9. WATER

9.1 Introduction

9.1.1 Background and Objectives

McCarthy Keville O'Sullivan Ltd. (MKO) was engaged by Hibernian Wind Power (Hibernian) to conduct an Environmental Impact Assessment (EIA) of the likely effects of the proposed extension of operational life of the existing Carnsore Wind Farm, Nethertown, Co. Wexford (the Proposed Development) on the water environment (hydrology and hydrogeology).

The Applicant plans to continue to utilise the existing site as an operational 14 no. turbine wind farm to generate renewable energy for export to the National Grid, for a period of 15 years. No new construction or significant project alterations are proposed beyond routine operation and maintenance activities.

The objectives of this assessment area to:

- Produce a baseline study of the existing water environment (surface and groundwater) in the area of the Proposed Development;
- Identify likely positive and negative impacts of the development on surface and groundwater during construction and operational phases of the development;
- Identify mitigation measures implemented to avoid, reduce, or offset significant negative impacts;
- Assess significant residual impacts and effects;
- Assess cumulative impacts of the Proposed Development along with other local infrastructure developments.

9.1.2 Statement of Authority

McCarthy Keville O'Sullivan Ltd. (MKO) is a specialist planning and environmental consultancy. Based in Galway but working nationwide, we deliver challenging and complex projects on behalf of our clients. MKO employs over 100 people across the company's four planning, ecology, environmental and ornithology teams. Our multi-disciplinary service offering, and broad range of nationwide experience add real value to our client's projects.

MKO company experience spans the full range of industry sectors, including renewable energy, commercial development, roads and transport infrastructure, ports and marinas, tourism, energy infrastructure, retail, sport and leisure, quarrying and aggregates, manufacturing, education, housing, waste management, water, telecoms and other utilities.

Our areas of expertise and experience include a wide variety of environmental topics, including hydrology and hydrogeology. We routinely are involved with carrying out impact assessments for hydrology and hydrogeology for a large variety of project types.

This chapter of the EIAR was prepared by Eoin Hurst and reviewed by Michael Watson.

Eoin Hurst is a Project Environmental Engineer with MKO with over 12 years of progressive experience in private sector civil and environmental engineering consultancy. Eoin holds a BE in Civil Engineering from NUI Galway and a MSc in Environmental Technology from Imperial College London. Prior to joining MKO in September 2019, Eoin worked as an Environmental Engineer with Tetra Tech in the United States.

Michael Watson completed an MA in Environmental Management at NUI, Maynooth in 1999. He is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv). Michael joined McCarthy Keville O'Sullivan Ltd. in 2014 having gained over 15 years' experience in a Cork-based environmental & hydrogeological consultancy firm.

9.1.3 Scoping and Consultation

The scope for this chapter of the EIAR has also been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process is outlined in Section 2.6 of this EIAR. Issues and concerns highlighted with respect the water environment are summarised in Table 9-1 below.

Table 9-1 Summary of Water Environment related Scoping Responses

Consultee	Description	Addressed in Section
Geological Survey of Ireland (GSI)	• Requested copies of any available previous site investigations concerning hydrogeology.	n/a
Health Service Executive (HSE)	• No response received at the time of report issue.	n/a
Inland Fisheries Ireland (IFI)	• No response received at the time of report issue.	n/a
Irish Water (IW)	• No response received at the time of report issue.	n/a
Wexford County Council, Water Services	• No response received at the time of report issue.	n/a

9.1.4 Relevant Legislation

This EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU.

Regard has also been taken of the requirements of the following legislation (where relevant) as it pertains to the water environment:

- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments (S.I. No. 84 of 1994, S.I. No. 101 of 1996, S.I. No. 351 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001, S.I. 134 of 2013 and the Minerals Development Act 2017), the Planning and Development Act 2000 (as amended), and S.I. 600 of 2001 Planning and Development Regulations and subsequent Amendments. These instruments implement EU Directive 85/337/EEC and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;

- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No 296 of 2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of Directive 2014/52/EU into Irish law;
- S.I. No. 293 of 1988: European Communities (Quality of Salmonid Waters) Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 296/2009; S.I. No. 386/2015; S.I. No. 327/2012; and S.I. No. 77/2019 and giving effect to Directive 2008/105/EC on environmental quality standards in the field of water policy and Directive 2000/60/EC establishing a framework for Community action in the field of water policy) and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) establishing a framework for the Community action in the field of water policy and provide for implementation of 'daughter' Groundwater Directive (2006/118/EC) on the protection of groundwater against pollution and deterioration. Since 2000 water management in the EU has been directed by the Water Framework Directive (2000/60/EC) (as amended by Decision No. 2455/2011/EC; Directive 2008/32/EC; Directive 2008/105/EC; Directive 2009/31/EC; Directive 2013/39/EU; Council Directive 2013/64/EU; and Commission Directive 2014/101/EU ("WFD"). The WFD was given legal effect in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003
- S.I. No. 684 of 2007: Waste Water Discharge (Authorisation) Regulations 2017, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);S.I. No. 106 of 2007: European Communities (Drinking Water) Regulations 2007and S.I. No. 122 of 2014: European Communities (Drinking Water) Regulations 2014, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the "Drinking Water Directive") and EU Directive 2000/60/EC;
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended by S.I. No. 389/2011; S.I. No. 149/2012; S.I. No. 366/2016; the Radiological Protection (Miscellaneous Provisions) Act 2014; and S.I. No. 366/2016); and,
- S.I. No. 296 of 2009: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (as amended by S.I. No. 355 of 2018)

9.1.5 Relevant Guidance

The water section of the EIAR is carried out in accordance with guidance contained in the following:

- Environmental Protection Agency (2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) where relevant;
- Environmental Protection Agency (September 2015): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Statements where relevant;
- European Commission (2017) Guidance on Screening;
- European Commission (2017) Guidance on Scoping;

- European Commission (2017) Guidance on the preparation of the Environmental Impact Assessment Report;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006); and,
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

9.2 Methodology

9.2.1 Desk Study & Preliminary Hydrological Assessment

A desk study and preliminary hydrological assessment of the site of the Proposed Development and the surrounding area was completed in advance of the site walkover. This involved collection of all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included review of the following sources:

- Environmental Protection Agency (EPA) Maps application (https://gis.epa.ie/EPAMaps/);
- Geological Survey of Ireland (GSI) - Groundwater Database (www.gsi.ie);
- GSI – Groundwater Wells and Springs database (https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx#Wells)
- GSI – 1:500,000 scale bedrock geology map of Ireland (https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx)
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/Water Framework Directive Map Viewer (www.catchments.ie);
- OPW Flood Hazard Mapping (www.floodinfo.ie);
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie); and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

9.2.2 Site Investigations

A visual inspection of the existing Carnsore Wind Farm and surrounding area, including drainage mapping, was undertaken by MKO on 16th April 2021. The purpose of the site inspection was to investigate the site for any indications of residual impacts to the water environment resulting from the historic construction and operation of the wind farm.

