

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED COOM GREEN ENERGY PARK GRID CONNECTION

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## VOLUME 2 – MAIN EIAR

### CHAPTER 11 - HYDROLOGY AND WATER QUALITY

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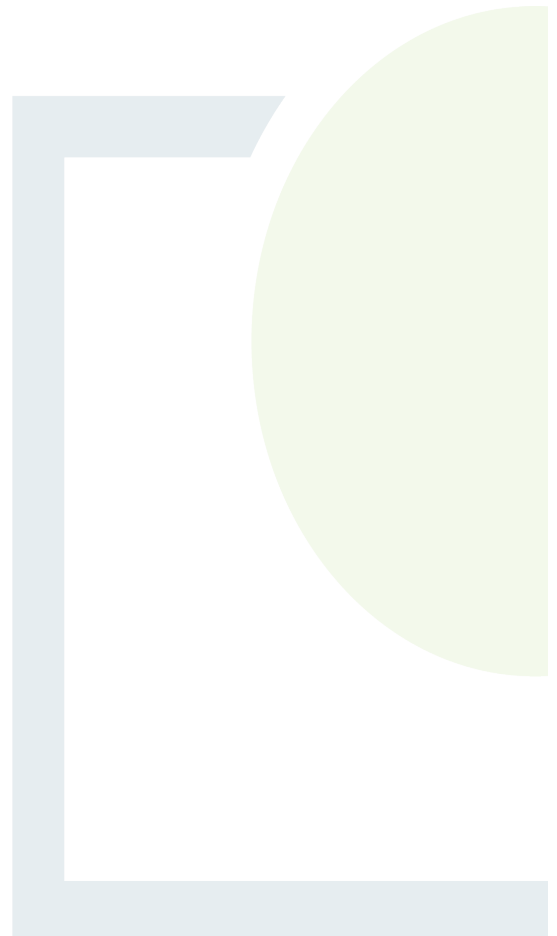
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## 11. INTRODUCTION

This chapter has been prepared to describe the existing hydrology and water quality of the local environment and to examine the aspects of the hydrology and water quality within the study area that could be affected by the activities associated with the Proposed Development as described in Chapter 2 of this EIAR.

Section 11.4 of this chapter provides details on the existing hydrology and water quality in the receiving environment including receiving waterbodies and catchments. It includes information on any historical flooding interacting with the Proposed Development.

Following an analysis of the receiving environment, potential effects during the construction, operation and decommissioning phases are identified and discussed in Sections 11.6. Flood risk assessment is set out in Section 11.7.

Section 11.4.7 describes the proposed drainage layout and Section 11.8 identifies the proposed mitigation measures for effects identified in Sections 11.6 and 11.7.

### 11.1 Statement of Authority

This chapter has been prepared by Brian Cronin and reviewed by Trevor Byrne, both of Fehily Timoney and Company.

Brian is a Senior Environmental Scientist at Fehily Timoney and a member of Engineers Ireland (MIEI) with over 10 years of technical experience in environmental work including biomass research, work in the contaminated land and remediation sector, and more recently in the preparation of EIAR, with over 5 years' experience in the preparation of EIAR chapters, and 3 years specifically in the preparation of chapters for large scale renewable energy projects. Brian holds a master's degree in Environmental Engineering and an honours degree in Environmental Science.

Trevor is an Associate Director at Fehily Timoney and a chartered member of Engineers Ireland with over 15 years of industry experience and over 10 years' experience in the preparation of EIAR's for large scale renewable energy projects. Trevor holds a master's degree in Sustainable Energy Systems and a first-class honours degree in Civil and Environmental Engineering. Trevor also holds an Advanced Diploma in Planning and Environmental Law from the Honourable Society of Kings Inns. Throughout his career to date, Trevor has provided technical advisory services through all stages of project delivery from feasibility assessment, impact assessment, design, expert witness, contract administration and construction.

### 11.2 Study Area

The Study Area associated with hydrology and water quality is comprised of catchments, sub-catchments, sub-basins and associated hydrological features within the vicinity of and hydrologically connected to the Proposed Development. The delineation of the waterbodies encompassing the drainage networks is defined by the latest available Water Framework Directive (WFD) 'Cycle 3' River Basin Management Plan 2022 - 2027.

For each component of the Proposed Development, the relevant catchment characteristics and associated hydrological features are discussed within this Chapter.



The site is located in County Cork, approximately 12 km southeast of Mallow. The Proposed Development is primarily a linear development, comprising:

- A 110 kV Underground Cable (UGC) Grid Connection Route from the permitted onsite substation at Lackendarragh to the existing Barrymore 110 kV substation located near Rathcormac, Co. Cork (also referred to herein as the '**110 kV GCR**')
- A 33kV Underground Cable (UGC) Collector Network Route between the western and eastern arrays of the permitted Coom Green Energy Park (CGEP) development (also referred to herein as the '**33 kV CNR**');
- A 110kV onsite substation at Lackendarragh, in line with the latest Eirgrid functional specifications (also referred to herein as '**110 kV Substation**').

The study area associated with the Proposed Development is illustrated in Figure 11.1, Volume 4.

For a detailed description of the infrastructure associated with the Proposed Development please refer to Chapter 2 of the EIAR.

### 11.3 Methodology

The following sources of information were considered in this assessment:

- The design layout of the Proposed Development;
- Legislation and guidance, as described in Section 11.3.1 below;
- A desk-based assessment of the surface water hydrology and water quality in the catchments relevant to the Proposed Development and those which could potentially receive surface water runoff from the Proposed Development;
- A field assessment of the existing hydrological environment, to both verify desk-based assessment and record all significant hydrological features;
- Cork County Development Plan 2022–2028;
- The 2020 EIAR prepared for the consented Coom Green Energy Park;
- The 2020 Surface Water Management Plan prepared for the consented Coom Green Energy Park (Appendix A of the Construction and Environmental Management Plan);
- TLI Construction Methodology Report, presented as Appendix 2.1 of this EIAR; and
- Aquatic Ecology Report, presented as Appendix 9.1 of this EIAR.



### 11.3.1 Relevant Legislation and Guidance

#### 11.3.1.1 *Relevant EU Directives and Legislation*

The 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. The requirements of the following legislation are complied with:

- Planning and Development Act, 2000, as amended;
- Planning and Development Regulations, 2001 (as amended);
- S.I. No 296/2018: 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. 293/1988: European Communities (Quality of Salmonid Waters) Regulations;
- S.I. No. 272/2009: 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. 722/2003 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. 722/2003);
- S.I. No. 684/2007: 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. 106/2007: European Communities (Drinking Water) Regulations 2007 and S.I. No. 122/2014: 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. 9/2010: 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. 296/2009: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (as amended by S.I. No. 355/2018)

##### 11.3.1.1.1 *Water Framework Directive*

The WFD established a new system for the protection and improvement of water quality and water dependent ecosystems. It has influenced the management of water resources and has affected conservation, fisheries, flood defence, planning and development. It has endeavoured to ensure that all impacts on water resources – physical modification, diffuse and point source pollution, abstraction or otherwise – are controlled.



The overriding purpose of the WFD is to achieve at least ‘good status’ in all European waters and to ensure that no further deterioration occurs in these waters. European waters are classified as ground waters, rivers, lakes, transitional and coastal waters. The WFD has been implemented in Ireland by dividing the island of Ireland into eight river basin districts. These districts are natural geographical areas that occur in the landscape.

The River Basin Management Plan 2022–2027 has been prepared by the Department of Housing, Local Government and Heritage. This third-cycle plan sets out the roadmap of actions Ireland will implement to protect and improve water quality in our rivers, lakes, estuaries, and coastal waters. Its primary objective is to achieve at least ‘good’ ecological status for all water bodies and to prevent further deterioration, in accordance with the requirements of the EU Water Framework Directive. The WFD has been transposed into Irish law following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003)<sup>1</sup>
- European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014)
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009)<sup>2</sup>
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010)<sup>3</sup>
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2010 (S.I. No. 610 of 2010)<sup>4</sup>
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).

To ensure no further deterioration of water occurs it is required to address possible effects of the development and propose mitigation measures within the EIAR.

#### 11.3.1.1.1.1 Water Framework Directive Waterbody Status

The European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009)<sup>5</sup> (the Surface Water Regulations), give effect to the criteria and standards used for classifying surface waters in accordance with the WFD. There are five categories of surface water status: ‘High’, ‘Good’, ‘Moderate’, ‘Poor’ and ‘Bad’.

A surface waterbody must achieve both good ecological status and good chemical status before it can be considered to be of good status. The chemical status of a waterbody is assessed based on certain chemical pollutants. The ecological status is assessed based on Biotic Indices or Quality (Q) Values. The EPA Biological Quality Rating System for Rivers (Q Rating System) and its relationship with the WFD Status is shown in Table 11-1.

