

TOBIN

BUILT ON KNOWLEDGE

Bord na Móna

Derryaroge, Derryadd and Lough Bannow Bog
Substitute Consent

Water Framework Directive
Compliance Assessment



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1. INTRODUCTION

TOBIN Consulting Engineers were requested by Bord na Móna to complete a Water Framework Directive (WFD) Compliance Assessment for a planning application for substitute consent, regarding historical peat extraction that occurred at the Derryadd, Derryaroge and Lough Bannow Bogs (Application Site) within the Mountdillon Bog Group in County Longford from 2003 to present day.

The Application Site comprises mainly of cutover and cutaway bog. Bord na Móna has been involved in peat extraction activities at the site since the 1940s. Milled peat extraction ceased on the site in July 2019.

Peat extraction operated under an Integrated Pollution Control Licence (IPC Reg. No. P0504-01) issued by the Environmental Protection Agency (EPA) in 2000. In accordance with this licence, Cutaway Bog Decommissioning and Rehabilitation Plans have been developed. The Cutaway Bog Decommissioning and Rehabilitation Plans provide a description of the three bogs and their ecology. They also provides a framework and outline the typical works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the plan will likely be implemented.

The purpose of this WFD Compliance Assessment is to determine if any specific components or activities, associated with the Application Site, will compromise the objectives of the WFD since its transposition into Irish Law in 2003, or cause a deterioration in the status of any surface water or groundwater body and/or jeopardise the attainment of good surface water or groundwater status. This assessment will determine the water bodies with the potential to be impacted, describe the mitigation measures and determine if the Application Site is in compliance with the objectives of the WFD.

1.1 BACKGROUND

The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) was established in 2000 in order to provide a framework for the protection of surface waterbodies (including rivers, lakes, coasts, estuaries and heavily modified waterbodies) and groundwater.

The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003). The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, undertaking monitoring and setting environmental objectives. In Ireland the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021. The third cycle of the River Basin Management Plan 2022-2027¹ was published in 2024.

The WFD requires that the ecological status of all surface waterbodies are assessed that pressures are identified and that programmes of measures are put in place in order to maintain or achieve Good Ecological Status (GES) or Good Ecological Potential (GEP) in heavily modified and artificial waterbodies. Ecological status is assessed by considering a range of biological, hydromorphological, chemical and physico-chemical quality elements as well as specific pollutants.

¹ Water Action Plan (WAP) 2024 – A River Basin Management Plan for Ireland

Ecological status and the status of the quality elements is assessed and classified as one of the following:

- High;
- Good;
- Moderate;
- Poor; and
- Bad.

Member States must provide information on anthropogenic pressures. The magnitude of pressure and associated impact affects the status classification.

This report provides a WFD Compliance Assessment for the Application Site i.e. Derryaroge, Derryadd and Lough Bannow Bogs. This report forms part of the remedial Environmental Impact Assessment (rEIAR) submitted with the substitute consent application and should be read in conjunction with Chapter 9 Hydrology Hydrogeology and Water Quality of the rEIAR. For avoidance of doubt, any reference hereafter to 'the rEIAR' relates to the rEIAR prepared and submitted with the application for substitute consent for peat extraction and ancillary activities at Derryadd, Derryaroge and Lough Bannow bogs. Consideration of the WFD is required for any development application which has the potential to cause deterioration in the ecological and chemical status of a waterbody or to compromise improvements which might otherwise lead to a waterbody meeting its WFD objectives.

Any new development must therefore ensure that four objectives are satisfied:

- Objective 1: Deterioration in the ecological status of the waterbody or connected waterbodies (within the same catchment) is prevented;
- Objective 2: Impediments to the attainment of GES status for the waterbody are not introduced;
- Objective 3: Attainment of the WFD objectives for the waterbody is not compromised;
- Objective 4: Achievement of the WFD objectives in other waterbodies within the same catchment are not permanently excluded or compromised.

1.1.1 Assessment Methods

This WFD Compliance Assessment evaluates the potential for the Application Site to have non-temporary effects on WFD parameters of freshwater waterbodies. Transitional and coastal waterbodies were considered and scoped out from further assessment due to the inland location.

There is no formal Irish guidance for carrying out WFD assessments for the freshwater environment. The Northern Ireland Environment Agency provides guidance for EIA developments on carrying out a WFD assessment (Northern Ireland Environment Agency, 2012). The UK's Planning Inspectorate (PINS) Advisory Note 18 'Water Framework Directive' June 2017 (PINS 2017) also sets out the stages of a compliance assessment. In principle, the approaches outlined in each of these guidelines are similar. These documents have been used to inform the approach taken for this WFD Compliance Assessment, which is as follows:

- **Screening:** Identify and record the current status, future objectives and any relevant activities that may influence the waterbodies in the locality of the Application Site.
- **Scoping:** For each WFD element, record where the construction, operation and/or decommissioning could affect the status.
- **Assessment:** Evaluate the extent to which activities influence (positively or negatively) the WFD elements; the likelihood of non-temporary effects; the data available and confidence in the assessment; and any next steps for data collection and evaluation as required.
- **Mitigation:** Identify where actions may be possible and appropriate to mitigate any negative effects of the development.

A 2km buffer zone was applied for assessing protected areas. For clarity and brevity purposes, the 2km buffer and the full list of identified protected sites (including those which are considered coastal water specific) are maintained for all assessments.

1.1.2 Assessment Criteria

This assessment needs to evaluate where activities may influence WFD waterbodies. Evaluation was made against those quality elements that make up the classification of ecological status. For the freshwater waterbodies that intersect the Application Site, these are shown in. Ecological Status is defined as alteration from 'natural' conditions; see the official WFD normative definitions in the box below.

Table 1-1: Description of elements for the classification of Ecological Status that are recorded for those waterbodies intersected by the Application Site.

WFD Element	Description of elements for the classification of Ecological Status
Biological Status	Composition and abundance of aquatic flora (including macrophytes and phytobenthos) Composition and abundance of benthic invertebrate fauna Composition, abundance and age structure of fish fauna
Chemical Status	Elements that support the biological elements including: <ul style="list-style-type: none"> • Temperature • pH • Ammonia • Phosphate
Hydrology Status	Quantity of water flow Connection to groundwater bodies
Morphology Status	River depth and width variation Structure and substrate of the river bed Structure of the riparian zone

Source: WFD Directive 2000/60/EC

This assessment is reliant on identifying those effects that are non-temporary i.e., three years for biological status, Hydrology and Morphology and 12 months for Chemical status.

To inform this assessment the following datasets owned by the EPA and available online (<https://www.catchments.ie/data/#/?k=afsbrv> accessed in March 2025) have been used:

- Catchment Data - River Waterbodies GIS
- Catchment Data - Lake Waterbodies GIS
- Surface Water Classification Status and Objectives results for 2016-2021.
- Groundwater Classification Status and Objectives results 2016-2021

1.2 STATEMENT OF AUTHORITY

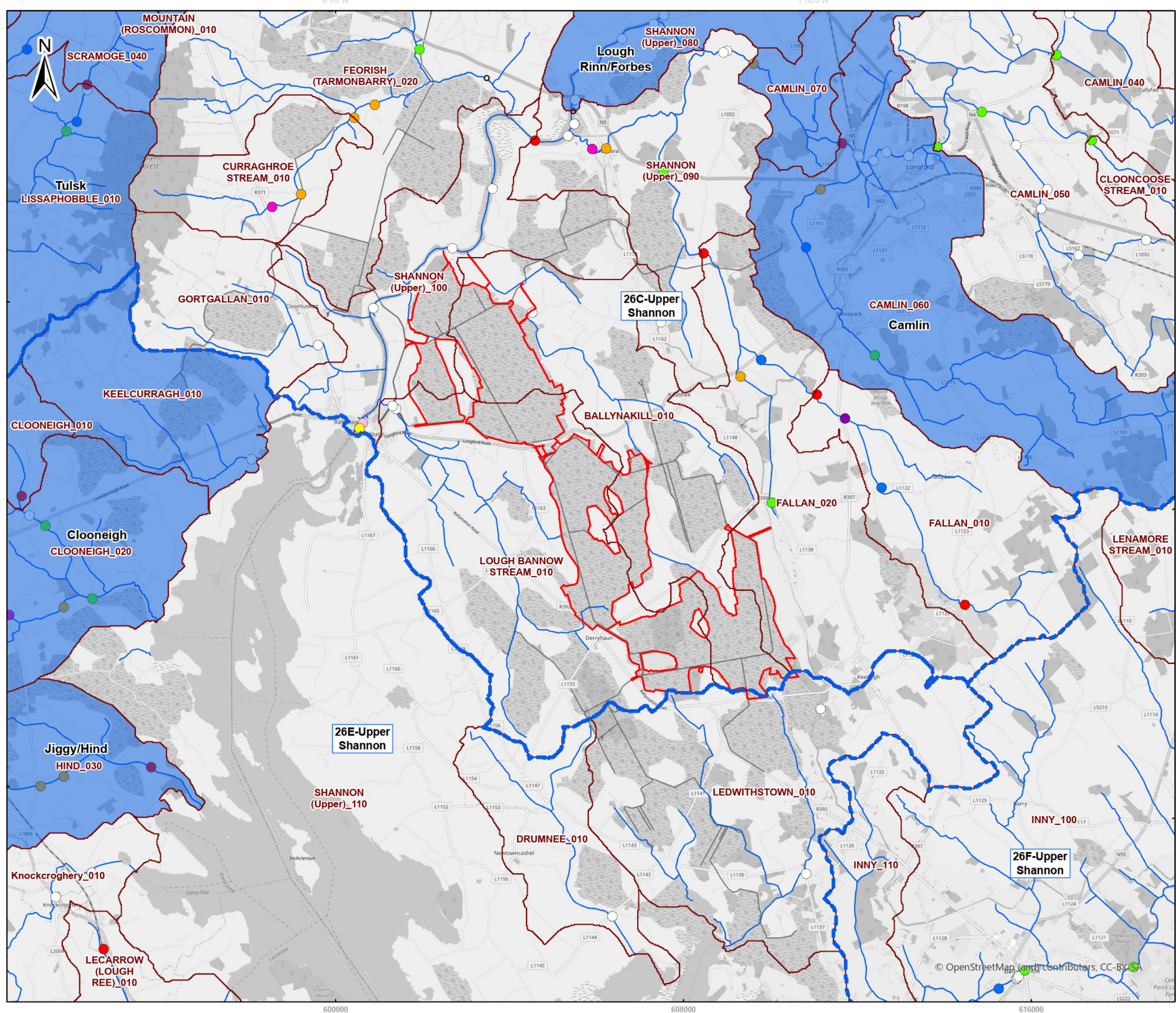
John Dillon of TOBIN Consulting Engineers have completed this chapter. TOBIN Hydrologists and Hydrogeologists are intimately familiar with the site characteristics of Derryaroge, Derryadd and Lough Bannow bogs, having worked on the preparation of a planning application for the wind farm development in the same area, and renewable energy projects including wind farms at Lisheen, Castlebanny and Bruckana set in similar ground and water conditions to Derryaroge, Derryadd and Lough Bannow bogs.

This assessment has been completed by Mr. John Dillon (BSc, MSc, MCIWM, PGeo), TOBIN. John has over 18 years of experience in hydrogeological/hydrological assessment for EIS/EIA. John is a Senior Environmental Consultant in the Environment and Planning section of TOBIN Consulting Engineers. John has an active involvement in the compilation of environmental impact assessment reports, planning applications and wind farm applications.