Particular attention was paid to identifying existing site drainage, drainage patterns, watercourses, water flow directions and any other notable hydrological features.

Limited relevant historic site data was also available from the Environmental Impact Statement (EIS) for Carnsore Point Windfarm (ESB International, 1998).

9.2.3 Impact Assessment Methodology

Please refer to Chapter 1 of the EIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015 and 2017). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study and baseline study. Levels of sensitivity which are defined in Table 9-2 are then used to assess the potential effect that the Proposed Development may have on them.

Table 9-2: Receptor Sensitivity Criteria (Adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not sensitive	Receptor is of low environmental importance (e.g. surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted. Heavily engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability "Low" – "Medium" classification and "Poor" aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability "High" classification and "Locally" important aquifer.
Very sensitive	Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer

9.3 Receiving Environment

9.3.1 Site Description, Land and Topography

The Proposed Development is located approximately 8 kilometres (km) south of Rosslare Harbour and approximately 15km east of Kilmore Quay, in the seven townlands of Bunarge, Burrow, Bush, Nethertown, Shilmore, St. Vogue's and Summerstown, Co. Wexford. The approximate grid reference location for the centre of the site is E711919, N604394.

The EIAR Study Area for the Proposed Development is approximately 77.4 hectares (ha). The total development footprint of the Proposed Development (i.e. the existing Carnsore Wind Farm) is approximately 1.72ha. The Proposed Development consists of the existing Carnsore Wind Farm, with 14 no. turbines located predominantly on the eastern portion of the site. The current wind farm also

includes a substation and control building, located adjacent to the main site entrance. The site is accessed by maintenance staff on a weekly basis to perform routine inspections.

The eastern and southern site boundary are formed by the Co. Wexford coastline, the western boundary is formed by a local road (Lane of Stones) and the northern site boundary lies along a local road (Nethertown Lane), residential property and agricultural lands.

The majority of the Proposed Development site area, approximately 75.6ha is under agricultural use for grazing and rough pasture, with approximately 6.7ha along the western boundary consisting of undeveloped scrubland and sand dunes. The local topography across the site slopes generally east-southeast towards the coastline. The elevation of the site ranges from approximately 3m to 16 metres above Ordnance Datum (OD) with the site considered a low-lying coastal landscape.

The Proposed Development contains approximately 3.2km of existing site roads, constructed of consolidated gravel with a running width of 4m. Access to the site is via the existing entrance from Nethertown Lane, at the northern site boundary.

Due to the nature of the Proposed Development, there is a very small water requirement, primarily for staff facilities. There is an existing Irish Water mains water supply to the control building, with the source reported by Irish Water as the Fardystown Water Supply Zone (WSZ). The Proposed Development is located entirely within the Ballyteigue-Bannow (13) Water Framework Directive (WFD) catchment.

9.3.2 Water Balance

Long term rainfall and evaporation data was sourced from Met Éireann. The 30-year annual average rainfall (AAR) (1978 – 2007) data from the Met Éireann weather station at Rosslare, Co. Wexford are presented in Table 9-3. The Rosslare weather station is located approximately 7.5km north-northeast of the Proposed Development and is the closest weather station for which long term averages are available. The Rosslare weather station closed in 2008, however it is unlikely that there has been any significant change in annual rainfall patterns since that time.

The closest synoptic station where the average potential evapotranspiration (PE) is recorded is at Johnstown Castle, Co. Wexford, approximately 15.3km northwest of the Proposed Development. The long-term average PE for this station is 560 millimetres per year (mm/yr). This value is used as a best estimate of the site PE. Actual Evaporation (AE) at the site is estimated as 532mm/yr (which is 0.95 × PE).

Table 9-3: Local Average long-term Rainfall Data (mm)

Station		Easting (IG)		Northing (IG)		Ht (mOD)		Opened		Closed		
Rosslare		313700		112200		67		1956		2008		
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	**Mean AAR (mm)**
88	71	69	59	56	55	50	72	75	109	101	101	**906**

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

Effective rainfall (ER) = AAR – AE = 906mm/yr – 532mm/yr = 374mm/yr

Based on recharge coefficient estimates from the GSI (www.gsi.ie), 60% recharge is reported for the majority of the Proposed Development site (Carnsore Wind Farm) for moderate permeability subsoil overlain by well-drained soil. This means that 60% of the effective rainfall in the area infiltrates into the ground and becomes groundwater, the remaining 40% of the effective rainfall will runoff as surface water to rivers, lakes, streams, or the sea.

Based on this recharge coefficient, the annual recharge and runoff rates for the proposed route are estimated to be 224mm/yr and 150mm/yr respectively.

9.3.3 Surface Water

9.3.3.1 Regional and Local Hydrology

The entire site of the Proposed Development lies within the South Eastern River Basin District (RBD). With respect to regional hydrology, under the Water Framework Directive (WFD) the Proposed Development is located entirely within the Ballyteigue-Bannow (13) surface water catchment. The Proposed Development site is located within 1 no. regional surface water sub-catchment, the Kisha_SC_010 sub-catchment. Bordering sub-catchments include Forth_Commons_SC_010 and Bridgetown [Wexford]_SC_010 beyond to the north and northwest respectively. A regional hydrology map is shown as Figure 9-1.

9.3.3.2 Local and Site Drainage

There are no named streams identified on the EPA WFD maps that drain the Proposed Development within the Kisha sub-catchment. The nearest identified surface water feature is Lady's Island Lake, a brackish coastal lagoon, located approximately 1.40km west-northwest of the western site boundary. The nearest stream to the Proposed Development is the Kisha River, which drains Lady's Island Lake to the sea, approx. 1.95km west of the western site boundary. The Kisha and several other streams drain into Lady's Island Lake along its western and northern boundary including the Strand, Trane, Racecourse and Coldblow.

Surface water runoff on the Proposed Development site itself drains east-southeast to the sea via sheet flow into three existing manmade drainage channels, located along the eastern site boundary. At the time of the site walkover (mid-April 2021) these drainage channels were observed to be very low or dry. A spring identified on historic OS maps as St. Vouge's well was observed on the southeast of the site, draining southeast to the sea on the north side of Turbine No. 7. This drainage channel, typical of those encountered on the site, is depicted in Plate 9-1. A local hydrology map is presented as Figure 9-2 and a site drainage aerial photograph presented as Figure 9-3.

Due to the nature of the Proposed Development, there is a very small water requirement, primarily for staff facilities. There is an existing Irish Water mains water supply to the control building, with the source reported by Irish Water as the Fardystown Water Supply Zone (WSZ).