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<sup>1</sup> Amended in 2005 (S.I. No 413/2005), 2008 (S.I. No. 219/2008) and 2010 (S.I. No. 93/2010)

<sup>2</sup> Amended in 2012 (S.I. No. 327/2012) and 2015 (S.I. No. 386/2015)

<sup>3</sup> Amended in 2011 (S.I. No 389/2011), 2012 (S.I. No 149/2012) and 2016 (S.I. No 366/2016)

<sup>4</sup> Amended in 2014 (S.I. 31/2014)

<sup>5</sup> Amended in 2012 (S.I. No. 327 of 2012) and 2015 (S.I. No. 386 of 2015)



**Table 11-1: EPA Q Rating System and WFD Status**

Q-Value	Water Quality	WFD Status
Q5	Pristine	High
Q4-5	Very good	
Q4	Good	Good
Q3-4	Slightly Polluted	Moderate
Q3	Moderately Polluted	Poor
Q2-3	Moderate to Poor	
Q2	Poor	Bad
Q1-2	Poor to bad	
Q1	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. The Surface Water Regulations also state that, for the purpose of classification, a status of less than good is assigned in the case of a waterbody where the environmental objectives are not met.

#### 11.3.1.2 Relevant Guidance

The following guidelines were considered in the development of this chapter to identify relevant objectives relating to hydrology and surface water quality:

- EPA (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (IGI) (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Department of Environment, Heritage and Local Government (DoEHLG); Wind Farm Development Guidelines for Planning Authorities (2006);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016);
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- SEPA (2014): Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems;
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on ‘Control of Water Pollution from Linear Construction Projects’ (CIRIA Report No. C648, 2006);



- CIRIA (2006): Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018); and
- Environmental Impact Assessment of Projects: Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU), European Union, 2017.

### 11.3.2 Desk Study

The desk top study involved an examination of the hydrological aspects and water quality aspects of the following sources of information:

- Current and historic Ordnance Survey Ireland mapping, and ortho-photography.
- Science and Stories about Integrated Catchment Management (<https://www.catchments.ie/>)
- OPW Indicative Flood Maps (<https://www.floodinfo.ie/map/floodplans/>).
- Geological Survey of Ireland ([www.gsi.ie](http://www.gsi.ie)).
- Review of the WFD online mapping and data (available at <http://www.wfdireland.ie/maps.html>).
- Review of the EPA online mapping (<https://gis.epa.ie/EPAMaps/>).
- History of flooding and status of drainage in the vicinity of the Proposed Development (available at <http://www.floodinfo.ie/map/floodmaps/>).
- Met Eireann Meteorological Database (available at <https://www.met.ie>).

### 11.3.3 Field Assessment

As part of the preparation of the EIAR for the main Coom Green Energy Park (CGEP) planning application, which was lodged in 2020, a site walkover survey was carried out to establish the pattern of existing drainage and to record existing hydrology features in the study area of the now-consented CGEP development. The information gathered in the fieldwork for the CGEP has been built upon for this EIAR through updated hydrological walkovers.

A water quality monitoring programme was established for the CGEP to establish a baseline for water quality within the study area. Water sampling took place for dry weather conditions on 31st August 2018 and for wet weather conditions on 8th March 2019 at 16 locations to establish baseline conditions. Additional water sampling was undertaken on 23rd August 2020 and 2nd October 2020 at 3 locations. Again, while this work was carried out to inform the planning application for the CGEP, the results from this work are utilised in the context of the current Proposed Development to establish the baseline environment. Further details of the water quality monitoring programme are provided in Section 11.4.5.

A targeted hydrological survey of watercourse crossings associated with the current Proposed Development was carried out by FT Engineers on the 10th and 11th June 2025 which has been used to inform this EIAR. The survey recorded the location and details of all watercourse crossings, including natural surface waterbodies and manmade drains. Details of the proposed crossings of WFD surface waterbodies are presented in Section 11.5.

No significant constraints were encountered during site visits.



#### 11.3.4 Evaluation Criteria

The sensitivity of receptors, the quality of effects the magnitude of effects, the probability and duration of the effects are assessed for the Proposed Development to determine significance of the effects.

Thresholds for assessing the sensitivity of the environment and magnitude of effects are outlined in Image 11-1.

Quality of an effect is either 'Positive', 'Neutral' or 'Negative' and may have influence in the 'Momentary', 'Short', 'Medium' or 'Long-term'. Effects may also be either 'Temporary' or 'Permanent'.

The probability of effect can be either 'Likely' or 'Unlikely'.

##### *11.3.4.1 Sensitivity of Receptors*

The sensitivity of a hydrological receptor or attribute is based on its ability to absorb development without perceptible change. The hydrological environment of the Proposed Development is considered to be of high sensitivity for receptors draining to the Bride River and the associated designated conservation areas downstream. The receptors which are part of Special Areas of Conservation are rated as 'high' sensitivity.<sup>6</sup>

Special Areas of Conservation (SAC), Special Protection Areas (SPA) and rivers supporting salmonid species are described in Chapter 9.

##### *11.3.4.2 Assessment of Magnitude and Significance of Hydrological Effect*

The assessment of the magnitude of an effect incorporates the timing, scale, size, duration and probability of the effect in accordance with the EPA Guidelines. The significance criteria for hydrological effects are defined as set out in Table 11-2.

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<sup>6</sup> A handbook on environmental impact assessment Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland, Scottish Natural Heritage.

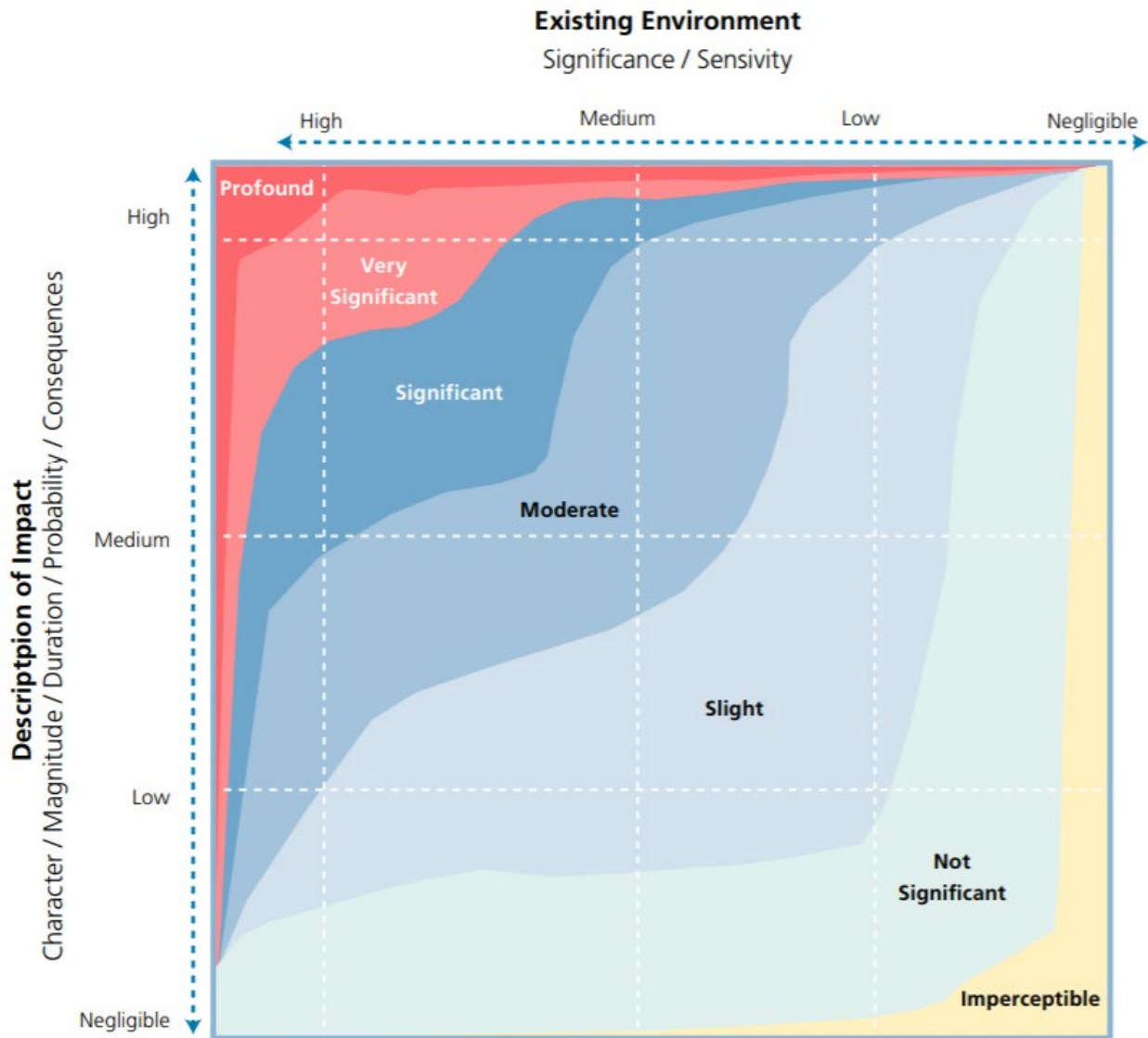


**Table 11-2: Assessment of Magnitude of Hydrological Effect<sup>7</sup>**

Effect Significance	Criteria
Imperceptible	An effect capable of measurement but without noticeable consequences
Not significant	An effect which causes noticeable changes in the character of environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends
Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

The diagram below, in Plate 11-1, shows how comparison of the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect. Sensitivity of the receiving environment can be ‘high’, ‘medium’, ‘low’ or ‘negligible’. Description of effect is defined by its character, magnitude, duration, probability and consequences. The magnitude of effect can be ‘high’, ‘medium’, ‘low’ or ‘negligible’.