2. WFD SCREENING AND SCOPING

On a national stage, the Environmental Protection Agency (EPA, 2022) has published the Water Quality in Ireland Report 2016-2021 which provides the latest assessment of the quality of Ireland's rivers, lakes, estuaries, coastal and groundwaters. Water quality nationally has declined. The data within the application area has shown slight improvements since 2013. However, the overall status of surface water/rivers in the vicinity of the Application Site is 'Poor' Status. The WFD describes the groundwater at the Application Site as 'Good'.

The Application Site is located on a catchment boundary between the subcatchment of Shannon 26C which covers the majority of the site and Shannon 26F which forms a small segment to the south. The Ledwithstown River or Bilberry River is the only stream located in the Shannon 26F subcatchment. Lough Bannow Stream and Ballynakill stream are located in the Shannon 26C subcatchment. For this assessment to inform Cycle 3, there are three waterbodies achieving High Status, 42 achieving Good Status, 14 achieving Moderate Status seven achieving Poor Status and 10 waterbodies in the Upper Shannon Catchment do not have a status classification assigned. The River Subbasins and Q values surrounding the Application Site are included below in Figure 2-1.



Legend

- Application Site
- Catchments
- WFD - River Sub Basins
- WFD - Areas For Action (AFAs)

Water Quality Monitoring Stations

- No value
- 1
- 2-3
- 2-3*
- 3
- 3*
- 3-4
- 3-4*
- 4
- 4-5
- Not Sampled
- Rivers

NOTES

- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
- ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
- ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
- ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

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Client: **Bord na Móna**

Project: **Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent**

Title: **Figure 2-1 River Subbasins. Q values and Areas for Action (AFA)**

Scale @ A3: 1:80,000

Prepared by: S.Pezzetta Checked by: C.Naughton Date: March 2025

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Map Ref: 11400-001-R.Sub.Ba-AFAs-TOB-A Draft: A

2.1.1 Surface Water Bodies

The river waterbody types located beside the Application Site are primarily small, low lying streams/drainage channels which flow to the River Shannon. There are four WFD river water bodies either intersecting or flowing in the vicinity of the Application Site. There is one WFD artificial water body intersecting the Application Site. The hydrological pathway from the Application Site includes one WFD lake water body – Lough Ree.

More locally, five sub basins are present at the Application Site. The Application Site lies within the Lough Bannow Stream_010, Ballynakill_010, Fallan_020, Ledwithstown_010, and Shannon (Upper)_100. All rivers discharge to the River Shannon Catchment.

The Application Site is part of the Upper Shannon catchments (26C and 26E). The majority of the site lies within the catchment of the Lough Bannow_010 and Ballynakill_010 River Basins. The Ballynakill River is located to the northeast of the site. The southeast of the site is within the Ledwithstown_010 WFD River subbasin. There are no EPA or WFD monitoring locations on the streams adjacent to the Application Site.

Table 2-1: Water Body Status (<https://www.catchment.ie>) within 2km of the Application Site

Waterbody Code	Name	Status 2010-2015	Status 2013-2018	Current Status 2016-2021	Application Site within WFD subbasin
IE_SH_26L120100	Lough Bannow Stream_010	Unassigned	Good	Moderate	Yes
IE_SH_26B220790	Ballynakill_010	Unassigned	Good	Moderate	Yes
IE_SH_26L840850	Ledwithstown_010	Unassigned	Good	Moderate	Yes
IE_SH_26F010200	Fallan 020	Good	Good	Good	Yes
IE_SH_26S021600	Shannon (Upper)_100	Poor	Poor	Poor	Yes
IE_SH_26S021530	Shannon (Upper)_090	Moderate	Moderate	Poor	No
IE_26C_AWB_RC MLW	Royal Canal Main Line (Upper Shannon C)	Good	Good	Good	No
IE_SH_26_750a	Lough Ree	Moderate	Good	Good	Located downgradient

The Environmental Protection Agency (EPA) regularly monitors water bodies in Ireland as part of their remit under the Water Framework Directive (WFD) (2000/60/EC), which requires that rivers are maintained or restored to good/ favourable status. Quality of watercourses are assessed in terms of 4 No. quality classes; 'Unpolluted' (Class A), 'Slightly Polluted' (Class B), 'Moderately Polluted' (Class C) and 'Seriously Polluted' (Class D). These water quality classes, and the water quality monitoring programme are described in the EPA publication 'Water Quality in Ireland, 2022'. The water quality assessments are based on biological surveys. Biological Quality Ratings or Biotic Indices (Q-values) ranging from Q1 to Q5 are defined as part of the biological river quality classification system. The relationship of these indices to the water quality classes defined above, are set out in Table 2-2.

Table 2-2 Relationship between biotic Indices and Water Quality Classes

Biotic Index (Q-value)	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4	Slightly Polluted	Class B
Q3, 2-3	Moderately Polluted	Class C
Q2, 1-2, 1	Seriously Polluted	Class D

Q-values were recorded on the River Shannon 1km downgradient of Lanesborough Power Station and upgradient at Tarmonbarry village as shown in Table 2-3. Q-Values within the River Fallan are between Q3-Q4 'Slightly Polluted' status, with 'Unpolluted' status -Q4, recorded in the Fallan river (Br S of Kilmore Upper) in 2020 and Q4 also recorded in the Fallan River (W of Curry Bridge) in 2023. The EPA monitoring point on the River Shannon indicates that the overall water quality in this area was Q3 - 'Moderately Polluted' in 2023, and that the water quality upstream of the Application Site is Q3-Q4 'Slightly Polluted'. The overall status of surface water/ivers in the vicinity of the Application Site is 'Poor Status'. This classification is based on a low macroinvertebrate value (Q-Value) according to the EPA². The water quality on the Shannon is generally good. Results for ammonium are included below in Figure 2-2.

Table 2-3: Q-Values at various EPA monitoring stations on River Shannon Upper

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Br Lanesboro
River	Fallan	Fallan	Shannon	Shannon
Station Code	RS26F0100040	RS26F010200	RS26S021530	RS26S021600
1984	ND ³	Q4	ND	ND
1992	ND	Q3-4	ND	ND
1996	Q3-4	Q3-4	ND	ND
1999	Q3-4	Q3-4	ND	Q3
2002	Q4	ND	ND	Q3
2005	Q3-4	Q3-4	ND	Q3
2008	Q3-4	Q4	Q3-4	ND
2011	Q3-4	Q4	Q4	Q3-4

² <https://www.epa.ie/media/epa-2020/monitoring-amp-assessment/freshwater-amp-marine/River-Monitoring-Invertebrates-fact-sheet-final.pdf>

³ ND=No Data

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Br Lanesboro
2014	Q3-4	Q4	Q3-4	Q3
2017	Q3-4	Q4	Q3	ND
2020	Q3-4	Q4	Q4	Q3
2023	Q4	-	Q3-4	Q3

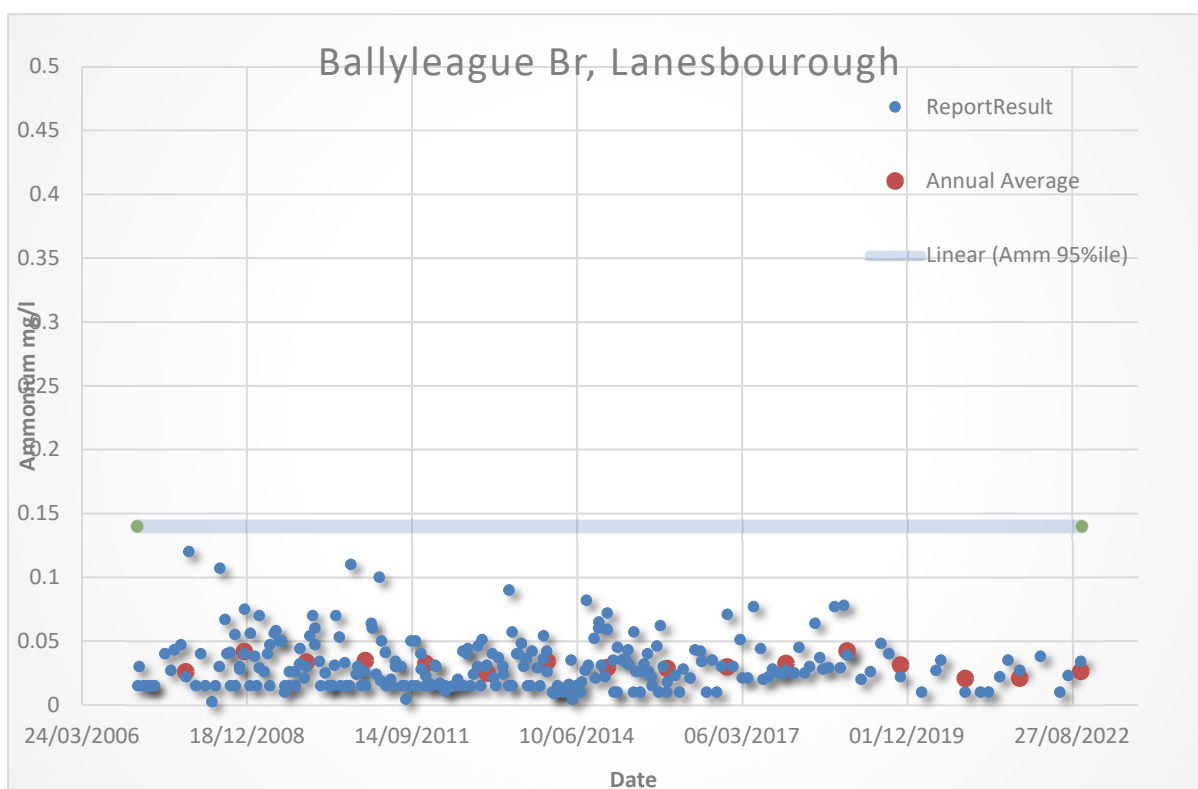


Figure 2-2: Ammonium Concentrations Ballyleague Bridge

The implementation of the WFD resulted in an expanded surface water and groundwater monitoring programme. EPA Data are only available since 2007. Summary data for ammonium at Ballyleague Bridge is included below in Table 2-4 below. No significant overall trend is noted in the data from 2007 to 2023.

Table 2-4: Annual Average Ammonium - Ballyleague Bridge

<i>Ballyleague Br</i>	
Year	Average Ammonium Concentration
2007	0.035
2008	0.056
2009	0.039
2010	0.043
2011	0.041
2012	0.030
2013	0.040
2014	0.034
2015	0.035
2016	0.036
2017	0.033
2018	0.101
2019	0.031
2020	0.031
2021	0.028
2022	0.029
2023	0.023

The Fallan River was unsatisfactory at the upper site (RS26F010020) and at the mid station (RS26F010040). The lower site surveyed (RS26F010200) remained satisfactory. The catchment is dominated by agriculture – predominantly intensive pasture.

The WFD classified the surface waters as at risk of not achieving good status by 2027 (www.epa.ie)⁴. Where waterbodies have been classed as ‘At Risk’, significant pressures have been identified. The significant pressure affecting the greatest number of waterbodies is agriculture, followed by hydromorphology, other⁵, peat, domestic wastewater, urban wastewater, urban run-off, industry and forestry.

A summary of the catchment is included in Table 2-5 regional natural surface water drainage pattern, in the environs of the Application Site, is outlined in Figure 2-3 below. The Application Site is located on a catchment boundary between the subcatchment of Shannon 26C, which covers the majority of the site, and the Shannon 26E, which is less than 0.1km², in the southern portion of Lough Bannow Bog.

