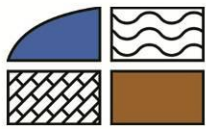




APPENDIX 8-4

**Water Framework Directive
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**WATER FRAMEWORK DIRECTIVE ASSESSMENT
PEAT EXTRACTION AND REHABILITATION PLAN AT THE BALLIVOR BOG GROUP,
CO. MEATH/WESTMEATH**

FINAL REPORT

Prepared for:
BORD NA MÓNA PLC

Prepared by:
HYDRO-ENVIRONMENTAL SERVICES

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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by MKO Ireland on behalf of Bord na Móna PLC to complete a Water Framework Directive (WFD) Assessment for the effects of peat extraction operations and associated ancillary activities at the Ballivor Bog Group, Co. Meath/Westmeath.

The Application Site comprises 5 no. Bord na Móna bogs, Ballivor, Carranstown, Bracklin, Lisclogher, and Lisclogher West Bogs, situated c. 2.5 km south-southeast of Delvin, c. 3.7 km east of Raharney, and c. 2.2 km west of Ballivor Village in Counties Meath and Westmeath. The total Application Site area is approximately 24.19km².

The purpose of this WFD assessment is to determine whether any specific components or activities associated with the peat extraction activities at the Application Site have compromised WFD objectives or have resulted in a deterioration of the status of any waterbodies in the vicinity or downstream of the Application Site. In addition, this assessment will determine whether any components or activities associated with the proposed site Cutaway Bog Decommissioning and Rehabilitation Plans and associated activities will compromise WFD objectives or result in a deterioration of the status of any waterbodies in the vicinity or downstream of the Application Site. This assessment will determine the water bodies with the potential to be impacted, describe the control measures and determine if the peat extraction activities have been in compliance with the objectives of the WFD since its transposition into Irish Law in 2003.

This WFD assessment is intended to supplement the remedial EIAR submitted as part of the substitute consent application. For the purposes of this FRA, and consistent with the rEIAR, the various components are described and assessed using the following references: the 'Project', 'Peat Extraction Phase', 'Current Phase' and the 'Remedial Phase'.

1.2 STATEMENT OF AUTHORITY

Hydro-Environmental Services (HES) are a specialist hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford. We routinely complete impact assessments for hydrology and hydrogeology for a large variety of project types.

This WFD assessment was prepared by Michael Gill and Conor McGettigan.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 18 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments for a variety of development types across Ireland. He has substantial experience in surface water drainage design and SUDs design and surface water/groundwater interactions.

Conor McGettigan (BSc, MSc) is a junior Environmental Scientist, holding an M.Sc. in Applied Environmental Science (2020) from University College Dublin. Conor has also completed a B.Sc. in Geology (2016) from University College Dublin. In recent times Conor has assisted in the preparation of hydrological and hydrogeological impact assessments for a variety of developments.

1.3 WATER FRAMEWORK DIRECTIVE

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU ("WFD"), was established to ensure the protection of the water environment. The Directive was transposed in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that all member States protect and improve water quality in all waters, with the aim of achieving good ecological status by 2027 at the latest. Any new development must ensure that this fundamental requirement of the WFD is not compromised.

The WFD is implemented through the River Basin Management Plans (RBMP) which comprises a six-yearly cycle of planning, action and review. RBMPs include identifying river basin districts, water bodies, protected areas and any pressures or risks, monitoring and setting environmental objectives. In Ireland, the first RBMP covered the period from 2010 to 2015 with the second cycle plan covering the period from 2018 to 2021.

The River Basin Management Plan (2018 - 2021) objectives include:

- Ensure full compliance with relevant EU legislation;
- Prevent deterioration and maintain a 'high' status where it already exists;
- Protect, enhance and restore all waters with the aim of achieving at least good status by 2027;
- Ensure waters in protected areas meet requirements; and,
- Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objectives and (2) addressing more complex issues that will build knowledge for the third cycle.

Furthermore, the Department of Housing, Local Government and Heritage are currently reviewing the submissions made on the Draft River Basin Management Plan (2022 - 2027) which was out for public consultation in Q4 of 2021 and Q1 of 2022. As of January 2024, the plan has not been published while the draft plan is available to view at <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/>.

Our understanding of these objectives is that surface waters, regardless of whether they have 'Poor' or 'High' status, should be treated the same in terms of the level of protection and mitigation measures employed, i.e. there should be no negative change in status at all.

2. WATERBODY IDENTIFICATION & CLASSIFICATION

2.1 INTRODUCTION

This section identifies those surface waterbodies (SWBs), groundwater bodies (GWBs) and protected areas with potential to be affected by the historic peat extraction activities and proposed remedial measures and reviews any available WFD information.

2.2 SURFACE WATERBODY IDENTIFICATION

Regionally the Application Site is located in the River Boyne surface water catchment within Hydrometric Area 7 of the Eastern River Basin District (www.epa.ie).

On a more local scale, the majority of the Application Site is located in the River Boyne sub-catchment (Boyne_SC_050) with much of Ballivor Bog and a small section towards the southwest of Bracklin Bog located in the Boyne_040 sub-catchment. Additionally, a small area in the northwest of Bracklin Bog is located in the Deel[Raharney]_010 sub-catchment.

Within the Deel[Raharney]_010 sub-catchment, the Deel River flows to the southeast approximately 1km west of Bracklin Bog. This area of the Application Site (*i.e.* the northwest of Bracklin bog) drains towards the Deel(Raharney)_030 and Deel(Raharney)_040 river waterbodies. The River Deel flows to the southeast entering the Boyne_040 sub-catchment to the south of Raharney village. The River Deel reaches its confluence with the River Boyne approximately 4.5km south of Ballivor village.

Within the Boyne_040 sub-catchment, the Deel River flows to the southeast approximately 1.25km southwest of Ballivor Bog. This area of the Application Site (*i.e.* the southwest of Bracklin Bog and the west of Ballivor Bog) is drained by the Deel(Raharney)_060 river waterbody which discharges into the Boyne_060 river waterbody approximately 3.5km southeast of Ballivor Bog.

As stated above, the majority of the Application Site is located in the Boyne_050 sub-catchment. The Stonyford River flows to the southeast, approximately 700m east of Lisclogher Bog before eventually discharging into the Boyne River approximately 7km east of Ballivor Bog. The north of Lisclogher Bog is drained by the Stonyford_030 river waterbody with the remainder of Lisclogher bog and the majority of Bracklin and Carranstown bogs drained by the Stonyford_040 river waterbody. The south of Carranstown Bog and the east of Ballivor Bog are drained by the Boyne_060 river waterbody.

The Stoneyford River discharges into the Boyne_070 river waterbody approximately 5km southeast of Ballivor village. The River Boyne then flows to the northeast through the towns of Trim and Navan after which it continues eastwards before becoming tidal to the west of my M1 motorway. The Boyne flows through the Boyne Estuary transitional waterbody and discharges into the Boyne Estuary Plume Zone costal waterbody between Haven and Mornington Point.

Error! Reference source not found. below illustrates the surface waterbodies located downstream of the Application Site.

