, short term, unlikely, not significant, negative (TDR Over-run Areas)	**Not Significant** (TDR Over-run Areas)
Surface Water (Indirect)				

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
4	Impact on designated sites from potential reduction in surface water quality from sediment release / accidental spillage at downstream locations	**Low - Medium**- Potential to affect surface water quality in nearby designated sites - Blacksod Bay Complex SAC/pNHA, Blacksod Bay/Broad Haven SPA, Tullaghan Bay and Bog NHA	Temporary, short term, unlikely, moderate, negative (Main Wind Farm Development Site)	**Moderate** (Main Wind Farm Development Site)
		Negligible - Potential to impact designated sites along the GCR during trench excavation	Temporary, short term, unlikely, not significant, negative (GCR)	**Not Significant** (GCR)
		Low - Potential to impact designated sites during temporary works for three Over-run Areas. Over-run Area 2 is located on the edge of an SAC, north of N59 which acts as a boundary.	Temporary, short term, unlikely, slight, negative (TDR Over-run Areas)	**Slight** (TDR Over-run Areas)
Groundwater (Direct)				
5	Reduction in groundwater quality from sediment release during construction	**Low** - Potential to affect groundwater quality in underlying bedrock beneath the Main Wind Farm Development Site through vertical migration. Areas of newly exposed bedrock will be localised (turbine base excavations). Bedrock aquifer is poorly productive at the Main Wind Farm Development Site. Belmullet GWB has "Good" WFD status is labelled as "Not At Risk"	Temporary, short term, unlikely, slight, negative (Main Wind Farm Development Site)	**Slight** (Main Wind Farm Development Site)
		Low – Negligible Potential to affect groundwater quality in the underlying bedrock beneath the GCR during trench excavation through vertical migration.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Slight to Not Significant** (GCR)
		Low – Negligible Potential to affect groundwater quality in the underlying bedrock beneath during temporary works locations for three Over-run Areas through vertical migration.	Temporary, short term, unlikely, slight – not significant, negative (TDR Over-run Areas)	**Slight to Not Significant** (TDR Over-run Areas)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
6	Reduction in groundwater quality from the accidental spillage of oil, fuels and cement	**Low** - Potential to affect groundwater quality in underlying bedrock beneath the Main Wind Farm Development Site through vertical migration. Bedrock aquifer is poorly productive at the Main Wind Farm Development Site. Any leakage / spillage will be accidental only and of limited volume. Belmullet GWB has "Good" WFD status which is labelled as "Not At Risk"	Temporary, short term, unlikely, slight - moderate, negative (Main Wind Farm Development Site)	**Slight to Moderate** (Main Wind Farm Development Site)
		Low – Negligible Potential to affect groundwater quality in the underlying bedrock beneath the GCR during trench excavation through vertical migration.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Slight to Not Significant** (GCR)
		Low – Negligible Potential to affect groundwater quality in the underlying bedrock beneath during temporary works locations for three Over-run Areas through vertical migration.	Temporary, short term, unlikely, slight – not significant, negative (TDR Over-run Areas)	**Slight to Not Significant** (TDR Over-run Areas)
7	Reduction in groundwater levels from dewatering of turbine base excavations	**Low – Negligible** Potential to lower groundwater in underlying bedrock is limited by the localised and short term nature of any dewatering required.	Temporary, short term, unlikely, not significant, negative	**Not Significant**
Groundwater (Indirect)				
8	Reduction in groundwater quality at Public Water Supply from sediment release / accidental spillage	**Low – Negligible** Potential to affect groundwater quality in Public Water supplies located at distance through vertical migration followed by lateral migration. Impact is unlikely as areas of exposed bedrock will be localised. Any leakage / spillage will be accidental only and of limited volume. Nearest PWS located 11.5 km northwest of Main Wind Farm Development Site.	Temporary, short term, unlikely, not significant, negative (Main Wind Farm Development Site)	**Not Significant** (Main Wind Farm Development Site)
		Negligible Potential to affect groundwater quality at PWSs along the GCR during trench excavation through vertical migration in the underlying bedrock.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Not Significant** (GCR)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
		Negligible Potential to affect groundwater quality at PWSs during temporary works for three Over-run Areas through vertical migration in the underlying bedrock.	Temporary, short term, unlikely, slight – not significant, negative (TDR Over-run Areas)	**Not Significant** (TDR Over-run Areas)
9	Reduction in groundwater quality at local domestic water supplies from sediment release / accidental spillage	**Low – Negligible** Potential to affect groundwater quality in domestic water supplies in wider area through vertical migration followed by lateral migration. Bedrock aquifer is poorly productive at the Main Wind Farm Development Site and very few identified domestic water supplies in the wider area. Impact is unlikely as areas of exposed bedrock / gravel will be localised. Any leakage / spillage will be accidental only and of limited volume.	Temporary, short term, unlikely, not significant, negative (Main Wind Farm Development Site)	**Not Significant** (Main Wind Farm Development Site)
		Negligible Potential to affect groundwater quality at local groundwater supplies along the GCR during trench excavation through vertical migration in the underlying bedrock.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Not Significant** (GCR)
		Negligible Potential to affect groundwater quality at local groundwater supplies during temporary works for three Over-run Areas through vertical migration in the underlying bedrock.	Temporary, short term, unlikely, slight – not significant, negative (TDR Over-run Areas)	**Not Significant** (TDR Over-run Areas)
10	Impact on designated sites potentially in hydrogeological continuity with the Main Wind Farm Development Site from potential reduction in groundwater quality from sediment release / accidental spillage	**Low** - Potential to affect groundwater quality in nearby designated sites through vertical migration followed by lateral migration - - Blacksod Bay Complex SAC/pNHA, Blacksod Bay/Broad Haven SPA, Tullaghan Bay and Bog NHA t	Temporary, short term, unlikely, slight, negative (Main Wind Farm Development Site)	**Slight** (Main Wind Farm Development Site)
		Negligible Potential to affect groundwater quality at designated sites along the GCR during trench excavation through vertical migration in the underlying bedrock.	Temporary, short term, unlikely, slight – not significant, negative (GCR)	**Not Significant** (GCR)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
		Negligible Potential to affect groundwater quality at designated sites during temporary works for three Over-run Areas through vertical migration in the underlying bedrock. Over-run Area 2 is located on the edge of an SAC, north of N59 which acts as a boundary.	Temporary, short term, unlikely, slight, negative (TDR Over-run Areas)	**Slight** (TDR Over-run Areas)

Potential Impacts: Operational

7.201 The potential impacts during the operational stage of the Main Wind Farm Development Site, GCR and TDR Over-run Areas are detailed in this section and summarised in below. The description and significance of effects are in accordance with the EPA 2022 guidance, as presented in **Technical Appendix 7-6** and **Technical Appendix 7-7.** The significance and sensitivity of the identified receptors has been assessed in **Table 7-13.**

7.202 During the operational phase of the Proposed Project, it is anticipated that routine maintenance of infrastructure and tracks will be required across the Main Wind Farm Development Site and the Proposed Project. This may include work such as maintaining access tracks and drainage and carrying out wind turbine maintenance. Should any maintenance be required onsite which would involve construction type activities, the mitigation measures identified in the CEMP (**Technical Appendix 2-1** found in Volume 3 of the EIAR) will be implemented.

7.203 There will be a limited number of vehicles required onsite for routine maintenance and operational activities. Twice a year each turbine will undergo a scheduled service. The operation of the wind turbines will be monitored remotely. Storage of fuels/oils onsite will be limited to the hydraulic oil required in turbine gearboxes and this is bunded to (110% bund capacity) to prevent fluid escaping.

7.204 During the operation of the Proposed Project, it is not anticipated that there will be any excavation or stockpiled material, reducing the potential for erosion and sedimentation effects. Should any excavation be required, this is likely to be limited and required for maintenance of tracks.

7.205 Immediately post-construction, newly excavated drains and track dressings may be prone to erosion as any vegetation would not have matured. Appropriate design of the drainage system, incorporating sediment traps, attenuation basins and silt fences, will reduce the potential for the increased delivery of sediment to natural watercourses. Potential effects from sedimentation or erosion during the operational phase are considered to come from linear features on steeper slopes, where velocities in drainage channels are higher. Immediately post-construction, flow attenuation measures will remain and be maintained to slow runoff velocities and prevent erosion until vegetation becomes established.

7.206 Operation of the Proposed Project requires limited activities relative to the construction phase. The presence of access tracks and hardstanding, as opposed to their construction, may affect the potential infiltration and groundwater conditions as well as the sub-surface flow paths around the infrastructure. In addition, cabling and crane hardstandings will also remain in situ to serve the Proposed Project.

7.207 Drainage will be required to service new sections of access track, which could also potentially alter recharge.

7.208 Impacts and the significance of the effects which result from each impact in the operational stages are described in **Table 7-15** below.

Table 7-15: Operational Stage Description of Impacts and Impact Rating (No Mitigation)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
Surface Water (Direct)				
1	Reduction in surface water quality from sediment release / accidental spillage	**Low – Negligible** Potential to affect surface water quality in the local surface waterbodies from site access and maintenance at the Main Wind Farm Development Site. Impact to surface water quality is unlikely due to short term nature of maintenance works.	Temporary, short term, rarely, slight - not significant, negative	**Slight to Not Significant**
		Negligible Potential to affect surface water quality in the local surface waterbodies along the GCR during access and maintenance at the GCR. Impact to surface water quality is unlikely due to short term nature of maintenance works and limited requirement for maintenance along the GCR.	Temporary, short term, unlikely, not significant, negative (GCR)	**Not Significant** (GCR)
		Negligible Potential to affect surface water quality during temporary works for three Over-run Areas of the TDR during access and maintenance at the Over-run Areas. Impact to surface water quality is unlikely due to short term nature of maintenance works and limited requirement for maintenance at the TDR Over-run Areas.	Temporary, short term, unlikely, not significant, negative (TDR Over-run Areas)	**Not Significant** (TDR Over-run Areas)
2	Increase in risk of flooding due to increase in surface water run-off	**Low - Negligible** Risk of an increase in downstream flooding is limited due to the small increase in run-off from surfaced and hard stand areas for the Main Wind Farm Development Site relative to overall catchment areas	Permanent, long term, rarely, slight - not significant, negative	**Slight to Not Significant**
		Negligible Risk of an increase in downstream flooding is limited due to the negligible increase in run-off from surfaced and hard stand areas along the GCR relative to overall catchment areas.	Temporary, short term, unlikely, not significant, negative (GCR)	**Not Significant** (GCR)
		Negligible Risk of an increase in downstream flooding is limited due to the negligible increase in run-off from surfaced and hard stand areas at the three Over-run Areas of the TDR relative to overall catchment areas	Temporary, short term, unlikely, not significant, negative (TDR Over-run Areas)	**Not Significant** (TDR Over-run Areas)

No.	Potential Impact	Impact Rating (No Mitigation)	Description of Effect (No Mitigation)	Significance of Effect (No Mitigation)
3	Increase in baseflow to Doolagh Stream	**Low - Negligible** Peat restoration works will have a positive impact on nearby water receptors by raising the groundwater levels in the peat and improving the groundwater baseflow to the Doolagh Stream Doolagh Streams on the northern site boundary. "Poor" WFD status, and "At Risk".	Temporary, long term, rarely, slight - not significant, positive	**Slight to Not Significant**
Groundwater (Direct)				
4	Reduction in groundwater quality from sediment release / accidental spillage	**Negligible** Potential to affect groundwater quality in the poorly productive bedrock aquifer beneath the Main Wind Farm Development Site through vertical migration from site access and maintenance. Impact to groundwater quality is unlikely due to short term nature of maintenance works.	Temporary, short term, rarely, not significant, negative	**Not Significant**
		Negligible Potential to affect groundwater quality in bedrock aquifers beneath the GCR during access and maintenance at the GCR. Impact to groundwater quality is highly unlikely due to short term nature of maintenance works and limited requirement for maintenance along the GCR	Temporary, short term, unlikely, not significant, negative (GCR)	**Not Significant** (GCR)
		Negligible Potential to affect groundwater quality in bedrock aquifers beneath the three Over-run Areas through vertical migration in the underlying bedrock during access and maintenance. Impact to groundwater quality is highly unlikely due to short term nature of maintenance works and limited requirement for maintenance at the TDR Over-run Areas.	Temporary, short term, unlikely, not significant, negative (TDR Over-run Areas)	**Not Significant** (TDR Over-run Areas)

Potential Impacts: Decommissioning

7.209 During the decommissioning, cranes will disassemble the above ground turbine components which will be removed offsite for recycling.