Wastewater from the staff welfare facilities in the control buildings is managed by means of an existing septic tank. As wastewater is treated on-site, the Environmental Protection Agency's (EPA) 2009 *Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. 10)* applies. Similarly, the EPA's 1999 manual *Treatment Systems for Small Communities, Business, Leisure Centres and Hotels* also applies, as it too deals with scenarios where it is proposed to treat wastewater on-site. The existing septic tank will continue to be maintained according to current best practice. The septic tank is inspected and maintained at regular intervals and drainage conditions at the site are very good. No further discharges are expected to arise from the operation of the proposed wind farm development.

Plate 9-1 Typical drainage channel on site

9.3.3.3 Flood Risk Identification

OPW's indicative river and coastal flood map (www.floodinfo.ie), CFRAM Preliminary Flood Risk Assessment (PFRA) maps which can be accessed at the Department of Environment, Community and Local Government on-line planning mapping (www.myplan.ie), and historical mapping (i.e. 6" & 25" base maps) were consulted to identify those areas as being at risk of flooding.

There are no flood incidents recorded within the vicinity of the Proposed Development on the OPW's indicative river and coastal flood map. Please note that not all local flooding issues are recorded on the OPW database.

The Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie) has areas along the coastline (adjacent to the east and south/southwest of the site) indicated as within the "coastal flood hazard" scenario. This mapping shows the extent of the indicative 100-year coastal flood zone. The identified areas are confined to the coastline and do not extend into the site boundary. There are no fluvial or pluvial flood zones identified on the PFRA mapping within the vicinity of the site.

Historical 6" and 25" maps for the proposed route were consulted to identify areas that are "prone to flooding". There are no areas within the vicinity of the Proposed Development identified as prone to flooding shown in the historical mapping. Based on the above information there is low potential risk of flooding at the development site.

Map Legend

- Study Area Boundary
- WFD Sub-Catchments

N

Drawing Title: Regional Hydrology

Project Title: Carnsore Wind Farm EIAR

Drawn By	Checked By
EH	MW
Project No.	Drawing No.
210202	Fig 9-1
Scale	Date
1:50000	23/06/21

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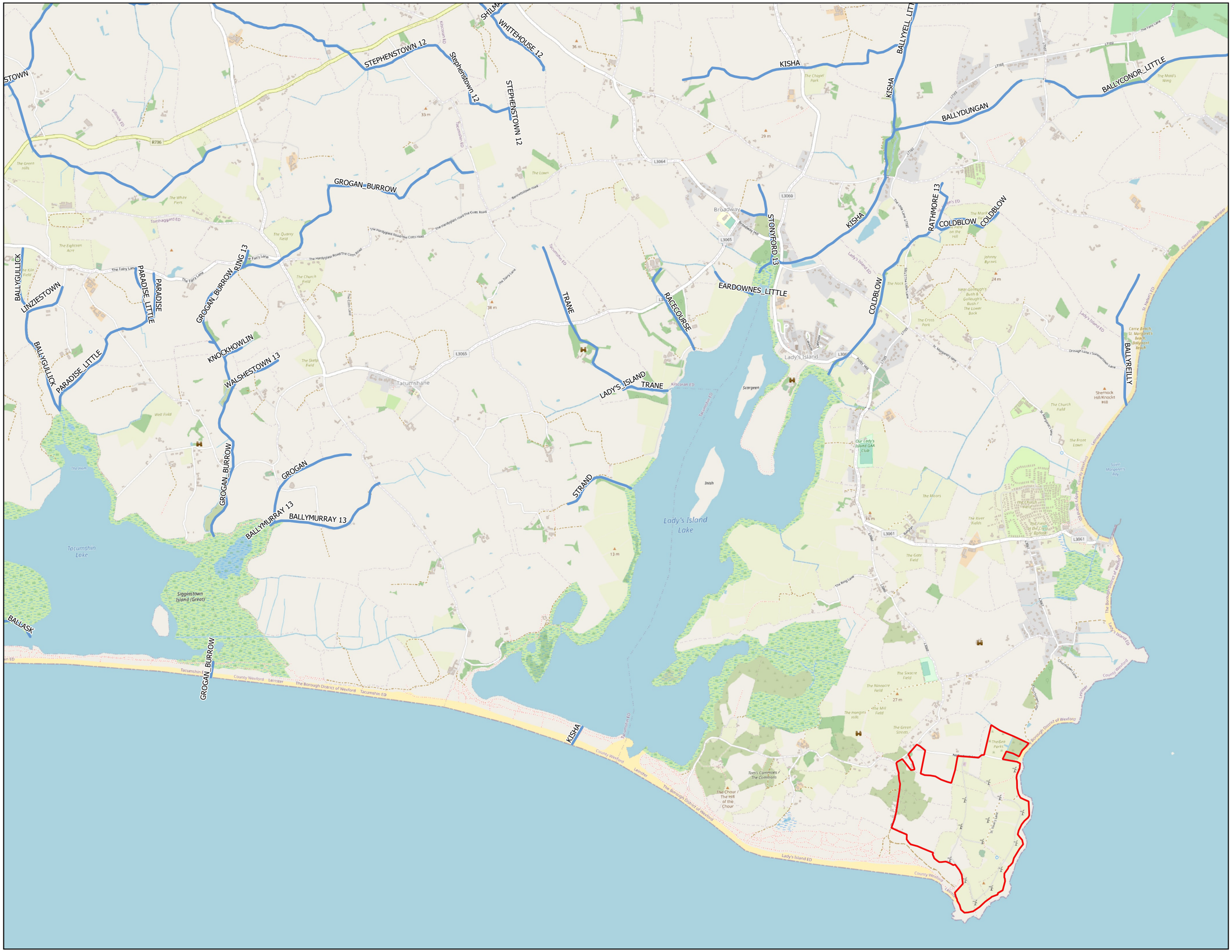

Map Legend

- Study Area Boundary
- WFD Streams

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Drawing Title
Local Hydrology

Project Title
Carnsore Wind Farm EIAR

Drawn By	Checked By
EH	MW
Project No.	Drawing No.
210202	Fig 9-2
Scale	Date
1:25000	23/06/21

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Map Legend

- Study Area Boundary
- Drain
- Septic tank
- St. Vogue's Well
- Existing Turbines
- Met Mast
- Substation

N

Drawing Title

Site Drainage

Project Title

Carnsore Wind Farm

Drawn By	Checked By
EH	MW
Project No.	Drawing No.
210202	Fig 9-3
Scale	Date
1:10000	12/07/21

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9.3.3.4 Surface Water Hydrochemistry

The Environmental Protection Agency's (EPA) Quality Rating System (Q-Rating) is a biotic index used to rate the ecological quality of streams and rivers. The rating system assigns streams a Q-Value of between 1 and 5, with 1 indicating bad ecological quality and 5 indicating the highest ecological quality. The nearest EPA monitoring points to the Proposed Development are located at Lady's Island Lake, and at the Kisha River, approximately 2.1 and 3.8km to the northwest and north respectively. These watercourses are not likely to be affected by the proposed extension of operation of Carnsore Wind Farm due to its location and surrounding topography. No surface water sampling was performed on the site of the Proposed Development.