<sup>7</sup> Guidelines on the information to be contained in environmental impact assessment report Draft August 2017.



**Plate 11-1: Classifications of the Significance of Effects<sup>8</sup>**

This chapter considers the consultation responses as referred to in Chapter 5. No hydrology-specific issues were raised by any of the scoping consultees. However, during pre-application consultation with An Coimisiún Pleanála (the Commission) dated 14th November 2025, the Commission stated that any "application documentation should provide clear and specific details in relation to how the proposed development is intended to cross any watercourses or drains along the route" (record of the meeting contained within Appendix 5.1). The crossing method for any WFD surface waterbody is set out within this chapter and tabulated in Table 11-1. With regard to crossing methods for smaller watercourses including drains, a comprehensive schedule of crossing methods is contained within the TLI Construction Methodology Report, presented as Appendix 2.1 of this EIAR.

<sup>8</sup> Guidelines on the information to be contained in environmental impact assessment report 2022



A site meeting took place with Inland Fisheries Ireland (IFI) before preparing the EIAR for the CGEP. The meeting was held on site on the 21st of August 2019 during which inspections took place of water crossing points, both on the public road and within the development site associated with the grid connection cable route and the proposed internal access road network. Crossing points were inspected, and preferred design solutions and construction methodologies were agreed for both the examined crossing points and generally throughout the site.

## 11.4 Existing Environment

This section describes the receiving environment and sets out a summary of historical flooding, protection policies and water quality of rivers within the study area.

### 11.4.1 Regional Hydrology

The Proposed Development is contained within 1 no. WFD catchment unit, the Blackwater (Munster) (catchment ID 18) of the Irish River Network System. The Proposed Development extends across 3 no. WFD sub-catchment units. The western portion of the Proposed Development, comprising the 33 kV CNR as well as the 110 kV Substation is contained entirely within the Bride [Waterford]\_SC\_010; while the 110 kV GCR straddles the boundary between the Bride [Waterford]\_SC\_010 and the Blackwater[Munster]\_SC\_110 for approximately 4 km, and terminates in the east in the Bride[Waterford]\_SC\_020, where it is proposed to connect into the existing Barrymore 110 kV substation.

### 11.4.2 Local Hydrology

Of the 13.9 km 110 kV GCR total length, approximately 1.8 km will be located within private lands (of which 1.5 km is within the already consented CGEP site boundary) and 12.1 km within public road corridor. Of the total 15.8 km 33 kV CNR, 14.7 km is located within third-party lands and 1.1 km within public road. Approximately 7.1 km of the 33 kV CNR is located outside the permitted CGEP development boundary. Of this, 1.1 km is located in public roads with 6 km located in private lands.

Overall, of the 29.7 km of total cable route associated with the Proposed Development, 13.2 km (44 %) is contained within the public road corridor and 16.5 km (56 %) is located within private lands. Of this latter portion contained within private lands, 9.1 km of cable route is located within lands associated with the permitted CGEP development boundary.

The Proposed Development site is drained by the Toor River and the Bride River within the Bride [Waterford]\_SC\_010 sub-catchment, by the North Lackendaragh River in the Blackwater[Munster]\_SC\_110 sub-catchment, and by the Shanowen (Bride) River and the Shanowennadrimina Stream in the Bride[Waterford]\_SC\_020 sub-catchment.

The average annual rainfall in period 1991-2020 in the area of development is 1,239mm, recorded at Cork Airport Met Station<sup>10</sup>. M5-60<sup>11</sup> at the development location is 17.3 mm according to the Met Éireann rainfall data. This is the predicted rainfall depth in a sixty-minute storm that will occur with a frequency of once every five years.

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<sup>10</sup> Source: [https://www.met.ie/cms/assets/uploads/2023/09/www\\_met\\_ie\\_cork\\_9120.htm](https://www.met.ie/cms/assets/uploads/2023/09/www_met_ie_cork_9120.htm)

<sup>11</sup> This is for a 5-year return period, with a 60-minute duration rainfall.



### 11.4.3 Historical Flooding

The OPW Flood Info Website ([www.floodinfo.ie](http://www.floodinfo.ie)) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences recorded in the vicinity of the site of the Proposed Development. The OPW has produced indicative flood mapping to assist with flood risk identification as listed below:

- Catchment Flood Risk Assessment and Management (CFRAM)
- National Indicative Fluvial Maps (NIFM)<sup>12</sup>

The indicative flood mapping for the Proposed Development is shown on Figure 11.2, Volume 4. According to the CFRAM and NIFM flood mapping, the majority of the Proposed Development comprising the 33kV CNR, the 110 kV GCR and the 110 kV Substation are within 'Flood Zone C'; Low risk of flooding (less than 0.1% annual exceedance probability [AEP]). According to NIFM mapping, the 33 kV CNR crosses 'Flood Zone A', which corresponds to a 'high risk' of flooding (1 in 100 years or 1% AEP) where the proposed cable route crosses the River Bride (ITM Coordinates: 568359.058,590213.390).

The national flood hazard mapping ([www.floodinfo.ie](http://www.floodinfo.ie)) does not indicate any record of historical flooding in close proximity to the Proposed Development, as shown on Figure 11.2, Volume 4. There are multiple recurring flood incidents at considerable distance from the cable routes. These flood incidents are recorded under the names:

- Cregg Stream at Ballymacphilip Bridge
- Castelyons Kill Saint Annes
- River Bride at Bride Bridge
- Edgar's Cross.

The closest recurring flood incident to the grid route as per bullets above is Castelyons Kill Saint Annes approximately 1.5 km southeast of the existing 110 kV substation at Barrymore.

There are no areas defined as 'benefitting lands'<sup>13</sup> within the Proposed Development site in the OPW flood hazard mapping.

### 11.4.4 Water Quality (Desk Study)

WFD water quality status and river waterbody risk within the study area is provided in Table 11-3:

**Table 11-3: WFD River Status and River Waterbody Risk<sup>14</sup>**

Waterbody	EPA CODE	River Status	Waterbody Risk
Tooreen North	18T33	Good	At Risk

<sup>12</sup> The EIAR for the CGEP utilised the PFRA mapping as this was the relevant mapping at that time. However, the NIFM has replaced the PFRA mapping. Therefore, the NIFM mapping is used in this EIAR.

<sup>13</sup> Benefitting lands are lands benefiting from Arterial Drainage Scheme

<sup>14</sup> <https://gis.epa.ie/EPAMaps/>.



Waterbody	EPA CODE	River Status	Waterbody Risk
Coom_010	18C03	Moderate	At Risk
Toor River	18T51	Poor	At Risk
Lyravarrig	18L66	Good	Review
Bride (Waterford)	18B05	Moderate	At Risk
Bunnaglanna	18B07	Poor	At Risk
Inchinanagh	18I16	Good	Not at Risk

The EPA scheme of Biotic Indices or Quality (Q) Values was developed to determine the status of organic pollution in Irish rivers by assessing the occurrence of macro-invertebrate taxa of varying sensitivity to pollution. Biological Water Quality data was examined as part of this assessment.<sup>14</sup>

The location of the EPA’s Q-value stations for the receiving waters is shown on Figure 11.3, Volume 4.

Biological water quality ratings Q5, Q5-4 and Q4 relate to ‘Unpolluted’ status, Q3-4 relates to ‘Slightly polluted’, Q3 and Q2-3 relate to ‘Moderately polluted’ and Q2, Q1-2, Q1 relate to ‘Seriously polluted’ surface waterbody.<sup>15</sup>

Biological Water Quality Ratings at stations downstream of the site are outlined in Table 11-4. Q ratings range between Q3-4 to Q4 in the most recent available data. The data indicates that surface water quality in the vicinity of the Proposed Development is unpolluted.

**Table 11-4: EPA Biological Water Quality Ratings**

Station ID	Location	2009	2012	2015	2018	2021	2024
RS18C030400	Coom Bridge	4	3-4	4	4	4	4
RS18B050050	Bride Bridge, Chimneyfield	4	4	4	4	4	-
RS18B050300	Bridge South of Rathcormack	4	4	4	4	4-5	4-5

#### 11.4.5 Water Quality Monitoring Programme

As part of the preparation of the planning application for the CGEP, a water quality monitoring programme was established to determine a baseline for water quality within the study area. Water sampling took place for dry weather conditions on 31st August 2018 and for wet weather conditions on 8th March 2019 at 16 locations to establish baseline conditions. Additional water sampling was undertaken on 23rd August 2020 and 2nd October 2020 at 3 locations.