7.210 The foundations will be covered over and allowed to re-vegetate naturally and it is proposed that the internal site access tracks will be left in situ. The proposed onsite substation will be left in place and underground cabling will be cut back and left in situ.

7.211 The proposed onsite substation and GCR will be taken in charge by ESBN /EirGrid upon completion and will be left in place forming part of the national electricity network.

7.212 During the decommissioning phase the impacts have been assessed as being similar or less to the Construction Phase, and the potential impacts are presented in **Table 7-14**.

Mitigation Measures

7.213 As stated in **Chapter 2**, the design of the Proposed Development has implemented a range of best practice construction measures which will ensure avoidance and reduction of impacts throughout the construction, operational and decommissioning phases. Additional measures have been developed to mitigate the impacts identified in the preceding section and are outlined in the CEMP found in **Technical Appendix 2-1** of Volume 3 of this EIAR.

Mitigation by Avoidance

7.214 The Proposed Project has undergone design iterations and evolution in response to the constraints identified as part of the baseline studies and field studies so as to avoid potential effects on receptors where possible.

7.215 In identifying and avoiding sensitive surface waters, the Proposed Project has implemented 'avoidance of impact' measures, also known as embedded mitigation. Mitigation by avoidance is viewed as part of the 'Reasonable Alternatives' outlined in **Chapter 3.**

Buffer to Water Courses

7.216 A 50 m buffer distance, including fuel storage and construction compounds, will be maintained between watercourses and the wind turbine infrastructure. CIRIA Guidance as referred to above will be followed to ensure the protection of streams within the 50 m buffer in the temporary works areas of Over-run Areas 2 and 3 of the Turbine Delivery Route (TDR).

Mitigation by Prevention and Reduction

7.217 A number of mitigation measures are outlined below and are considered as embedded to the design of the Proposed Project. These mitigation measures are a combination of measures to comply with legislation and best practice construction methods to be implemented in order to prevent water (surface water and groundwater) pollution and deterioration of water quality.

Mitigation Measures - Construction

7.218 In order to mitigate potential impacts during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. Good practice measures will be applied in relation to pollution risk, sediment management and management of surface runoff rates and volumes.

7.219 A CEMP (**Technical Appendix 2-1** found in Volume 3 of the EIAR) has been developed for the Proposed Project to ensure adequate protection of the water environment. All personnel working on the Proposed Project will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP.

7.220 During the construction phase, all works associated with the construction of the Proposed Project will be undertaken in accordance with the guidance contained within CIRIA Document C741 'Environmental Good Practice on Site' (CIRIA, 2015). Any groundwater encountered will be managed and treated in accordance with CIRIA C750, 'Groundwater control: design and practice' (CIRIA, 2016).

Good Practice Measures

7.221 Implementation of good practice measures as a matter of course during the construction of the Proposed Project are not considered to be mitigation measures but form an integral part of the design/construction process. Key good practice measures are stated below and the assessment incorporates these measures as part of the Proposed Project.

7.222 Measures to prevent the release of any pollution/sediment are outlined in Section 7 of the CEMP and are as follows:

7.223 During the construction phase of the Proposed Project, measures will be adopted, in order to prevent silt, chemicals and/or other contaminants from being washed into existing watercourses. Areas exposed due to the removal of vegetation are more susceptible to erosion during heavy rainfall, so areas will be reinstated as soon as possible to minimise this effect.

7.224 Measures, outlined in the sections down below, will include specific guidance in relation to drainage (and control of pollution to the water environment) around the following aspects of site infrastructure:

- access tracks;
- turbine foundations;
- watercourse crossings; and
- hardstanding areas and buildings (including crane hardstandings, temporary construction compounds and associated infrastructure).

7.225 Ditches will remain in place to convey surface water flows during the operational life of the Proposed Project.

Management of Sediment and Surface Waters

7.226 The drainage design for the Main Wind Farm Development Site as shown in Planning Drawings **501.065301.00001.D12-1** to **12-5** utilises the existing peat drains and drainage ditches. Surface water runoff from the hardstanding areas within the Main Wind Farm Development Site will be controlled and diverted into the surrounding drainage channels and attenuation basins following the topography of the site to permit a gravity flow. All drainage is designed to incorporate Sustainable Drainage Systems (SuDS) through the use of permeable surfaces, attenuation basins, shallow ditches, stone check dams, silt fences and swales, where applicable.

7.227 Prior to main earthwork activities, interceptor drains, or diversion ditches will be created to minimise the pooling water in areas of development. The employed diversion method will flow into the existing peat drainage channels. The diversion method will follow the

topography of the site and installation shall commence up gradient of all construction to commence. The clean surface water will be collected and diverted to the existing ditches via the peat channels.

7.228 Preservation of the existing local hydrology and its incorporation into the design is important to maintain equilibrium between the new tracks and the underlying peat. To ensure a lesser effect on the local hydrology, flat ditches will be employed parallel to tracks opposed to standard V-ditches. The shallower excavation will not lower the water table, preventing lateral effects to the infrastructure.

7.229 Surface water runoff from impermeable surfaces will be managed via attenuation basins, designed as functional industrial infrastructure rather than permanent water bodies. These basins will provide the required storage for runoff within their respective compounds while also providing treatment of the water prior to discharge.

7.230 Good practice construction techniques will be adopted for the management of sediment and surface water run-off generated during the construction phase of the Proposed Project and SuDS will be used where applicable.

7.231 In addition, a wet weather protocol to manage activities during periods of heavy and prolonged precipitation will be developed and implemented by the Project Supervisor for Construction Stage (PSCS) to manage activities during periods of heavy and prolonged precipitation. The protocol will be approved by MCC in consultation with EPA.

7.232 Heavy or prolonged rainfall during construction and operation may lead to sediment transport or vegetation causing blockage to infrastructure drainage channels or watercourse crossing structures. Regular monitoring and prompt maintenance of these assets will be carried out to ensure that the drainage system continues to function as designed.

7.233 SuDS are desirable and easily constructible at a large scale for wind farms. Additionally, wind farm sites usually have established vegetation which can act as a form of SuDS, naturally intercepting pollutants and allowing for slow infiltration. Thus, the use of SuDS for wind farm sites can assist in reducing the risk of polluting the local environment and/or overwhelming drainage systems to a non-significant level. There are several forms of SuDS, however the methods mentioned below are those which will be implanted into the Proposed Project depending on specific ground conditions within respective areas of the Proposed Development Site. Permeable surfaces such as gravelled areas, drain water through voids within the gravel, into the soil below. The access tracks to the wind turbines will be constructed using porous materials, encouraging a natural and slow infiltration process. Filter strips, which are a method of source control constructed by sloping a gentle strip of ground for runoff to flow over. Considering wind farms are usually naturally hilly, runoff will flow down the hillside and the vegetation will intercept the pollutants such as silt, whereas the water will infiltrate slowly into the soil below. Filter strips are typically constructed between the upland development/access tracks and the watercourses at the bottom of the development. However, it is noted that filter strips are not suitable for use at steep sites.

7.234 Swales, which are a source control and a method of deterring runoff from accumulating into one large drainage area. Swales are typically broad but shallow and can be created by excavating a small trench alongside the source of runoff, for example access tracks. Swales assist water into a storage or discharge system to reduce flood risk and encourage slow infiltration.

7.235 Silt fences, which are constructed using a closely woven synthetic geotextile material, and are a quick and easy form of SuDS which can be used from the construction stage. They can be established along the leading runoff routes, intercepting high runoff flows and pollutants. Both methods have high capabilities of intercepting the mass of pollutants during

the construction stage, with further use of being temporary check dams if required, for example within swales.

7.236 Attenuation basins will be constructed on the Main Wind Farm Site by constructing a depression within the ground where water from the drainage network and runoff collects. Basins reduce flood risk while encouraging slow infiltration into the ground below. All attenuation basins will be actively managed, with regular inspections and removal of silt build up to control water levels and ensure that any run-off is contained, especially during times of rainfall. Attenuation basins will be regularly inspected, and discharge may be pumped, when required, for maintenance purposes.

7.237 Silt traps will be utilised to trap and filter any sediment-laden run-off from isolated areas of excavation works at the Proposed Project, see **Planning Drawing 501.065301.00001.D16** for details.

7.238 For the construction of the proposed permanent water crossing culverts (WCX1 and 2), appropriate construction mitigation measures will be put in place to ensure no sediment or silt material will enter any water courses. These include:

- No storage of stockpiled material within 50 m of construction works.
- Silt fences will be erected between the construction works and all drains and watercourses within the 50 m buffer, see **Planning Drawing 501.065301.00001.D15** for details.
- There will be daily visual inspections of all drains and water courses near construction works.

7.239 All attenuation basins will be actively managed, with regular inspections and removal of silt build up to control water levels and ensure that any run-off is contained, especially during times of rainfall.

7.240 Attenuation basin outflow will be regularly inspected, and discharge may be pumped, when required, for maintenance purposes. Attenuation basin outflow will be regularly inspected, and discharge may be pumped, when required, for maintenance purposes, see **Planning Drawing 501.065301.00001.D12** for details about the attenuation basins. Any pumping activities will be supervised and authorised by the PSCS and Site Ecological Clerk of Works (ECoW). Treated water will be discharged with care in accordance with the following principles:

- Water to be discharged in a planar sheet flow way rather than as a single point discharge in order to slow and spread the flow and minimise potential scour.
- Use of many small/mid diameter outlets, rather than collecting larger volumes of drainage flows to discharge to a smaller number of larger capacity outlet points.
- not allowing direct, contaminated ditch discharge into watercourses, loughs and sensitive wetlands or grasslands.
- not diverting natural flows, unless under prior agreement with EPA and Mayo County Council (MCC).

7.241 Given the high carbon storage potential of peat soils, the Proposed Project aims to offset habitat loss and carbon emissions through restoration measures. Restoration of blanket bog is technically viable across most open ground and key-holed forestry areas, using methods such as ditch blocking, ground smoothing, scrub clearance, and hag re-profiling. To the northwest of the Main Wind Farm Development Site, there will be peat enhancement works as outlined in **Peat Restoration Plan and Habitat Management Plan** (**Technical Appendix 5-5** of Volume 3 of this EIAR). It is anticipated that the restoration works will have

a positive impact on nearby water receptors by raising the groundwater levels in the peat and improving the groundwater baseflow to the Doolough Stream.