⁴ https://www.catchments.ie/data/#/subcatchment/26C/26C_1?k=b41qnb

⁵ *Other – abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species have all been grouped into the “Other” pressure category for the purpose of this report

Table 2-5 WFD Subbasin Summary

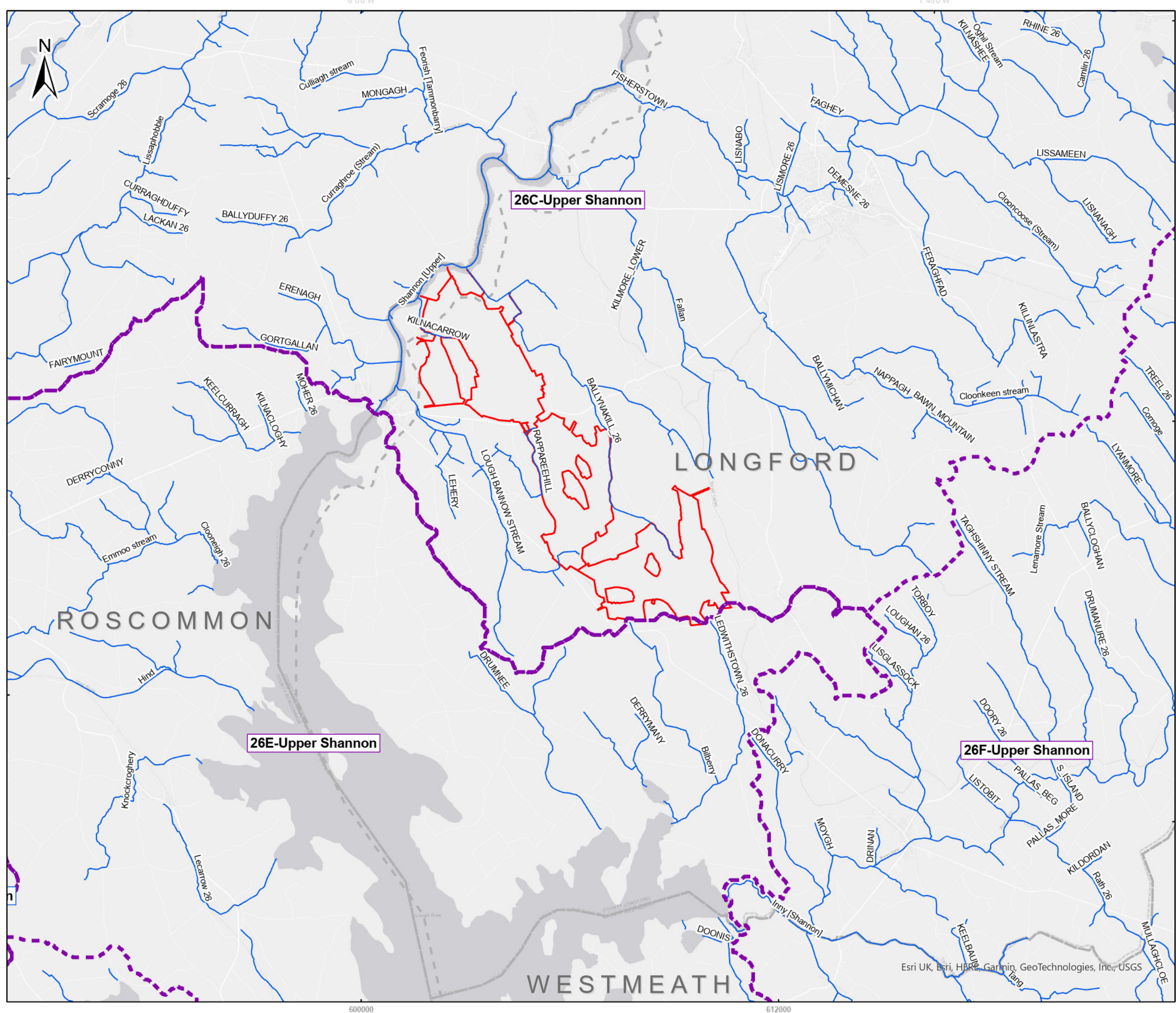
Catchment (Catchment ID)	River Network EPA Name (Segment Code)	River Waterbody WFD Risk 2010-2015	River Waterbody WFD Status 2013-2018	River Waterbody WFD Status 2016 - 2021	River Waterbody WFD Risk 2016-2021
Upper Shannon (26C)	Fallan 020 IE_SH_26S021530 Fallan 020 (26_2725)	Moderate	Moderate	Good	At risk
Upper Shannon (26C)	Shannon (upper)_100 (IE_SH_26S021600) Kilnacarrow (26_1494)	Poor	Poor	Poor	At risk
	Ballynakill_010 (IE_SH_26B220790) Ballynakill_26 (26_3102) Ballynakill_26 (26_625) Ballynakill_26(26_3574)	Unassigned	Good	Moderate	Under review
	Lough Bannow Stream_010 (IE_SH_26L120100) Lough Bannow Stream (26_1469) Rappareehill (26_3871) Derrygeel (26_593)	Unassigned	Good	Moderate	Under review

Catchment (Catchment ID)	River Network EPA Name (Segment Code)	River Waterbody WFD Risk 2010-2015	River Waterbody WFD Status 2013-2018	River Waterbody WFD Status 2016 - 2021	River Waterbody WFD Risk 2016-2021
	Ledwithstown (26_3735) Ledwithstown_010 (IE_SH_26L840850)	Unassigned	Good	Moderate	Under review

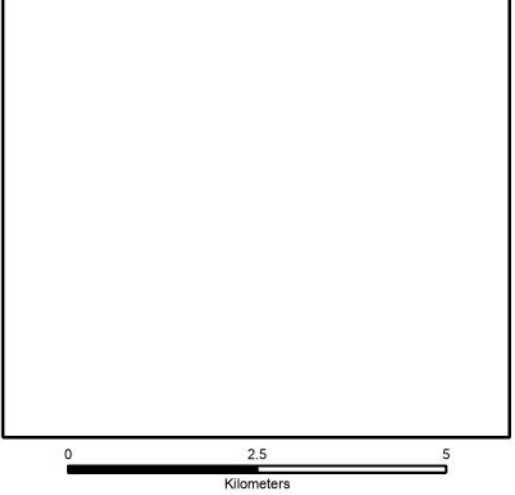
The Application Site consists of three river basins: the Ballynakill 010 and Lough Bannow 010 flow towards the northwest, the Ledwithstown flows to the south and southeast. The regional natural surface water drainage pattern, in the environs of the Application Site is shown in Figure 2.3.

Figure 2-3 depicts Surface Water Features/Local Catchment Delineation in relation to site area which includes a significant number of unnamed streams although EPA reference names have been applied for identification purposes. The Application Site is not located in a delineated area for action as set out in the 2018-2021 National River Basin Management Plan. Each of the streams flowing through or adjacent to the site has its own sub-catchment area. The delineation of these catchment boundaries is shown on Figure 2-3.






- Legend**
- Application Site
 - Catchments
 - Rivers
 - County Boundaries



Client:				
Bord na Móna				
Project:				
Derryadd, Derryaroge and Lough Bannow Bogs - Application for Substitute Consent				
Title:				
Figure 2-3 Regional Catchment Delineation				
Scale @ A3:		1:100,000		
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Map Ref:

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Draft:

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2.1.2 Groundwater Bodies

The groundwater body (GWB) is the groundwater management unit under the WFD. Groundwater bodies are subdivisions of large geographical areas of aquifers so that they can be effectively managed in order to protect the groundwater and linked surface waters⁶. The GWB is defined as a distinct volume of groundwater, including recharge and discharge areas with little flow across the boundaries.

The Application Site is underlain by The Funshinagh GWB, The Inny GWB and The Longford Balinalee GWB. The groundwater body descriptions are available from the GSI website⁷ and the 'status' is obtained from the EPA website⁸. The GWBs underlying the Application Site are classified as being at 'Good' status. The GWBs underlying the Application Site are classified as being at 'Good' status as shown on Table 2-6.

The Funshinagh WFD GWB is comprised of primarily of high transmissivity karstified limestone. The Inny and Longford Balinalee GWB is comprised of low transmissivity and storativity rocks, described as Poorly Productive bedrock.

Table 2-6: Summary of groundwater bodies

EU_CD Code	Name	Description	GWB status (2010-2015)	GWB status (2013-2018)	GWB status (2016-2021)
IE_SH_G_091	Funshinagh	Karstic	Good	Good	Good
IE_SH_G_110	Inny	Poorly Productive Bedrock	Good	Good	Good
IE_SH_G_149	Longford Ballinalee	Poorly Productive Bedrock	Good	Good	Good

Groundwater is often used as a source of drinking water supply. According to Longford County Council and Irish Water, there are two groundwater schemes used as part of the Lanesborough public water scheme (PWS).

Lisrevagh borehole, is located 7.3 km to the east of the rEIAR Application Site and abstracts groundwater for use in the Lanesborough public water supply scheme. The Lanesborough ESB borehole, which is located 2.5 km to the west of Derryaroge, abstracts groundwater at Lanesborough RWS. Zones of Contribution (ZOCs) were delineated for the EPA in 2011. The ZOC of a groundwater source is effectively a groundwater catchment. They are influenced by the hydrogeology of a given area, and are determined from the consideration of:

- The total outflow at the source;
- The recharge to the associated groundwater flow system;
- Groundwater flow directions and gradients; and
- Subsoil and bedrock permeabilities.

⁶⁶ <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx>

⁷ <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx>

⁸ <https://gis.epa.ie/EPAMaps/Water>

Part of Derryaroge Bog is located within the Lanesborough Public Water Supply ZOCs. These abstraction points and zones of contribution are included in Appendix 9.2 of the rEIAR.

The groundwater in the Application Site is assessed as being of Good quantitative and chemical status. This is expected to continue. The bedrock is generally overlain by deep soil and peat deposits. No significant dissolution features (i.e., karst) were observed from visual appraisal of the Application Site and no karst features are recorded within the GSI Karst Database of Ireland within the rEIAR Application Site boundary. A Karst Plateau is located further to the east of the Application Site.

2.1.3 Lake Water Bodies

The hydrological pathway from the Application Site includes one WFD lake water body – the Ree (IE_SH_26_750a). It is a large surface water body (i.e. more than 100km²). All streams from the site eventually discharge into Lough Ree as bodies described in **Section 2.1.1**.

Lough Ree lake water body has maintained a regular *Good* WFD water quality status throughout all WFD monitoring periods since the 2013-2018 period, achieving the WFD water quality objectives. The lake was at good chemistry status in 2010-2015 however it was moderate overall status due to the presence of invasive species.

There are no Register of Protected Areas (RPA) nutrient sensitive lakes and estuaries in hydrological/hydrogeological connection with the Application Site and there are no RPA shellfish/pearl mussel areas within the Application Site.

Table 2-7: Summary of Lake Status (<https://www.catchment.ie>)

Waterbody Code	Name	2007-2009	2010-2012	2010-2015	2013-2018	2016-2021
IE_SH_26_750a	Ree	Moderate	Moderate	Moderate	Good	Good

2.1.4 Transitional and Coastal Waters

Transitional and coastal waters are not considered by this WFD Compliance Assessment, having been assessed and scoped out from further assessment as outlined in Section 1.1.1. The scoping exercise has identified those river waterbodies that are present within a 2km buffer zone of the Application Site.

2.2 SCOPING AND ASSESSMENT RESULTS

The WFD requires that activities are also in compliance with other relevant legislation, as considered below. The following are looked at as part of the assessment (as mentioned above, in line with guidance a 2km buffer zone was applied in this assessment):

2.2.1 Protected areas.

Nutrient sensitive areas comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Wastewater Treatment Directive (UWWTD)(91/271/EEC).