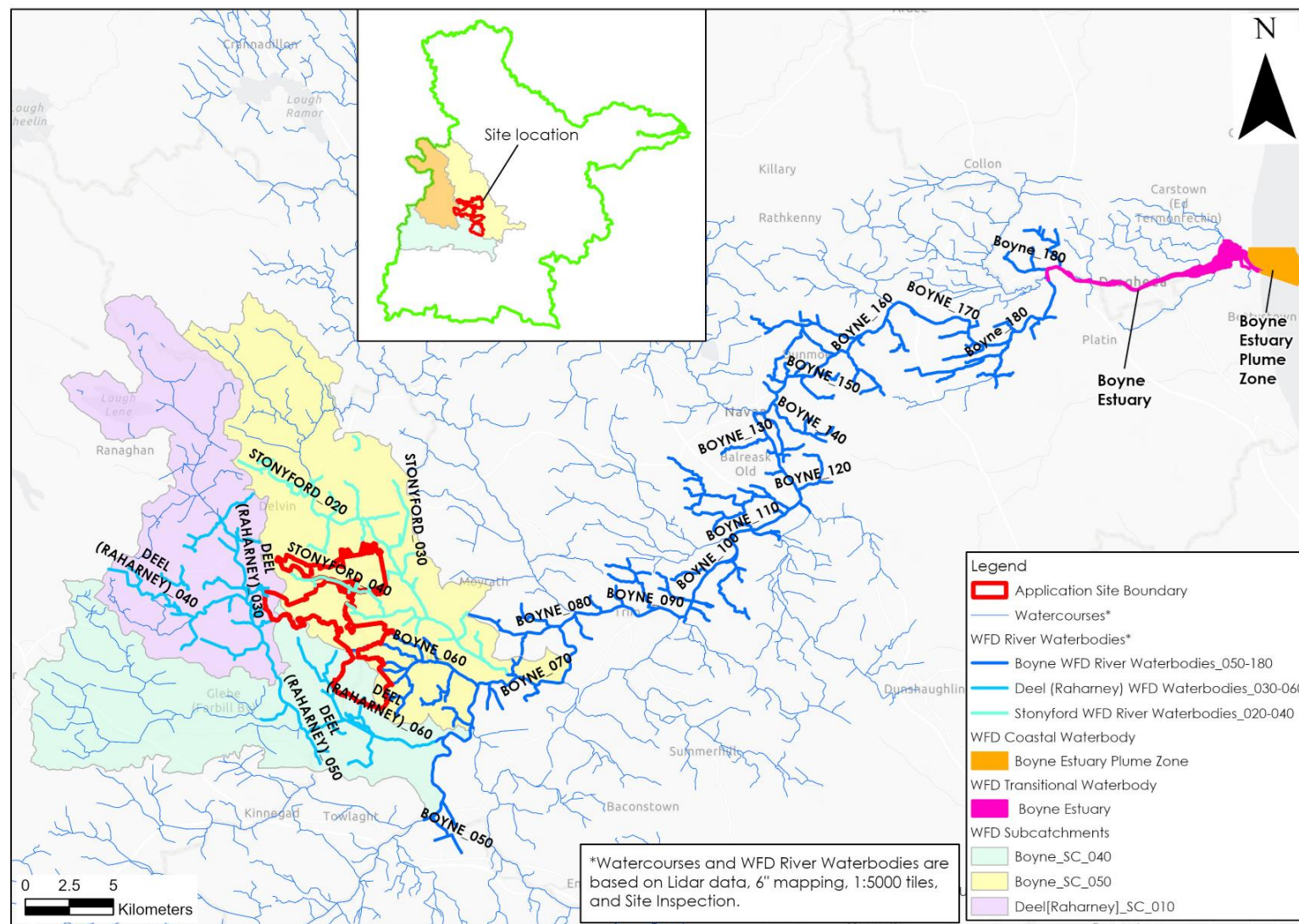


Figure A: Hydrological Setting and Downstream Surface Water Bodies

Table A presents the catchment area of each waterbody downstream of the Application Site. The Deel(Raharney)_030 river waterbody in the vicinity of the Application Site has the smallest catchment area of 68.54km². The catchment area increases progressively downstream as more tributaries discharge into the Boyne River, with the final river waterbody i.e. Boyne_180, having a total catchment area of 2,524km². In addition, **Table A** presents the area of the Application Site draining to each waterbody as a percentage of the total catchment area for that waterbody. The percentage decreases progressively downstream of the Application Site. For example, the Application Site is 10.10% of the total catchment area of the Stonyford_040 river waterbody but only 0.96% if the total catchment draining to the Boyne_180 river waterbody. Therefore, those waterbodies which are located in close proximity to the Application Site are more susceptible to water quality impacts as a result of activities within the Application Site.

Table A: Downstream Catchment Size

WFD River Sub-Basin	Total Catchment Area (km ²)	Area of Application Site draining to Waterbody (km ²)	Application Site as % Area of Catchment
Deel(Raharney)_030	68.54	0.46	0.45
Deel(Raharney)_040	103.81	0.97	0.66
Deel(Raharney)_050	118.71	0.97	0.38
Deel(Raharney)_060	153.96	6.17	2.11
Boyne_050	741.64	6.17	0.83
Boyne_060	947.67	8.58	0.91
Stonyford_030	102.83	0.49	0.48
Stonyford_040	154.67	15.61	10.10
Boyne_070	1,147.95	24.19	2.11
Boyne_080	1,343.76	24.19	1.80
Boyne_090	1,354.41	24.19	1.77
Boyne_100	1,471.87	24.19	1.64
Boyne_110	1,563.22	24.19	1.55
Boyne_120	1,666.65	24.19	1.45
Boyne_130	1,680.85	24.19	1.44
Boyne_140	2,397.15	24.19	1.00
Boyne_150	2,411.06	24.19	1.00
Boyne_160	2,468.03	24.19	0.98
Boyne_170	2,477.50	24.19	0.97
Boyne_180	2,524.54	24.19	0.96
Boyne Estuary	2,672.86	24.19	0.91

2.3 SURFACE WATER BODY CLASSIFICATION

A summary of the WFD status and risk result for Surface Water Bodies (SWBs) downstream of the Application Site are shown in **Table B**. The overall status is based on the ecological, chemical and quantitative status of each SWB.

Local Groundwater Body (GWB) and Surface water Body (SWB) status information is available from (www.catchments.ie).

The western section of Bracklin Bog is drained by the Deel(Raharney)_030 SWB. The status of this SWB has improved from "Moderate" in the 2nd WFD cycle (2013-2018) to "Good" in the latest 3rd WFD cycle (2016-2021). Further downstream the Deel(Raharney)_040 SWB achieved "Good" status in all 3 no. WFD cycles while the Deel(Raharney)_050 SWB was assigned "Moderate" status in all 3 no. WFD cycles. The Deel(Raharney)_060 SWB drains the western section of Ballivor Bog and its status has increased from "Moderate" in the 1st WFD cycle (2010-2015) to "Good" in the 2nd WFD cycle (2013-2018) and has remained at "Good" status in the latest WFD cycle (2016-2021). Further downstream, the Boyne_050 achieved "Good" status in all 3 no. WFD cycles.

The Boyne_060 SWB drains the eastern section of Ballivor and Carranstown bogs. This SWB has experienced an improved status from "Moderate" in 2010-2015 to "Good" in 2013-2018 and 2016-2021. The Stonyford River drains Lisclogher, Lisclogher West and Bracklin bogs. The Stonyford_030 has consistently deteriorated in status throughout each of the WFD cycles, having "Good" status in 2010-2015, to "Moderate" in 2013-2018, to "Poor" in 2016-2021. The Stonyford_040 however, received a deterioration in status from "Good" in 2010-2015 to "Moderate" in 2013-2018 and remained to be of "Moderate" status in 2016-2021. Further downstream the Boyne_070 and Boyne_080 both achieved "Moderate" status in the latest WFD round.

Further downstream the River Boyne (Boyne_090 to Boyne_180) is mostly of "Moderate" status with only its lower reaches (Boyne_170 and _180) achieving "Good" status in the latest WFD cycle. A greater proportion of waterbodies proximal to the Application Site have achieved "Good" status in comparison to those further downstream.

The majority of the SWBs draining the Application Site or directly downstream have been deemed to be "At risk" of not meeting their WFD objectives. The Boyne Estuary transitional waterbody and the Boyne Estuary Plume Coastal waterbody both achieved "Moderate" status in the latest WFD cycle.

The Draft 3rd Cycle Boyne Catchment Report (HA 07) states that excess nutrients remain the most prevalent issue in the Boyne Catchment. The report states that excessive nutrient loss leading to eutrophication is a major issue for SWBs within the Boyne Catchment. Significant pressures relating to excess nutrients are primarily agriculture but also include the extractive industry and urban wastewater. The poor status of these downstream waterbodies relates to a combination of activities and pressures within the wider catchment.

Agriculture is a significant pressure on 7 no. SWBs downstream of the Application Site. In relation to agriculture, the Draft 3rd Cycle Boyne Catchment Report states that phosphorous loss to surface waters remains an issue. Organic pollution associated with run-off from farmyards has also been identified throughout the catchment. Sediment associated with agricultural activities such as stream crossings and land drainage has also been listed as an issue.

Hydromorphology has been listed as a significant pressure on 7 no. SWBs in the vicinity and downstream of the Application Site. The Draft 3rd Cycle Catchment Report states that channelisation is the dominant hydromorphology subcategory with 34 no. river waterbodies in the Boyne catchment subject to extensive modification mainly due to drainage schemes.

Peat (peat drainage and peat extraction) is listed as significant pressure 13 no. river waterbodies within the Boyne Catchment. However, only 1 no. waterbody downstream of the Application Site (Stonyford_030) is under significant pressure from peat. The Draft 3rd Cycle Catchment Report states that peat pressures have resulted in increased sediment loads in these rivers which alters habitats, morphology and hydrology. The report also states that peat pressures have resulted in fluctuations in ammonia concentrations.