9.3.4 Groundwater

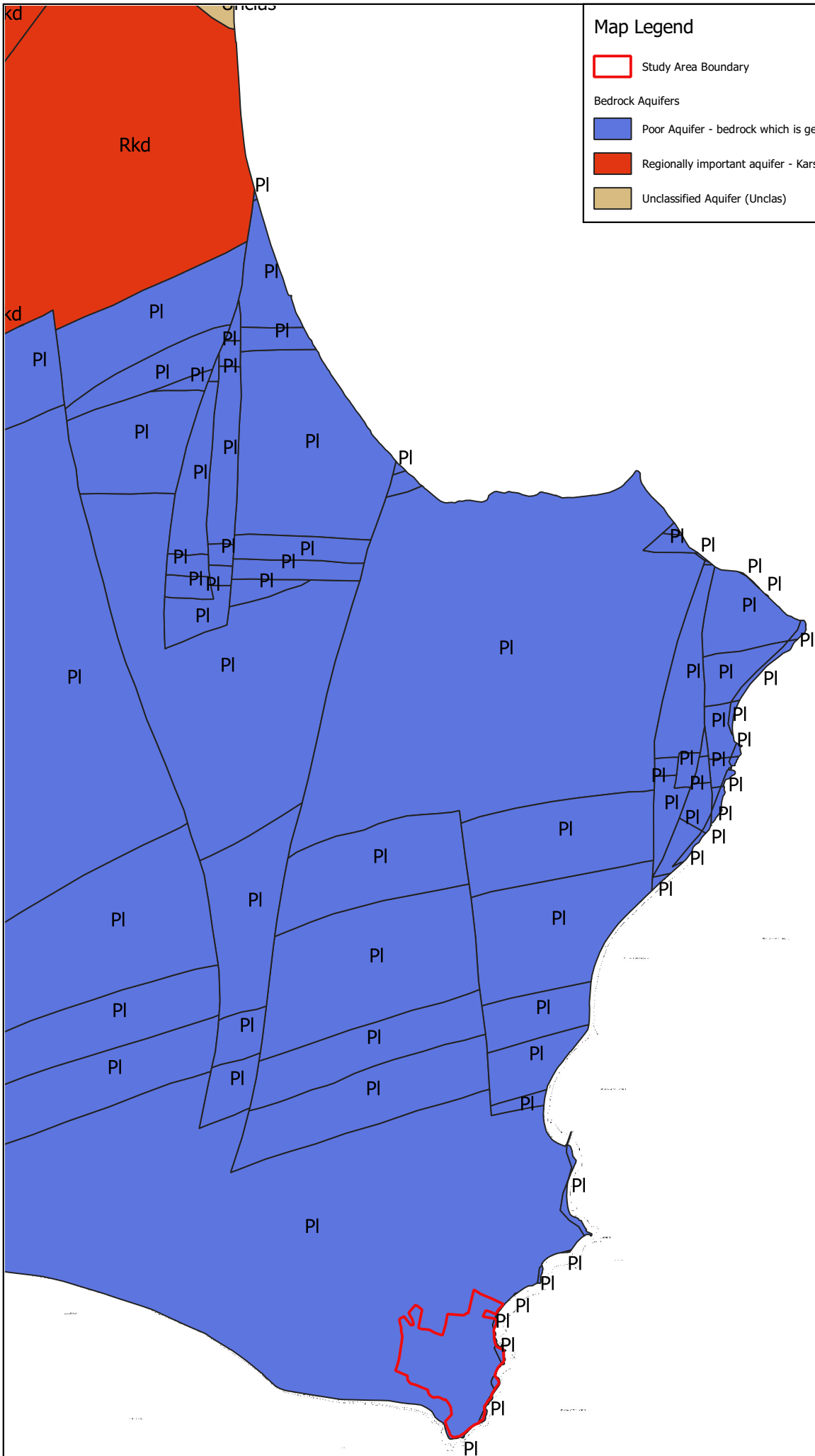
9.3.4.1 Hydrogeology

Based on the GSI bedrock map of the region, the Proposed Development is underlain by the Carnsore Granite Formation (Cs) which consists of pink biotite granite with xenoliths. The Carnsore Granite Formation is classified by the GSI as a 'Poor Aquifer - bedrock which is generally unproductive except for local zones (Pl)'. This aquifer classification extends north from the site to Rosslare and west to Kilmore Quay. A bedrock aquifer map is shown as Figure 9-4.

The Proposed Development is underlain by the generally poorly productive Bridgetown Ground Water Body (GWB) as delineated by the EPA/GSI. This GWB contains some of the oldest bedrock in the southeast however little information is available on their hydrogeological properties. The groundwater flow paths in the Bridgetown GWB are generally considered to be short and likely only extend as far as the closest surface water body. Estimated transmissivities are considered to be in the range of 1 -6 metres squared per day (m^2/d) with effective thickness estimated at between 15 - 30m.

It was previously reported as part of the Carnsore Wind Farm EIS that the depth to groundwater within the site varies from 1 to 4m below ground level (bgl) with groundwater flow generally following topography to the southeast. Historic packer tests were conducted across the site which found bedrock to be very impermeable (ESB International, 1998). A local rising of groundwater was observed around St. Vogue's Well, noted as a spring during the site walkover, which drains southeast to the sea.

A regional groundwater body map is provided as Figure 9-5.