- There are no shellfish waters within 2km of the Application Site;

- There are no bathing water sites within 2km of the Application Site;
- There are no nutrient sensitive sites within 2km of the Application Site; and
- There are a number of SPAs or SACs within 2km of the Application Site.

2.2.1.1 Natura Designations

These are areas previously designated for the protection of habitats or species where maintaining or improving the status of water is important for their protection. They comprise the aquatic part of Natura 2000 sites – Special Protection Areas (SPAs) designated under the Birds Directive (79/409/EEC) and Special Areas of Conservation (SACs) designated under the Habitats Directive (92/43/EEC).

Table 2-8: National Sites within the 5km Initial Zol from Application Site

Site Name [Code]	Distance from Application Site (km)	Hydrological connectivity with the application site
Lough Bawn pNHA [0001819]	0.0	Yes (located on site boundary)
Royal Canal pNHA [0002103]	0.1	No
Lough Bannow pNHA [0000449]	0.1	Yes -located downgradient of Lough Bannow Stream
Lough Ree pNHA [0000440]	0.9	Yes
Derry Lough pNHA [0001444]	2.6	Yes, located downgradient of Bilberry stream
Cordara Turlough pNHA [0001821]	2.8	No
Mount Jessop Bog NHA [0001450]	3.4	No
Forthill Bog NHA [0001448]	3.8	No
Fortwilliam Turlough pNHA [0000448]	4.0	No
Lough Forbes Complex pNHA [0001818]	4.4	No

2.2.2 Hydromorphology

This section provides a summary of the known existing hydromorphology risk issues for the fluvial water bodies. A summary is provided in Table 2-9 below.

Table 2-9: Hydromorphological Assessment

Assessment Questions	Lake Water Body – Lough Ree –	Ballynakill_100	Lough Bannow_010 and 020	Ledwichtown_100
WFD code	IE_SH_26_750 a	IE_SH_26B22079 0	IE_SH_26L12010 0	IE_SH_26L84085 0
Consider if your activity could impact on the hydromorphology (morphology or water flow of a water body at high status?	No. No changes to Lough Ree Status.	No. RWB is not at High Status.	RWB at high status – no alteration to river.	RWB at high status – no alteration to river.
Consider if your activity could significantly impact the hydromorphology of any water body?	No. Surface water drainage flow and volume will not significantly change to Lough Ree Status.	No. Surface water drainage flow and volume will not significantly change.	No. Surface water drainage flow and volume will not significantly change.	No. Surface water drainage flow and volume will not significantly change.
Consider if your activity is in a water body that is heavily modified for the same use as your activity?	No. Not a heavily modified water body.	No. Not a heavily modified water body.	No. Not a heavily modified water body.	No. Not a heavily modified water body.

3. STAGE 3: WFD COMPLIANCE ASSESSMENT (ASSESSING THE EFFECT OF PREVIOUS ACTIVITIES)

3.1 ASSESSMENT OF APPLICATION SITE AGAINST PROGRAMME OF MEASURES

Within the RBMP, there is a list of measures, or environmental improvements, which have been identified by the RBMP, to meet the target date set by the Water Framework Directive. Part of the WFD Compliance Assessment is to consider measures and assess whether an Application Site can contribute to them or might obstruct any of them from being delivered. Measure outlined in the Rehabilitation plans align with the Programme of Measures. A number of specific measures are outlined in the RBMP 2016-2021 and the WAP 2024⁹ including:

Peat 4: Bord na Móna to oversee the EU LIFE Integrated Project “Peatlands and People”.

Peat 7: Continuation of the Bord na Móna operated Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) to H2 2026.

These measure will be implemented in accordance with the Water Action Plan (WAP) 2024 – A River Basin Management Plan for Ireland . Peat extraction ceased at the Application Site in July 2019.

The WFD Compliance Assessment follows the structure of Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR in so far as the three main phases (Peat Extraction Phase (1988 – July 2019), Current Phase (July 2019-present) and Remedial Phase (future) of the Application Site considered separately in the first instance. The potential for cumulative impacts on a water body as a result of multiple elements of the Application Site potentially impacting upon them is considered in Step 3 of the assessment – see section 4.

3.2 PEAT EXTRACTION ACTIVITIES (PRE-2003)

The Application Site has been subject to drainage and peat extraction activities since 1949. The WFD was not enacted until 54 years later i.e. 2003. The greatest hydrological and hydrogeological changes associated with peat extraction occur during the initial drainage of the bog in advance of peat extraction.

The drainage ditches were installed in the upper surface of the bog and resulted in a lowering of the local peat water table. After the Application Site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains.

The timing of drainage and initiation of peat extraction varies across the Application Site. Derryaroge Bog was first drained in 1949, with peat extraction commencing in 1952. Site preparation and drainage works commenced at Derryadd and Lough Bannow bogs in 1960, with peat extraction commencing in 1964. Between the 1940s and 1960s, ancillary features were also constructed including railway lines, machine passes, canteens, Mountdillon Works, welfare facilities, and fixed fuel tanks.

Prior to 2000, peat extraction activities were not subject to IPC Licence controls. However, management of silt in discharges was always implemented, and this became formalised in the 1970s with the setting up of the silt committees within Bord na Móna, resulting in the

⁹ Water Action Plan (WAP) 2024 – A River Basin Management Plan for Ireland

installation of silt ponds at the Application Site from the 1970s to trap and reduce the emission of suspended solids to surface water bodies originating from activities associated with peat extraction, such as suspended peat particles generated from the extraction fields and collected in the bog drainage network as well as run-off from workshop areas.

Due to the nature of peat extraction activities being near surface activities, impacts on groundwater are generally low. The primary risks to groundwater at the Application Site was from hydrocarbon (fuel) spillage and leakages, on the bog or at the production centres/workshop areas which infiltrated to groundwater. The primary risk to surface waters will be entrained suspended sediments (peat and soil particles) in site runoff during peat extraction works along with potential hydrocarbons spillage and leaks.

There is no requirement to assess the peat extraction activities at the Application with respect to the WFD which pre-date 2003 (i.e. the date of the required transposition of the WFD Directive into Irish Law).

However, for completeness and in order to describe the baseline environment we provide a brief discussion on the potential impacts of peat extraction on water quality and water quantity and present the available water quality data for this period.

3.2.1 Biological Quality Elements

As the 1st WFD cycle was completed in 2010-2015, no WFD status reports exist for this period. However, as outlined in Section 2.1.1, the EPA have been completing ecological monitoring on these waterbodies since the 1970s. Historic Q-values were recorded on the River Shannon 1km downgradient of Lanesborough Power Station and upgradient at Tarmonbarry village as shown in the EPA monitoring data¹⁰**Error! Reference source not found..** Water quality in the Fallan River had an overall steady trend from 1984 to 2002 with Q-values of Q3-Q4 'Moderate status' with two recordings of Q4 values 'Good status' occurring in 1984 and 2002. Historic Q-values on the River Shannon found had no recorded data until 1999, where a Q3 value was recorded indicating 'poor' water quality status. The Shannon has remained at Q3 since 1999. No Q-values were available on the Ledwithstown, Ballynakill River or Lough Bannow Stream.

Table 3-1 Historic Q-values during peat extraction phase

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Lanesboro	Br
River	Fallan	Fallan	Shannon	Shannon	
Station Code	RS26F0100040	RS26F010200	RS26S021530	RS26S021600	
1984	ND ¹¹	Q4	ND	ND	
1992	ND	Q3-4	3	ND	

¹⁰ <https://epawebapp.epa.ie/qvalue/webusers/>

¹¹ ND=No Data

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Lanesboro	Br
1996	Q3-4	Q3-4	3-4	ND	
1999	Q3-4	Q3-4	3-4	Q3	
2002	Q4	ND	3-4	Q3	

3.2.2 Chemical and Physico-chemical Quality

Potential impacts on water quality are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures. Limited data are available on water quality pre-2003.

No significant impacts on water bodies are considered likely or evident in the monitoring records. The impact has been classed as imperceptible differences in water quality concentrations and within the normal bounds of variation of laboratory analysis results from coincident physical samples. No significant changes were identified pre-2003.

The impacts predicted for in terms of levels and water quality mean that any impacts on inputting water bodies would also be slight in terms of emissions of dissolved organic carbon (DOC), ammonium, and suspended solids.

3.2.3 Hydromorphological Quality

Potential impacts on hydromorphology are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR.

The operation of the Application Site (pre-2003) is not considered likely to have any significant detrimental impact on hydromorphological quality elements.

3.2.3.1 Surface Water Quantity/Quality

Active raised bogs can store water and provide storage of water after rainfall events. With the implementation of bog drainage, the water levels in the Application Site were lowered and the capacity of the bog to store water was temporarily reduced. The available water storage within the bogs would have provided a small buffer for downstream flooding. Following drainage, surface runoff rates from the Application Site would have increased slightly causing downstream rivers and streams to become flashier (i.e. faster and higher flood peaks). However, drainage from the bogs is regulated by the shallow (low gradient) nature of the drainage, and by routing all bog drainage via field drains, main drains, headland drains, pumps (if required), then from silt ponds to outfalls, with final discharge to natural watercourses. The bog drainage network likely alters flow volumes entering downstream surface waterbodies due to the increased connectivity of drains to the river network.

In terms of surface water quality, the potential negative impact on surface water quality would be the increase in suspended solid entrainment in surface waterbodies. During

the Peat Extraction Phase, there was an ongoing risk of elevated concentrations of suspended solids making their way into downstream surface watercourses from the erosion and transport of peat sediment via the bog drainage network. This potential pathway would have posed a risk to local surface water quality. The largest potential negative water quality effect would have occurred in those surface waterbodies directly downstream of the Application Site.

Accidental spillage during refuelling of machinery with petroleum hydrocarbons is a potential pollution risk to groundwater and surface water quality. Small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbons can affect flora and aquatic life.

Discharges from wastewater systems (septic tanks) at office buildings, and at welfare facilities and workshops could potentially have caused surface water contamination.

Activities and features associated with peat extraction include railway lines, machine passes, canteen structures, work sites, mobile fuel tanks, fixed fuel tanks.

3.2.3.2 Groundwater bodies

There is no groundwater body status available for the period pre-2003. Due to the local hydrogeological regime and the isolation of the perched water table in the peat from the underlying regional groundwater table, it is considered that that the no change in the status of the three GWB would have occurred during the Peat Extraction Phase.

3.3 PEAT EXTRACTION PHASE (2003 – JULY 2019)

This phase includes all peat extraction activities from the date of the required transposition of the WFD into Irish Law in 2003 to the formal cessation of peat extraction activities in the July 2019. During this time period the peat extraction activities at the Application Site were completed under the conditions set out in IPC Licence (Reg. no. P0504-01). This IPC Licence came into effect in May 2000 and upgraded and enhanced several pre-existing environmental monitoring and control measures which had been implemented at the Application Site since and pre-1988 (refer to Section 4.7.6 of rEIAR Chapter 4 for a complete description of the measures). These pre-IPC measures largely included the incorporation of silt ponds into the bog drainage system to minimise the concentrations of suspended solids entering local watercourses.

The EPA has undertaken Technical Amendments of the IPC Licence for the purpose of aligning the conditions of the IPC Licence to the objectives of national and European environmental protection legislation enacted over the lifetime of the IPC Licence. The IPC Licence was subject to a Technical Amendment for the purpose of the European Communities Environmental Objectives (Surface Water) Regulations, 2009 and it now contains an objective to 'maintain' or 'restore' the water surface water quality to the defined 'Good Status'. With the implementation of conditions listed in the IPC Licence, the potential environmental effects of peat extraction activities and all ancillary works on water quality (such as the release of elevated concentrations of suspended sediments, and by association on aquatic ecosystems and protected species), have and continue to reduce through the implementation of IPC Licence conditions. Therefore, throughout this phase peat extraction activities have been operating under strict conditions designed to protect downstream water quality and quantity.