Other pressures listed on river waterbodies downstream of the Application Site include urban wastewater, urban runoff and domestic wastewater.

In terms of transitional and coastal waterbodies, the Boyne Estuary and the Boyne Estuary Plume are both "at risk" of failing to meet their respective WFD objectives. The Boyne Estuary is under significant pressure from agricultural activities in the wider catchment and urban wastewater from the Drogheda agglomeration. Meanwhile the Boyne Estuary Plume is being impacted by urban runoff and unknown anthropogenic activities which are resulting in macroalgae and phytoplankton issues.

SWB status for the 2016-2021 WFD cycle are shown in **Figure B**.

Table B: Summary WFD Information for Downstream Surface Water Bodies

SWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	3 rd Cycle Risk Status	WFD Pressures
Deel(Raharney)_030	Good	Moderate	Good	At risk	Agriculture
Deel(Raharney)_040	Good	Good	Good	Not at risk	None
Deel(Raharney)_050	Moderate	Moderate	Moderate	At risk	Hydromorphology
Deel(Raharney)_060	Moderate	Good	Good	Under review	Hydromorphology & agriculture
Boyne_050	Good	Good	Good	Not at risk	None
Boyne_060	Moderate	Good	Good	At risk	Hydromorphology & agriculture
Stonyford_030	Good	Moderate	Poor	At risk	Agriculture & peat
Stonyford_040	Good	Moderate	Moderate	At risk	Agriculture
Boyne_070	Good	Moderate	Moderate	At risk	Agriculture
Boyne_080	Moderate	Moderate	Moderate	At risk	Hydromorphology
Boyne_090	Moderate	Moderate	Moderate	At risk	Hydromorphology & urban run-off
Boyne_100	Moderate	Moderate	Moderate	At risk	Hydromorphology & agriculture
Boyne_110	Unassigned	Good	Moderate	Under review	None
Boyne_120	Moderate	Good	Moderate	Under review	None
Boyne_130	Unassigned	Good	Moderate	Not at risk	None
Boyne_140	Unassigned	Moderate	Moderate	Under review	None
Boyne_150	Moderate	Moderate	Moderate	At risk	Anthropogenic & domestic wastewater
Boyne_160	Moderate	Moderate	Moderate	Under review	Hydromorphology, agriculture, & urban wastewater
Boyne_170	Good	Good	Good	Under review	None
Boyne_180	Good	Good	Good	Not at risk	None
Boyne Estuary	Moderate	Moderate	Moderate	At risk	Agriculture & urban wastewater
Boyne Estuary Plume	Good	Moderate	Moderate	At risk	Anthropogenic & Urban Runoff

2.4 GROUNDWATER BODY IDENTIFICATION

According to data from the GSI database and bedrock geology series (www.gsi.ie), the majority of the Application Site is underlain by a locally Important Aquifer (LI) with a small area in the north underlain by a Poor Aquifer (PI). These bedrock aquifers comprise of Dinantian Pure Unbedded Limestones and Dinantian Upper Impure Limestones.

The Application Site is underlain by the Athboy Groundwater Body (GWB), characterised by poorly productive bedrock.

2.5 GROUNDWATER BODY CLASSIFICATION

The Athboy GWB (IE_EA_G_001) underlies the Application Site. This GWB has been assigned 'Good Status' in all WFD cycles (2010-2015, 2013-2018 and 2016-2021) (**Table C**). This status is defined based on the quantitative status and chemical status of the GWB. The Athboy GWB is deemed to be "At risk" of not meeting its WFD objectives, however, no significant pressures have been identified to be impacting this GWB.

Table C: Summary WFD Information for Groundwater Bodies

GWB	Overall Status (2010-2015)	Overall Status (2013-2018)	Overall Status (2016-2021)	3 rd Cycle Risk Status	WFD Pressures
Athboy	Good	Good	Good	At risk	None

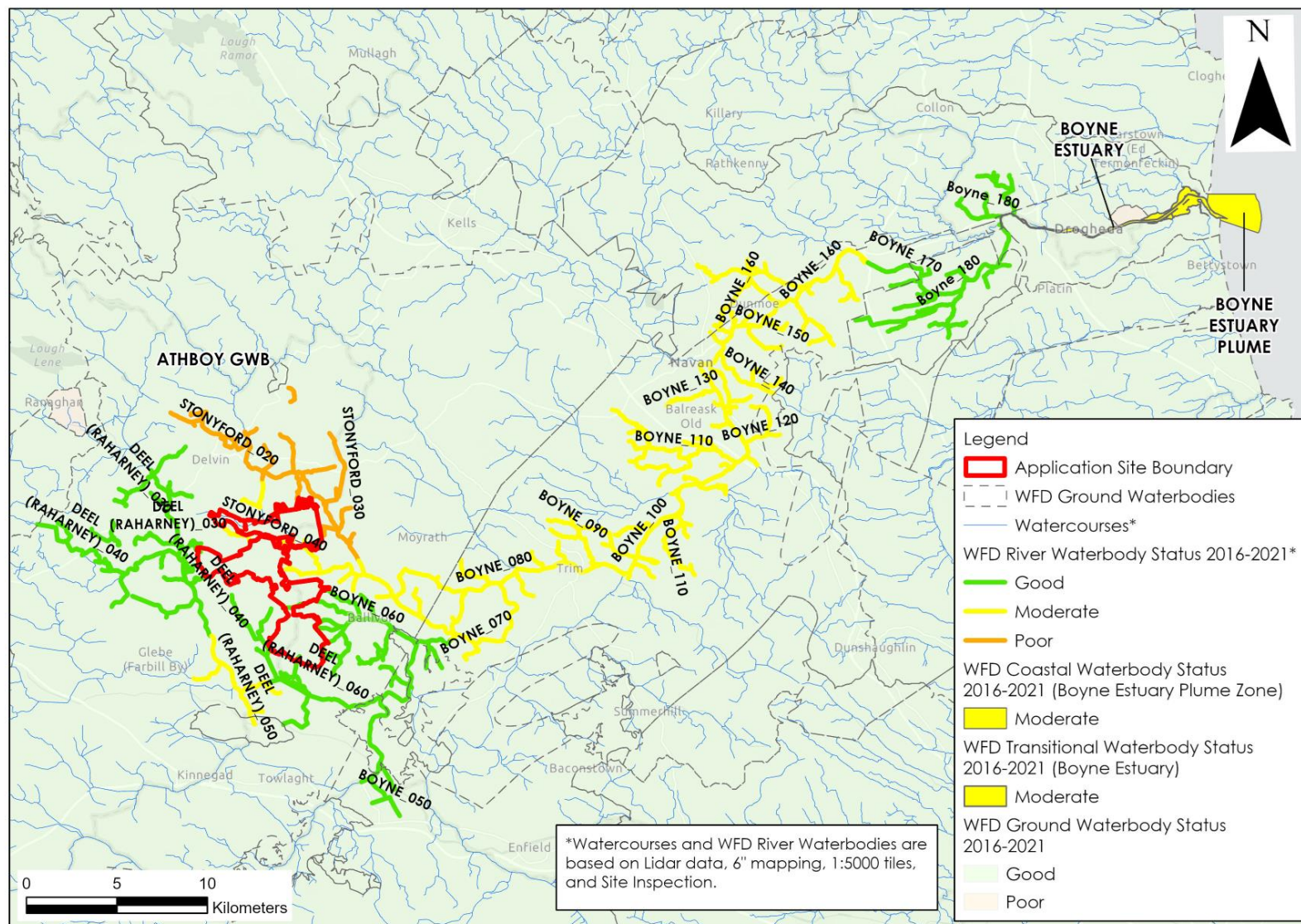


Figure B: WFD Waterbody Status (2016-2021)

2.6 PROTECTED AREA IDENTIFICATION

The WFD requires that activities are also in compliance with other relevant legislation, as considered below.

The potential effect of the historic peat extraction activities and the proposed remedial measures on nature conservation designated sites, bathing waters, nutrient sensitive areas (NSAs), shellfish areas and drinking water protected area's (DWPAs) are also included as part of the WFD Compliance Assessment.

2.6.1 Nature Conservation Designations

Within the Republic of Ireland designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs).

Ramsar sites are wetlands of international importance designated under the Ramsar Convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resources.

The Application Site is not located within a Ramsar site or a designated site of national (Natural Heritage Area (NHA) / Proposed Natural Heritage Area (pNHA)) or European importance (Special Area of Conservation (SAC) / Special Protection Area (SPA).