Drawing Title

Bedrock Aquifers

Project Title

Carnsore Wind Farm

Drawn By	Checked By
EH	MW
Project No.	Drawing No.
210202	Fig 9-4
Scale	Date
1:50000	23/06/21

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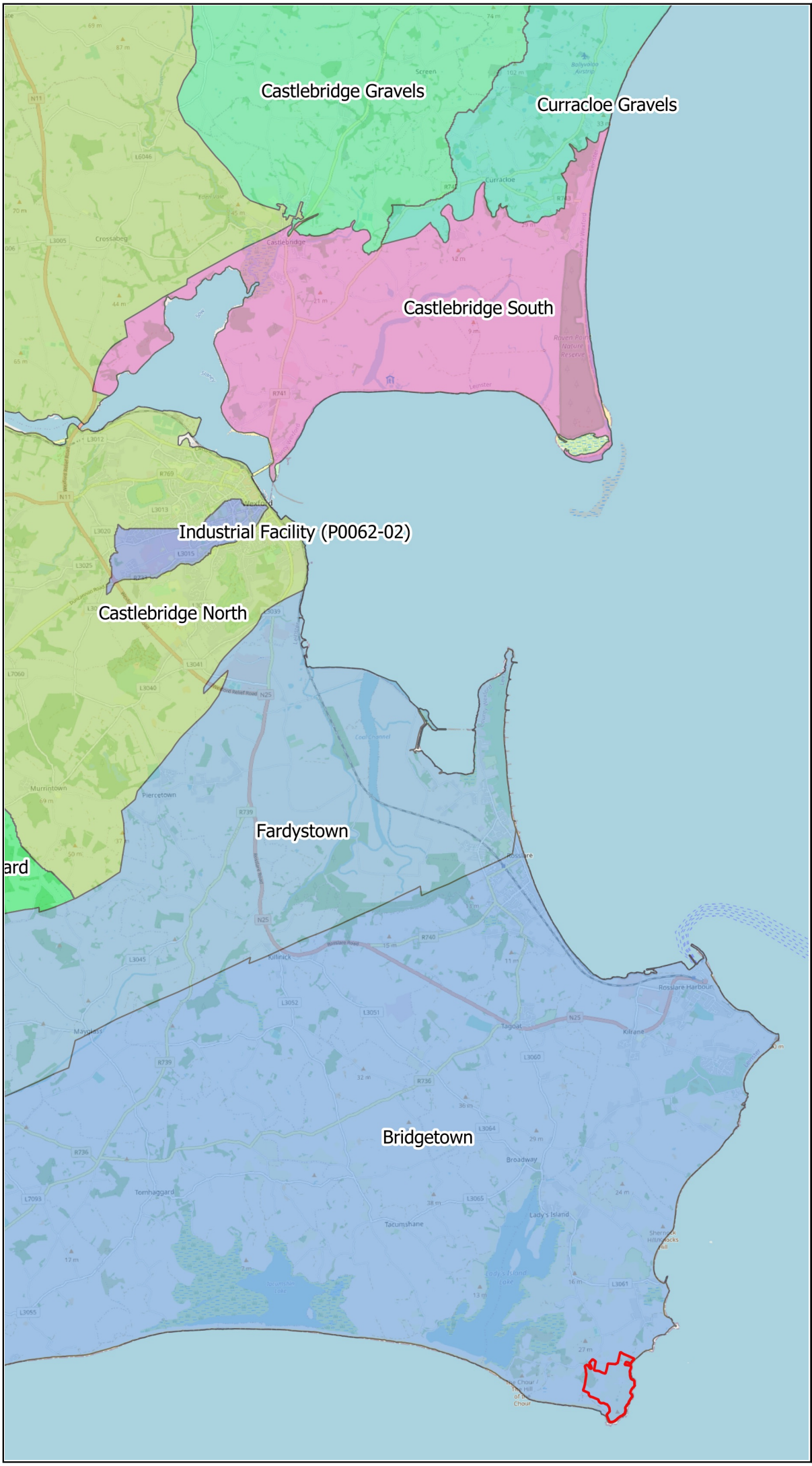

Map Legend

- Study Area Boundary

Groundwater Body

- Bridgetown
- Castlebridge Gravels
- Castlebridge North
- Castlebridge South
- Curracloe Gravels
- Fardystown
- Fethard
- Industrial Facility (P0062-02)

N

Drawing Title

Groundwater Bodies

Project Title

Carnsore Wind Farm

Drawn By	Checked By
EH	MW
Project No.	Drawing No.
210202	Fig 9-5
Scale	Date
1:100000	23/06/21

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9.3.4.2 Groundwater Vulnerability

Groundwater vulnerability is generally mapped as High (H) across the area of the Proposed Development, with a small area in the centre-west of the site mapped as Extreme (X and E). Small areas in the centre-south of the site are also mapped by the GSI as having bedrock (granite) at or near the surface.

9.3.4.3 Groundwater Hydrochemistry

There is no groundwater hydrochemistry data available related to the site of the Proposed Development. As this is an existing development and no groundworks are proposed, groundwater sampling has not been undertaken. As there is no excavation or construction activity associated with the Proposed Development groundwater quality impacts, or discharges to groundwater are not anticipated.

The Initial Characterisation Report on the Bridgetown GWB does not contain hydrochemical data or other groundwater quality data.

9.3.5 Water Framework Directive Water Body Status & Objectives

The Water Framework Directive (WFD) establishes a framework for the protection of ground and surface waters and their dependent habitats and wildlife. Under the directive the EPA is working to classify all waterbodies in the State and to assign a risk status to each of them. The overall objective of the WFD is for all waterbodies to achieve a minimum of 'Good' water quality status.

Local Groundwater Body and Surface Water Body status and risk result are available from (www.catchments.ie).

9.3.5.1 Groundwater Body Status

Groundwater Body (GWB) status information is available (www.catchments.ie). Please refer to Figure 9-5 for the location and extent of associated groundwater bodies.

In terms of WFD status the Bridgetown GWB (IE_SE_G_022) which underlies the Proposed Development site currently has a 'Good' overall status. It is not a 'high status objective' and is assigned a 'not at risk' risk status. There is no monitoring data available at present for this GWB.

9.3.5.2 Surface Water Body Status

Local surface water body status and risk result are available from (www.catchments.ie). There are no surface water bodies identified within the Proposed Development site or the immediate vicinity. The nearest watercourse to the site, the Kisha River (Kisha_010) has an 'Unassigned' WFD status and is not a high status objective.

The WFD sub-catchment assessment report for Kisha_SC_010 (EPA, 2019) identifies the Kisha River as facing 'significant environmental pressures' such as from agriculture and domestic wastewater (septic tanks). Surface water runoff from the Carnsore Wind Farm site does not drain to the Kisha River.

9.3.6 Designated Sites & Habitats

Designated sites include National Heritage Areas (NHAs), Proposed National Heritage Areas (pNHAs) Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs). There are 14 sites of European importance for nature conservation within

15km of the Proposed Development. The sites comprise eight Special Areas of Conservation (SACs) and six Special Protection Areas (SPAs) as listed below:

- Carnsore SAC
- Lady's Island Lake SAC
- Tacumshin Lake SAC
- Saltee Islands SAC
- Long Bank SAC
- Blackwater Bank SAC
- Slaney River Valley SAC
- Ballyteige Burrows SAC
- Lady's Island SPA
- Tacumshin Lake SPA
- Wexford Harbour and Slobs SPA
- The Raven SPA
- Saltees Islands SPA
- Ballyteige Burrows SPA

The existing wind farm is located partially within the boundary of Lady's Island Lake SAC; an area of approximately 19,150m^2 of the SAC overlaps with the south-western corner of the site. The site also borders Carnsore Point SAC along stretches of the north-eastern boundary of the site. Other European sites in close proximity to the site are Lady's Island Lake SPA located approximately 136m northeast of the site, at its nearest point, Tacumshin Lake SAC approximately 3.8km to the west of the site boundary and Tacumshin Lake SPA approximately 4.4km to the west of the site boundary.