The first WFD cycle was completed in 2010-2015. Not all WFD status for surface waters exists for the first half of this period. However, EPA Q-values are available from 2000 to 2019 on the River Shannon 1km downgradient of Lanesborough Power Station and upgradient at Tarmonbarry village as shown in Table 3-2. The data show relatively stable Q-values during this period with the majority of watercourses fluctuating between Q3-Q4 – ‘Moderate’ status and Q4 ‘Good’ status. These Q-values indicate a similar trend in Q-values to those in the pre-2003 period, therefore variation in Q-values is likely indicative of land use changes and the prevailing climatic conditions in the Upper Shannon Catchment rather than any specific peat extraction related activities within the Application Site. The overall peat extraction area would have gradually decreased during the 2003-2019 period. Consequently, changes in water quality during this period cannot be attributed solely to peat extraction activities, which were being scaled back during this period.

Table 3-2 Summary of Historic Q-values during mitigated peat extraction period

Location	W of Curry Bridge	Br S of Kilmore Upper	1km downstream of Tarmonbarry	Ballyleague Br Lanesboro
River	Fallan	Fallan	Shannon	Shannon
Station Code	RS26F0100040	RS26F010200	RS26S021530	RS26S021600
2005	Q3-Q4	Q3-Q4	ND	Q3
2008	Q3-Q4	Q4	Q3-Q4	ND
2011	Q3-Q4	Q4	Q4	Q3-Q4
2014	Q3-Q4	Q4	Q3-Q4	Q3
2017	Q3-Q4	Q4	Q3	ND

Between 2003-2019 the Application Site operated in accordance with IPC Licence conditions which put in place a series of control measures designed for the protection of surface water quality in the vicinity and downstream of the Application Site. These measures included:

- All process water from the peat extraction areas is to be treated via an appropriately designed silt pond treatment system which has been inspected and maintained in accordance with Condition 6 of the IPC Licence. Treated process wastewater is discharged into nearby surface watercourses, with quarterly grab sampling completed on a select number of discharge outlets;

- Stormwater derived on-site is released into a local waterbody following basic treatment.
- Where run-off is from a rooftop only, it is directed to a drain. Runoff from other areas such as carparks is passed through hydrocarbon interceptor prior to release.

Bord na Móna have been conducting monitoring of emissions to water from the Application Site with the results summarised in Table 3-3 below.

Table 3-3 Bord na Móna Water Quality Monitoring (2010-2019)

Parameter	IPC Licence Limit	No. samples	No. Exceedances	% Compliant
COD (mg/l)	100	77	1	>95%
pH	6 – 9	76	1	>95%
Ammonia (mg/l)	1.42	77	3	>95%
Total Phosphorous (mg/l)	Not applicable	77	Not applicable	Not applicable
Suspended Solids (mg/l)	35	77	0	100

3.3.1 Biological Quality Elements

Potential impacts on biological quality elements are assessed in Chapter 7 (Biodiversity) of the rEIAR. A summary is provided here and includes the likely residual effects following implementation of mitigation and control measures. Formal silt control measures were adopted in 1974. By 1988 drainage channels, silt ponds, outfalls and pumps were extant at the Application Site. Appendix 4.19 of the EIAR contains the Planning Drawing Pack which shows the detailed drainage across the Application Site. Control measures for silt were incorporated into the IPC Licence, granted in 2000. Mountdillon Bog Group EPA IPC Licence (Reg. No. P0504-01) is included in Appendix 4.1 of the rEIAR.

Review of the available WFD reports show that the downstream surface water bodies achieved varied from good to poor status during the Peat Extraction Phase (2003-2019). Whilst several waterbodies experienced a deterioration in WFD status this is unlikely to be related to peat extraction activities as peat extraction areas decreased during this time period.

The Application Site was operating in accordance with IPC Licence requirements during this period. It is likely that the changes in WFD status mainly relate to changes in EPA modelling and assessment. Lough Ree status changed from Moderate to Good Status in 2013 and has maintained Good status to the most recent monitoring in 2003.

The Peat Extraction Phase would have had a negligible concern to the distribution and abundance of suitable aquatic habitats since 2003. No indirect impacts on habitats or protected species are likely as a result of peat extraction and ancillary activities at the Application Site.

3.3.2 Chemical and Physico-chemical Quality

Potential impacts on water quality are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR.

Peat extraction activities could potentially have resulted in an increase in the suspended sediment load and affected the water quality in adjacent streams. No significant impacts on water bodies are evident in the monitoring records. The Application Site operated in accordance with IPC licence conditions which put in place a series of control measures designed for the protection of surface water quality in the vicinity and downstream of the Application Site.

The impact has been classed as slight differences in water quality concentrations and within the normal bounds of variation of laboratory analysis results from coincident physical samples. No significant changes were identified between 2008 and present.

The impacts predicted for in terms of levels and water quality mean that any impacts on inputting water bodies would also be slight in terms of ammonium and silt and negligible or slight positive in terms of ortho-phosphate.

3.3.3 Hydromorphological Quality

Potential impacts on hydromorphology are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR. There were no significant alterations to hydromorphology since 2003.

Activities at the Application Site are not considered likely to have any significant detrimental impact on hydromorphological quality elements.

3.3.4 Protected Areas

The impacts on surface water levels and flows would be indistinguishable from 2003 baseline conditions, and would meet the WFD requirements under existing and future climate conditions. As a result, it is not considered likely that the Application Site would have resulted in any deleterious impacts on the qualifying features of these protected areas.

3.3.5 Groundwater Bodies

Due to the local hydrogeological regime and limited connectivity with the bedrock aquifer, we consider that that the no change in the status of the three GWB would have occurred during the Peat Extraction Phase.

3.3.6 Compliance Assessment Summary

The site-specific impacts of the Peat Extraction Phase at the Application Site on the biological, physico-chemical and hydromorphological quality elements of the water bodies are shown in the assessment above and summarised in Table 3-4.

Table 3-4: WFD: Assessment Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Surface water drainage flow and volume was not significantly changed as a result of peat extraction activities at the Application Site. The streams in all cases are channelised since the 1960s/1970s. Peat extraction activities at the Application Site did not significantly change the current level of surface water or groundwater volume or flow.
Biology: habitats and fish	No	The footprint of the Application Site primarily comprises cutover bog. There are no significant direct or indirect impacts on SACs/SPAs/NHAs/pNHAs or Annex Habitats. The risks to the receptors are from sediment <i>loading</i> to adjacent streams. <i>There are no significant changes since 2003 that would affect fish.</i>
Water quality	Yes	In absence of mitigation, long-term, activities at the Application Site would have resulted in increased levels of sediment and ammonium. Bogs not in agricultural use have low to very low ortho-Phosphate loading. Mitigation measures are detailed in the IPC Licence.
Protected areas	No	The Application Site is proximate to a number of SACs/SPAs/NHAs and pNHAs. An IPC Licence was implemented 2000 in accordance with the EPA 1992 Act, as amended. No extraction works occurred in SACs/SPAs. Activities at the Application Site did not significantly change the current level of surface water or groundwater volume or flow.

3.4 CURRENT PHASE

This phase includes the cessation of peat extraction at the Application Site in July 2019 to present day. During this phase, the Application Site has and will continue to operate under the conditions set out in IPC Licence (Reg. No. P0504-01). Therefore, throughout this phase activities will operate under strict conditions designed to protect downstream water quality and quantity.

Environmental monitoring, drainage and silt maintenance has continued during this phase in accordance with IPC licence conditions.

As part of the decommissioning of peat extraction activities at the Application Site, activities have been limited and included the removal of stockpiled peat. The last stockpiled peat was removed from the Application Site in 2022.

During the current phase, silt ponds are maintained and silt removed on a regular basis as required. The measures outlined in the draft Cutaway Bog Decommissioning and Rehabilitation Plans will be agreed with the EPA. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. The Bord na Móna bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats have started to develop, such as poor fen, heath, wetlands/reedbeds and birch woodland on shallower peat. In time areas of *Sphagnum* rich embryonic bog communities (on deeper peat) and areas or naturalised peatland can be developed.

The National River Basin Management Plan (NRBMP) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). Peatland rehabilitation of Bord na Móna cutaway was part of the WFD (2018-2021) programme of measures. The NRBMP 2018-2021 took account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 and will look to implement best-available measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2018-2021 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Peatland Climate Action Scheme (PCAS).

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures, which is in addition to the IPC licence requirements and site-specific measures are being applied at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures. PCAS measures to rewet peat including intensive and targeted drain blocking have commenced at the Application site (refer to Section 4.7.2 of the remedial EIAR for further details in relation to PCAS) during this phase.

The site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna is expected to have a positive impact on water quality and will help the NRBMP 2018-2021 and Water Action Plan 2024 deliver its objectives in relation to the Water Framework Directive and is one of the five key actions. Restoration works will result in improvements in water quality, depending on site-specific factors. While research is limited on the long-term restoration of peatlands, ammonium and DOC concentrations are likely to be reduced over time. Based on a number of international studies, ammonium concentrations at rehabilitated peatlands are

typically higher than intact raised bogs. The majority of measures will be implemented during the initial stages of the decommissioning and rehabilitation work. Once drain blocking and other measures have been implemented the operational activities will comprise maintenance and repair works if/as those works are deemed necessary to comply with the EPA conditions and implement the plan. In addition, ecological surveys and hydrological/hydrogeological monitoring will be undertaken.

3.4.1 Biological Quality Elements

No significant direct or indirect impacts on habitats or protected species are likely as a result of the Application Site. Potential impacts on biological quality elements are assessed in Chapter 7 (Biodiversity) of the rEIAR.

Peat extraction ceased in 2019. Formal silt control measures will remain in place in accordance with the IPC Licence until such a time as the IPC Licence is surrendered.

With the cessation of peat extraction, there is lower potential for disturbance of peat and therefore a lower likelihood of elevated concentrations of suspended sediments entering surface watercourses. During this period the site drainage operates under the same drainage systems as during the Peat Extraction Phase i.e. a hierarchy of field drains, main drains, silt ponds and discharge outlets). The expansion of wetland habitats on the site will further improve and filter surface water on the Application Site. The discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase.

The current phase would have had a slight positive effect on water quality.

3.4.2 Chemical and Physico-chemical Quality Elements

Potential impacts on water quality are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR.

The impacts predicted for in terms of levels and water quality mean that any impacts on inputting water bodies would also be slight in terms of ammonium and silt and negligible or slight positive in terms of ortho-phosphate.

Discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase. Flow rates in internal drains will decrease as the sides of the drain are changed from bare peat to vegetation due to increased surface friction. The vegetated area also increase filtration of water, oxygenates the water and absorbs nutrients such as nitrogen and phosphorus.

No additional control measures are deemed necessary as the conditions and emission limit values associated with the IPC Licence are in accordance with the relevant legislation to ensure ongoing protection of groundwaters and surface waters.

Overall, studies show long-term decreases in inorganic nitrogen, phosphorus, base cations, suspended solids and DOC, as well as increasing biodiversity and carbon sequestration potential (Holden et al, 2004, Klove et al 2010 and Renou-Wilson et al.,2018). International studies have shown a reduction of pollutants, including nitrate and ammonia, following

rewetting compared to drained and degraded peatlands, albeit some rewetted bogs may still have higher concentrations of ammonium compared to intact natural bogs.