<sup>15</sup> <http://www.epa.ie/QValue/webusers/>



At monitoring locations as shown on Figure 11.3, Volume 4, the following parameters were measured:

- Biological oxygen demand (BOD)
- Chemical oxygen demand (COD)
- Ammonia as N
- Nitrate as N
- Nitrite as N
- Phosphate as P
- Metals Dissolved
- Suspended Solids
- pH
- Turbidity
- Total Phosphorus
- Conductivity.

Of the monitoring locations sampled between 2018 and 2020; WQ\_SP5, WQ\_SP7, WQ\_SP13 and WQ\_SP14 were located at, or in close proximity to, proposed river/stream crossings required as part of the current Proposed Development.

- The 33 kV CNR will cross the Toor River at two points. The monitoring point WQ\_SP5 was located where the 33 kV CNR will cross the Toor River at the upstream point. The cables will be laid in the consented access track at this location.
- WQ\_SP7 was located where the 33kV CNR will cross the Bride River. The cables will be laid in the existing bridge deck at this location.
- WQ\_SP13 was located where the 110 kV GCR will cross a tributary of the Shanowen (EPA Name: 'Shanowen Trib 1'; EPA Code: 18S42). It is proposed that the 110 kV GCR will cross this stream by an undercrossing of the existing culvert at this location (note the stream is not mapped by the EPA at the point of the crossing and therefore is not considered a WFD crossing).
- WQ\_SP14 was located where the 110 kV GCR will cross the Farran North River. It is proposed to cross this surface waterbody by HDD below the Farran North (EPA Name: 'Farran North'; EPA Code: 18F27).

At the location WQ\_SP5 values of Ammonia as N, Phosphate as P, pH and Conductivity were higher during dry conditions compared to wet conditions. During the wet event at the location WQ\_SP5 there was an increase in value of Nitrate and Nitrite as N. This increase mostly likely occurred due to agricultural lands being drained to the surface waterbody.

At WQ\_SP7 values of COD, total nitrogen, total phosphate, total orthophosphate was higher during wet conditions compared to dry conditions and therefore would indicate that agricultural lands are being drained to the surface waterbody.

At WQ\_SP13, no sample could be collected during dry conditions. During wet conditions, values of BOD, COD, nutrients and suspended solids were all low, and therefore indicative of high-quality surface water with minimal pollution or algal bloom risk.



At WQ\_SP14 values of Ammonia as N, Phosphate as P, pH and Conductivity were higher during wet conditions compared to dry conditions and therefore would indicate that agricultural lands are being drained to the surface waterbody.

In general, the lab results for surface waters in the study area indicate high-quality surface water, with good aeration and low organic pollution. Nutrient levels (especially nitrate) suggest only slight anthropogenic influence. The low phosphate and suspended solids reinforce the impression of a clean system with limited sediment or algal bloom risk.

Recorded monitoring data was included in Appendix 10.1 of the EIAR for the CGEP planning application and is reproduced as Appendix 11.1 for this EIAR.

#### *11.4.5.1 Biological Water Quality (Q-sampling)*

In addition to the physio-chemical sampling described above, 14 no. riverine survey sites were assessed for biological water quality through Q-sampling in April 2025, as detailed in Chapter 9 - Biodiversity. The results of the Q-sampling confirm that surface waters in the study area are of "high status" in the rivers Bride and Toor, with "poor status" in the Farran North River. The following Q-values were recorded at watercourse crossings of WFD surface waterbodies:

- Site 3a/4a, 33 kV CNR crossing of the Toor River (cables to be laid in the permitted wind farm track): **Q4-5**
- Site 3b, 33 kV CNR crossing of the Toor River (cables to be laid in the permitted wind farm track): **Q4-5**
- Site 1X, 33 kV CNR crossing of the River Bride (cables to be laid in the existing bridge deck): **Q4-5**
- Site 1b, 110 GCR crossing of the Farran North River (cables to be installed below the river by way of horizontal directional drilling [HDD]): **Q3**

Please refer to Chapter 9 - Biodiversity for further information on Q-sampling.

#### *11.4.5.2 Summary of Water Quality Monitoring*

A summary of water quality monitoring results at each of the proposed crossings of WFD surface waterbodies is tabulated below as Table 11-5.



**Table 11-5: Existing Water Quality at WFD Stream Crossings**

EPA name	EPA code	ITM_X	ITM_Y	Feature/Activity	Proposed Method of Crossing	Results of Water Quality Monitoring (Physio-chemical)	Results of Biological Water Quality (Q-sampling)
Toor River	18T51	564133	591667	33 kV CNR crossing over the Toor River (upstream)	To be constructed as part of permitted wind farm access track	The results from location WQSP5 indicate that agricultural lands are being drained to the surface waterbody. However, in general, the lab results indicate high-quality surface water, with good aeration and low organic pollution.	Q4-5 - "High Status"
Toor River	18T51	564710	591159	33 kV CNR crossing over the Toor River (downstream)	Proposed cable route to cross beneath watercourse by horizontal direction drilling (HDD)	The results from location WQSP5 indicate that agricultural lands are being drained to the surface waterbody. However, in general, the lab results indicate high-quality surface water, with good aeration and low organic pollution.	Q4-5 - "High Status"
Bride [Waterford]	18B05	568359	590213	33 CNR cable crossing the River Bride	Cables to be laid in the existing bridge deck	The results from location WQSP7 indicate that agricultural lands are being drained to the surface waterbody. However, in general, the lab results indicate high-quality surface water, with good aeration and low organic pollution.	Q4-5 - "High Status"
FARRAN_NORTH	18F27	582074	594274	110 kV GCR crossing the Farran North River	Insufficient clearance in existing bridge deck. Proposed cable route to cross beneath watercourse by horizontal direction drilling (HDD)	The results from location WQSP14 indicate that agricultural lands are being drained to the surface waterbody. However, in general, the lab results indicate high-quality surface water, with good aeration and low organic pollution	Q3 - "Poor Status"



#### 11.4.6 Protected Ecological Environment

The site is not situated within any environmentally designated areas, however surface water running off the site drains into the Bride/Bunaglanna Valley (000079) Natural Heritage Area (NHA) and Blackwater River (Cork/Waterford) (002170) Special Area of Conservation (SAC). The development does not traverse any Special Protection Area (SPA). The closest SPA, Cork Harbour SPA (004030), is approximately 17.6km southeast of the site.

Special Areas of Conservation are described in Chapter 9 - Biodiversity.

#### 11.4.7 Internal Site Drainage

Site walkover surveys were completed by FT as described in Section 11.3.3.

##### 11.4.7.1 *33 kV CNR*

The 33 kV CNR will extend northwest from the proposed 110 kV Substation for approximately 460 m along existing forest road with over-the-edge drainage, which drains into a network of field drains in the forestry plantation.

The proposed cable route continues northwest off the forest road into forestry plantation and curves west and then southwest, for approximately 1,500 m. This plantation land is drained by a series of field drains, which ultimately drain into the River Bride.

The 33 kV CNR then rejoins forest roads with over-the-edge drainage into a network of field drains. The proposed cable route follows the road alignment west, then curving southwest and south, for approximately 2,275 m.

The proposed cable route takes an approximate 90-degree turn off the forest road into more commercial forestry, and meanders in a generally southern direction for approximately 4,200 m before joining the Chimney Field public road. This land is drained by a network of field drains which ultimately drain to the River Bride.

The 33 kV CNR follows the Chimney Field public road to the south, then southwest across the Bride River Bridge and continues along the Chimney Field Road as far as the junction with Knocknacagheragh public road. This stretch of the 33 kV CNR is approximately 750 m. The public road along this stretch drains into roadside drainage which in turn drains into the River Bride.

The proposed cable route continues in the public road corridor in a general northwestern direction for approximately 360 m, then follows an approximate 90-degree bend into agricultural fields. The proposed cable route extends in a generally western direction, through a series of approximate 90-degree bends as the route adjoins field boundaries. This stretch of the 33 kV CNR is approximately 2,950 m and is drained by field drains. The field drains in the eastern portion of this stretch drain into the River Bride, while field drains in the western portion of this stretch drain into the Toor River, which in turn drains to the River Bride.

The 33 kV CNR enters a narrow strip of commercial forestry for approximately 900 m and crosses the Toor River at the northern extent of this forestry. The forestry is drained by a network of field drains which drain to the Toor River, which flows southeast to the River Bride.

The 33 kV CNR continues northwest along an existing forest road for approximately 655 m. This stretch of road is drained by trackside drainage which drains into the Toor River.