However, there are downstream hydrological connections with some Natura 2000 sites within the River Boyne surface water catchment. Designated sites that lie downstream of the Application Site include:

- River Boyne and River Blackwater SAC (Site Code: 002299), is hydrologically linked with the Application Site as the Deel (Raharney), Stonyford and Boyne rivers are included within the SAC;
- River Boyne and River Blackwater SPA (Site Code: 004232), is hydrologically linked with the Application Site as the Deel (Raharney), Stonyford and Boyne rivers are included within the SAC;
- Boyne Woods pNHA (Site Code: 001592), 26km northeast of Lisclogher Bog and to the east of Navan Town along the River Boyne;
- Crewbane Marsh pNHA (Site Code: 000553), 35km northeast of Lisclogher Bog along the River Boyne;
- Dowth Wetland pNHA (Site Code: 001861), 40km northeast of Lisclogher Bog;
- Boyne River Islands pNHA (Site Code: 001862), 42km northeast of Lisclogher Bog and to the west of Drogheda; and,
- Boyne Coast and Estuary SAC and pNHA (Site Code: 001957), 48km northeast of the Lisclogher Bog.

Other protected sites located in the vicinity of the Application Site but are not directly linked via surface water pathways include:

- Mount Hevey Bog SAC and Mount Hevey Bog pNHA is located approximately 3.4km west of the Application Site.
- The Royal Canal pNHA is located approximately 1.3km southwest of the Application Site.

2.6.2 Bathing Waters

There are no bathing water sites located in the vicinity of the Application Site. The closest protected bathing waters are located at Portrane - Brook Beach (IEEABWC020_0000_0200), ~60km west (as the crow flies) of the Application Site.

2.6.3 Nutrient Sensitive Areas

Nutrient Sensitive Areas (NSA) comprise Nitrate Vulnerable Zones and polluted waters designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive areas under the Urban Wastewater Treatment Directive (UWWTD)(91/271/EEC). Sensitive areas under the UWWTD are water bodies affected by eutrophication associated with elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

The Boyne River NSA (IERI_EA_1994_0001) and the Boyne Estuary NSA (IE_EA_010_0100) are mapped downstream of the Application Site. The Boyne River NSA is mapped to begin within the Boyne_100 river sub-basin, approximately 16km downstream of the Application Site. The EPA carried out a review of Nutrient Sensitive Areas (NSAs) downstream of large urban wastewater discharges in 2020. Once the regulations are in place, and nutrient sensitive areas have been identified, additional nutrient removal must be applied (if not already applied) to wastewater treatment plants discharging to the sensitive area. If this treatment was in place the objective was deemed to have been met. According to the Draft 3rd Cycle Boyne Catchment Report (2021, EPA) the NSA objectives are being met for the River Boyne and Boyne Estuary within the catchment.

2.6.4 Shellfish Areas

The Shellfish Waters Directive (2006/113/EC) aims to protect or improve shellfish waters in order to support shellfish life and growth.

There are no designated shellfish areas located in the vicinity of the Application Site. The Application Site is ~60km west (as the crow flies) of Balbriggan\Skerry (IE_EA_020_0000), the nearest protected shellfish area.

2.6.5 Drinking Water Protected Areas

According to the Draft 3rd Cycle Boyne Catchment Report (EPA, 2021) there are 12 no. surface waterbodies in the catchment identified as Drinking Water Protected Areas (DWPAs).

The Stoneyford_040 (IE_EA_07S020400) SWB mapped within the Application Site is identified as a DWPA. Further downstream the Boyne_100 SWB (IE_EA_07B041500), the Boyne_120 SWB (IE_EA_07B041700) and the Boyne_180 SWB (IE_EA_07B042200) are also recognised as DWPA's.

Meanwhile, all GWBs within the catchment, including the Athboy GWB, are listed as DWPAs.

3. WFD SCREENING

As discussed in **Section 2**, there are a total of 22 no. surface water bodies that are located in the vicinity or downstream of the Application Site. In addition, 1 no. groundwater body underlies the Application Site. Furthermore, there are several protected areas within the vicinity and downstream of the Application Site including a number of nature conservation designated sites, NSAs and DWPA's.

3.1 SURFACE WATER BODIES

As shown in Error! Reference source not found. above, there are 20 no. river water bodies, 1 no. transitional waterbody and 1 no. coastal waterbody located downstream of the Application Site.

With consideration for the historic peat extraction activities and the Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site, it is considered that all sections of the Deel(Raharney) and Stonyford Rivers in the vicinity and downstream of the Application Site are carried through into the WFD Assessment (i.e. Deel(Raharney)_030, Deel(Raharney)_040, Deel(Raharney)_050, Deel(Raharney)_060, Stonyford_030 and Stonyford_040). Similarly, the sections of the River Boyne to the west of Trim and downstream of the Application Site will be carried through for WFD Assessment (i.e. Boyne_050, Boyne_060, Boyne_070 and Boyne_080).

The River Boyne downstream of Trim has been screened out due to its distant location (>10km) from the Application Site. As outlined above in **Table A**, the area of the Application Site draining to downstream waterbodies as a percentage of the total catchment area for that waterbody decreases progressively downstream. For example, the Application Site is 1.77% of the total catchment area of the Boyne_090 river waterbody. This figure decreases to 0.96% for the Boyne_180 river waterbody upstream of the Boyne Estuary. Therefore, the Application Site comprises a very small percentage of the total catchment area to these surface waterbodies. The WFD also note the emergence of several new pressures on river waterbodies downstream of Trim i.e. agriculture, urban runoff and urban wastewater. The status of these waterbodies will not be affected by activities at the Application Site but rather represent pressures associated with wider land-use patterns in their catchments.

In addition, the Boyne Estuary transitional waterbody and the Boyne Estuary Plume coastal waterbody have been screened out due to their distant location, the large volumes of water within these surface waterbodies and the saline nature of these waters. The historic peat extraction activities and the proposed rehabilitation plans have no potential to cause a deterioration in the status of these screened out SWBs and/or jeopardise their attainment of good surface water status.

3.2 GROUNDWATER BODIES

With respect to groundwater bodies, the Athboy GWB will be carried through to the WFD Assessment due to its proximal location directly underlying the Application Site.

3.3 PROTECTED AREAS

The Application Site is hydrologically connected to the River Boyne and River Blackwater SAC and SPA via several drains and streams which flow from the bog areas into the Deel (Raharney), Stonyford and Boyne rivers. With consideration for the historic peat extraction activities and the proposed Cutaway Decommissioning and Rehabilitation Plans for the Application Site, it is considered that the River Boyne and River Blackwater SAC and SPA are carried through into the WFD Impact Assessment.

Several other designated sites, listed in **Section** Error! Reference source not found., are located further downstream along the River Boyne and are therefore also hydrologically connected with the Application Site. However, these designated sites are located significant distances (>25km) from the Application Site. Therefore, the historic peat extraction activities and the proposed Cutaway Bog Decommissioning and Rehabilitation Plans have no potential to impact any of these designated sites and so have been screened out. Consequently, the River Boyne and River Blackwater SAC/SPA remain the primary sensitive receptors due to their proximity to the Application Site and the direct hydrological linkage.

The Mount Hevey Bog SAC and Mount Hevey Bog pNHA is a raised bog and is located upgradient of any drainage from the Application Site. In addition, the River Deel acts as a hydraulic barrier between the Application Site and Hevey Bog. Therefore, no hydrological or hydrogeological impacts will occur on this designated site as a result of the historic peat extraction activities and the proposed rehabilitation plans.

The Royal Canal pNHA is located approximately 1.3km southwest of the Application Site. The River Deel acts as a hydraulic barrier between the Application Site and this pNHA. Therefore, no hydrological or hydrogeological impacts will occur on this designated site as a result of the historic peat extraction activities and the proposed Cutaway Bog Decommissioning and Rehabilitation Plans.

The Boyne River NSA downstream of the town of Trim has been screened out due to its distant location (>10km) from the Application Site and the increasing volumes of water within the Boyne River. In addition, the Boyne Estuary NSA has been screened out due to its distant location, the large volumes of water within the surface waterbody and the saline nature of these waters. The historic peat extraction activities and the proposed Cutaway Bog Decommissioning and Rehabilitation Plans have no potential to cause a deterioration in the status of these NSAs.

With consideration for the historic peat extraction activities and the proposed rehabilitation plan for the Application Site, it is considered that the Stonyford_040 DWPA is carried through into the WFD Impact Assessment due to its proximal location.