Temporary Over-run Areas

7.242 The temporary Over-run Areas will primarily use floated construction to minimize excavation in peat and to preserve the existing ground and hydrological conditions, see **Planning Drawing Number 501.065301.00001.D21** for a visual representation of a typical floating track.

7.243 The construction specification for the access tracks will be informed by confirmatory site investigations once planning permission has been granted. This will include in-situ testing, such as Dynamic Cone Penetrometer (DCP) testing, to determine the California Bearing Ratio (CBR) of the underlying peat. The CBR values will inform the track design, including the required thickness of the stone sub-base and the need for, and specification of, any geogrid or other geosynthetic reinforcement necessary to achieve the required load-bearing capacity for construction and operational traffic.

7.244 Floating tracks will vary dependent on the peat's CBR value which will be obtained during detailed site investigations for each track section. The range of the depth can be between 400mm and 1500mm thickness with a varied depth and quantity of geocomposite layer placement. A standard floating track incorporates two geogrid layers, or similar. Soils beneath Over-run Areas 1, 2 and 3 are mapped as comprising peat, however in the case of at least Over-run Area 2, made ground is also present where the historical access road is located.

7.245 A standard floating track incorporates two geogrid layers, or similar. A general construction methodology of floating tracks, outlined in **Chapter 2** of this EIAR under the heading *"New Access Tracks"* will be followed.

7.246 Floating construction will comprise geogrid-reinforced granular layers placed directly on the vegetation mat with geotextile separation, with thickness varied by detailed design in response to CBR and peat depth. Sediment traps will be installed to ensure there is no impact on the water environment from the Over-run Areas.

7.247 It should be noted that Over-run Area 2 of the TDR, seen in **Figure 7-10c**, involves constructing a track over the Moneynierin river and Over-run Area 3, seen in **Figure 7-10d** involves constructing a track within the 50 m buffer from the OWENMORE_060 stream. However, it is considered that the river will not be impacted as the works are temporary and will not involve any modification of the river channel or obstruction of flow.

7.248 Appropriate construction mitigation measures will be implemented to prevent surface run-off of sediment or potential pollutants into these streams. These include:

- No refuelling of vehicles / machinery and no storage of stockpiled material within 50 m of nearby drains and streams.
- No discharge from the temporary construction works at the Over-run Areas to nearby drains or river channels.
- Silt fences will be installed between any construction works and the river channel and any drains within the 50 m buffer to ensure no silt will enter the water course.
- Daily visual inspections will be undertaken at all drains and river channels.

7.249 The Environmental Incident and Emergency Response Plan outlined in **Technical Appendix 2-1**, the CEMP will provide emergency response contacts, reporting procedures, and procedures for dealing with all potential pollution incidents during the construction of

the Proposed Project. Upon completion of works, the Main Wind Farm Development Site will be restored to its existing land use without delay.

Foul Drainage

7.250 Separate surface water and foul drainage networks will be provided. The network will include manholes located at junctions and directional changes in the drainage pipework as appropriate.

7.251 A separate system consisting of foul water drainage pipework, manholes and a foul water holding tank will be installed. The foul water holding tank will be tankered off-site by a permitted waste collector to a wastewater treatment plant.

7.252 The sealed wastewater holding tank and foul water holding tank will be transported offsite as required by an authorised waste collector to a wastewater treatment plant. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007, will be employed to transport wastewater away from the Main Wind Farm Development Site.

7.253 The proposed wastewater storage tank will be fitted 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 Proposed Development's turbines, wind measurement devices and electricity substation that will be monitored 24 hours a day, seven days per week. This approach for managing wastewater onsite has become a standard practice in wind farm sites.

Pollution Risk

7.254 Oil separators will be installed where required, particularly in transformer or plant areas, to prevent hydrocarbons entering the surface water system. Discharge from the built compounds and turbine hardstandings will be directed to a network of associated attenuation ponds, which will be connected by a series of underground pipes, as shown on **Planning Drawing Number 501.065301.00001.D14**.

7.255 Environmental management measures relating to pollution risk is detailed in Section 6 of the CEMP, and include the following:

- Vehicle re-fuelling will take place either within the compound at a dedicated impermeable refuelling pad or by mobile double bunded bowsers.
- The refuelling pad will have an impermeable base and bund with a capacity of 110% with sumps provided such that they do not drain directly into the surface water drains.
- Where practicable, drainage from the compound will be passed through oil interceptors prior to discharge.
- Absorbent material (spill kits) will be available onsite with dedicated kits adjacent to watercourses and will be deployed to contain drips and small spillages.
- All other fuels, oils and potential contaminants, as well as waste oils, will be stored in secure, fit for purpose containers within bunded containment as appropriate and in accordance with the EPA guidance (2004) Guidance Note on Storage and Transfer of Materials for Scheduled Activities which is generally considered as best practice.
- The bunded containment will have a capacity of 110% of the volume to be stored and will have impervious, secured walls and base.

- Absorbent pads/granules in the case of an accidental leak/spillage will be available at the temporary construction compounds.
- All maintenance will be conducted on suitable absorbent spill pads to minimise the potential for groundwater and surface water pollution.
- All machinery will be equipped with drip pans to contain minor fuel spillage or equipment leakages.

7.256 Management measures relating to the management and movement of concrete is detailed in Section 5 of the CEMP, and include the following:

- There will be a wash-out facility within the construction compound consisting of a sump overlain with a geosynthetic membrane. The geosynthetic membrane will filter out the concrete fines leaving water to pass through to the sump.
- No washing of concrete-associated vehicles will be undertaken outside the wash out facility, and the area will be signposted, with all site contractors informed of the locations.

7.257 To prevent pollution, all concrete pours will be planned, and specific procedures adopted in accordance with Construction Industry Research and Information Association (CIRIA) C532 Control of water pollution from construction sites: guidance for consultants and contractors. These procedures will include:

- ensuring that all excavations are sufficiently dewatered before concrete pours begin and that dewatering continues while the concrete cures. Construction good practice will be followed to ensure that fresh concrete is isolated from the dewatering system;
- ensuring that covers are available for freshly placed concrete to avoid the surface of the concrete washing away during heavy precipitation; and
- perimeter drains with silt traps.

7.258 The excavated area will be back-filled with compacted layers of graded material from the original excavation, where this is suitable, and capped with peat or soil. The finished surface around the base of the turbine, will be capped with crushed aggregate.

Water Quality Monitoring

7.259 Groundwater monitoring standpipes have been installed at locations BH01 and BH06, and BH07 and screened in the bedrock to facilitate groundwater quality monitoring. Groundwater quality monitoring will be carried out prior to commencement of the construction stage and continue during construction to demonstrate no deterioration in groundwater quality during the works.

7.260 Water Quality Monitoring protocols are outlined in Section 8 of the CEMP. Water quality monitoring during the construction phase will be undertaken for the surface water catchments that serve the Main Wind Farm Development Site and the Proposed Project, to ensure that none of the tributaries of the main channels are carrying pollutants or suspended solids. Monitoring will be carried out at a specified frequency on these catchments.

7.261 A Water Quality Monitoring Plan (WQMP) will be implemented to monitor surface water quality, fish populations and macroinvertebrate community prior to, during and post-construction. A robust baseline of water quality in surface watercourses/drainage channels downstream of construction works will be established prior to construction commencing and used as a benchmark of water quality for the construction phase monitoring.

7.262 During construction, all drainage channels and water courses near any construction works will be visually inspected on a daily basis for any signs of pollution. If pollution is observed, all construction works will halt until the source of the pollution is identified and managed effectively.

7.263 The WQMP will outline details for the monitoring of surface watercourses down gradient of works areas including watercourse crossings, access tracks, turbine foundations, Over-run Areas and at control sites (up gradient of works areas), and will include:

- indicative monitoring locations;
- frequency of monitoring prior to, during and after construction;
- parameters for field hydrochemistry testing and laboratory analysis including as a minimum pH, electrical conductivity, suspended solids, dissolved metals, nutrients and hydrocarbons;
- sampling and analysis protocols;
- relevant environmental quality standards (EQS);
- responsibilities for monitoring;
- procedures to be followed in the event of an environmental incident; and
- recording and communicating of results.

Emergency Response

7.264 Drainage networks provide a conduit for rapid transport of silty water and potential contamination from surface spills of fuels/oils, concrete or chemicals. A pollution incident would include any discharge to the drainage network that could potentially cause environmental damage. Examples of pollution incidents include:

- fuel drips or spills during refuelling;
- leaking plant or equipment;
- leaks from fuel or chemical containers;
- contaminated water or sediment/silt entering a watercourse or drainage network;
- windblown dust and waste;
- excess silt deposition in drainage ditches, channels, culverts following heavy rainfall events;
- operational failures of pumps and pipelines; and
- failures of treatment or sediment controls.

7.265 The PSCS will be required to prepare a Pollution Prevention and Incident Plan which will provide emergency response contacts, reporting procedures, and procedures for dealing with all potential pollution incidents during the construction of the Proposed Project.

Mitigation Measures: Operational

7.266 During the operational phase of the Proposed Project, it is anticipated that routine maintenance of infrastructure and tracks will be required across the Main Wind Farm Development Site. This may include work such as maintaining access tracks and drainage and carrying out wind turbine maintenance.

7.267 Should any maintenance be required onsite which will involve construction type activities, the mitigation measures identified in the CEMP will be implemented.

7.268 During the operation of the Proposed Project, it is not anticipated that there will be any excavation or stockpiled material, reducing the potential for erosion and sedimentation effects. Should any excavation be required, this is likely to be limited and required for maintenance of tracks etc. Any excavation, handling and placement of material from excavations will be subject to the same safeguards that will be used during the construction phase of the Proposed Project, as outlined in **Sections 7.190 to 7.198**.

Mitigation Measures: Decommissioning

7.269 The risk of a pollution incident occurring will be managed using good practice measures as detailed in the CEMP. Many of these practices are concerned with undertaking decommissioning activities away from watercourses and identifying safe areas for stockpiling or storage of potential pollutants that could otherwise lead to the pollution of watercourses.

7.270 Potential pollution events occurring during the decommissioning of the turbines or any hardstanding will be controlled by good practice measures and will be subject to some attenuation in the soils before reaching groundwater.

7.271 Adherence to good practice measures will ensure that any material generated is not transported into nearby watercourses.

7.272 Location specific good practice measures will be in place for sediment control for each of the decommissioning activities to control the amount of fine sediment that could potentially enter a watercourse if not managed appropriately. These measures will be dependent upon the final designs and stone quality, but will potentially include cut-off drainage, sediment traps, attenuation basins and flocculation stations.

7.273 In particular, drainage, some of which will be temporary, will be required around turbine working areas, to manage surface flows. Decommissioning of turbine foundations may require temporary de-watering for the period of the foundation decommissioning. These drainage activities may lead to temporary changes in the water table surrounding these decommissioning activities (where de-watering is required below the level of the natural water table).

Residual Effects

7.274 Following decommissioning, with the above mitigation measures in place at the Main Wind Farm Development Site it is projected that the following reduction in the assessed significance of effects will result in:

- Reduction of the potential effects on surface water quality from accidental fuel leakage/ spillage during the Construction stage from "**moderate"** to "**slight**".
- Reduction in surface water quality from sediment release during the construction stage from "**moderate**" to "**slight**.
- Reduction in the groundwater quality from accidental spillage of oils, fuels and cement during the construction stage from "**slight - moderate**" to "**slight – not significant**".