Natural Heritage Areas (NHAs) are sites of national importance for nature conservation designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. A review the National Parks and Wildlife Service (NPWS) website indicates that there is one ecological pNHA located within 15km of Carnsore Wind Farm. St. Helen's Burrow pNHA is located approximately 6km from the site; given this distance it has not been considered further in the assessment as no impact pathways between it and the Proposed Development have been identified.

Designated sites within proximity to the Proposed Development are detailed further in Chapter 6: Biodiversity of this EIAR, and in the accompanying Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS).

The NIS found that potential for impacts related to surface water deterioration at adjacent designated sites will be prevented by adhering to the mitigation described in Section 9.4 of this EIAR.

9.3.7 Water Resources

A search of the Geological Survey of Ireland (GSI) well database (www.gsi.ie) indicates that there are two wells mapped in the vicinity of the Proposed Development. Both of these mapped wells are historic private wells that appear to have been used for agricultural/domestic purposes. They are located approximately adjoining the northern site boundary and 500m north of the site entrance.
The GSI well database is not exhaustive and it is most likely that other private wells exist within the vicinity. Due to the local aquifer characteristics and topography it is not likely that groundwater flow towards these wells occurs. Based on the limited activity proposed during the operational phase of the extension of life of the wind farm no impacts to groundwater quality, quantity or flow are likely. Mitigation measures proposed to protect groundwater quality at the Proposed Development are outlined in Section 9.4.

9.3.8 Receptor Sensitivity

Due to the existing nature of the Proposed Development (extension of operation of Carnsore Wind Farm) potential for impacts to surface water and groundwater are not likely. No new construction works, excavations, groundworks or significant alterations to the existing wind farm are proposed. The primary risk to groundwater at the site would be from cementitious materials, hydrocarbon spillage and leakages. There is limited potential for these risks to occur during the operational phase of a wind farm as significant quantities of potentially hazardous materials are not stored on-site. All potential contamination sources will be carefully managed at the site during the operational phase of the Proposed Development and mitigation measures will be put in place to deal with these potential minor impacts.

Groundwater within the vicinity of the Proposed Development is not identified as sensitive to pollution as although groundwater vulnerability is classified as high to extreme, the aquifer is poor and generally unproductive, with no private-use wells present on the site. No significant interactions with the hydrogeological regime are expected to occur during the operational phase of the wind farm.

No surface water features were identified on or adjacent to the Proposed Development. Surface waters in the surrounding area such as the Kisha River and Lady's Island Lake have been identified as facing environmental pressures from agriculture and domestic wastewater (septic tanks). These surface waters also form part of designated sites and are important natural habitats, as outlined in Chapter 6: Biodiversity. As such, surrounding surface waters are considered very sensitive to potential contamination.

Mitigation measures currently in place at the operational wind farm to ensure the protection of all downstream receiving waters will be continued should the application for extension of the operational period be granted.

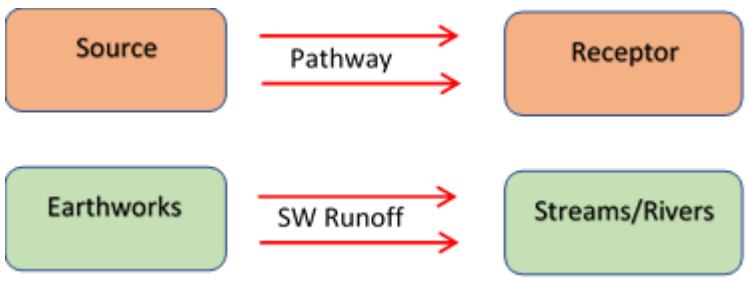
Implementation of these mitigation measures will ensure that surface runoff is of a high quality and will not impact on the quality of downstream surface water bodies. Mitigation measures are outlined in Section 9.4. No additional drainage works are proposed at the site, thereby avoiding changes to flow volumes leaving the site.

9.4 Likely, Significant Impacts and Mitigation Measures Implemented

The potential impacts of the Proposed Development and mitigation measures that were put in place to eliminate or reduce them are set out below.

9.4.1 Overview of Impact Assessment Process

The conventional source-pathway-target model (see below, top) was applied to assess potential impacts on downstream environmental receptors (see below, bottom as an example) as a result of the Proposed Development.



Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017); and,
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

In order to provide an understanding of the stepwise impact assessment process applied below, we have firstly presented a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process (refer to Table 9-4). The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to all operation activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

Table 9-4: Impact Assessment Steps

Step 1	Identification and Description of Potential Impact Source: This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway / Mechanism:	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of this type of development, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	Receptor:	A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	Pre-mitigation Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	Proposed Mitigation Measures:	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to this type of development, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	Post Mitigation Residual Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.

Step 1	Identification and Description of Potential Impact Source: This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway / Mechanism:	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of this type of development, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 7	Significance of Effects:	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

9.4.2 Do-Nothing Scenario

The 'Do-Nothing' scenario entails the decommissioning of the existing wind farm once the current planning permission expires (2022) and restoration of the site to its original use as agricultural lands for pasture and crops.

Condition 9 of the original Planning Application to An Bord Pleanála (ABP) (ABP Ref. PL26.116487) states the following in relation to decommissioning of the wind farm:

> *'On full or partial decommissioning of the wind farm or if the wind farm ceases operation for a period of more than one year the masts and turbines concerned (including foundations) shall be dismantled and removed from the site. The site shall be reinstated (including all access roads) and all decommissioned structures shall be removed within three months of decommissioning.'*

Should the Decommissioning Plan as set out in the Condition be implemented it may lead to environmental effects on hydrology due to the potentially extensive ground works required to remove existing access tracks and the turbine foundations. Surface water drainage and groundwater flow patterns are not expected to be significantly affected during these potential decommissioning works however a more environmentally sensitive approach is outlined for the end of the proposed extended operational period as set out below. The effect of decommissioning is considered **neutral** in the context of the EIAR.

9.4.3 Construction Phase

No construction activities or significant alterations to the existing wind farm are proposed as part of this application therefore **no impacts or significant effects** to the water environment will occur.

9.4.4 Operational Phase

There will be no soil disturbance or use of machinery during the operation phase. Furthermore, since there was no deep excavation associated with the project there is no potential for impacts on groundwater flow during the operation phase. Therefore, **no impacts** are envisaged during the operational phase.