3.4.3 Hydromorphological Quality Elements

Potential impacts on hydromorphology are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR. There are no significant proposed alterations to the hydromorphology. Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with Bord na Mona reporting to the EPA until such a time as the IPC Licence is surrendered. The existing drainage systems which have proven effective will continue to operate during this period. The operation, monitoring, and maintenance of silt ponds will continue in line with IPC Licence requirements to prevent silt run-off from the Application Site.

With the cessation of peat extraction, there is less potential for disturbance of peat and therefore a lower likelihood of elevated concentrations of suspended sediments entering surface watercourses. During this period the site drainage still operates under the same drainage systems as during the Peat Extraction Phase i.e. field drains, main drains, silt ponds and discharge outlets etc. Therefore, discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase.

The current phase at the Application Site is not considered likely to have any significant impact on hydromorphological quality elements.

3.4.4 Protected Areas

The impacts on levels and flows would be similar to the Peat Extraction Phase conditions. As a result, it is not considered likely that the Application Site would have resulted in any significant impacts on the qualifying features of these protected areas.

The Application Site cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats have started to develop, such as poor fen, heath, wetlands/reedbeds and birch woodland on shallower peat. In time areas of *Sphagnum* rich embryonic bog communities (on deeper peat) and areas of naturalised peatland can be developed.

With the implementation of the measures and requirements of the IPC Licence at the Application Site during this period, the decommissioning and rehabilitation works will have no potential to cause a deterioration in the status of downstream surface water bodies and/or jeopardise their attainment of good surface water or lake status. The long-term impacts of the rehabilitation plans may lead to an improvement in the status of those waterbodies directly downstream of the Application Site, however this is dependent on several site-specific factors. The main improvement required in the surface water bodies is improving channel morphology.

3.4.5 Groundwater Bodies

Due to the local hydrogeological regime and limited connectivity with the bedrock aquifer, it is considered that there is no change in the status of the three GWB during the Current Phase.

3.4.6 Compliance Assessment Summary

The site-specific impacts of the Current Phase at the Application Site on the biological, physico-chemical and hydromorphological quality elements of the water bodies are shown in the assessment above and summarised in Table 3-5.

Table 3-5: WFD: Assessment Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Surface water drainage flow and volume has and will not significantly change during the Current Phase at Application Site. The boundary streams in all cases are channelised since the 1960s/1970s. The Current Phase has and will not significantly change the current level of surface water or groundwater volume or flow.
Biology: habitats and fish	Yes	The footprint of the Application Site primarily comprises cutover bog. There are no significant direct or indirect impacts on SACs/SPAs or Annex Habitats. The risks to the receptors are from sediment loading to adjacent streams. There has and will be no significant changes that would affect fish.
Water quality	Yes	Medium term, the Application Site would have increased sediment and ammonium. Peat extraction areas have a low to very low ortho-Phosphate loading. Mitigation measures are detailed in the EPA Licence.
Protected areas	No	The Application Site is adjacent to a number of SACs and SPAs. An IPC Licence was implemented in accordance with the EPA 1992 Act, as amended. No peat extraction works have or will occur in SACs/SPAs. The Current Phase of the Application Site has and will not significantly change the current level of surface water or groundwater volume or flow.

3.5 REMEDIAL PHASE

This phase includes the future rehabilitation and PCAS implementation. During this phase, the Application Site will continue to operate under the conditions set out in IPC Licence (Reg. No. P0504-01). Therefore, throughout this phase activities will operate under strict conditions designed to protect downstream water quality and quantity.

Environmental monitoring, drainage and silt maintenance will continue during this phase in accordance with IPC licence conditions.

During the Remedial Phase, silt ponds will be maintained and silt removed on a regular basis as required. The measures outlined in the draft Cutaway Bog Decommissioning and Rehabilitation Plans will be agreed with the EPA. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. The Bord na Móna bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified.

However other natural habitats have started to develop, such as poor fen, heath, wetlands/reedbeds and birch woodland on shallower peat. In time, areas of *Sphagnum* rich embryonic bog communities (on deeper peat) and areas of naturalised peatland can be developed.

The Peatland Climate Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures, which is in addition to the IPC licence requirements and site-specific measures are being applied and will continue to be at specific locations across the Bord na Móna landbank that are identified as suitable for the prescribed enhancement measures. PCAS measures to rewet peat including intensive and targeted drain blocking have commenced at the Application site (refer to Section 4.7.2 of the rEIAR for further details in relation to PCAS) during this phase.

The site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna is expected to have a positive impact on water quality and will help the WAP (2024) deliver its objectives in relation to the Water Framework Directive and is one of the five key actions. Restoration works will result in improvements in water quality, depending on site-specific factors. While research is limited on the long-term restoration of peatlands, ammonium and DOC concentrations are likely to be reduced over time. Based on a number of international studies, ammonium concentrations at rehabilitated peatlands are typically higher than intact raised bogs. The majority of measures will be implemented during the initial stages of the decommissioning and rehabilitation work. Once drain blocking and other measures have been implemented the operational activities will comprise maintenance and repair works if/as those works are deemed necessary to comply with the EPA conditions and implement the plan. In addition, ecological surveys and hydrological/hydrogeological monitoring will be undertaken.

3.5.1 Biological Quality Elements

No significant direct or indirect impacts on habitats or protected species are likely as a result of the Remedial Phase. Potential impacts on biological quality elements are assessed in Chapter 7 (Biodiversity) of the rEIAR.

No future peat extraction is proposed. Formal silt control measures will remain in place in accordance with the IPC Licence until such a time as the IPC Licence is surrendered.

During this period the site drainage will operate under the same drainage systems as during the Peat Extraction Phase i.e. a hierarchy of field drains, main drains, silt ponds and discharge outlets. The continued expansion of wetland habitats on the site will further improve and filter surface water on the Application Site. The discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase.

The Remedial Phase would have had a slight positive impact on water quality.

3.5.2 Chemical and Physico-chemical Quality Elements

No additional control measures are deemed necessary as the conditions and emission limits set out in the IPC Licence are designed in accordance with the relevant legislation to ensure ongoing protection of groundwaters and surface waters.

Potential impacts on water quality are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR.

The impacts predicted for in terms of levels and water quality mean that any impacts on inputting water bodies will be slight in terms of ammonium and silt and negligible or slight positive in terms of ortho-phosphate. Flow rates in internal drains will decrease when the sides of the drain are changed from bare peat to vegetation due to increased surface friction. The vegetated area also increase filtration of water, oxygenates the water and absorbs nutrients such as nitrogen and phosphorus. The exact impact will depend on factors like the vegetation type, the density of the vegetation, and the overall maintenance of the drain.

Discharge volumes from the Application Site to nearby surface watercourses will be comparable to, if slightly lower than the surface water discharges during the peat extraction phase. No additional control measures are deemed necessary as the conditions and emission limit values associated with the IPC Licence are in accordance with the relevant legislation to ensure ongoing protection of groundwaters and surface waters.

Overall, studies show long-term decreases in inorganic nitrogen, phosphorus, base cations, suspended solids and DOC, as well as increasing biodiversity and carbon sequestration potential (Holden et al, 2004, Klove et al 2010 and Renou-Wilson et al., 2018). Studies show that peatland rehabilitation, particularly through rewetting and drain blocking, leads to a decrease in ammonium concentrations. This is primarily due to the suppression of aerobic decomposition, reduced mineralization, and increased denitrification and vegetation uptake.

Rewetting peatlands results in improvements in water quality, although depending on site-specific factors, there may be temporal variations in concentrations. International studies have shown a reduction of pollutants, including nitrate and ammonia, following rewetting compared to drained and degraded peatlands, albeit some rewetted bogs may still have higher concentrations of ammonium compared to intact natural bogs.

3.5.3 Hydromorphological Quality Elements

Potential impacts on hydromorphology are assessed in Chapter 9 (Hydrology, Hydrogeology and Water Quality) of the rEIAR. There are no significant proposed alterations to the hydromorphology. Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with Bord na Mona reporting to the EPA until such a time as the IPC Licence is surrendered. The existing drainage systems which have proven effective will continue to operate during this period. The operation, monitoring, and maintenance of silt ponds will continue in line with IPC Licence requirements to prevent silt run-off from the Application Site.

With the cessation of peat extraction, there is less potential for disturbance of peat and therefore a lower likelihood of elevated concentrations of suspended sediments entering surface watercourses. During this period the site drainage still operates under the same drainage systems as during the Peat Extraction Phase i.e. field drains, main drains, silt ponds and discharge outlets etc. Therefore, discharge volumes from the Application Site to nearby surface watercourses will be comparable to surface water discharges during the Peat Extraction Phase.

The Remedial Phase at the Application Site is not considered likely to have any significant impact on hydromorphological quality elements.

3.5.4 Protected Areas

The impacts on levels and flows would be indistinguishable from the Peat Extraction Phase conditions; and would meet the WFD requirements under existing and future climate conditions. As a result, it is not considered likely that the Application Site would have resulted in any significant impacts on the qualifying features of these protected areas.

The Application Site cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats have started to develop, such as poor fen, heath, wetlands/reedbeds and birch woodland on shallower peat. In time areas of *Sphagnum* rich embryonic bog communities (on deeper peat) and areas of naturalised peatland can be developed.

With the implementation of the measures and requirements of the IPC Licence at the Application Site during this period, the decommissioning and rehabilitation works will have no potential to cause a deterioration in the status of downstream surface water bodies and/or jeopardise their attainment of good surface water or lake status. The long-term impacts of the rehabilitation plans may lead to an improvement in the status of those waterbodies directly downstream of the Application Site, however this is dependent on several site-specific factors.

Further measures outlined in the WAP (2024) will be implemented outside of the Application Site to reduce diffuse agricultural pollution and continue to improve water quality over the water action plan period. Measures included in WAP 2024 include Improved nutrient management, increase inspections in relation to the Nitrates Directive and Good Agricultural Practices (GAP) regulations and Low Emission slurry spreading,

3.5.5 Groundwater bodies

Due to the local hydrogeological regime and limited connectivity with the bedrock aquifer, it is considered that there will be no change in the status of the three GWB during the Remedial Phase.

3.5.6 Compliance Assessment Summary

The site-specific impacts of the Remedial Phase at the Application Site on the biological, physico-chemical and hydromorphological quality elements of the water bodies are shown in the assessment above and summarised in Table 3-5.

Table 3-6: WFD: Assessment Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Surface water drainage flow and volume will not significantly change during the Remedial Phase at Application Site. The boundary streams in all cases are channelised since the 1960s/1970s. The Remedial Phase will not significantly change the current level of surface water or groundwater volume or flow.

Biology: habitats and fish	Yes	The footprint of the Application Site primarily comprises cutover bog. There are no significant direct or indirect impacts on SACs/SPAs or Annex Habitats. The risks to the receptors are from sediment loading to adjacent streams. There will be no significant changes that would affect fish.
Water quality	Yes	Long term, the Application Site would have increased sediment and ammonium. Peat extraction areas have a low to very low ortho-Phosphate loading. Mitigation measures are detailed in the EPA Licence.
Protected areas	No	The Application Site is adjacent to a number of SACs and SPAs. An IPC Licence was implemented in accordance with the EPA 1992 Act, as amended. No peat extraction activities will occur in SACs/SPAs. The Remedial Phase of the Application Site will not significantly change the current level of surface water or groundwater volume or flow.

4. CONTROL MEASURES

Post-1988, but prior to the implementation of the IPC Licence at the Application Site in 2000, the environmental management measures, remained in place across the Application Site. In addition, as evidenced in the 1991 Harkins Report (see Appendix 4.7), silt control measures in the form of silt ponds were in place prior to 1988, with Bord na Móna carrying out further studies and surveys throughout the 1980s and 1990s to improve silt pond design and use such that suspended solids emissions in surface run-off were reduced.