The bathing waters at Portrane, the Brook Beach and Shellfish areas at Balbriggan\Skerries, have been screened out due to their distal location from the Application Site. The historic peat extraction activities and the proposed Cutaway Bog Decommissioning and Rehabilitation Plans have no potential to cause a deterioration to these bathing or shellfish protected areas.

3.4 WFD SCREENING SUMMARY

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

Table D: Screening of WFD water bodies

Type	WFD Classification	Waterbody Name/ID	Inclusion in Assessment	Justification
Surface Water Body	River	Deel(Raharney)_030	Yes	The northwest of Bracklin Bog is located within the catchment of the Deel(Raharney)_030 SWB. An assessment is required to consider the potential impacts that historic peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Deel(Raharney)_040	Yes	The west of Bracklin Bog is located within the catchment of the Deel(Raharney)_040 SWB. An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Deel(Raharney)_050	Yes	The Deel(Raharney)_050 SWB is located directly downstream of the Deel(Raharney)_040 SWB and in close proximity to the Application Site. An assessment is required to consider the potential impacts of the peat extraction activities on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Deel(Raharney)_060	Yes	The southwest of Bracklin bog and the west of Ballivor bog drain to the Deel(Raharney)_060 SWB. An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Boyne_050	Yes	The Boyne_050 SWB is located directly downstream of the Deel(Raharney)_060 SWB and in close proximity to the Application Site. An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Stonyford_030	Yes	The north of Lisclogher bog is located within the catchment of the Stonyford_030 SWB. An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Stonyford_040	Yes	Lisclogher, Bracklin and Carranstown bogs are located within the catchment of the Stonyford_040 SWB. An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Boyne_060	Yes	The south of Carranstown bog and the east of Ballivor bog are located within the catchment of the Boyne_060 SWB. Furthermore, peat related activities are listed as a significant pressure impacting on this SWB. An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.

	River	Boyne_070	Yes	The Boyne_070 SWB is located directly downstream of the Stonyford_040 and Boyne_060 SWBs and in close proximity to the Application Site (~6.5km). An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Boyne_080	Yes	The Boyne_080 SWB is located directly downstream of the Boyne_070 SWB and in close proximity to the Application Site (~10km). An assessment is required to consider the potential impacts that peat extraction activities have had on this SWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this SWB.
	River	Boyne_090	No	The Boyne_090 SWB has been screened out due to its distal location from the Application Site (~13km), the increasing volumes of water within the River Boyne and the emergence of new non-peat related pressures (urban runoff) on this SWB. Furthermore, SWBs closer to the Application Site which have peat related activities listed as a significant pressure (Boyne_060) have a higher status than this waterbody.
	River	Boyne_100	No	The Boyne_100 SWB has been screened out due to its distal location from the Application Site (~16km), the increasing volumes of water within the River Boyne and the emergence of new non-peat related pressures (agriculture) on this SWB. Furthermore, SWBs closer to the Application Site which have peat related activities listed as a significant pressure (Boyne_060) have a higher status than this waterbody.
	River	Boyne_110	No	The Boyne_110 has been screened out due to its distal location from the Application Site (~20km), the increasing volumes of water within the River Boyne and the emergence of new non-peat related pressures (agriculture) on this SWB. While this SWB is unassigned with regards status, the historic or proposed activities will not cause this SWB to deteriorate.
	River	Boyne_120	No	The Boyne_120 SWB has been screened out due to its distal location from the Application Site (~23km), the increasing volumes of water within the River Boyne and the listing of non-peat related pressures (agriculture and urban runoff) on the SWB.
	River	Boyne_130	No	The Boyne_130 SWB has been screened out due to its distal location from the Application Site (~23km) and the increasing volumes of water within the River Boyne. While this SWB is unassigned with regards status, the historic or proposed activities will not cause this SWB to deteriorate.
	River	Boyne_140	No	The Boyne_140 SWB has been screened out due to its distal location from the Application Site (~22.5km) and the increasing volumes of water within the River Boyne. While this SWB is unassigned with regards status, the historic or proposed activities will not cause this SWB to deteriorate.
	River	Boyne_150	No	The Boyne_150 SWB has been screened out due to its distal location from the Application Site (~24km) and the increasing volumes of water within the River Boyne.
	River	Boyne_160	No	The Boyne_160 SWB has been screened out due to its distal location from the Application Site (~29km) and the increasing volumes of water within the River Boyne.

	River	Boyne_170	No	The Boyne_170 SWB has been screened out due to its distal location from the Application Site (~33km) and the increasing volumes of water within the River Boyne.
	River	Boyne_180	No	The Boyne_180 SWB has been screened out due to its distal location from the Application Site (~36km) and the increasing volumes of water within the River Boyne.
	Transitional	Boyne Estuary	No	The Boyne Estuary transitional waterbody has been screened out due to its distal location from the Application Site, the large volume of water within the estuary and the saline nature of its water.
	Coastal	Boyne Estuary Plume	No	The Boyne Estuary Plume coastal waterbody has been screened out due to its distal location from the Application Site, the large volumes of water within the surface waterbody and the saline nature of its water.
Groundwater Body	Groundwater	Athboy	Yes	The Application Site overlies the Athboy GWB. An assessment is required to consider the impacts of peat extraction activities on this GWB. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this GWB.
Protected Areas	Nature Conservation Designations	River Boyne and River Blackwater SAC & SPA	Yes	The Application Site is hydrologically connected to the River Boyne and River Blackwater SAC and SPA via several drains and streams which flow from the bog areas into the Deel (Raharney), Stonyford and Boyne rivers. An assessment is required to consider the potential impacts that historic peat extraction activities have had on this designated site. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this designated site.
		Boyne Woods pNHA	No	The Boyne Woods pNHA has been screened out due to its distal location from the Application Site (>25km). Therefore the historic or proposed activities have no potential to impact the pNHA.
		Crewbane Marsh pNHA	No	Crewbane Marsh pNHA has been screened out due to its distal location from the Application Site (>25km). Therefore the historic or proposed activities have no potential to impact the pNHA.
		Dowth Wetland pNHA	No	Dowth Wetland pNHA has been screened out due to its distal location from the Application Site (>25km). Therefore the historic or proposed activities have no potential to impact the pNHA.
		Boyne River Islands pNHA	No	Boyne River Islands pNHA has been screened out due to its distal location from the Application Site (>25km). Therefore the historic or proposed activities have no potential to impact the pNHA.
		Boyne Coast and Estuary SAC & pNHA	No	Boyne Coast and Estuary SAC & pNHA have been screened out due to its distal location from the Application Site (>25km). Therefore the historic or proposed activities have no potential to impact the SAC & pNHA.
		Mount Hevey Bog SAC & pNHA	No	Mount Hevey Bog SAC & pNHA is located upgradient of the Application Site. In addition, the River Deel acts as a hydraulic barrier between the Application Site and Hevey Bog. Therefore the historic or proposed activities have no potential to impact the SAC & pNHA.
		Royal Canal pNHA	No	The Royal Canal pNHA is located approximately 1.3km southwest of the Application Site. The River Deel acts as a hydraulic barrier between the Application Site and the pNHA. Therefore the historic or proposed activities have no potential to impact the pNHA.

	Bathing Waters	Portrane, the Brook Beach	No	Portrane, the Brook Beach bathing waters have been screened out due to its distal location from the Application Site (>60km). The historic or proposed activities have no potential to impact these Bathing Waters
	Nutrient Sensitive Areas	Boyne River NSA	No	The Boyne River NSA has been screened out due to its distal location from the Application Site (~16km) and the increasing volumes of water within the River Boyne. Therefore the historic or proposed activities have no potential to impact the status of this NSA.
		Boyne Estuary NSA	No	The Boyne Estuary NSA has been screened out due to its distal location from the Application Site, the large volume of water within the estuary and the saline nature of its water. Therefore, the historic or proposed activities have no potential to impact the status of this NSA.
	Shellfish Areas	Balbriggan\Skerries	No	Balbriggan\Skerries shellfish area has been screened out due to its distal location from the Application Site (>60km). The historic or proposed activities have no potential to impact this Shellfish Area.
	Drinking Water Protected Areas.	Stonyford_040	Yes	Lisclogher, Bracklin and Carranstown bogs are located within the catchment of the Stonyford_040 DWPA. An assessment is required to consider the potential impacts of the historic peat extraction activities on this DWPA. Similarly, an assessment is required to consider the potential impacts of the proposed rehabilitation plan on this DWPA.
		Boyne_100	No	The Boyne_100 DWPA has been screened out due to its distal location from the Application Site (~16km) and the increasing volumes of water within the River Boyne. Therefore the historic or proposed activities have no potential to impact the status of this DWPA.
		Boyne_120	No	The Boyne_120 DWPA has been screened out due to its distal location from the Application Site (~23km) and the increasing volumes of water within the River Boyne. Therefore the historic or proposed activities have no potential to impact the status of this DWPA.
		Boyne_180	No	The Boyne_180 DWPA has been screened out due to its distal location from the Application Site (~36km) and the increasing volumes of water within the River Boyne. Therefore the historic or proposed activities have no potential to impact the status of this DWPA.