The operational wind farm does not require on-site storage of significant quantities of materials or liquids likely to cause a pollution incident, however small quantities of hydrocarbons may be required from time to time in order to operate/maintain machinery. Chapter 4: Description of the EIAR states

that there will be no ground disturbing works associated with the operational phase, no natural drainage features will be altered and there will be no direct or indirect discharges to natural watercourses during the continued operation of the wind farm.

While pollution incidents could arise from staff welfare facilities, this is considered unlikely as wastewater from the staff welfare facilities in the control building is managed by means of an existing septic tank with no untreated foul water discharged into adjacent surface or coastal waters. The existing septic tank will continue to be maintained according to current best practice guidance and is inspected and maintained at regular intervals. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the site to a licensed facility. Spillages could arise from maintenance vehicles visiting the site; however, this is also considered unlikely as all such vehicles are regularly maintained in good working condition and park on areas of hard standing away from surface water features. In addition, each vehicle carries a spill kit.

The two adjacent SACs are of international value for nature conservation and would have a high sensitivity to changes in water quality. However, given the measures in place to protect water quality detailed above, in the unlikely event that a pollution incident occurred, it would be localised, small-scale, short-term, with a negligible magnitude of change. This potential impact has therefore been assessed as not significant.

The habitat Key Ecological Receptors (KERs) were assessed as being of local (higher) value and would have a high sensitivity to changes in water quality. However, given the measures in place to protect water quality detailed above, in the unlikely event that a pollution incident occurred, it would be localised, small-scale, short-term, with a negligible magnitude of change. This potential impact has therefore been assessed as not significant.

A Natura Impact Statement (NIS) has been carried out for the Proposed Development (RSK Biocensus, 2021). The NIS concludes that there would be no adverse effects on the integrity of the European sites considered in the assessment as a result of the continued operation of the wind farm.

9.4.4.1 Potential Release of Hydrocarbons During Operation and Storage

During routine maintenance works plant and machinery may require refueling on-site and so hydrocarbons may be present. Also, the transformer in the substation and transformers in each turbine are a mix of oil cooled and dry type cast resin transformer. Managed incorrectly, there is the potential for spills / leaks of oils from this equipment resulting in contamination of surface and groundwater.

Pathway: Surface water, soil/bedrock pore water and groundwater.

Receptor: Surface water, groundwater, sea.

Potential Impact: Negative, direct, slight, short term, medium probability impact on surface waters and groundwater.

Mitigation Measures

Oil used in transformers (at the substation and within each turbine) and storage of oils in tanks at the substation could potentially leak during the operational phase and impact on groundwater or surface water quality. The substation transformer is in a concrete bund capable of holding 110% of the stored oil volume, and all oil on site is stored in suitable bunds capable of holding 110% of the stored oil volume. Turbine transformers are located within the turbines, so any leaks would be contained within the turbine. In addition:

- All plant and machinery to be serviced before being mobilised to site;

- No plant maintenance completed on-site, any broken down plant removed from site to be fixed;
- Refuelling completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums stored in secure, impermeable bunded storage areas away from open water;
- Only designated trained operators authorised to refuel plant on-site;
- Procedures and contingency plans set up to deal with emergency accidents or spills; and,
- Highest standards of site management maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during works.

These mitigation measures are considered sufficient to reduce risk to ground/peat/soils and subsoils, and to groundwater and surface water quality.

Residual Impacts

The implementation of the above mitigation measures will result in a residual **neutral, imperceptible, direct, short term, unlikely impact** to surface water and groundwater. There was no recorded or observed evidence of storage of significant quantities of hydrocarbons or other chemicals, nor any leakages or spillages of hydrocarbons during the site walkover.

Significance of Effects

No significant effects on the water environment are envisaged during the operational stage of the Proposed Development.

9.4.5 Decommissioning Phase - Likely Significant Effects and Mitigation Measures

The potential impacts associated with decommissioning of the Proposed Development in circa 15 years will be similar to those associated with a typical wind farm construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works, as outlined in Chapter 4, Section 4.8 of this report.

During decommissioning, it may be possible to reverse or at least reduce some of the potential impacts caused during the initial construction of the wind farm by rehabilitating construction areas such as turbine bases and hard standing areas. This will be done by covering with local topsoil and reseeding with a local native mix to encourage vegetation growth and reduce run-off and sedimentation.

In relation to decommissioning, Condition 9 of the original Planning Application (ABP Ref. PL26.116487) states the following:

> '*On full or partial decommissioning of the wind farm or if the wind farm ceases operation for a period of more than one year the masts and turbines concerned (including foundations) shall be dismantled and removed from the site. The site shall be reinstated (including all access roads) and all decommissioned structures shall be removed within three months of decommissioning*.'

It is considered that this Condition is not appropriate, from an environmental perspective, for the Proposed Development. Upon decommissioning of the Proposed Development in 15 years, the wind turbines will be disassembled in reverse order to how they were erected. All above- ground turbine components will be separated and removed off-site for reuse or recycling. The disassembly and removal of the turbines will not have an impact on the hydrological environment at the site.

It is proposed to leave turbine foundations in place underground and to covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally

prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environmental nuisances such as noise, vibration and dust.

It is proposed to leave underground cables in place where they are unlikely to be impacted by typical agricultural works. It is proposed that site roadways will be left in situ, as appropriate, to facilitate agricultural and amenity uses by the local community. A decommissioning plan will be agreed with the local authority at least three months prior to decommissioning of the Proposed Development.

Other impacts such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude. Mitigation measures to avoid these potential impacts will be implemented.

However, as noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made far in advance, so within the 15-year lifespan of the Proposed Development, technological advances and preferred approaches to reinstatement may change. According to the SNH guidance, it is, therefore:

> *'Best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm'.*

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

9.4.5.1 Earthworks Resulting in Suspended Solids Entrainment in Surface Waters

Decommissioning phase activities that require earthworks resulting in removal of vegetation cover/ road pavement material and excavation of mineral subsoil (where present) are detailed in Chapter 4: Description. Potential sources of sediment laden water include stockpiled excavated material providing a point source of exposed sediment.

This activity has the potential to 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 and fish stocks of downstream water bodies. However, given the relatively small, localised scale of the works, the volume of runoff from decommissioning works is expected to be minimal in relation to the overall runoff to local waterbodies.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses and dependant ecosystems.

Pre-Mitigation Potential Impact: Indirect, negative, significant, temporary, likely impact.

Implemented Mitigation Measures:

The key mitigation measure during the decommissioning phase is the avoidance of sensitive aquatic areas. There are no watercourses within or immediately adjacent to the Proposed Development site and therefore no direct impacts to surface waters are likely. No in-stream works would be required during the decommissioning of the existing wind farm. Best construction practices will be adhered to throughout the decommissioning phase of the development.