The proposed cable route splits in approximate southwest and northeast directions in the western part of the Proposed Development boundary. The length of the proposed cable route which extends to the northeast from this split is approximately 780 m and follows the consented access tracks of the CGEP. Existing drainage in this area is a series of field drains which drain into the Toor River. However, the consented access tracks will comprise SUDS trackside drainage with an interceptor drain on the upslope side of the tracks and a grassy swale provided on the downslope side of the tracks. The length of the proposed cable route which extends to the southwest from the split is approximately 1,500 m and also follows the consented access tracks of the CGEP. Again, existing drainage is a network of field drains which drain to the Toor River, but the consented access tracks will provide SUDS trackside drainage.

#### *11.4.7.2 110 kV GCR*

The 110 kV GCR will extend southeast from the proposed 110 kV Substation for approximately 1,500 m along existing forest road within private lands with over-the-edge drainage, which drains into a network of field drains in the surrounding forestry plantation. This network of field drains ultimately drain to the River Bride.

The proposed cable route then joins the existing public road L1505 which comprises over-the-edge drainage into agricultural lands. The route follows the L1505 for 4,390 m in a generally easterly direction, curving northeasterly until it intersects with the L1503. This stretch is also drained over-the-edge to agricultural lands.

The 110 kV GCR continues east in the public road L1510 for 3,340 m until the northwest corner of Fermoy Golf Club, where the route leaves the L1510 and joins an unnamed local road bisecting the golf course. The route is approximately 1,080 m in length here, continuing easterly and curving southeasterly before joining the L5770. This stretch is also drained over-the-edge to agricultural lands.

The proposed cable route continues to the east along the L5770 for approximately 1,310 m. This stretch is generally drained over-the-edge, however there are road gullies either side of the carriageway in the L5770 at the low elevation before the ramp up to the bridge over the M8. Therefore, a small section of the L5770 drains into a local municipal stormwater network.

The proposed cable route then leaves the existing road network to cross the M8 by way of horizontal directional drilling (HDD). The M8 is drained by roadside filter drains, as is typical on the Irish Motorway network. The HDD route will be below all M8 infrastructure and will not interact with the road structure or its associated drainage.

The route briefly rejoins the L5770 on the far side of the M8 before curving south onto the R639 for approximately 180 m. The route leaves the R639 to join the L1517 and continues in a southeasterly direction for approximately 1,700 m where it connects into the existing Barrymore 110 kV substation. This stretch is also drained over-the-edge to agricultural lands.

#### *11.4.7.3 110 kV Substation*

The proposed 110 kV Substation is located on agricultural and forestry lands which are currently drained by a series of field drains, which ultimately drain to the River Bride.



## 11.5 Proposed Watercourse Crossings

The Proposed Development will require for the 33 kV CNR to cross WFD surface waterbodies at three locations and the 110 kV GCR to cross a WFD surface waterbody at one location, as detailed in Table 11-6 and shown on Figure 11.4, Volume 4. Excluding WFD surface waterbodies, there are a further 58 watercourses (smaller streams and drains) which will be crossed by the Proposed Development, also shown on Figure 11.4, Volume 4. The four WFD crossings and 63 other watercourse crossings have been numbered 1 to 67 on Figure 11.4 for identification purposes.

### 11.5.1.1 33 kV Collector Circuit Watercourse Crossings

The proposed 33 kV CNR is proposed to cross the Toor River (EPA Code 18T51) twice, at ITM coordinates 564133.20, 591667.40 (crossing ID 54) and approximately 750 m further downstream at ITM coordinates 564710.767,591159.095 (crossing ID 52).

The 33 kV CNR will also cross the Bride River at ITM coordinates 568359.058, 590213.390 (crossing ID 46). This crossing will be achieved by laying the cable into the existing bridge deck on the L-1501 which traverses the Bride River.

### 11.5.1.2 110 kV GCR Watercourse Crossing

The 110 kV GCR crosses the Farran North River (EPA Code 18F27) approximately 700 m northwest of the existing Barrymore 110 kV substation, at ITM coordinates 582025.51, 594306.6 (crossing ID 2). The L-1517 traverses above the watercourse by means of a single arch bridge. As described in TLI's construction methodology (presented as Appendix 2.1), the bridge has insufficient depth to install the 110 kV GCR with a minimum of 450mm cover to top of ducts, therefore it is proposed to utilise a Horizontal Directional Drill (HDD) to traverse below the watercourse and bridge structure. The proposed HDD will be implemented to bore a minimum of 1,500mm beneath the watercourse bed.

The HDD works are proposed to launch the drill shot from the western side of the structure within the curtilage of the public road (L-1517), travel beneath the watercourse bed and for the drill shot to exit to a receptor pit on the eastern side of the structure within the curtilage of the public road (L-1517).



**Table 11-6: WFD Stream Crossings**

Crossing ID	EPA name	EPA code	ITM_X	ITM_Y	Feature/Activity	Proposed Method of Crossing
54	Toor River	18T51	564133.20	591667.40	33 kV CNR crossing over the Toor River (upstream)	To be laid in the permitted wind farm access track which will cross the surface waterbody with a box culvert
52	Toor River	18T51	564710.767	591159.095	33 kV CNR crossing over the Toor River (downstream)	33 kV CNR to cross beneath watercourse by horizontal direction drilling (HDD)
46	Bride [Waterford]	18B05	568359.058	590213.390	33 kV CNR crossing the River Bride	Cable to be laid in the existing bridge deck
2	FARRAN_NORTH	18F27	582025.51	594306.6	110 kV GCR crossing the Farran North river	110 kV GCR to cross beneath watercourse by horizontal direction drilling (HDD)

### 11.5.1.3 Minor Watercourse Crossings

There are 63 minor watercourse crossings required as part of the Proposed Development. These minor watercourses include non-WFD surface waterbodies and drains. The locations of these crossings are shown on Figure 11.4, Volume 4. They have been surveyed and suitable crossings methods proposed for each location as illustrated on the planning drawings 300100920-DR-142 to 300100920-DR-150 inclusive.

Two non-WFD surface waterbodies (streams) will be crossed by HDD. These surface waterbodies are tributaries of the Bride (Blackwater)\_020. Both HDD crossings of non-WFD streams are along the 33 kV CNR, one at ITM 570092, 594419 (crossing ID 15), the other HDD crossing at ITM 568212, 591692 (crossing ID 43).

## 11.6 Potential Effects

The potential effects on the hydrological regime at the site and quality of waters draining the site are assessed in the following sections for the activities associated with each phase (construction, operation, maintenance and decommissioning) of the Proposed Development. The potential effects are assessed in accordance with the evaluation criteria outlined in Section 11.2.4.



The potential effects in relation to an increase in flooding, cumulative flood risk with neighbouring developments, as well as specific effects during the various phases of the subject development are outlined below.

The summary of potential effects, magnitude, duration, likelihood and whether it is of a direct or indirect nature is provided in Section 11.4.7.

#### 11.6.1 Do Nothing Effect

If the Proposed Development does not proceed, the Proposed 110 kV Substation location will remain as forestry and agricultural land for the foreseeable future. These agricultural lands will likely continue to be grazed by livestock, while the forestry lands will be subject to continued cycles of planting, growing and harvesting of forest materials.

The 110 kV GCR will remain as predominantly public road network, with a short section remaining as forest road for the foreseeable future. The public road will continue to convey local and regional traffic, while the forest road will be used intermittently for forest management, harvesting and forwarding of forest materials.

The 33 kV CNR will remain as predominantly commercial forestry and forest track, public road and agricultural lands. The public road will continue to convey local traffic, while the forest road will be used intermittently for forest management, harvesting and forwarding of forest materials. The agricultural lands will likely continue to be grazed by livestock.

#### 11.6.2 Potential Effects During Construction

During the construction period, the Proposed Development has the potential to lead to effects on hydrology and water quality unless appropriate mitigations are applied. Inappropriate construction practices could also have the potential to impact the water quality and WFD status of existing waterbodies in the area which includes the Blackwater River special area of conservation (SAC).

##### 11.6.2.1 *Earthworks Resulting in Suspended Solids Entering Surface Waterbodies*

Construction-phase activities involving earthworks—such as removal of vegetation or road pavement and excavation of mineral subsoil (where present)—are described in Chapter 2: Description of the Proposed Development. Potential sources of sediment-laden water include:

- Sediment entrainment during construction of cable trenches and the foundation of the 110 kV Substation;
- Stockpiled excavated material acting as point sources of exposed sediment; and
- Erosion of sediment from installed site drainage channels.



These activities may release suspended solids into surface water bodies, increasing sediment loads and turbidity, which could negatively impact water quality. However, given the relatively small and localised nature of the works, runoff volumes will be minimal compared to overall catchment runoff. Potential effects could be significant if appropriate mitigation measures are not implemented.

**Pathways:** Drainage; including surface run-off, field drains and forestry drains.

**Receptors:** Local WFD surface waterbodies listed in Table 11-7, draining into the River Blackwater.

**Pre-Mitigation Potential Effect:** Negative, indirect, significant, short term, likely effect on down-gradient water quality in rivers.