7.275 The significance of all other potential effects during the construction and operational stage will be reduced to "**slight**" or lower to the water environment receptors.

7.276 Additionally, the Proposed Project will not cause a deterioration of the status of any surface or groundwater body under the WFD and will not undermine the attainment by any such body of good status.

Assumptions, Limitations and Confidence

7.277 No particular limitations were encountered in undertaking the assessment of Water (hydrogeology and hydrology).

Cumulative Effects

7.278 For the assessment of cumulative effects, any other permitted or proposed and unbuilt projects in proximity to the Main Wind Farm Development Site (wind energy or other) have been considered where they have the potential to generate an in-combination or cumulative effect with the Proposed Project.

7.279 In terms of all proposed and permitted developments within vicinity of the Main Wind Farm Development Site, the details of projects considered in the cumulative assessment are presented in **Technical Appendix 2-3** 'Projects Considered in the Cumulative Assessment'. In the context of Water, a search of the National Planning Map Viewer (myplan.ie) indicates that there are no other major planned developments in the vicinity of the Main Wind Farm Development Site, GCR or TDR Over-run Areas or on surrounding lands that have recently been granted planning permission that have the potential to give rise to any significant adverse hydrogeology or hydrology cumulative impacts.

Summary of Predicted Effects

7.280 This chapter has presented an assessment of the potential effects of the Proposed Project on surface water and groundwater.

7.281 The design of the Proposed Project considered a range of best practice construction measures to ensure avoidance and reduction of effects throughout the construction, operational and decommissioning phases. Additional measures were also developed to mitigate the potential effects identified on the water environment receptors.

7.282 This chapter comprehensively assesses all scenarios within the Turbine Range which is described in **Table 2-1** of **Chapter 2** of this EIAR. The potential effects that could arise from the Proposed Project during the construction, operational and decommissioning phases are set out in this conclusion.

7.283 With mitigation measures in place at the Main Wind Farm Development Site, GCR and Over-run Areas of the TDR the significance of potential effects during the construction, operational and decommissioning stages will be reduced to "slight" or lower to the water environment receptors. Therefore any potential adverse direct or indirect residual effects were assessed as being **not significant** in terms of the EIA Regulations.

Statement of Significance

7.284 The effects on water (hydrology and hydrogeology) receptors has been assessed using appropriate legislation, guidance and policy. Following the implementation of mitigation measures, potential residual effects due to the Proposed Project are considered **not significant** under the EIA Regulations.

Figures

Figure 7-1: Existing and Proposed Watercourse Crossings

Figure 7-2: Surface Water Catchment and Flood Risk

Figure 7-3: Surface Water Monitoring Locations

Figure 7-4: Bedrock Aquifer and Karst Features

Figure 7-5: Groundwater Vulnerability

Figure 7-6: Groundwater Bodies

Figure 7-7: Public Supply Source Protection Areas

Figure 7-8: GSI Groundwater Supply Wells

Figure 7-9: Designated Areas

Figure 7-10a-d: TDR Over-run Areas - Surface Water Catchment

Figure 7-11a-d: TDR Over-run Areas - Bedrock Aquifer and Karst Features

Figure 7-12a-d: TDR Over-run Areas – Public Supply Source Protection Areas

Figure 7-13a-d: TDR Over-run Areas – Designated Areas

Figure 7-14a-d: TDR Over-run Areas - Groundwater Vulnerability

Figure 7-15a-d: TDR Over-run Areas - Groundwater Bodies

Figure 7-16a-d: TDR Over-run Areas - GSI Groundwater Supply Wells

Technical Appendices

Technical Appendix 7-1	EU Directives / National Legislation and Regulations / Guidelines / Technical Standards
Technical Appendix 7-2	Site Visit Details
Technical Appendix 7-3	TDR and Cable Route
Technical Appendix 7-4	Water Framework Directive Assessment report
Technical Appendix 7-5	Surface Water Laboratory Results
Technical Appendix 7-6	Rating of Existing Environmental Significance / Sensitivity (IGI, 2013 Guidelines)
Technical Appendix 7-7	Description of Effects (EPA, 2022)
Technical Appendix 7-8	Classification of the Significance of Effects (EPA, 2022)

(Refer to EIAR Volume 3 for Technical Appendices)

460000 470000 480000 490000 500000

840000 830000 820000

Broadhaven Bay

Béal an Mhuirthead

Blacksod Bay - Cuan an Fhóid Duibh

Achill Island - Acaill

Keel Beach

Loch na Gealtrún Móire

Wild Nephin National Park

N59

OVER-RUN AREA 1

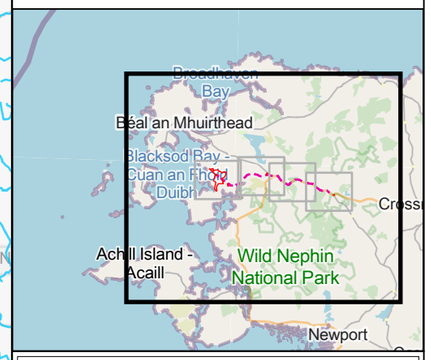
OVER-RUN AREA 3

OVER-RUN AREA 2

N

LEGEND

- Proposed Development Site Boundary
- Bellacorick 110 kv Substation
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Over-run Area Location
- Watercourse
- Waterbody



0 5 10

Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

EXISTING AND PROPOSED WATERCOURSE CROSSINGS

FIGURE 7-1a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0163.0 Watercrossing Overview

474000
476000
478000
480000
824000
822000
402.064443.00001.0081.0 Watercrossing

N

Loughnashelly
L1205
L1205
L1205
L1205
Geesala Cemetery

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
WCX1
WCX2
WCX3
WCX4
WCX5
TCC1
TCC2
1
2
3

0
1
2
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound
- Proposed Attenuation Basin
- Watercourse
- Waterbody

Watercourse Crossing Type

- Proposed
- Existing

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MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

EXISTING AND PROPOSED WATERCOURSE CROSSINGS

FIGURE 7-1b

Scale 1:25,000 @ A3

Date MARCH 2026

482000 484000 486000 488000

826000 824000 822000

402.064443.00001.0081.0 Watercrossing

N

Gortmore Island
Attavally Island
Carrafull
323.4 m
Barrets Quarry
Bangor Erris
Wastewater Treatment Plant
Bangor Erris Cemetery
Muingmore River

R313 L1204 N59

WCX5 WCX6 WCX7 WCX8 WCX9 WCX10 WCX11 WCX12 WCX13 WCX14

0 1 2
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Watercourse
- Waterbody

Watercourse Crossing Type

- Existing

RWE

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MUINGMORE WIND FARM

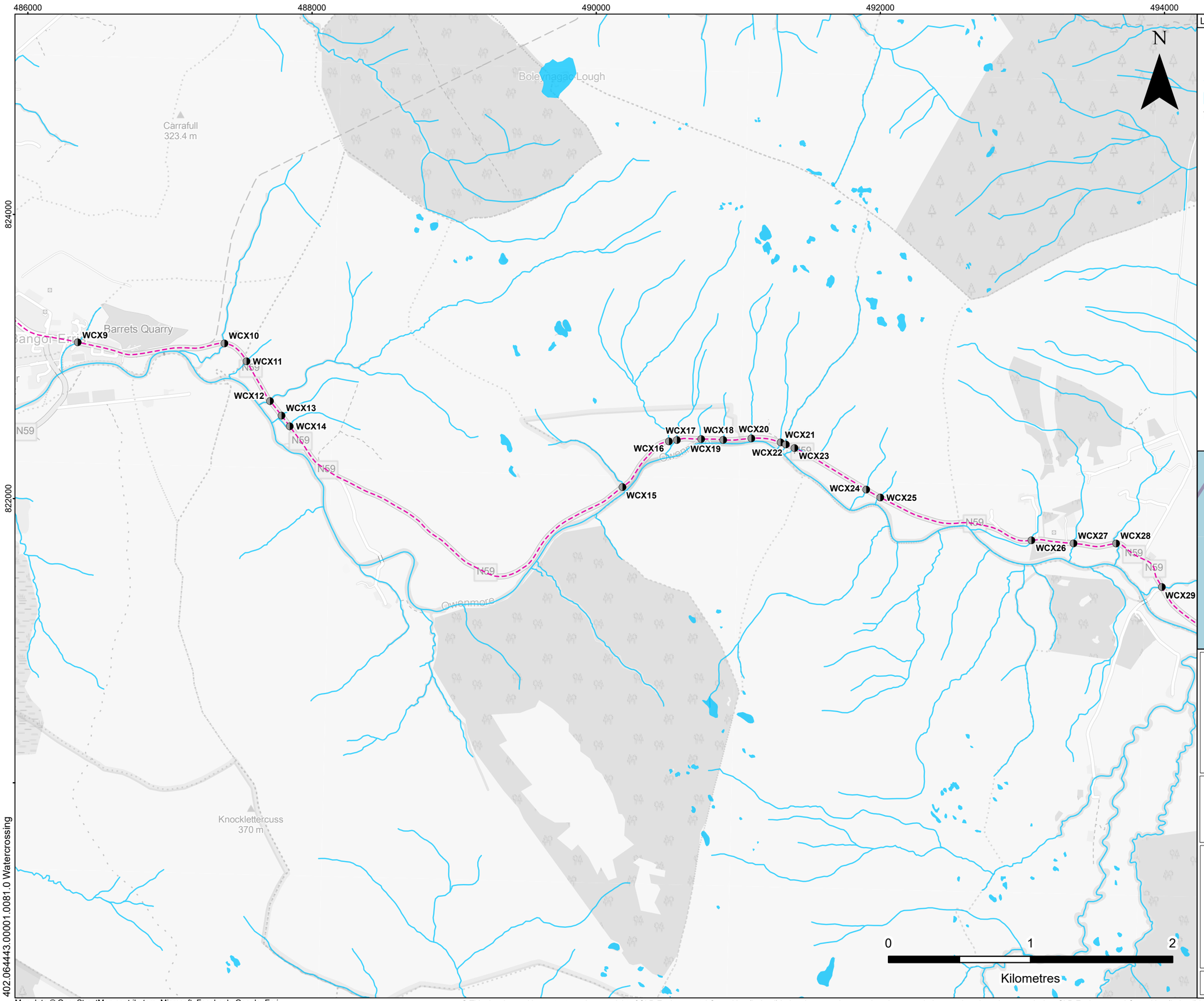
WATER
(HYDROLOGY AND HYDROGEOLOGY)

EXISTING AND PROPOSED WATERCOURSE CROSSINGS

FIGURE 7-1c

Scale 1:25,000 @ A3

Date MARCH 2026



LEGEND

- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Watercourse
- Waterbody

Watercourse Crossing Type

- Existing

RWE

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MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

EXISTING AND PROPOSED WATERCOURSE CROSSINGS

FIGURE 7-1d

Scale 1:25,000 @ A3

Date MARCH 2026

494000 496000 498000 500000

822000 820000 402.064443.00001.0081.0 Watercrossing

N

WCX26 WCX27 WCX28 WCX29 WCX30 WCX31 WCX32 WCX33 WCX34

N59 N59 N59 N59 N59 N59 N59

Shranakilla 110kV Substation

Lough Nagappul

Owenmore

Bellacorrick 110kV Substation

Bellacorrick AGI

Lough Dahybaun

R312 R312 R312

0 1 2

Kilometres

LEGEND

- Proposed Development Site Boundary
- Bellacorick 110 kv Substation
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Watercourse
- Waterbody