4. WFD COMPLIANCE ASSESSMENT (ASSESSING THE EFFECT OF PREVIOUS ACTIVITIES)

4.1 PEAT EXTRACTION ACTIVITIES (PRE – 2003)

The Application Site has been subject to drainage and peat extraction activities since 1948, i.e. for more than 50 years before the WFD existed.

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. Constructed drainage ditches drain the upper surface of the bog by lowering the local peat water table. At this time, ancillary features were also constructed including railway lines, machine passes, canteens, work sites, Welfare facilities, mobile fuel tanks, fixed fuel tanks and peat loading facilities. After the Application Site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. During the Peat Extraction Phase, only minimal landuse change occurs which predominantly relate to minor annual topographic changes (i.e., lower ground levels) caused by ongoing peat extraction.

The timing of drainage and initiation of peat extraction varies across the Application Site. Ballivor Bog was the first bog to be drained in 1948, with industrial peat extraction commencing in 1953. The installation of drainage began in Lisclogher in 1959 with peat extraction commencing there in 1960. By the mid-1980s Carranstown and Bracklin bogs had all been drained with peat extraction beginning in both Carranstown and Bracklin bogs by 1988. Installation of drainage began in Lisclogher West in 1973, though Lisclogher West was never subject to peat extraction.

Prior to 2000, the 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. Also, since 1988, environmental monitoring and control measures in the form of silt ponds have been utilised at the Ballivor Bog Group with the aim of minimising the concentrations of suspended solids entering local watercourses (refer to Section 4.3.5 of rEIAR Chapter 4 for a full description of the measures).

Due to the nature of peat extraction activities being near surface activities, impacts on groundwater are generally negligible. Any groundwater impacts will be contained within the bog basin which is typically isolated from the underlying bedrock groundwater body due to a substantial thickness impermeable lacustrine deposits which underlies the basin peat. Therefore, surface water is the main sensitive receptor. The primary risks to groundwater at the Application Site was from cementitious materials, hydrocarbon spillage and leakages, and wastewater systems installed at welfare facilities across the bogs. 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 leakages.

There is no requirement to assess the peat extraction activities at the Application with respect to the WFD which predate 2003 (i.e. the transposition of the WFD Directive into Irish Law). Similarly, the assessment of peat extraction activities at the Application Site on Nature Conservation Designations and Drinking Water Protected Areas that have been screened in, is ineffectual pre-2003 due to the fact that the River Boyne and River Blackwater was only proposed as a Site of Importance in 2003. In addition, abstractions data collected for DWPA's only commenced in 2004 (and updated in 2009) for the legislation governing the quality of drinking water, set out in the European Communities (Drinking Water) (No. 2) Regulations 2007 (SI no. 278/2007).

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.

4.1.1 Effects

4.1.1.1 Surface Water Quantity/Quality

Peat in its natural state can act as a sponge providing storage of water after rainfall. However, with the implementation of bog drainage, the water levels in the peat bog were lowered and the capacity of the bog to store water was reduced. The available water storage within the bogs would have provided a small buffer for downstream flooding. However, following drainage, surface runoff rates from the Application Site would have increased slightly causing downstream rivers and streams to become flashier (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 (no longer active) then from silt ponds to outfalls, with final discharge to [surrounding each bog unit] 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 primary potential negative impact on surface water quality would be the increase in suspended solid entrainment in surface waterbodies. The greatest risk of suspended sediment entrainment occurs during times of major earthworks, such as during the removal of vegetation and the construction of the bog drainage network. 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 significant risk to local surface water quality, particularly as the River Boyne and its tributaries are capable of supporting populations of Salmonids which are particularly sensitive to elevated concentrations of sediments. The largest potential negative water quality effect would have occurred in those surface waterbodies directly downstream of the Application Site (i.e. the Ballivor Group of Bogs).

4.1.1.2 Effects from Hydrocarbon Leakages and Spills

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

Potential accidental wastewater discharges from on-site welfare facilities (tea stations and workshop/office facilities) have the potential to impact on groundwater and surface water quality. Runoff from concrete works can also impact on surface water and groundwater quality.

Furthermore, 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, production centres, mobile fuel tanks, fixed fuel tanks, and peat loading facilities. These potential impacts existed for all 5 no. bogs and their associated welfare facilities and workshops.

4.1.2 Baseline Water Quality

As the 1st WFD cycle was completed in 2010-2015, no WFD status reports exist for this period. However, the EPA have been completing ecological monitoring on these waterbodies since the 1970s. The Biological Q-Value is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories¹ (Q-values)

¹ Referred to hereinafter as 'Q-status' in order to differentiate between the EPA Q-Rating status, which is based solely on ecological parameters, and the WFD status which is a combination of ecological and chemical parameters.

ranging from 0-1 (Poor) to 4-5 (Good/High) (refer to **Table E**). These historic Q-values guide our estimates of the health of the waterbodies during this period.

Historic Q-values for SWBs directly downstream of the Application Site are summarized in **Table F** and presented graphically in Error! Reference source not found.. The data shows an overall decreasing trend from the early 1970s to the late 1990s. However, improvements in water quality occurred in the early to mid-1980s with many SWBs downstream of the Application Site achieving a Q-value of Q4 (Good Q-status) or Q4-5/Q5 (High Q-status) during this time. By the late 1990s, all SWBs directly downstream of the Application Site achieved a Q-value of Q3.5 (Moderate Q-status) or Q4 (Good Q-status) and were deemed to be either slightly polluted or unpolluted.

Of the 10 no. SWBs screened into the WFD assessment, 9 no. waterbodies achieved a Q-value of Q4-5/Q5 (High Q-status) and were deemed to be of satisfactory condition during this period (1971-2000). Only 1 no. waterbody achieved a Q-value of Q3 or lower. The Boyne_050 was assigned a Q-value of Q3 in 1974 but improved in quality to be of high Q-value in the early 1980s.

However, as shown in **Figure C: Historic Q Values (1971-2000)**, river waterbodies upstream of the Application Site (Boyne_040, Stonyford_020 and Deel(Raharney)_010) have experienced a similar trend in Q-values. Therefore, the trend is likely to reflect land-use changes in the wider Boyne catchment rather than any specific peat extraction related activities within the Application Site.

Table E: EPA Q-Rating System

EPA Q-Rating	EPA Q-Status	Pollution Status	Waterbody Condition
Q5/Q4-5	High Q-Status	Unpolluted	Satisfactory
Q4	Good Q-Status	Unpolluted	Satisfactory
Q3-4	Moderate Q-Status	Slightly Polluted	Unsatisfactory
Q3/Q2-3	Poor Q-Status	Moderately Polluted	Unsatisfactory
Q2/Q1-2/Q1	Bad Q-Status	Seriously Polluted	Unsatisfactory

Table F: Summary Historic Q-values during Unmitigated Peat Extraction Phase

WFD SWB	Station ID	Available Data	EPA Q-Rating Range
Deel(Raharney)_030	RS07D010200	1971 – 2000	3.5 - 5
Deel(Raharney)_040	RS07D010300	1976 – 2000	3.5 – 5
Deel(Raharney)_050	RS07D010400	1971 – 2000	3.5 – 5
Deel(Raharney)_060	RS07D010600	1971 – 2000	3.5 - 5
Boyne_050	RS07B040800	1974 – 2000	3 – 4.5
Boyne_060	RS07B040900	1974 – 2000	3.5 – 5
Stonyford_030	RS07S020075 RS07S020090 RS07S020080	1981 – 2000	3.5 – 4
Stonyford_040	RS07S020300	1976 – 2000	3.5 – 4.5
Boyne_070	RS07B041000	1974 – 2000	3.5 – 4
Boyne_080	RS07B041100	1979 – 2000	3.5 – 4.5