#### *11.6.2.2 Potential Release of Hydrocarbons during Construction and Storage*

Accidental spillage of petroleum hydrocarbons during refuelling of construction plant is a significant pollution risk to surface water. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbons can be highly toxic to humans, ecological receptors, and are persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters.

**Pathway:** Seepage through soils into site drainage network.

**Receptor:** Surface water quality of local surface waters (WFD surface waterbodies listed in Table 11 7), draining into the River Blackwater.

**Pre-Mitigation Potential Effect:** Negative, indirect, significant, short term, unlikely effect to surface water quality.

#### *11.6.2.3 Potential Release of Cement-based Products*

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative effects on water quality. They generate very fine, highly alkaline silt that can physically damage fish by burning their skin and blocking their gills. A pH range of  $\geq 6 \leq 9$  is set in S.I. No. 293/1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of  $\pm 0.5$  pH units. Entry of cement-based products into surface water runoff represents a risk to the aquatic environment during construction works associated with the Proposed Development. Batching wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

**Pathway:** Runoff to surface water and seepage to groundwater (throughflow to local surface waterbodies).

**Receptor:** Surface water quality of local surface waters (WFD surface waterbodies listed in Table 11 7), draining into the River Blackwater.

**Pre-Mitigation Potential Effect:** Negative, indirect, low, short term, likely effect to surface water quality.

#### *11.6.2.4 Horizontal Directional Drilling*

Construction-phase activities along the Proposed Development include directional drilling at watercourse crossings. These works will involve earthworks such as removal of vegetation and excavation of minor pockets of organic soil or subsoil where present. All crossings occur at existing bridges and culverts along public roads, and no in-stream works are required at any location.



However, due to the proximity of streams to construction activities at these crossings, there is potential for surface water quality impacts during trench excavation. The primary risk associated with directional drilling is the occurrence of a “frac-out” (unintended release of drilling fluid).

**Pathway** Riverbed (drilling fluids pass through riverbed into surface waterbody by 'frac-out').

**Receptor:** Surface water quality of local surface waters (WFD surface waterbodies listed in Table 11 7), draining into the River Blackwater.

**Pre-Mitigation Potential Effect:** Negative, indirect, slight, temporary, likely effect on surface water quality.

#### 11.6.2.5 Tree Felling

Tree felling will be undertaken prior to the construction of site access tracks and hardstanding areas. The area of proposed felling is small relative to the overall area and is expected to develop a vegetation ground cover relatively quickly on areas which are not built upon. Thus, no significant sedimentation due to increased erosion is anticipated as a result of felling.

**Pathway:** Drainage; including surface run-off, field drains and forestry drains.

**Receptor:** Surface water quality of local surface waters (WFD surface waterbodies listed in Table 11 7), draining into the River Blackwater.

**Pre-Mitigation Potential Effect:** Negative, indirect, slight, temporary, unlikely effect on surface water quality.

#### 11.6.2.6 Changes to the Morphology of Surface Waterbodies by Crossings and Culverts

There are four WFD surface waterbody crossings required for the Proposed Development, which are described in detail in Section 11.5. There will be no in-stream works in any surface waterbody.

Smaller non-WFD surface waterbodies and man-made drains will also be crossed by the Proposed Development. Details regarding these minor crossings can be found in the TLI Construction Methodology Report, presented as Appendix 2.1 of this EIAR.

Diversion, culverting and bridge crossing of surface waterbodies can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over surface waterbodies has the potential to significantly interfere with water quality and flows during the construction phase.

**Pathway:** Existing forestry and agricultural drainage network, existing trackside drainage, local streams and rivers.

**Receptor:** Morphology of local surface waters (WFD surface waterbodies listed in Table 11 7), draining into the River Blackwater.

**Pre-Mitigation Potential Effect:** Negative, direct, slight, long term, unlikely effect on stream flows, stream morphology and surface water quality.



### 11.6.3 Potential Effects During Operation and Maintenance

The Proposed Development will be installed primarily along a series of public road networks, along with sections of agriculture, forestry lands and commercial forestry track where the Proposed Development deviates off the public road. Therefore, drainage regimes will predominantly remain as before within pre-existing drains along these existing roads. Assuming the Proposed Development is built out as part of the overall Project (that is, in tandem with the consented CGEP), the cables of the Proposed Development will be laid in the new access tracks that form part of the CGEP. Where this is the case, the drainage regime will be as per the consented CGEP which is a SUDS design comprising interceptor drains on the upslope side of tracks, cross-drains beneath the tracks to grassy swales on the downslope side which discharge to stilling ponds before being diffused over land downgradient of the track.

Minor maintenance works may be required for the Proposed Development. In such cases, potential effects would resemble those identified for the construction phase; however, these works will be temporary and short in duration, meaning significant effects are unlikely. Mitigation measures outlined in Section 11.8 will also apply to any emergency repair works during operation.

Overall, effects on the water environment during the operational phase are expected to be imperceptible as the site remains largely static, with construction completed and drainage systems established. Runoff will be clean, and therefore no adverse effects are anticipated. Occasional minor maintenance works may take place, but these will be infrequent and of very limited scale. During such works, mitigation measures—including drainage control, sediment management, and spill/chemical containment—will be implemented to ensure runoff quality remains high along the grid route.

### 11.6.4 Potential Effects During Decommissioning

The 110kV GCR and 110 kV Substation within Lackendarragh North and ancillary electrical equipment will form part of the national grid and will be left in situ.

The 33kV CNR that connects each turbine will be removed from the cable ducting. The cabling will be pulled from the cable duct using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at each of the joint bays/pull pits along the proposed cable route. The access track will be excavated using a mechanical excavator at each cable pulling pit location and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible.

It is proposed that all access tracks will be left in place. These will continue to be used for forestry and agriculture.

A detailed decommissioning plan will be agreed with Cork County Council in advance of works commencing.

Due to the minimal works associated with decommissioning, it is expected that the likely effects on surface waters would be imperceptible.



## 11.6.5 Potential Effects of a Risk of Flooding

### 11.6.5.1 *Potential Risk of Flooding Offsite as a Result of Increased Runoff from the Proposed Development*

#### 11.6.5.1.1 110 kV GCR

The 110 kV GCR is primarily to be laid in existing roads or drilled by HDD below existing ground surfaces; no net increase in impermeable surfaces is expected. As such, there will be no increase in the potential for flood risk downstream of the site.

#### 11.6.5.1.2 33 kV CNR

The 33 kV CNR will involve the provision of new access tracks in forestry lands. These new tracks will be located across three sub-basins on the 33 kV CNR: the COOM\_010, the BRIDE(BLACKWATER)\_010 and the BRIDE(BLACKWATER)\_020. Table 11-7 demonstrates the percentage increase in runoff predicted as a result of these proposed access tracks along the 33 kV CNR and compares the increase to that predicted as a result of the consented CGEP.

**Table 11-7: Percentage Increase in runoff to each sub-basin**

Sub-basin	% increase in runoff predicted for the CGEP	Length of new access tracks for Proposed Development	% increase in runoff predicted for the CGEP plus new access tracks of Proposed Development	Difference in % increase (Proposed Development vs. consented CGEP)
COOM_010	0.45%	995 m	0.46%	0.01%
BRIDE (BLCKWATER)_010	0.30%	1340 m	0.30%	<0.01%
BRIDE (BLCKWATER)_020	0.04%	855 m	0.04%	<0.01%

Notes:

*Impervious factor for overland flow is 0.3. For tracks and hardstanding areas impervious factor of 0.45 is applied; for turbine foundation the runoff coefficient of 1.00 was applied.*

*Rainfall Intensity for 1-in-100-year return period storm of 180 minutes duration supplied by Met Eireann.*

*10% increase is applied to rainfall intensity to allow for climate change.<sup>16</sup>*

*Q100 flow derived using the Modified Rational method  $Q=2.78 \times (\text{Rainfall Intensity}) \times (\text{Contributing Impervious Area.})$*

Other than the provision of the new access tracks, the 33 kV CNR will either be laid in existing field boundaries of existing agricultural land, or within the existing road network, with the surface being reinstated to its previous condition and therefore not resulting in a change to volumes or rates of runoff.

<sup>16</sup> Greater Dublin Strategic Drainage Study – Regional Drainage Policies – Volume 5 Climate Change



#### 11.6.5.1.3 110 kV Substation

The 110 kV Substation will involve the provision of a hardstanding compound, generally comprising loose stone, with small areas of less permeable materials such as concrete plinths and road surfacing. However, the 110 kV Substation proposed will replace the consented substation at the same location which formed part of the CGEP application. The footprint of the 110 kV Substation is less than that of the consented substation. As such, the runoff as a result of the 110 kV Substation will be less than the runoff from the consented substation.

#### *11.6.5.2 Potential Risk of Flooding Onsite*

On-site flood risk is generally low, with only watercourse crossings representing medium or high flood risk. As the cable will be trenched into bridge decks or driven underground by HDD, flood waters do not present a risk to the cables.