Bord na Móna was granted an IPC Licence (Reg. No. P0504-01) for the Mountdillon Bog Group (within which the Application Site is located) in May 2000. Following the grant of the IPC Licence, the control measures were updated and expanded. A copy of the IPC Licence is provided in Appendix 4-1 of the rEIAR. Bord na Móna staff underwent an EPA IPC Licence Compliance training programme, which resulted in the development of an environmental management system. This system addresses emissions to water and air, noise, vibration and odour emissions, waste management, use of natural resources, visual effects and the natural environment and ecosystem.

The conditions of the IPC Licence are intended for the protection of the environment and apply from the time of grant of the IPC Licence. The EPA has undertaken Technical Amendments of the IPC Licence for the purpose of aligning the conditions of the IPC Licence to the objectives of national and European environmental protection legislation enacted over the lifetime of the IPC Licence. In September 2012, the IPC Licence was subject to a Technical Amendment for the purpose of aligning with the European Communities Environmental Objectives (Surface Water) Regulations, 2009 and it now contains an objective to 'maintain' or 'restore' the water surface water quality to the defined 'Good Status'. With the implementation of conditions listed in the IPC Licence, the potential environmental effects of peat extraction activities and all ancillary works on water quality (such as the release of elevated concentrations of suspended sediments, and by association on aquatic ecosystems and protected species), have and continue to reduce through the implementation of IPC Licence conditions.

Cutaway Bog Decommissioning and Rehabilitation Plans will be implemented in compliance with Condition 10 of the IPC Licence. The Cutaway Bog Decommissioning and Rehabilitation Plans are included in Appendix 4-3 of the rEIAR submitted with the substitute consent application, and the details and scope of the plan are briefly described in Section 9.1 of Chapter 9 (Hydrology) and Chapter 4 (Project Description) of the rEIAR. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation.

4.1 PEAT EXTRACTION ACTIVITIES (PRE-2003)

With the exception of silt control (which from 1974 was subject to a formal management program, formal documentation outlining dedicated measures referred to as control measures practised on site from 1948 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site as part of daily, monthly, and annual bog management and operations and were outlined in the IPC Licence application submitted to the EPA in 1999.

4.1.1 Peat Extraction Machinery – Maintenance Programmes and Storage

- All peat extraction machinery listed were stored either at the Mountdillon Works, or at machine storage locations in Derryaroge, Derryadd, or Lough Bannow bogs at the end of the workday;
- All machinery was regularly inspected, serviced and maintained;
- All machinery was regularly cleaned via power steam wash system at a wash bay which drained into a fuel/oil interceptor unit and associated gravel soak pit. The interceptor unit facilitated the removal of any oil/grease components. This was done to minimise dust and particle release; and,
- A self-contained machine parts washer was located in the workshop at the Mountdillon Works.

4.1.2 Refuelling Facilities

- Refuelling and maintenance of all vehicles were undertaken at the Mountdillon Works, or at machine storage locations in Derryaroge, Derryadd, or Lough Bannow bogs. When machinery required refuelling on the Application Site, it was carried out by a mobile (rail or tractor-transported) fuelling unit which travelled out from the Mountdillon Works to the bogs where the machinery was located. Refuelling procedures were upgraded to standard bunding specifications to comply with IPC Licence requirements in 2000.

The following emergency action procedure was implemented at the Application Site prior to IPC Licencing (i.e., pre-2000):

1. When a spill occurred, the General Manager was immediately informed of the incident;
2. The spill was required to be assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences;
3. If there was a risk of explosion, all personnel were required to be evacuated from the area;
4. The spill was sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%);
5. All efforts were made to prevent the spill from entering a storm drain or nearest outfall;
6. Once the spill had been contained, a suitable absorbent (e.g., dry peat) was to be used to soak the spillage;
7. All possible ignition sources such as electrical equipment, naked lights, machinery were removed from the area. Any combustibles in the spill area were removed;
8. Follow up action measures taken includes the implementation of appropriate remedial work to prevent such a spillage recurring in the future; and,
9. In the event of a significant spillage, the General Manager was required to notify the local authority.

Surface water run-off from the Mountdillon Works and hard standing areas drained via onsite surface water drainage systems, which were installed as part of the construction of buildings and hardstand areas over the decades, into the adjacent peatland surface water drainage network.

All machinery was regularly inspected and serviced. All machinery was regularly cleaned via power steam wash system at a wash bay which drained into an interceptor unit and associated gravel soak pit. There are 2 interceptor units which facilitated the removal of any oil/grease components. This was done to minimise dust and particle release.

4.1.3 Maintenance Programme for Internal Drains

The internal drains were cleaned on a regular basis in suitable weather, mainly prior to and post the peat extraction season (i.e. between October and March). This was necessary to remove sludge from the bottom of drains and dispose of it by spreading it on the adjacent field. Drain maintenance was carried out using ditchers. These works were programmed to ensure that the drains servicing the peat extraction areas were fit for purpose. Drain maintenance was carried out mainly prior to and post the peat extraction season (i.e. between October and March).

4.1.4 Maintenance of Onsite Surface Water Pumps

The following procedure was followed with respect to ensuring that the onsite pumps were maintained in good working order:

- Visual inspection of pumps daily;
- Operational check of pumps biweekly; and,
- Service of pumps monthly.

4.1.5 Silt Management

As part of the Third Development Programme in the 1970s, Bord na Móna decided in 1974 to control all effluent by means of specially designed and constructed silt ponds, thereby trapping more than 90% of the suspended solids present in the drainage water. A silt committee was set up in October 1975 to study the feasibility of removing silt from the bog effluents. Recommendations of an interim report prepared by the committee in 1975/1976 were as follows:

1. *Provision of silt ponds should be a basic feature of new bog development for milled peat and their construction should be planned for all outlet systems.*
2. *Ideally, silt ponds should be located in cutaway bog.*
3. *Sufficient area should be acquired at the initial stage to provide for silt ponds.*
4. *In production bogs, existing large catchments should be broken up into manageable proportions and ponds constructed to accord with local topography.*
5. *Revision of drainage techniques should be considered such as arranging flatter gradients in external and internal outfalls and extending their width and length in the lower reaches to encourage settlement of silt.*
6. *Initial drainage effluent should be allowed to spill over face banks (where practicable) until adequate silt ponds have been provided. This should be applied to all new bog development immediately. Similarly, growth and vegetation should not be removed from external outfalls until interference with drainage and/or complaints force us [Bord na Móna] to act.*
7. *It is recommended that catchments to be protected by silt ponds should not be greater than 500 acres.*
8. *Ponds should be designed for maximum run-off of 1 cubic foot per minute per acre and run-off controlled by provision of small diameter culverts, weirs or sluices.*
9. *For milled peat, 50 square foot of pond per acre of catchment. For 500 acres, 45-foot wide x 555-foot long x 7-foot deep, i.e., 6-foot maximum of silt and 1 foot minimum of water.*
10. *Ponds should be provided in pairs each sufficient for the catchment protected.*
11. *Ponds should be cleaned out at regular intervals as required but at least four times a year using dragline or Hymac retained permanently for this purpose. Investigations to be made into the suitability of pumping units.*

12. Second parallel pond should be used during excessively large water flow (storm water).

Bord na Móna records show that silt pond measures were introduced across all Bord na Móna bogs in the early to mid-1980's in response to the 1977 *Water Pollution Act*. A number of silt ponds were installed at the Application Site pre-1988 to reduce sediment discharge from the extraction works. Silt ponds were installed to trap and reduce the emission of suspended solids to surface water bodies originating from activities associated with peat extraction, such as suspended peat particles generated from the extraction fields and collected in the bog drainage network as well as run-off from workshop areas.

IPC Licence P0504-01

The Application Site has been regulated by the EPA under IPC Licence (Reg. No. P0504-01) since May 2000. No additional mitigation measures, other than compliance with the conditions of the IPC Licence, including the implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans in agreeance with the EPA, are considered necessary in terms of protecting surface water and groundwater quality.

Condition 6 of the IPC Licence (which is included in Appendix 4.1 of the rEIAR) details the requirements for Bord na Móna to implement a programme to ensure all drainage water from all boglands is discharged via an appropriately designed silt pond treatment arrangement, that an operational procedure for de-silting was prepared and that de-silting is carried out twice per year. The silt arising from the de-silting operations was either stockpiled a distance from drains and the silt pond or placed back out onto the extraction fields. Up until the cessation of peat extraction, this material would then have been incorporated into the subsequent harvests.

Condition 9 of the IPC Licence (which is included in Appendix 4.1 of the rEIAR) pertains to the 'Water Protection' and outlines the daily, weekly, monthly, quarterly, and annual inspections Bord na Móna are required to carry out to provide for the protection of surface and groundwater. There are currently silt pond inspections and maintenance including quarterly grab sampling ongoing at the application site.

The list below outlines control measures conditioned under the IPC licencing regime, as regulated by the EPA:

- Effective spill/leak management of mobile fuelling units;
- Replacement (and remediation where necessary) of all underground fuel tanks;
- There shall be no other emissions to water of environmental significance;
- All tank and drum storage areas shall be rendered impervious to the materials stored therein. In addition, tank and drum storage areas shall, as a minimum be bunded;
- Drainage from bunded areas shall be diverted for collection and safe disposal;
- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall be tested and demonstrated by the licensee to the satisfaction of the Agency and shall be reported to the Agency within eighteen months from the date of grant of this licence and every two years thereafter;
- The loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and leachate run-off;
- While awaiting disposal, all materials shall be collected and stored in designated areas protected against spillage and leachate run-off;
- With the exception of roof water, all surface water discharges from workshop areas shall, be fitted with oil interceptors;

- An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water shall be carried out weekly;
- The licensee (Bord na Móna) shall undertake a programme of testing and inspection of underground fuel pipelines to ensure that all underground fuel lines are tested at least every three years; and
- The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

Potential effects on GWS/PWS have been assessed based on a radius of approximately 4 km from the Application Site. Part of Derryaroge is located in the ZOC for Lanesborough. No groundwater effects were identified pre-2003 or during the peat extraction phase. The control measures that protected these water sources are the same as those outlined in above, relating to spills/leakages on the bog units, ancillary activities and at end user sites. The implementation of these measures has protected groundwater quality and eliminated any effects on water quality in the underlying aquifer and at downstream water supply source locations.

The exposure of peat/soils had the potential to be a source of fine sediment that could enter water bodies during periods of rainfall. Through implementation of the existing Bord na Mona control measures, IPC licence measures post-2000, any direct or indirect risk to the hydromorphology of the water bodies was minimal.

4.2 PEAT EXTRACTION PHASE (2003 – JULY 2019)

No additional measures were required during the Peat Extraction Phase. Measures outlined in Section 4.1 of Chapter 4 (Project Description) in the rEIAR were applied during the 2003-2019 period.

4.3 CURRENT PHASE (JULY 2019 - PRESENT)

All activities at the Application Site have and will operate in accordance with IPC Licence (P0504-01) during the current phase. All measures are active until such a time as the IPC Licence is surrendered. The measures in place during the peat extraction phase remain in place. Measures are outlined in Section 3.4 above and Section 4.1 of Chapter 4 (Project Description) in the rEIAR are applied during the Current Phase. Therefore, an unmitigated scenario is not applicable to the WFD assessment of the Current Phase. Measures outlined in the IPC licence were and are implemented on the Application site.

It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water was controlled on the bog with discharge via the existing outlets and IPC controls.