Watercourse Crossing Type

- Existing

RWE

SLR

MUINGMORE WIND FARM

WATER (HYDROLOGY AND HYDROGEOLOGY)

EXISTING AND PROPOSED WATERCOURSE CROSSINGS

FIGURE 7-1e

Scale 1:25,000 @ A3

Date MARCH 2026

474000
476000
478000
824000
822000
402.064443.00001.0082.0 Surface Water Catchment

N

EPA Monitoring Station Location
Watercourse
Watercourse Flow Direction
Waterbody
Watercourse and Waterbody 50 m Buffer
Water Framework Directory (WFD) Catchment Boundary (Blacksod-Broadhaven)
WFD Sub-Catchment Boundary
0.1% (Low Probability) Annual Exceedance Probability which can also be expressed as the 1000 Year Return Period and as 1000:1 Odds of Occurrence in ny given year
1% (Medium Probability) Annual Exceedance Probability which can also be expressed as the 100 Year Return Period and as 100:1 odds of occurrence in any given year

WFD Sub-Catchment

Glencastle_SC_010
Owenmore[Mayo]_SC_030
WFD Transitional Waterbody Boundary
WFD Transitional Coastal Waterbody Boundary

LEGEND

Proposed Development Site Boundary
Proposed Turbine Location
Proposed Site Access Location
Proposed Met Mast Location
Proposed New Access Track
Proposed Upgraded Access Track
Proposed Grid Connection Route (Subject to Separate Planning Application)
Proposed Crane Pad
Proposed Substation
Proposed Battery Energy Storage System (BESS) Compound
Proposed Temporary Construction Compound (TCC)
Proposed Attenuation Basin

Doolough (Stream)
AN MHOING MHÓR
TRISTIA 33
L1205
L1206
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
TCC1
TCC2
1
2
3
Glencastle_SC_010
Owenmore[Mayo]_SC_030
Blacksod Bay
Tullaghan Bay
Saint Comcille's Church

Béal an Mhuirthead
Blacksod Bay - Cuan an Fhoid Duibh

0 1 2
Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

SURFACE WATER CATCHMENT AND FLOOD RISK

FIGURE 7-2

Scale 1:18,000 @ A3
Date MARCH 2026

474000 476000 478000 480000

824000 822000

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound
- Surface Water Sampling (SW) Location
- Proposed Attenuation Basin
- EPA Watercourse
- EPA Waterbody

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

SURFACE WATER MONITORING

FIGURE 7-3b

Scale 1:25,000 @ A3

Date MARCH 2026

0 1 2
Kilometres

402.064443.00001.0083.0 Surface Water Monitoring

482000 484000 486000 488000

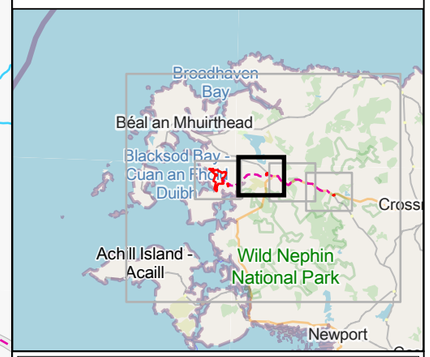
826000 824000 822000

402.064443.00001.0083.0 Surface Water Monitoring

N

LEGEND

- Proposed Development Site Boundary
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Surface Water Sampling (SW) Location
- Proposed Attenuation Basin
- EPA Watercourse
- EPA Waterbody



RWE

SLR

MUINGMORE WIND FARM

WATER (HYDROLOGY AND HYDROGEOLOGY)

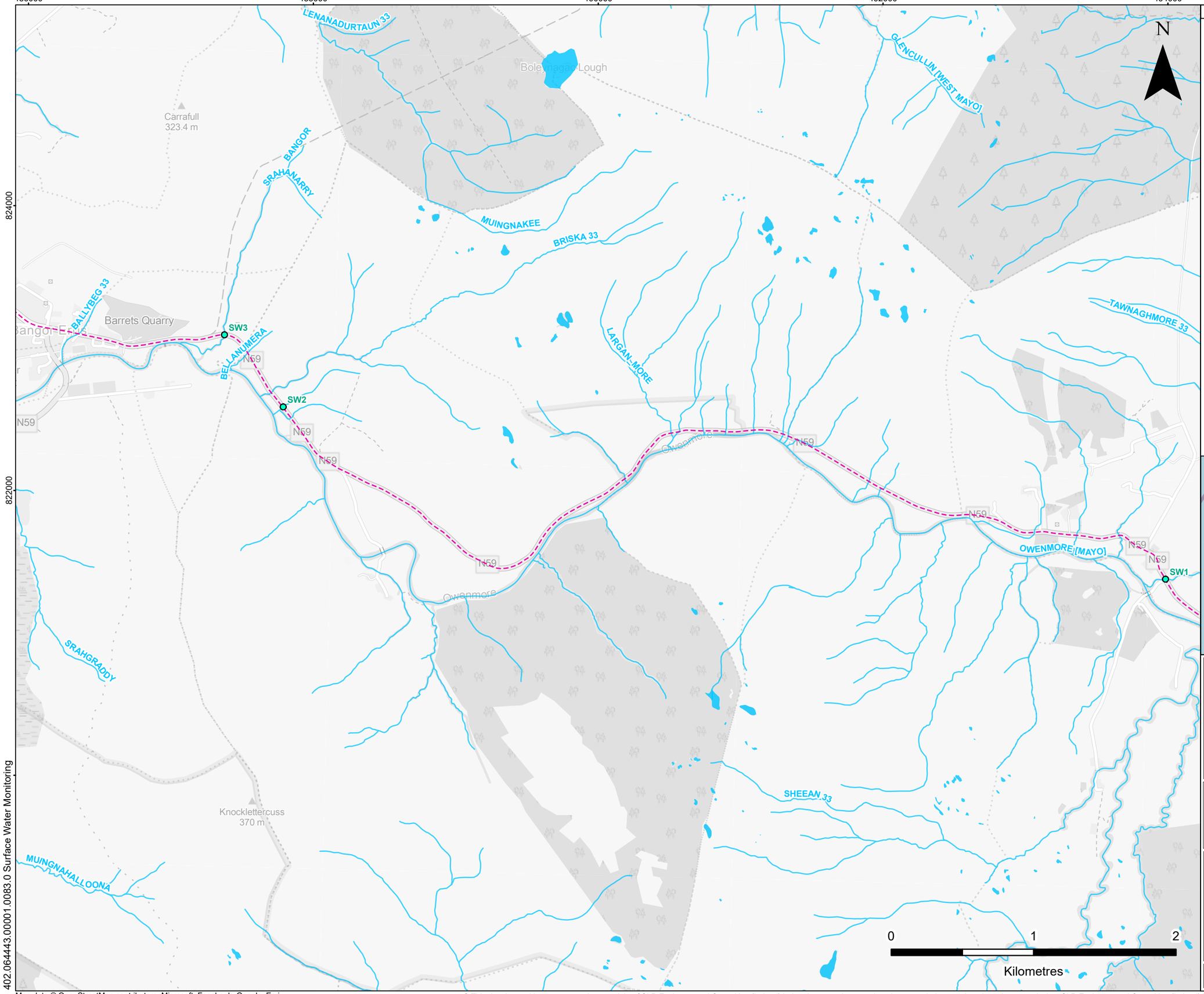
SURFACE WATER MONITORING

FIGURE 7-3c

Scale 1:25,000 @ A3

Date MARCH 2026

0 1 2 Kilometres



RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

SURFACE WATER MONITORING

FIGURE 7-3d

Scale 1:25,000 @ A3

Date MARCH 2026

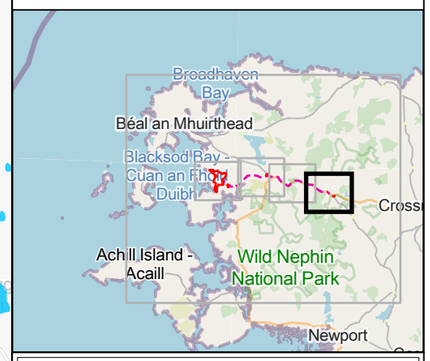
494000
496000
498000
500000
822000
820000
402.0644443.00001.0083.0 Surface Water Monitoring

N

TAWNAGHMORE 33
SHESKIN (STREAM)
Shranakilla 110kV Substation
CROAGHAUN_WEST
Lough Nagappul
MUING
N59
OWENMORE [MAYO]
SW1
KILSALLAGH 33
Owenmore
Bellacorick 110kV Substation
Bellacorrick AGI
BELLACORICK
Lough Dairybaun
R312
SHEEAN 33
ALTNABROCKY 33
DERRY LOWER
MONEYNIERIN
MUINGAGHEL
0
1
2
Kilometres

LEGEND

- Proposed Development Site Boundary
- Bellacorick 110 kv Substation
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Surface Water Sampling (SW) Location
- Proposed Attenuation Basin
- EPA Waterbody



RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

SURFACE WATER MONITORING

FIGURE 7-3e

Scale: 1:25,000 @ A3

Date: MARCH 2026

474000
476000
478000
824000
822000
402.064443.00001.0084.0 Bedrock Aquifer

N

L1205
L1206

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
1
2
3
TCC1
TCC2

Saint Cuthbert's Church

0
1
2
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound (TCC)
- Proposed Attenuation Basin
- Bedrock Aquifer Fault Line

Bedrock Aquifer

- PI - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones

RWE

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MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

BEDROCK AQUIFER AND KARST FEATURES

FIGURE 7-4

Scale 1:18,000 @ A3

Date MARCH 2026

474000 476000 478000

824000 822000

N

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13

1 2 3

TCC1 TCC2

L1205 L1206

0 1 2

Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound (TCC)
- Proposed Attenuation Basin

Groundwater Vulnerability

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

Béal an Mhuirthead

Blacksod Bay / Cuan an Fhóid Duibh

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

GROUNDWATER VULNERABILITY

FIGURE 7-5

Scale 1:18,000 @ A3

Date MARCH 2026

402.064443.00001.0085.0 Groundwater Vulnerability

474000
476000
478000
824000
822000
402.064443.00001.0086.0 Groundwater Bodies

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound (TCC)
- Proposed Attenuation Basin

Groundwater Body

- Belmullet

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

GROUNDWATER BODIES

FIGURE 7-6

Scale 1:18,000 @ A3

Date MARCH 2026

0 1 2
Kilometres

470000
480000
830000
820000
402.064443.00001.0168.0 Public Supply

Béal an Mhuirthead
An Geata Mór
Bun na hAbhna
Loch na Ceathrún Móire
Blacksod Bay - Cuan an Fhóid Duibh
Bangor Erris
Unnamed NFGWS
Achill Island - Acaill
Wild Nephin National Park