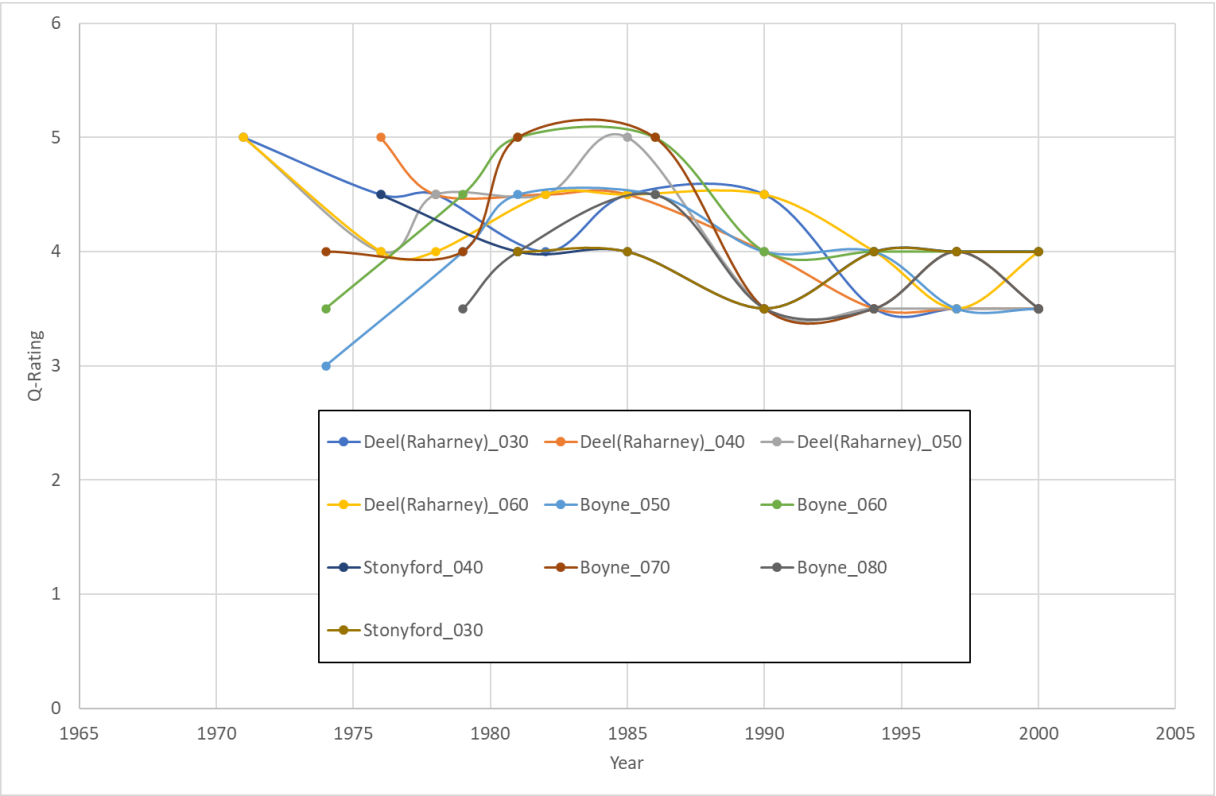


Figure C: Historic Q Values (1971-2000)

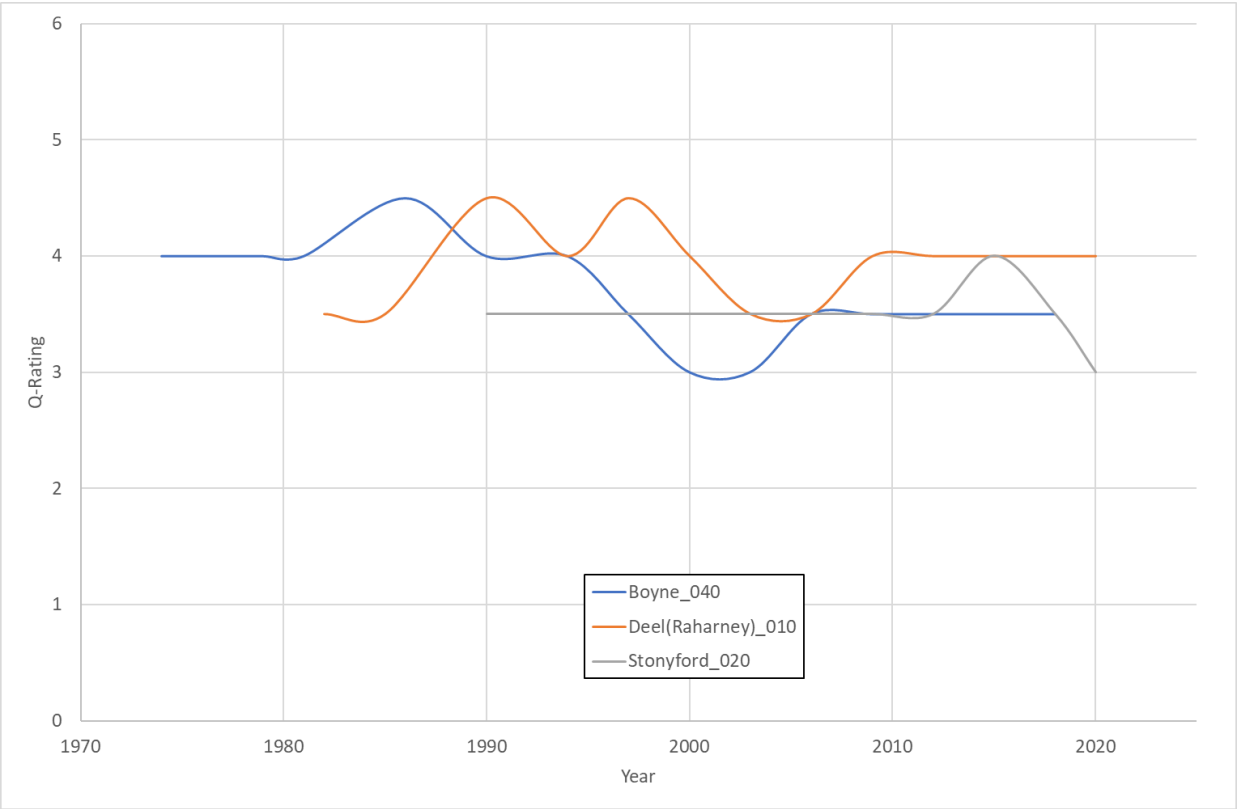


Figure D: Upstream EPA Q-Ratings (1974-2020)

4.2 PEAT EXTRACTION PHASE (2003 – JUNE 2020)

This phase includes all peat extraction activities from the transposition of the WFD into Irish Law in 2003 to the formal cessation of peat extraction activities in the June 2020. During this time period the peat extraction activities at the Application Site were completed under the conditions set out in IPC Licence No. P0501-01. This IPC Licence came into effect in April 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 4.3.5 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. Further amendments were made to the IPC Licence conditions in 2003 following the transposition of the WFD into Irish Law. The bogs also have Surface Water Management Plans² which define how compliance with the Licences is achieved. Therefore throughout this phase peat extraction activities have been operating under strict conditions designed to protect downstream water quality and quantity.

As the 1st WFD cycle was completed in 2010-2015, no WFD status exists for the first half of this period. However, EPA Q-values are available from 2000 to 2020 for all watercourses downstream of the Application Site and are summarized in **Table G** and presented graphically in

² Current versions: SWMP 0501 Derrygreenagh 31.01.2020.pdf

Error! Reference source not found.. The data shows a relatively stable trend in Q-values during this period with the majority of watercourses fluctuating between Q3.5 ("Moderate" Q-value) and Q4 ("Good" Q-value), being either slightly polluted or unpolluted. Only 1 no. waterbody achieved a "High" Q-value (Q4.5) during this period (Boyne_050). These EPA Q-values indicate a slight decline in water quality in comparison with the pre-2000 period. However, river waterbodies upstream of the Application Site have experienced a similar trend in Q-values (**Figure C: Historic Q Values (1971-2000)**). Therefore, the trend is likely to reflect land-use changes in the wider Boyne catchment rather than any specific peat extraction related activities within the Application Site. Consequently, changes in water quality during this period cannot be attributed solely to peat extraction activities, which were being scaled back at this time.

We consider that with the implementation of the control measures in accordance with IPC Licence Requirements the status of the SWBs during this phase were comparable to those recorded in the 1st WFD cycle (2010-2015).