Drain blocking and other PCAS rehabilitation works at the Application Site will improve water quality through reducing ammonium and sediment levels downgradient. Climate benefits include the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted. Overall, studies show long-term decreases in inorganic nitrogen, phosphorus, base cations, suspended solids and DOC, as well as increasing biodiversity and carbon sequestration potential (Renou-Wilson et al., 2018). Rewetting peatlands results in improvements in water quality, although depending on site-specific factors, there may be temporal variations in

concentrations. International studies have shown a reduction of pollutants, including nitrate and ammonia, following rewetting compared to drained and degraded peatlands, albeit some rewetted bogs may still have higher concentrations of ammonium compared to intact natural bogs.

4.4 REMEDIAL PHASE

The Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site will be implemented as part of the Condition 10 of the IPC licence. All activities at the Application Site are required to operate in accordance with IPC Licence (P0504-01) until such a time as the IPC Licence is surrendered. Therefore, an unmitigated scenario is not applicable to the WFD assessment of the Remedial Phase. Measures outlined in the IPC licence will be implemented on the Application site. Rehabilitation measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland and wetland habitats.

These rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will leave the bog via the existing outlets.

Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements and supporting national policies and strategies in relation to reduction of carbon emissions from peatlands, as well as supporting biodiversity and improvements to water quality.

Drain blocking and other rehabilitation works at the Application Site will improve water quality through reducing ammonium and sediment levels downgradient. Climate benefits include the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted. Overall, studies show long-term decreases in inorganic nitrogen, phosphorus, base cations, suspended solids and DOC, as well as increasing biodiversity and carbon sequestration potential (Renou-Wilson et al., 2018). Rewetting peatlands results in improvements in water quality, although depending on site-specific factors, there may be temporal variations in concentrations. International studies have shown a reduction of pollutants, including nitrate and ammonia, following rewetting compared to drained and degraded peatlands, albeit some rewetted bogs may still have higher concentrations of ammonium compared to intact natural bogs.

4.5 SUMMARY

The control measures and rehabilitation plans described above are sufficient to meet the obligations under the WFD. The assessment of WFD elements for the WFD waterbodies for the short-term and long-term is summarised in Table 4-1 below. With the implementation of the requirements of the IPC Licence at the Application Site during this period, the site rehabilitation works will have no potential to cause a deterioration in the status of downstream surface water bodies and/or jeopardise their attainment of good surface water status or lake status. The long-

term impacts of the Application Site Decommissioning and Rehabilitation Plans may lead to an improvement in the status of those waterbodies directly downstream of the Application Site, however this is dependent on several site-specific factors outside of the Application Site such as stream morphology, topography and agricultural activity.

Table 4-1 Summary of WFD status and future status

Waterbody Code	Name	Current Status 2016-2021	Short-term	Long-term
IE_SH_26L120100	Lough Bannow Stream_010	Moderate	Moderate	Moderate/Good
IE_SH_26B220790	Ballynakill_010	Moderate	Moderate	Moderate/Good
IE_SH_26L840850	Ledwithstown_010	Moderate	Moderate	Moderate/Good
IE_SH_26S021530	Shannon (Upper)_090	Poor	Poor/moderate	Moderate
IE_SH_26S021600	Shannon (Upper)_100	Poor	Poor/moderate	Moderate
IE_26C_AWB_RCMLW	Royal Canal Main Line (Upper Shannon C)	Good	Good	Good
IE_SH_26_750a	Lough Ree	Good	Good	Good

Taking into consideration the impacts of peat extraction and ancillary activities at the Application Site on the biological, physico-chemical and hydromorphological quality elements, following the implementation of design and mitigation measures, it is concluded that the peat extraction and ancillary activities did not compromise progress towards achieving GES or cause a deterioration of the overall GEP of any of the water bodies that are in scope.

Table 4-2: Compliance of the Application Site with the environmental objectives of the WFD

Environmental Objective	Application Site	Compliance with the WFD Directive
No changes affecting high status sites.	There are no high status water bodies in the surrounding area and therefore there are no changes in relation to high status in the study area. (High confidence)	Yes
No changes that will cause failure to meet surface water good ecological status or potential or result in a deterioration of surface water ecological status or potential.	After consideration as part of the detailed compliance assessment, activities at the Application Site will not cause deterioration in the status of the water bodies following the implementation of rehabilitation works, no significant impacts are predicted. (High confidence)	Yes
No changes which will permanently prevent or compromise the Environmental	Activities at the Application Site will not cause a permanent exclusion or compromise achieving the WFD	Yes

Environmental Objective	Application Site	Compliance with the WFD Directive
Objectives being met in other water bodies.	objectives in any other bodies of water within the River Basin District. (High confidence)	
No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	GWBs are currently at good status. Activities at the Application Site will not cause deterioration in the status of the groundwater bodies. (High confidence)	Yes

The WFD also requires consideration of how a new scheme might impact on other water bodies and other EU legislation. This is covered in Articles 4.8 and 4.9 of the WFD.

Article 4.8 states: ‘*a Member State shall ensure that the application does not permanently exclude or compromise the achievement of the objectives of this Directive in other bodies of water within the same river basin district and is consistent with the implementation of other Community environmental legislation.*’

All water bodies within the study area have been assessed for direct impacts. Activities at the Application Site will not compromise the achievement of the objectives of the WFD for any water body in the study area. In addition, activities at the Application Site have been assessed for the potential for cumulative impacts with relevant permitted, proposed and constructed projects and other land-uses in the vicinity of the site. Cumulative effects of this project with other developments in the region, relate to the effects on Hydrology.

With the implementation of the mitigation measures it is concluded that in combination with other proposed projects, the Peat Extraction Phase, Current Phase and Remedial Phase of the Application Site will not compromise the achievement of the objectives of the WFD for any water body. Further details are included in Chapter 9 (Hydrology and Hydrogeology) of the rEIAR. Therefore, the Application Site complies with Article 4.8.

Article 4.9 of the WFD requires that “*Member States shall ensure that the application of the new provisions guarantees at least the same level of protection as the existing Community legislation.*”

The Habitats Directive (1992) promotes the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats. European designated sites in the vicinity of the Application Site have been assessed and are presented in the remedial Natura Impact Statement (rNIS) submitted with the application for substitute consent. The rNIS concludes that the Application Site will not lead to a deterioration in the features of any designated site. The Application Site is not considered to be a risk to designated habitats and therefore is compliant with the Habitats Directive.

The Bathing Water Directive (BWD) (2006/7/EC) was adopted in 2006, and is the process used to measure/monitor water quality at identified bathing waters. There are no bathing waters within 2km of the Application Site.

5. CONCLUSIONS

Peat extraction activities commenced on the Application Site prior to the introduction of the Water Framework Directive. The Application Site has been subject to drainage and peat extraction activities since 1949. The WFD was not enacted until 54 years later i.e. 2003. The primary hydrological and hydrogeological changes associated with the peat extraction process occurs during the initial drainage of the bog in advance of peat extraction. Therefore, the peat extraction activities and potential effect on the groundwater bodies and surface water bodies pre-date the transposition of the WFD into Irish Law.

The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003). This report assessed the effect during the 2003-2019 period. During this 2003-2019 peat extraction phase, all activities at the Application Site operated in accordance with the EPA IPC Licence requirements. The IPC Licence (P0504-01) sets out specific conditions and emission limit values designed to ensure the protection of surface and groundwaters. There are no WFD status reports available pre-2010, however the EPA have been completing ecological monitoring on downstream waterbodies since the 1990s. The Q-values suggest that the peat extraction activities from 2003 to 2010 did not have a significant impact before the first WFD cycle in 2010.

Peat extraction ceased at the Application Site in July 2019 and no significant changes to the hydrological and/or hydrogeological environments will have occurred since the cessation of peat extraction activities. The Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site will be implemented as part of the condition 10 of the EPA licence. All activities at the Application Site are required to operate in accordance with IPC Licence (P0501-01) until the licence is surrendered. Therefore, an unmitigated scenario is not applicable to the WFD assessment of the Remedial Phase. Measures outlined in IPC licence will be implemented on the Application Site. Rehabilitation measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland and wetland habitats. During the Remedial Phase the Application Site will continue to operate in accordance with IPC Licence requirements. The outlined measures will ensure the protection of groundwater bodies and downstream surface and lake waterbodies.

Taking into consideration the potential impacts arising as a result of activities at the Application Site on the biological, physico-chemical and hydromorphological quality elements, it is concluded that, following with the implementation of control measures and compliance with the IPC Licence, did not and will not compromise progress towards achieving GES or cause a deterioration of the overall status of the water bodies that are in scope; it will not compromise the qualifying features of protected areas and is compliant with other relevant Directives. Measures such as peatland rehabilitation have been incorporated into the RBMPs. It can therefore be concluded that the activities at the Application Site are compliant with WFD and therefore does not require assessment under Article 4.7 of the WFD.



6. REFERENCES

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7. GLOSSARY

Term	Definition
Artificial waterbody	A body of surface water created by human activity.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Coastal waterbody	Surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters.
Confidence	<p>Low - Non-expert opinion, unsubstantiated opinion with no supporting evidence.</p> <p>Medium - Expert view grounded in theory but based on limited information, e.g., anecdotal evidence, or historical data.</p> <p>High - Estimation of potential impacts or consequences, with strong theoretical basis, using accepted methods, reliable analysis and accepted within the sector as 'fit for purpose'. This typically includes analytical methods where the methods are strong, and the science is reliable.</p>
Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Groundwater body	A distinct volume of groundwater within an aquifer or aquifers.
Lake waterbody	A body of standing inland surface water.
Non-Temporary/Temporary	<p>The requirement is to assess if the activities will have an effect that is non-temporary on the status of the waterbody. The terms are not currently defined within the guidance, however, for the purposes of this assessment 'temporary' is assumed to mean recovery should occur within the period of time the element in question is measured. For example, macro-invertebrates should be measured every 3 years.</p> <p>Therefore, temporary means less than three years for this element.</p>

River basin	The area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta.
River Basin District	The area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) of the Water Framework Directive as the main unit for management of river basins.
River Basin Management Plan	River Basin Management Plans describe the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment in the river basin district, and what actions will be taken to address the pressures. It sets out what improvements are possible by 2015 and how the actions will make a difference to the local environment - the catchments, estuaries, the coast and groundwater.
River waterbody	A body of inland water flowing on the surface of the land, but which may flow underground for part of its course.
Surface water	Inland waters, except groundwater; transitional waters and coastal waters, except in respect of chemical status for which it shall also include territorial waters.
Transitional waterbody	Bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are influenced by freshwater flows.



Appendix A WFD DEFINITIONS

WFD normative definitions

The WFD provides normative definitions of ecological quality for the purposes of classification of overall ecological status. In surface waterbodies, these are as follows:

High status

There are no, or only very minor, anthropogenic alterations to the values of the physico-chemical and hydromorphological quality elements for the surface waterbody type from those normally associated with that type under undisturbed conditions.

The values of the biological quality elements for the surface waterbody reflect those normally associated with that type under undisturbed conditions, and show no, or only very minor, evidence of distortion.

These are type-specific conditions and communities.

Good status

The values of the biological quality elements for the surface waterbody show low levels of distortion resulting from human activity but deviate only slightly from those normally associated with the surface waterbody type under undisturbed conditions.

Moderate status

The values of the biological quality elements for the surface waterbody type deviate moderately from those normally associated with the surface waterbody type under undisturbed conditions. The values show moderate signs of distortion resulting from human activity and are significantly more disturbed than under conditions of good status.

Poor status

Waters show evidence of major alterations to the values of the biological quality elements for the surface waterbody type and the relevant biological communities deviate from those normally associated with the surface waterbody type under undisturbed conditions.

Bad status

Waters show evidence of severe alterations to the values of the biological quality elements for the surface waterbody type and large portions of the relevant biological communities normally associated with the surface waterbody type under undisturbed conditions are absent.





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