R313
R314
L5285
L1204
L1205
N59

N

0 2 4
Kilometres

LEGEND

Proposed Development Site Boundary

Group Water Schemes Preliminary Source Protection Areas Zones of Contribution

RWE

SLR

MUINGMORE WIND FARM

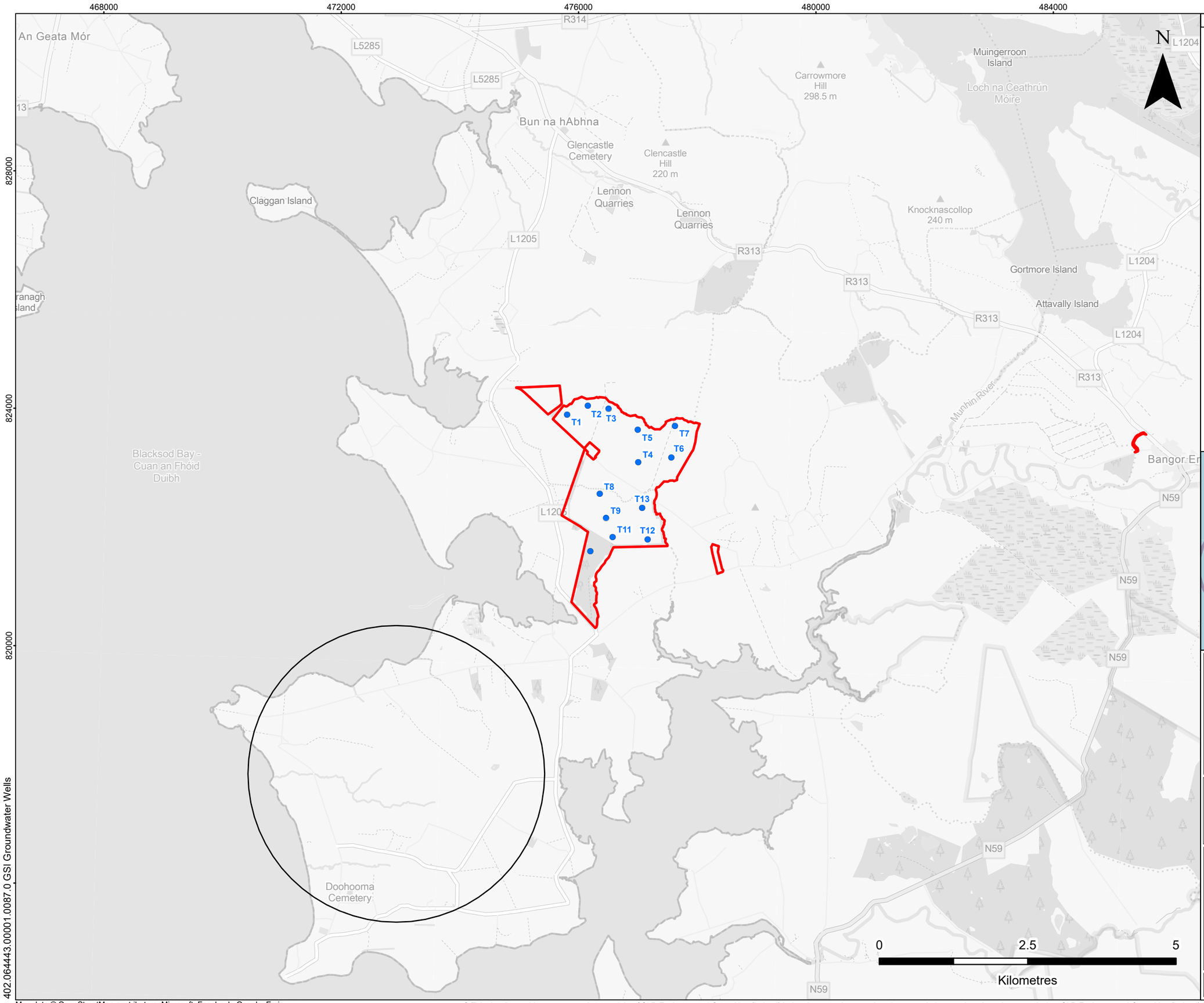
WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

PUBLIC SUPPLY SOURCE PROTECTION AREAS

FIGURE 7-7

Scale 1:80,000 @ A3

Date MARCH 2026



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- GSI Groundwater Supply Well

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

GSI GROUNDWATER SUPPLY WELLS

FIGURE 7-8

Scale 1:60,000 @ A3

Date MARCH 2026

475000

480000

825000

820000

402.064443.00001.0164.0 Designated Sites

Claggan Island

Lennon Quarries

Lennon Quarries

L1205

R313

R313

R313

Ederglen Bog NHA

Carrowmore Lake SPA

Carrowmore Lake Complex pNHA

Carrowmore Lake Complex SAC

'Blacksod' Bay/Broad Haven SPA

Tristia Bog NHA

Munhin River

TCC1

TCC2

1

2

3

L1205

Mullet/Blacksod Bay Complex pNHA

Mullet/Blacksod Bay Complex SAC

Tullaghan Bay and Bog NHA

N

0 2 4

Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Development Site Boundary 2 km Buffer
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Grid Connection Route (Subject to Separate Planning Application)
- Proposed Crane Pad
- Proposed Substation
- Proposed Battery Energy Storage System (BESS) Compound
- Proposed Temporary Construction Compound (TCC)
- Proposed Attenuation Basin
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)
- Natural Heritage Area (NHA)

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

DESIGNATED AREAS

FIGURE 7-9

Scale 1:40,000 @ A3

Date MARCH 2026

460000 470000 480000 490000 500000

840000 830000 820000

Note
National Indicative Fluvial Mapping (NIFM) River Flood Extents are shown from 7-10b Onwards

Broadhaven Bay
Broadhaven
Sruwaddacon Bay
Bunatrahir Bay
Western Atlantic Seaboard (HAs 32;33;34)
Belmullet Bay
Blacksod-Broadhaven
OVER-RUN AREA 1
Figure 7-10d
Figure 7-10b
Figure 7-10c
Blacksod Bay - Cuan an Fhóid Duibh
Tullaghan Bay
OVER-RUN AREA 3
OVER-RUN AREA 2
Blacksod Bay
Moy & Killala Bay
Achill Island - Acaill
Dooniver Loughs
Erriff-Clew Bay
Blacksod Bay SW / Achill Sound
Wild Nephin National Park
Bellacragher Bay
Clew Bay
Achill Island - Acaill
Wild Nephin National Park

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location
- Watercourse
- Waterbody
- EPA Monitoring Station Location
- Water Framework Directory (WFD) Catchment Boundary
- WFD Transitional Waterbody Boundary
- WFD Transitional Coastal Waterbody Boundary

WFD Sub-Catchment

- Addergoole_SC_010
- Belderg_SC_010
- Bellagarvaun_SC_010
- Cloonaghmore_SC_010
- Deel[Crossmolina]_SC_010
- Deel[Crossmolina]_SC_020
- Glenamoy_SC_010
- Glencastle_SC_010
- Glencullin[NorthMayo]_SC_010
- KEEL_EAST_SC_010
- Munhin_SC_010
- Newport[Mayo]_SC_010
- Owenduff[Blacksod]_SC_010
- Owengarve_SC_010
- Owenmore[Mayo]_SC_010
- Owenmore[Mayo]_SC_020
- Owenmore[Mayo]_SC_030
- Srahmore_SC_010
- Tóin An Mhása_SC_010

0 5 10
Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

SURFACE WATER CATCHMENT AND FLOOD RISK TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-10a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0157.0 Surface Water TDR Overview

476000 477000 478000 479000 480000

823000 822000 821000

TCC1 TCC2 T4 T6 T8 T9 T10 T11 T12 T13 2 3

L1206 L1206 L1206 L1206 L1206

TRISTIA 3.3

Blacksod-Broadhaven Blacksod-Broadhaven

TAWNANASOOL

Blacksod Bay

Tullaghan Bay

0 0.5 1 Kilometres

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Crane Pad
- Proposed Substation
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Attenuation Basin
- EPA Monitoring Station Location
- Watercourse
- Watercourse Flow Direction
- Waterbody
- Watercourse and Waterbody 50 m Buffer
- Water Framework Directory (WFD) Catchment Boundary
- 0.1% (Low Probability) Annual Exceedance Probability which can also be expressed as the 1000 Year Return Period and as 1000:1 Odds of Occurrence in ny given year
- 1% (Medium Probability) Annual Exceedance Probability which can also be expressed as the 100 Year Return Period and as 100:1 odds of occurrence in any given year

WFD Sub-Catchment

- Glencastle_SC_010
- Owenmore[Mayo]_SC_030
- WFD Transitional Waterbody Boundary
- WFD Transitional Coastal Waterbody Boundary

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

SURFACE WATER CATCHMENT AND FLOOD RISK TDR OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 7-10b

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0145.0 Surface Water Catchment TDR

496000 497000 498000 499000 500000

821000 820000 819000

KILSALLAGH 33
OWENMORE [MAYO]
BELLACORICK
ALTNABROCKY 33
MONEYNIERIN
DERRY LOWER
MUING
CROAGHAUN WEST
Bellacorick 110kV Substation
Bellacorrick AGI
Moy & Killala Bay
Blacksod-Broadhaven
N59
R312
N5

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- EPA Monitoring Station Location
- Watercourse
- Watercourse Flow Direction
- Waterbody
- Watercourse and Waterbody 50 m Buffer
- Water Framework Directory (WFD) Catchment Boundary
- 0.1% (Low Probability) Annual Exceedance Probability which can also be expressed as the 1000 Year Return Period and as 1000:1 Odds of Occurrence in ny given year
- 1% (Medium Probability) Annual Exceedance Probability which can also be expressed as the 100 Year Return Period and as 100:1 odds of occurrence in any given year

WFD Sub-Catchment

- Deel[Crossmolina]_SC_010
- Owenmore[Mayo]_SC_020

0 0.5 1
Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

SURFACE WATER CATCHMENT AND FLOOD RISK TDR OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 7-10c

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0145.0 Surface Water Catchment TDR

483000
484000
485000
486000
487000
825000
824000
823000

N

GORTMORE 33
MUNHIN
KILTEANY
ATTAVALLY
OWENMORE [MAYO]
SRAHGRADDY
DARRARAGH
BALLYBEG 33
BRISKA 33
SRAHANARRY
BANGOR

R313
L1204
L12044
L12065
L12063
L52543
N59
Carrafull
323.4 m
Barrets Quarry
Bangor Erris
Wastewater
tment Plant
Bangor Trail
Bangor Erris
Cemetery

0
0.5
1
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- EPA Monitoring Station Location
- Watercourse
- Watercourse Flow Direction
- Waterbody
- Watercourse and Waterbody 50 m Buffer
- Water Framework Directory (WFD) Catchment Boundary
- 0.1% (Low Probability) Annual Exceedance Probability which can also be expressed as the 1000 Year Return Period and as 1000:1 Odds of Occurrence in ny given year
- 1% (Medium Probability) Annual Exceedance Probability which can also be expressed as the 100 Year Return Period and as 100:1 odds of occurrence in any given year

WFD Sub-Catchment

- Munhin_SC_010
- Owenmore[Mayo]_SC_020
- Owenmore[Mayo]_SC_030

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

SURFACE WATER CATCHMENT AND FLOOD RISK TDR OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 7-10d

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0145.0 Surface Water Catchment TDR