Therefore, flood risk on and off site is considered to be imperceptible.

#### 11.6.6 Summary of Unmitigated Hydrological Effects on Sensitive Receptors

A summary of unmitigated potential effects due to the Proposed Development is provided in Table 11-8.



**Table 11-8: Summary of Potential Hydrological Effects on Sensitive Receptors**

Activity	Potential Effect	Receptor	Quality / Duration	Magnitude/ Probability	Significance
<b>Construction Phase</b>					
Cable trenching, construction of site tracks, and substation	Release of suspended solids into surface waters	Surface waters	Negative/ Short-term	Medium/Likely	Significant
Cable trenching, construction of site tracks, and substation, and management of material storage areas	Release of hydrocarbons or fuel spill	Surface waters	Negative/ Short-term	Low/Unlikely	Slight
Cable trenching, construction of site tracks, and substation	Release of cement-based products	Surface waters	Negative/ Short-term	Low/Likely	Slight
Grid Cable Route Installation and Horizontal Directional Drilling	"Frac-out"	Surface waters	Negative/ Temporary	Low/Likely	Slight
Provision of watercourse crossings	Changes to morphology of surface waterbodies	Surface waters	Negative/ Long-term	Low/Unlikely	Slight
<b>Operation &amp; Maintenance</b>					
Maintenance works on substation, cabling	Release of suspended solids into surface waters	Surface waters	Negative/ Temporary	Low/Likely	Imperceptible
Maintenance works on substation, cabling	Release of hydrocarbons or fuel spill	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible
Maintenance works on substation, cabling	Release of cement-based products	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible



Activity	Potential Effect	Receptor	Quality / Duration	Magnitude/ Probability	Significance
<b>Decommissioning</b>					
Removing cabling	Release of suspended solids into surface waters	Surface waters	Negative/ Temporary	Low/Likely	Imperceptible
Removing cabling	Release of hydrocarbons or fuel spill	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible
Removing cabling	Release of cement-based products	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible



As discussed in Section 11.2.4.1, the hydrological environment of the Proposed Development is considered to be of 'high' sensitivity for receptors draining to the Bride River. It can be observed from Table 11-8: that the release of suspended solids during the construction of the Proposed Development, if unmitigated, would be 'significant' on receiving surface waterbodies. All other potential effects during the construction phase would be slight, and therefore not significant.

Operation and maintenance and decommissioning activities are not expected to have a significant effect on the receiving surface waterbodies.

The effect on hydrology and water quality will be reduced by implementing measures discussed in Section 11.6 and 11.7.

## 11.7 Flood Risk Identification and Assessment

As detailed in Section 11.3, there are minimal flood extents interacting with the Proposed Development.

### 11.7.1 Essential Infrastructure

Essential Infrastructure is defined in Table 3.1 of The Planning System and Flood Risk Management Guidelines for Planning Authorities, OPW, November 2009, as 'Primary transport and utilities distribution, including electricity generating power stations and substations, water and sewage treatment, and potential significant sources of pollution (SEVESO site, IPPC sites, etc.) in the event of flooding'. The proposed substation in this development therefore comes under the category of 'Essential Infrastructure'.

The proposed substation is outside the Flood Zone A and B areas as shown on Figure 11.3, Volume 4.

### 11.7.2 Summary of Flood Risk Identification and Assessment

As detailed in Section 11.4, effects associated with flooding on and off the site are considered to be imperceptible and therefore flood risk is not considered any further in this chapter.

## 11.8 Proposed Mitigation Measures

The primary form of mitigation against potential hydrological effects is the drainage design. The proposed layout of the drainage for the CGEP development is shown in the CGEP Surface Water Management Plan (SWMP) (2020) contained within Appendix A of the Construction and Environmental Management Plan (CEMP). In the case of the current Proposed Development, new trackside drainage will be provided adjacent to the new access tracks in forestry lands along the 33 kV CNR. Drainage of the proposed 110 kV Substation will be materially similar to that which was designed for the now-consented substation of the CGEP development.

Where possible, existing access roads and tracks have been utilised in the layout design for the Proposed Development to minimise the disturbance to soils.

The following types of surfaces are considered on this site in addressing the drainage for the Proposed Development:

1. proposed 110 kV Substation
2. proposed access tracks for cables in forestry



### 11.8.1 Drainage of the Proposed Substation and Access Tracks in Forestry

It is proposed to drain the 110 kV Substation and access tracks in forestry using shallow swales, with a stilling pond at the end of the swale run.

Interceptor drains will be installed on the upslope side of the 110 kV Substation and the access tracks in forestry. Overland flow collected in these interceptor drains will then discharge diffusely on the downslope side over vegetated areas within the site boundary.

Within the compound of the 110 kV Substation, the runoff from roofs will be collected to water harvesting tanks. Wastewater will drain to a tank which will be regularly emptied and maintained. More details are provided in CGEP Surface Water Management Plan (2020) contained within Appendix A of the CEMP.

A suitable permanent petrol and oil interceptor will be installed to deal with all substation surface water drainage. A suitable unit is shown in the CGEP Surface Water Management Plan (2020) contained within Appendix A of the CEMP.

### 11.8.2 Construction Phase

#### 11.8.2.1 *Earthworks Resulting in Suspended Solids Entering Surface Waters*

Temporary silt fencing will be installed within existing roadside and field drainage features along the grid connection route to capture suspended sediments from the works area. Collected sediment will be removed and disposed of at an appropriately licensed facility. Bare ground will be reseeded or reinstated immediately, with silt fencing left in place temporarily if required.

Any excavated topsoil or subsoil from trenching and access track construction in off-road sections that is not transported off-site to a licensed facility will be temporarily stored near the excavation area and reused for reinstatement works.

The following mitigation measures are proposed during cabling works construction:

- Weather warnings will be monitored, and no construction will take place during extreme events to mitigate against potential flooding.
- Mitigation measures will be provided where surface water flows may be temporarily prevented from reaching gullies during trench excavation. Mitigation measures will include the provision of temporary over ground surface water channels using sand bagging for example to divert flows to downstream gullies.
- Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows.
- Any excavated material will be used in the reinstatement of the cable trenches subject to approval. Surplus material will be removed from the site to an appropriate licenced facility. There will be no stockpiling of excavated material.
- All excavated soil material will be managed on site in accordance with the CEMP.
- Silt fencing will be provided around any exposed areas to prevent the ingress of suspended solids into adjacent watercourses. These mitigation measures will prevent surface water contamination and will prevent subsequent flows of contaminated water into watercourses.



- Additional protection will be provided in the form of silt fencing downslope where required during construction, to further ensure that there is no effect from the development to streams and rivers downslope of the site.
- Daily visual inspections of drains and streams will be performed during the construction period to ensure suspended solids are not entering the streams and rivers alongside the work area, to identify any obstructions to channels, and to allow for appropriate maintenance of the existing roadside drainage regime.

#### 11.8.2.2 *Potential Release of Hydrocarbons during Construction*

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

- Due to the ease of access along the grid connection route, it is unlikely that any refuelling on site will be necessary. Nevertheless, if required, storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose;
- Spill kits will be available to deal with any accidental spillage from plant or equipment; and
- An emergency plan for the construction phase to deal with accidental spillages is included within the CEMP. Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area.

#### 11.8.2.3 *Release of Cement-Based Products*

The following mitigation measures are proposed:

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds;
- Weather forecasting will be used to plan dry days for pouring concrete; and,
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

#### 11.8.2.4 *Horizontal Directional Drilling*

The proposed mitigation measures during HDD are listed below:

- An Environmental Engineer with a “stop work” authority will be engaged to monitor the construction phase of the development when the water crossing is being undertaken.
- The working area around the bridge/culvert crossings will be fenced off prior to the commencement of works to avoid damage to bankside habitat
- Watercourses will be visually inspected



- Should increase levels of siltation be recorded within the watercourses during the course of the construction phase, the environmental auditor will seek to halt construction works until the source of the pressure can be found and remediated
- Surplus material will be removed from the site to an appropriate facility. There will be no stockpiling of excavated material. A setback distance of at least 20 m from watercourses will be adhered to when storing temporary spoil
- Prior to any works taking place near water courses, the Inland Fisheries Ireland will be consulted
- Construction works onsite will be timed to occur outside periods where heavy rainfall would be expected
- Silt traps will be regularly maintained during the construction phase. All personnel working onsite will be trained in pollution incident control response.
- Appropriate signage will be placed along the proposed route outlining the spillage response procedure and a contingency plan to contain silt. A regular review of weather forecasts of heavy rainfall is required, and the contractor is required to prepare a contingency plan for before and after such events
- Visual inspection to take place at all times along the bore path of the alignment.
- Silt fences will be constructed around proposed work areas prior to commencement of works.
- No refuelling will take place within 50m of the stream zone or any sensitive habitats.
- During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid will be used.

### Water Quality Monitoring Programme

As part of the wider project (CGEP), a monitoring programme will be established to ensure that water quality is maintained. The details of this programme are outlined below. This programme will ensure that designed measures are working, and water quality is not affected.