Residual Impact

The implementation of the mitigation measures discussed above will prevent the release of any significant quantity of suspended solids to surface watercourses. Therefore, there is **no residual impact** on downstream waters likely resulting from earthworks during the decommissioning phase.

Significance of Effects:

Based on the analysis above there would be **no significant effects** on surface water quality resulting from earthworks during the decommissioning phase of the project.

9.4.5.2 Potential Impacts on Groundwater Levels and Local Well Supplies During Excavations

Dewatering of deep excavations have the potential to impact on local groundwater levels. No groundwater level impacts are likely to occurred from the decommissioning of the wind farm infrastructure and no significant dewatering works are likely.

Pathway: Groundwater flowpaths.

Receptor: Groundwater levels.

Pre-mitigation Potential Impact: None.

Implemented Mitigation Measures

No impact on groundwater is anticipated, therefore no further mitigation measures are proposed.

Residual Impact

No impacts on groundwater levels or local well supplies are likely to occur during the decommissioning phase of the project.

Significance of Effects

Decommissioning of the project will have **no significant effects** on groundwater.

9.4.5.3 Potential Release of Hydrocarbons during Construction and Storage

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

Pathway: Groundwater flowpaths and grid route/road drainage network.

Receptor: Groundwater and surface water.

Pre-Mitigation Potential Impact:

Indirect, negative, slight, short term, likely impact to local groundwater quality.

Indirect, negative, significant, short term, unlikely impact to surface water quality.

Mitigation Measures

Oil used in transformers (at the substation and within each turbine) and storage of oils in tanks at the substation could potentially leak during the decommissioning phase and impact on groundwater or surface water quality. The substation transformer is in a concrete bund capable of holding 110% of the stored oil volume, and all oil on site is stored in suitable bunds capable of holding 110% of the stored oil volume. Turbine transformers are located within the turbines, so any leaks would be contained within the turbine. In addition:

- All plant and machinery to be serviced before being mobilised to site;
- No plant maintenance completed on-site, any broken down plant removed from site to be fixed;
- Refuelling completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums stored in secure, impermeable bunded storage areas away from open water;
- Only designated trained operators authorised to refuel plant on-site;
- Procedures and contingency plans set up to deal with emergency accidents or spills; and,
- Highest standards of site management maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during works.

These mitigation measures are considered sufficient to reduce risk to ground/peat/soils and subsoils, and to groundwater and surface water quality.

Residual Impacts

The implementation of the above mitigation measures will result in a residual **neutral, imperceptible, direct, short term, unlikely impact** to surface water and groundwater. There was no recorded or observed evidence of storage of significant quantities of hydrocarbons or other chemicals, nor any leakages or spillages of hydrocarbons during the site walkover.

Significance of Effects

No significant effects on the water environment are envisaged during the decommissioning stage of the Proposed Development.

9.4.5.4 Potential Hydrological Impacts on Designated Sites

The existing wind farm is located partially within the boundary of Lady's Island Lake SAC; an area of approximately 19,150m^2 of the SAC overlaps with the south-western corner of the site. The site also borders Carnsore Point SAC along stretches of the north-eastern boundary of the site. Other European sites in close proximity to the site are Lady's Island Lake SPA located approximately 136m northeast of the site, at its nearest point, Tacumshin Lake SAC approximately 3.8km to the west of the site boundary and Tacumshin Lake SPA approximately 4.4km to the west of the site boundary.

Lady's Island Lake SAC and Carnsore Point SAC both have potential hydrological connectivity with the Proposed Development site and all measures in relation to the protection of these European sites have been taken into account in the preparation of the accompanying NIS. Potential for impacts to these designated sites will be prevented by adhering to the mitigation detailed for the protection of the SACs. Potential for impacts in the form of surface water deterioration will be prevented by adhering to the mitigation described below:

The designated sites discussed above are located down-gradient of the Proposed Development.

Pathway: Surface and groundwater flowpaths.

Receptor: Down-gradient water quality and designated sites.

Pre-Mitigation Potential Impact: Indirect, negative, slight, short term, likely impact.

Impact Assessment and Implemented Mitigation Measures:

As the designated sites mentioned above are topographically below the level of the Proposed Development, mitigation measures may need to be put in place during the decommissioning phase, as surface waters from sections of the wind farm site will potentially drain towards these areas.

Mitigation measures as outlined in Section 9.4.5.1 to Section 9.4.5.3 above will be implemented to provide the necessary protection to these hydrologically sensitive areas.

These mitigation measures, which include drainage control measures, sediment control measures, and mitigation measures related to spills/chemical releases will ensure that the quality of runoff from the site during decommissioning remains good. Therefore, there is no potential for significant direct or indirect impacts on designated sites.

The hydrological regime locally will not be affected by the decommissioning works and so the regime of the designated sites will not be affected.

Residual Impact

The implementation of the mitigation measures discussed above will block the pathways for impacts to downstream designated sites. Observations during the site walkover revealed no evidence of any impacts to surface waters or designated sites. It is likely there will be **no residual impacts** on designated sites.

Significance of Effects

Based on the analysis above there are **no significant effects** on designated sites likely as a result of the decommissioning phase works.

9.4.6 Cumulative Impacts

The hydrological impact assessment undertaken in this chapter finds that significant effects are unlikely due to the limited nature of the works associated with the extension of operation of the wind farm. The operational Richfield Wind Farm is the nearest wind energy development to the Carnsore Wind Farm site, located approximately 15.5km to the west, and within the same sub-catchment (Kisha_SC_010). The Richfield development was subject to an EIA that identified mitigation measures to ensure that no significant impacts to the water environment would occur during its construction or operational phase.

Beyond cumulative wind farm assessment in the study area, the existing grid connection (underground and overhead line) was also assessed for hydrological/hydrogeological effects. The 38kV grid connection was permitted by ABP in September 2001 (ABP Ref. PL26.124600) and is composed of approximately 1.2km of buried 38kV transmission line and approximately 11.2km of overhead line, running in a general north and northwest direction from the wind farm to the Killinick 38kV substation, located at the junction of the R740 and N25, approximately 9.4km northwest of the wind farm (straight line distance). The grid connection is an existent linear infrastructure and there are no associated potential impact pathways which could lead to significant effects in combination with the Proposed Development.

Due to the limited scale of other proposed or permitted developments in the vicinity, there is little potential for significant impacts to surface waters, groundwaters or coastal waters resulting from those developments in combination with the Proposed Development. Therefore, **no significant cumulative**

impacts on the water environment within the Kisha sub-catchment are anticipated during the operational phase of the Proposed Development.