460000 470000 480000 490000 500000

840000 830000 820000

N

Broadhaven Bay

Béal an Mhuirthead

Loch na Ceathrún Móire

OVER-RUN AREA 1

Figure 7-11d

Blacksod Bay - Cuan an Fhóid Duibh

Figure 7-11b

Figure 7-11c

N59

OVER-RUN AREA 3

OVER-RUN AREA 2

Achill Island - Acaill

Keel Beach

Wild Nephin National Park

Clew Bay

0 5 10

Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location

Bedrock Aquifers

- Rkc - Regionally Important Aquifer - Karstified (conduit)
- Rk - Regionally Important Aquifer - Karstified
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Lk - Locally Important Aquifer - Karstified
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Lake
- Unclassified

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

BEDROCK AQUIFER AND KARST FEATURES TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-11a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0161.0 Bedrock Acquifer TDR Overview

476000 477000 478000 479000 480000

823000 822000 821000

TCC1 TCC2 T4 T6 T8 T9 T10 T11 T12 T13 2 3

L1206

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Crane Pad
- Proposed Substation
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Attenuation Basin
- Bedrock Aquifer Fault Line

Bedrock Aquifer

- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones

0 0.5 1

Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

BEDROCK AQUIFER AND KARST FEATURES TDR OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 7-11b

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0146.0 Bedrock Aquifer TDR

496000
497000
498000
499000
500000
821000
820000
819000

N

N59
R312
Bellacorick 110kV Substation
Bellacorrick AGI
Owenmore
River Muing
Lough D

0
0.5
1
Kilometres

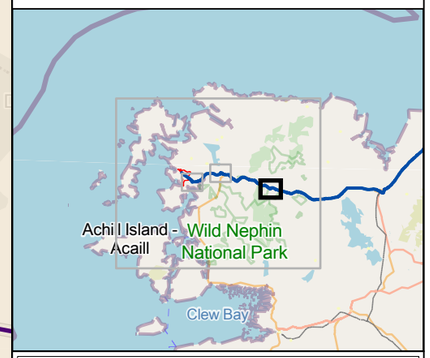
LEGEND

Proposed Development Site Boundary

Proposed Turbine Delivery Route

Bedrock Aquifer

Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones



RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

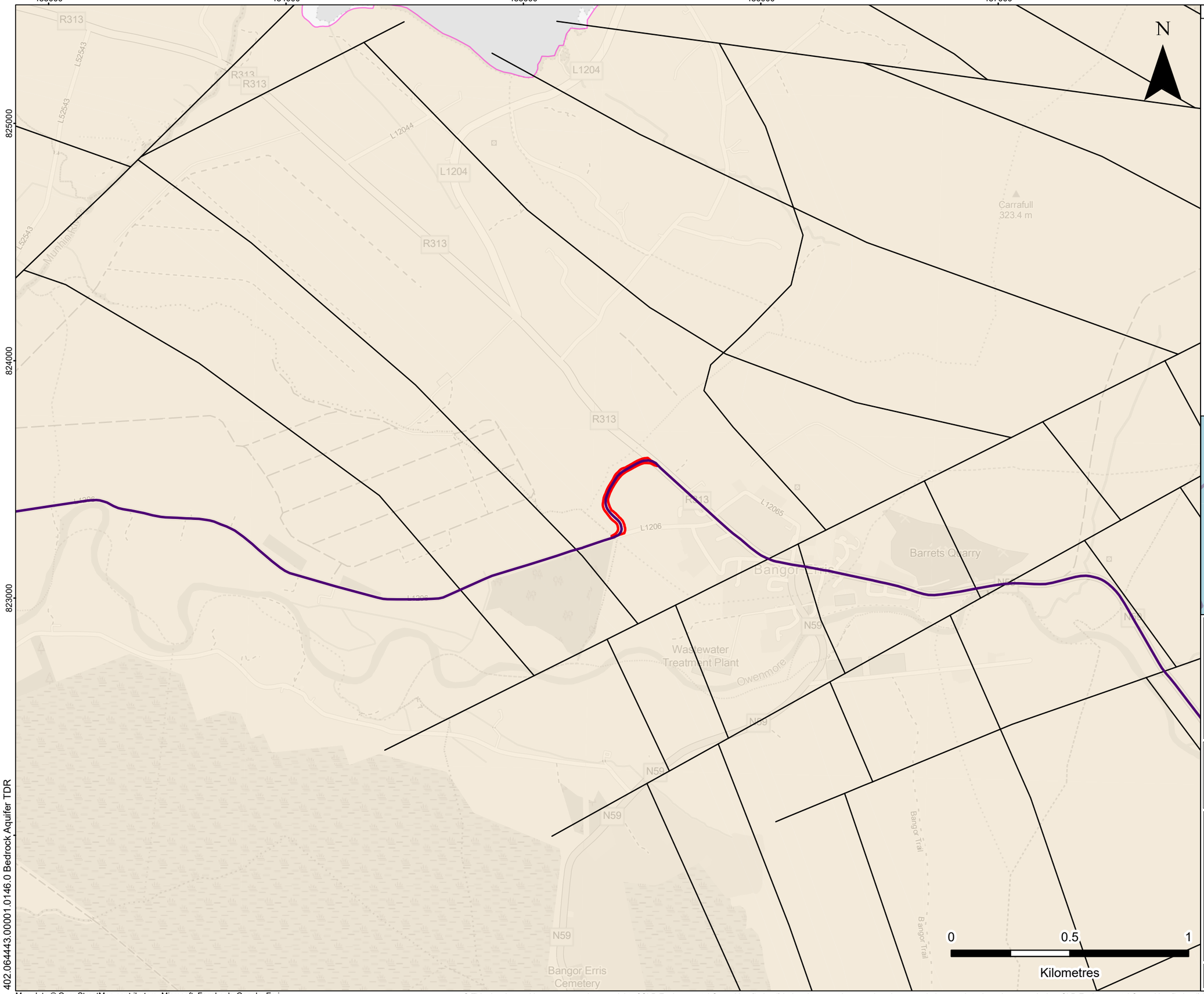
BEDROCK AQUIFER AND KARST FEATURES TDR OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 7-11c

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0146.0 Bedrock Aquifer TDR



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Bedrock Aquifer Fault Line

Bedrock Aquifer

- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Lake

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

BEDROCK AQUIFER AND KARST FEATURES TDR OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 7-11d

Scale 1:15,000 @ A3

Date MARCH 2026

460000 470000 480000 490000 500000

840000 830000 820000

N

Broadhaven Bay

Béal an Mhuirthead

Loch na Ceathrún Móire

OVER-RUN AREA 1

Blacksod Bay - Cuan an Fhóid Duibh

N59

Unnamed NFGWS

OVER-RUN AREA 3

OVER-RUN AREA 2

Achill Island - Acaill

Keel Beach

Wild Nephin National Park

0 5 10

Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location
- Group Water Schemes (GWS)
- Preliminary Source Protection Areas
- Zones of Contribution

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

PUBLIC SUPPLY SOURCE PROTECTION AREAS TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-12a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0167.0 Public Supply TDR Overview

460000 470000 480000 490000 500000

840000 830000 820000

402.064443.00001.0165.0 Designated Sites TDR Overview

Erris Head pNHA
Eagle Island pNHA
Broadhaven Bay Broadhaven Bay SAC
Glenamoy Bog Complex SAC
Benaderreen Cliffs pNHA
Glenamoy Bog Complex pNHA
Erris Head SAC
Termoncarragh Lake and Annagh Machair SPA
Mullet Peninsula SPA
Pollatomish Bog NHA
Inishglora & Inishkeeragh pNHA
Broadhaven Bay pNHA
Glenturk More Bog NHA
Slieve Fyagh Bog SAC
Slieve Fyagh Bog pNHA
Inishglora and Inishkeeragh SPA
Carrowmore Lake SPA
Ederglen Bog NHA
West Connacht Coast SAC
OVER-RUN AREA 1
Bellacorick Bog Complex pNHA
Mullet/Blacksod Bay Complex pNHA
Carrowmore Lake Complex SAC
Figure 7-13d
Tristia Bog NHA
Bellacorick Iron Flush pNHA
Mullet/Blacksod Bay Complex SAC
Bellacorick Iron Flush SAC
Blacksod Bay/Broad Haven SPA
Carrowmore Lake Complex pNHA
Bellacorick Bog Complex SAC
Figure 7-13c
Figure 7-13b
Lough Dahybaun SAC
Duvillaun Islands pNHA
Tullaghan Bay and Bog NHA
Duvillaun Islands SPA
River Moy SAC
Duvillaun Islands SAC
OVER-RUN AREA 3
Owenduff/Nephin Complex SPA
OVER-RUN AREA 2
Owenduff/Nephin Complex SAC
Croaghaun/Slievemore pNHA
Doogort Machair/Lough Doo pNHA
Altaconey Bog pNHA
Doogort Machair SPA
Corraun Point Machair/Dooreel Creek pNHA
Doogort Machair/Lough Doo SAC
Owenduff/Nephin Complex pNHA
Drumleen Lough pNHA
Achill Island - Acaill
Doogort East Bog NHA
Wild Nephin National Park
Newport River SAC
Croaghaun/Slievemore SAC
Keel Machair/Menaun Cliffs pNHA
Inishgalloon pNHA
Keel Machair/Menaun Cliffs SAC
Achill Head SAC
Lough Gall Bog SAC
Bellacragher Saltmarsh pNHA
Corraun Plateau pNHA
Lough Gall Bog pNHA

N

0 5 10
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)
- Natural Heritage Area (NHA)

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

DESIGNATED AREAS TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-13a

Scale 1:150,000 @ A3

Date MARCH 2026

476000 477000 478000 479000 480000

823000 822000 821000

TCC1 TCC2 T4 T6 T8 T9 T10 T11 T12 T13 2 3

Tristia Bog NHA

Tullaghan Bay and Bog NHA

Blacksod Bay/Broad Haven SPA

Mullet/Blacksod Bay Complex pNHA pNHA

L1206

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Crane Pad
- Proposed Substation (Indicative Size and Location)
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Drainage Feature
- Proposed Attenuation Basin
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)
- Natural Heritage Area (NHA)

0 0.5 1
Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

DESIGNATED AREAS TDR OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 7-13b

Scale 1:15,000 @ A3

Date MARCH 2026

402.0644443.00001.0166.0 Designated Sites_TDR

496000 497000 498000 499000 500000

821000 820000 819000

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Special Area of Conservation (SAC)
- Proposed Natural Heritage Area (pNHA)

N59 Oweninore Bellacorick 110kV Substation Owenmore River Muing Bellacorrick AGI River Muing Lough Dahybaun SAC Lough D N59 N59 R312 N59 R312 Bellacorick Bog Complex pNHA Bellacorick Bog Complex pNHA SAC R312 R312

Achill Island - Acaill Wild Nephin National Park Clew Bay

0 0.5 1 Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

DESIGNATED AREAS TDR OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 7-13c

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0166.0 Designated Sites TDR

483000 484000 485000 486000 487000

825000 824000 823000

Carrowmore Lake SPA

R313 L52543 L1204 L12044 L12065 L1206 N59

Munhin River

Carrafull 323.4 m

Barrets Quarry

Bangor Erris

Wastewater Treatment Plant

Owenmore

Bangor Erris Cemetery

Carrowmore Lake Complex pNHA pNHA

Carrowmore Lake Complex SAC

Owenduff/Nephin Complex SAC

Owenduff/Nephin Complex SPA

Owenduff/Nephin Complex pNHA pNHA

0 0.5 1 Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Proposed Natural Heritage Area (pNHA)

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

DESIGNATED AREAS TDR OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 7-13d