An Environmental Manager will be on-site during construction to monitor water quality. Turbidity meters will be installed prior to construction downstream of the site. Levels of turbidity will be monitored pre-construction to determine existing levels in the waterbodies. Should the turbidity levels measured during construction be higher than the existing levels, construction will be stopped, and remediation measures will be put in place immediately, to include silt fencing.

Water samples will be taken monthly during ground disturbance works and will include measurement of the parameters provided in Table 11-7 below.

**Table 11-9: Surface Water Quality Monitoring Parameters**

Parameter	Maximum Value	Regulation
Turbidity	-	-
pH	6.0 < pH < 9.0	Surface Water Regulations 2009
BOD	High Status < 1.3 (mean) or <2.2 (95%ile) Good Status <1.5 (mean) or < 2.6 (95%ile)	Surface Water Regulations 2009



Parameter	Maximum Value	Regulation
Total Suspended Solids (mg/l)	<25	Salmonid Water Regulations 1988
Total Ammonia (mg/l N)	High Status < 0.04 (mean) or <0.09 (95%ile) Good Status <0.14 (mean) or < 0.065 (95%ile)	Surface Water Regulations 2009
Nitrite (NO <sub>2</sub> ) (mg/l)	<0.05	Salmonid Water Regulations 1988
Molybdate Reactive Phosphorus (mg/l P)	High Status < 0.025 (mean) or <0.045 (95%ile) Good Status <0.035 (mean) or < 0.075 (95%ile)	Surface Water Regulations 2009

#### 11.8.2.5 Proposed Mitigation Measures for Tree Felling

To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).

Trees will be felled away from aquatic zones. Brush mats will be used as necessary on any off-road harvesting routes, removed and replenished if they become worn. Branches, logs or debris will not be allowed to accumulate in aquatic zones and will be removed as soon as possible.

#### 11.8.3 Proposed Mitigation Measures for Operation and Maintenance Stage

When operational, the development will have a negligible effect on surface water quality as there will be no further disturbance of soils post-construction. During the operation stage, small quantities of oil will be used in cooling the transformers associated with the facility. There is therefore a potential for small oil spills. Risks of potential oil leakage and pollutions draining to the watercourse from the installed transformer is mitigated with a transformer interceptor bund wall.

It is not envisaged that the maintenance period will involve any significant effects on the hydrological regime of the area. The maintenance of the development will incorporate effective maintenance of the drainage system.

The maintenance regime will include inspecting the following:

- Drains, cross-drains and culverts for any blockages
- Outfalls to existing field drains and watercourses
- Existing roadside swales for any obstructions
- Swales
- Progress of the re-establishment of vegetation.

The maintenance regime will also include implementing appropriate remedial measures as required after the above inspections and testing the water quality at the outfalls at appropriate intervals. Visual inspections will be undertaken during the maintenance period in accordance with maintenance schedule in CIRIA C753.



#### 11.8.4 Proposed Mitigation Measure for Decommissioning Stage

As described in Section 11.4.4, due to the minimal works associated with decommissioning, it is expected that the likely effects on surface waters would be imperceptible, and therefore no specific mitigation measures are proposed.

### 11.9 Residual Effects

The residual effects are summarised in Table 11-8 below, using the impact assessment criteria outlined in Section 11.2.4. Table 11-10 indicates that, following the implementation of mitigation measures, the residual risk to the receiving watercourses would be 'Imperceptible' during the construction, operation and decommissioning stage of the development.

By implementing the mitigation measures outlined in Section 11.8, there will be no deterioration in WFD classifications for the waterbodies described in Table 11-3, which includes the Blackwater River (Cork/Waterford)SAC.



**Table 11-10: Residual Hydrological Effect Significance for Sensitive Receptors**

Activity	Potential Effect	Receptor	Quality / Duration	Before Mitigation		After Mitigation	
				Magnitude/ Probability	Significance	Magnitude/ Probability	Residual Significance
<b>Construction Phase</b>							
Cable trenching, construction of site tracks, and substation	Release of suspended solids into surface waters	Surface waters	Negative / Short-term	Medium/ Likely	Significant	Low/ Unlikely	Imperceptible
Cable trenching, construction of site tracks, and substation, and management of material storage areas	Release of hydrocarbons or fuel spill	Surface waters	Negative / Short-term	Low/Unlikely	Slight	Low/ Unlikely	Imperceptible
Cable trenching, construction of site tracks, and substation	Release of cement-based products	Surface waters	Negative / Short-term	Low/Likely	Slight	Low/ Unlikely	Imperceptible
Grid Cable Route Installation and Horizontal Directional Drilling	"Frac-out"	Surface waters	Negative/ Temporary	Low/Likely	Slight	Low/ Unlikely	Imperceptible
Provision of watercourse crossings	Changes to morphology of watercourses	Surface waters	Negative / Long-term	Low/Unlikely	Slight	Low/ Unlikely	Imperceptible
<b>Operation &amp; Maintenance</b>							
Maintenance works on substation, cabling	Release of suspended solids into surface waters	Surface waters	Negative/ Temporary	Low/Likely	Imperceptible	Low/ Unlikely	Imperceptible
Maintenance works on substation, cabling	Release of hydrocarbons or fuel spill	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible	Low/ Unlikely	Imperceptible



Activity	Potential Effect	Receptor	Quality / Duration	Before Mitigation		After Mitigation	
				Magnitude/ Probability	Significance	Magnitude/ Probability	Residual Significance
Maintenance works on substation, cabling	Release of cement-based products	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible	Low/ Unlikely	Imperceptible
<b>Decommissioning</b>							
Decommissioning substation, removing cabling	Release of suspended solids into surface waters	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible	Low/ Unlikely	Imperceptible
Decommissioning substation, removing cabling	Release of hydrocarbons or fuel spill	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible	Low/ Unlikely	Imperceptible
Decommissioning substation, removing cabling	Release of cement-based products	Surface waters	Negative/ Temporary	Low/Unlikely	Imperceptible	Low/ Unlikely	Imperceptible



## 11.10 Potential Cumulative Effect

In terms of developments which have the potential to act cumulatively with the Proposed Development, the consented Coom Green Energy Park is the primary development to consider as the Proposed Development and the CGEP form parts of one overall Project. Other developments listed in Appendix 1.3 (List of Cumulative Developments) which might act cumulatively with the Proposed Development are the existing forestry activity in the area, the consented solar project at Castlelyons (refs. 205898 and 245211).

As a result of the construction of the CGEP, surface water runoff is likely to increase by 0.234 m<sup>3</sup>/s (or 0.06 %) due to changes to hard surfaces. Increase in runoff due to construction of the development is not significant and will be mitigated with the drainage system. As detailed in Section 11.6.5, the current Proposed Development will not result in a significant increase in run-off and as such will not act cumulatively in this regard.

Release of sedimentation is likely to occur due to disturbance of soils. Sediment release to watercourses is related to the type of works being undertaken on the site. When the soil excavation is carried out, sediment release is likely to be higher than at a period when the turbines are being installed. Releasing surface runoff without implementing sediment control measures is not acceptable for receptors.

Surface water runoff from the consented CGEP drains to tributaries of the River Bride. The River Bride is part of a Special Area of Conservation. Following the implementation of mitigation measures set out in the EIAR for the CGEP, the effects of effects are expected to be of imperceptible significance. Cumulative effects resulting from the current Proposed Development acting in combination with the imperceptible residual effects of the CGEP will not be significant.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the design of the CGEP to minimise significant adverse effects on water quality and downstream designated sites. A 50m stream buffer was used in designing the layout of the CGEP, thereby avoiding sensitive hydrological features. The EIAR for the CGEP concludes that there will be no deterioration in WFD classifications for the waterbodies in the area, including the Blackwater River (Cork/Waterford) SAC. The effects arising from the current Proposed Development will not be of such magnitude that they could act cumulatively with the CGEP to give rise to a deterioration in WFD status.

## 11.11 Conclusion

The potential for an increase in runoff has been assessed. The 33 kV CNR will result in an imperceptible increase in runoff, while the 110 kV GCR will not result in any increase in runoff. The 110 kV Substation will result in an imperceptible increase in runoff and will be less than the runoff predicted for the consented substation which was originally intended for that location under the 2020 CGEP design. All runoff will be managed by the proposed SuDS drainage system.

The Proposed Development will not cause deterioration in the status of any water body, nor will it compromise the achievement of good status of any of the WFD surface water bodies identified in Table 11-6.

The assessment concludes that the Proposed Development will not result in any significant effects on hydrology or water quality during the construction, operational, or decommissioning phases. The potential for effects is generally not significant before mitigation, and after mitigation all effects have been assessed as being imperceptible. This assessment will be reinforced by water quality monitoring as described in Section 11.8

The evaluation confirms that there will be no significant cumulative effects on the water environment when the Proposed Development is considered alongside the consented CGEP as well as existing or proposed projects.



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