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0166.0 Designated Sites TDR

460000 470000 480000 490000 500000

840000 830000 820000

Broadhaven Bay
Béal an Mhuirthead
Blacksod Bay - Cuan an Fhóid Duibh
Loch na Ceathrún Móir
Achill Island - Acaill
Keel Beach
Wild Nephin National Park

OVER-RUN AREA 1
OVER-RUN AREA 2
OVER-RUN AREA 3

Figure 7-14b
Figure 7-14c
Figure 7-14d

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location

Groundwater Vulnerability

- Rock at or Near Surface or Karst
- Extrmeme
- High
- Moderate
- Low
- Water

0 5 10
Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GROUNDWATER VULNERABILITY TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-14a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0160.0 Geoundwater Vul TDR Overview

476000 477000 478000 479000 480000

823000 822000 821000

TCC1 TCC2 T4 T6 T8 T9 T10 T11 T12 T13 2 3

L1206

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Crane Pad
- Proposed Substation
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Attenuation Basin

Groundwater Vulnerability

- Rock at or Near Surface or Karst
- Extrmeme
- High
- Moderate
- Low
- Water

0 0.5 1

Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

GROUNDWATER VULNERABILITY TDR OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 7-14b

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0147.0 Groundwater Vul TDR

496000 497000 498000 499000 500000

821000

820000

N

LEGEND

Proposed Development Site Boundary

Proposed Turbine Delivery Route

Groundwater Vulnerability

Rock at or Near Surface or Karst

Extrmeme

High

Moderate

Low

Water

Owenmore

Bellacorick 110kV Substation

Bellacorrick AGI

River Muing

N59

R312

Lough D

Achill Island - Acaill

Wild Nephin National Park

Clew Bay

0 0.5 1

Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

GROUNDWATER VULNERABILITY TDR OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 7-14c

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0147.0 Groundwater Vul TDR

483000 484000 485000 486000 487000

825000 824000 823000

N

LEGEND

Proposed Development Site Boundary

Proposed Turbine Delivery Route

Groundwater Vulnerability

Rock at or Near Surface or Karst

Extrmeme

High

Moderate

Low

Water

RWE

SLR

MUINGMORE WIND FARM

WATER
(HYDROLOGY AND HYDROGEOLOGY)

GROUNDWATER VULNERABILITY TDR OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 7-14d

Scale 1:15,000 @ A3

Date MARCH 2026

0 0.5 1

Kilometres

402.064443.00001.0147.0 Groundwater Vul TDR

460000 470000 480000 490000 500000

840000 830000 820000

Broadhaven Bay
Béal an Mhuirthead
Loch na Ceathrún Móire
Blacksod Bay - Cuan an Fhóid Duibh
Achill Island - Acaill
Keel Beach
Wild Nephin National Park
N59
N59
N59
N59
N59

OVER-RUN AREA 1
OVER-RUN AREA 2
OVER-RUN AREA 3

Figure 7-15b
Figure 7-15c
Figure 7-15d

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location

Groundwater Bodies

- Achill
- Ballina
- Bangor
- Bellacorick-Killala
- Belmullet
- Belmullet Gravels
- Beltra Lough South
- Clifden Castlebar
- Crossmolina Gravels
- Deel
- Laherdaun
- Malranny

0 5 10
Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GROUNDWATER BODIES TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-15a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0158.0 Groundwater Bodies TDR Overview

476000 477000 478000 479000 480000

823000 822000 821000

TCC1 TCC2 T4 T6 T8 T9 T10 T11 T12 T13 2 3

L1206

N

0 0.5 1
Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Crane Pad
- Proposed Substation (Indicative Size and Location)
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Drainage Feature
- Proposed Attenuation Basin

Groundwater Body

- Belmullet

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GROUNDWATER BODIES TDR OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 7-15b

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0148.0 Groundwater Bodies TDR

496000 497000 498000 499000 500000

821000

820000

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Drainage Feature
- Proposed Attenuation Basin

Groundwater Body

- Bellacorick-Killala
- Belmullet

N59 Owenmore Bellacorick 110kV Substation Owenmore Bellacorrick AGI River Muing River Muing N59 N59 R312 R312 R312 N59 Lough D

0 0.5 1

Kilometres

RWE

SLR

MUINGMORE WIND FARM

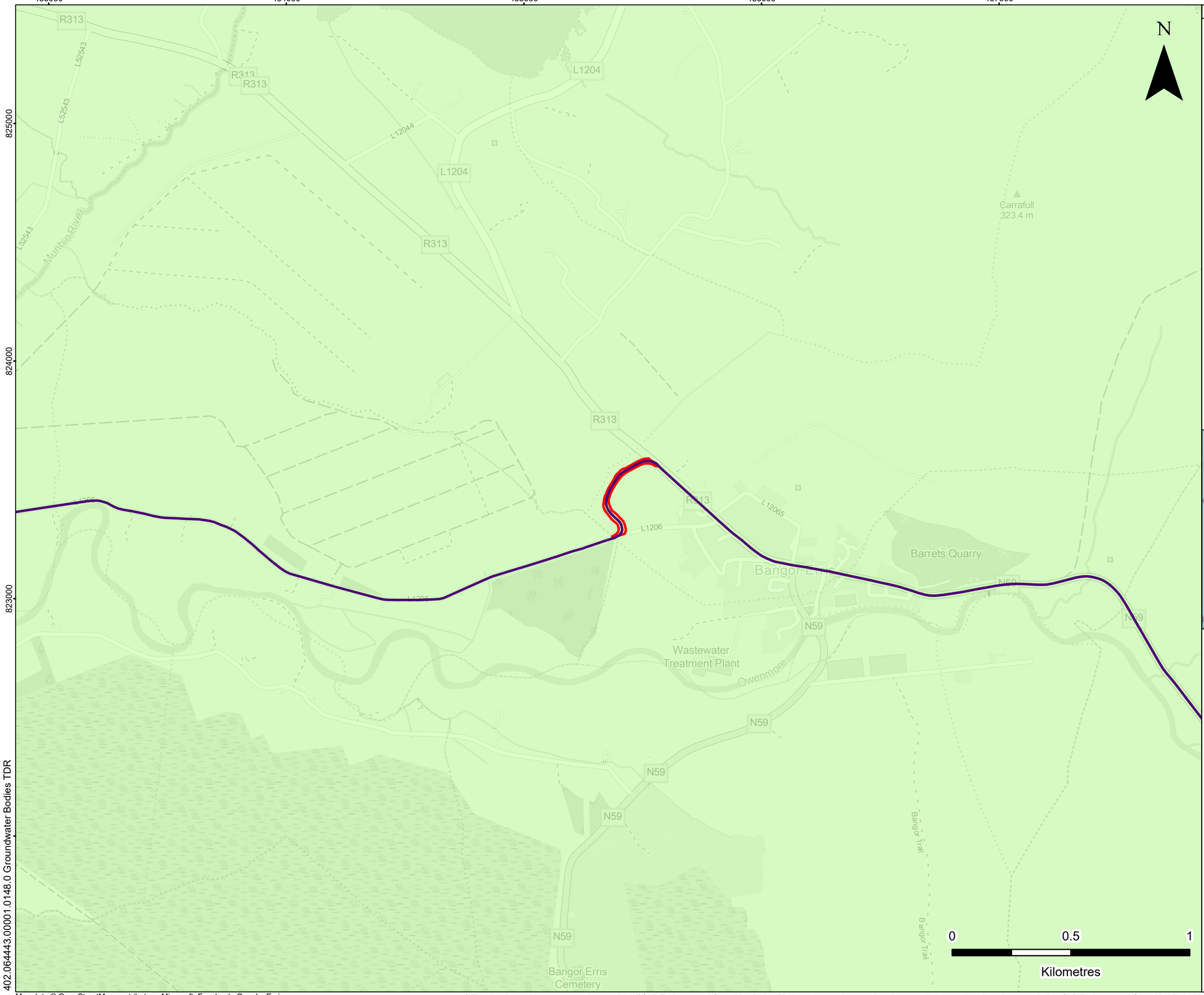
WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GROUNDWATER BODIES TDR OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 7-15c

Scale	Date
1:15,000 @ A3	MARCH 2026

402.064443.00001.0148.0 Groundwater Bodies TDR



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Drainage Feature
- Proposed Attenuation Basin

Groundwater Body

- Belmullet

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GROUNDWATER BODIES TDR OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 7-15d

Scale 1:15,000 @ A3

Date MARCH 2026

460000 470000 480000 490000 500000

840000

830000

820000

Broadhaven Bay

Béal an Mhuirthead

Loch na Ceathrún Móire

Blacksod Bay - Cuan an Fhóid Duibh

Achill Island - Acaill

Keel Beach

Wild Nephin National Park

N59

OVER-RUN AREA 1

OVER-RUN AREA 2

OVER-RUN AREA 3

Figure 7-16b

Figure 7-16c

Figure 7-16d

N

0 5 10

Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- Proposed Over-run Area Location
- GSI Groundwater Supply Well

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GSI GROUNDWATER SUPPLY WELLS TDR OVER-RUN AREAS: OVERVIEW

FIGURE 7-16a

Scale 1:150,000 @ A3

Date MARCH 2026

402.064443.00001.0159.0 GSI Well TDR Overview

476000 477000 478000 479000 480000

823000 822000 821000

TCC1 TCC2 T4 T6 T8 T9 T10 T11 T12 T13 2 3

L1206 L1206 L1206 L1206 L1206

N

0 0.5 1

Kilometres

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Site Access Location
- Proposed Met Mast Location
- Proposed New Access Track
- Proposed Upgraded Access Track
- Proposed Crane Pad
- Proposed Substation (Indicative Size and Location)
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Swale
- Proposed Attenuation Pond

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GSI GROUNDWATER SUPPLY WELLS TDR OVER-RUN AREAS: OVER-RUN AREA 1

FIGURE 7-16b

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0149.0 GSI Wells TDR

496000 497000 498000 499000 500000

821000

820000

N59 Owenmore Bellacorrick 110kV Substation Owenmore River Muing Bellacorrick AGI River Muing N59 N59 R312 R312 R312 N59 N59 R312

N

LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Delivery Route
- GSI Groundwater Supply Well

Achill Island - Acaill Wild Nephin National Park Clew Bay

0 0.5 1

Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GSI GROUNDWATER SUPPLY WELLS TDR OVER-RUN AREAS: OVER-RUN AREA 2

FIGURE 7-16c

Scale	Date
1:15,000 @ A3	MARCH 2026

402.064443.00001.0149.0 GSI Wells TDR

483000
484000
485000
486000
487000
825000
824000
3000

R313
L52543
L1204
L12044
Munhin River
Carrafull
323.4 m
L1206
L12065
Barrets Quarry
Bangor Erris
N59
Wastewater
Treatment Plant
Owenmore
Bangor Trail
Bangor Erris
Cemetery

N

LEGEND

Proposed Development Site Boundary

Proposed Turbine Delivery Route

Achil Island - Acaill

Wild Nephin National Park

Clew Bay

0 0.5 1

Kilometres

RWE

SLR

MUINGMORE WIND FARM

WATER INCLUDING HYDROLOGY, HYDROGEOLOGY AND WATER QUALITY

GSI GROUNDWATER SUPPLY WELLS TDR OVER-RUN AREAS: OVER-RUN AREA 3

FIGURE 7-16d

Scale 1:15,000 @ A3

Date MARCH 2026

402.064443.00001.0149.0 GSI Wells TDR