Table G: Summary Historic Q-Values during mitigated Peat Extraction Phase

WFD SWB	Station ID	Available Data	EPA Q-Rating Range
Deel(Raharney)_030	RS07D010200	2000 – 2020	3.5 – 4
Deel(Raharney)_040	RS07D010300	2000 – 2020	3 – 4
Deel(Raharney)_050	RS07D010400	2000 – 2020	3.5 – 4
Deel(Raharney)_060	RS07D010600	2000 – 2020	3.5 – 4
Boyne_050	RS07B040800	2000 – 2020	3.5 – 4.5
Boyne_060	RS07B040900	2000 – 2020	3.5 – 4
Stonyford_030	RS07S020075 RS07S020090 RS07S020080	2000 – 2020	3 – 4
Stonyford_040	RS07S020300	2000 – 2020	3.5 – 4
Boyne_070	RS07B041000	2000 – 2020	3.5 – 4
Boyne_080	RS07B041100	2000 – 2020	3.5 – 4

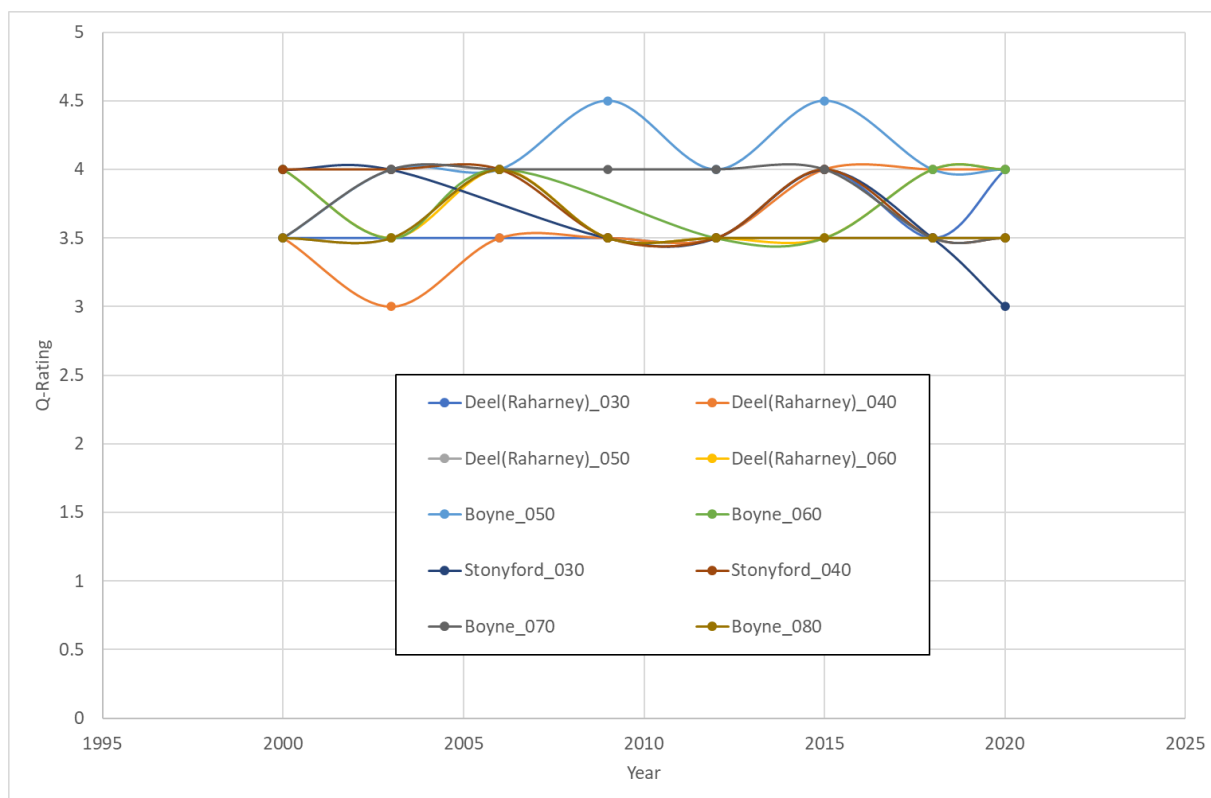


Figure E: Historic Q-Values (2000-2020)

4.2.1.1 Surface Water Quality Effects from Bog Drainage

During this period 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 wastewater 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 H** below.

We consider that the status of the SWBs at this time was comparable to those recorded during the 1st WFD round. Based on the EPA Q-values, there has been a slight decline in water quality in comparison with the pre-2000 period. However this is likely to be a combination of factors within the overall catchment and cannot be attributed solely to peat extraction activities which were being scaled back during this period. In addition, the monitoring and requirements of the IPC licence would have ensured that peat extraction activities were not adversely impacting water quality in downstream receptors.

A summary of potential status change to SWBs arising from potential surface water quality impacts from peat extraction works during the mitigated Peat Extraction Phase of peat extraction are outlined in **Table I**.

Table H: Bord na Móna Water Quality Monitoring (2003-2021)

Parameter	IPC Licence Limit	No. samples	No. Exceedances	% Compliant
COD (mg/l)	100	142	31	78%
pH	6 – 9	142	0	-
Ammonia (mg/l)	2.78	142	5	96%
Total Phosphorous (mg/l)	-	158	-	-
Suspended Solids (mg/l)	35	141	2	98.5%

Table I: Surface Water Quality Impacts during Mitigated Peat Extraction Phase

SWB	WFD Code	Assessed Pre-IPC Licence Status (Pre 2000)	Assessed Post IPC Licence Status (2000 – 2010)	WFD Cycle 1 Status (2010-2015)
Deel(Raharney)_030	IE_EA_07D010200	Moderate/Good	Good	Good
Deel(Raharney)_040	IE_EA_07D010300	Moderate/Good	Good	Good
Deel(Raharney)_050	IE_EA_07D010400	Moderate/Good	Moderate	Moderate
Deel(Raharney)_060	IE_EA_07D010600	Moderate/Good	Moderate	Moderate
Boyne_050	IE_EA_07B040800	Good	Good	Good
Boyne_060	IE_EA_07B040900	Moderate/Good	Moderate	Moderate
Stonyford_030	IE_EA_07S020100	Moderate/Good	Good	Good
Stonyford_040	IE_EA_07S020400	Moderate/Good	Good	Good
Boyne_070	IE_EA_07B041000	Good	Good	Good
Boyne_080	IE_EA_07B041200	Moderate	Moderate	Moderate

4.2.1.2 Groundwater Quality Effects from Leakages and Spills

The Ballivor Bog Group has been regulated by the EPA under IPC Licence Registration No. P0501-01 since 2000. Compliance with the IPC Licence requires a series of water quality protection controls. The list below outlines control measures conditioned under the IPC licencing regime, as regulated by the EPA:

- Effective spill/leak management of mobile fueling 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;
- Except for 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 (BnM) 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.

Due to the local hydrogeological regime and the isolation of the perched water table in the peat from the underlying regional groundwater table, we consider that that the no change in the status of the Athboy GWB would have occurred during the Peat Extraction Phase (refer to **Table J**).

Table J: Groundwater Quality Impacts during Mitigated Peat Extraction Phase

GWB	WFD Code	Assessed Pre-IPC Licence Status (Pre 2000)	Assessed Post IPC Licence Status (2000 – 2010)	WFD Cycle 1 Status (2010-2015)
Athboy	IE_EA_G_001	Good	Good	Good

4.2.1.3 Surface Water Quality Effects from Leakages and Spills

The Ballivor Bog Group has been regulated by the EPA under IPC Licence Registration No. P0501-01 since 2000. The bogs also have Surface Water Management Plans³ which define how compliance with the Licences is achieved via various control measures.

As described above in **Section 4.2** the historic Q-values during this period were generally of moderate and good status. If hydrocarbon leakages and spills were occurring during this phase of peat extraction activities such Q-values would not have been achieved. Much lower Q-ratings would be anticipated for waters polluted with hydrocarbon compounds. Therefore, we do not consider that peat extraction activities during this period resulted in a significant deterioration in surface water quality due to leakages and spills.

A summary of potential status change to SWBs arising from leakages and spills during the mitigated Peat Extraction Phase are outlined in **Table K**.

³ Current versions: SWMP 0501 Derrygreenagh 31.01.2020.pdf

Table K: Surface Water Quality Effects from Leakages and Spills during Mitigated Peat Extraction Phase

SWB	WFD Code	Assessed Pre IPC Licence Status (Pre 2000)	Assessed Post IPC Licence Status (2000 – 2010)	WFD Cycle 1 Status (2010-2015)
Deel(Raharney)_030	IE_EA_07D010200	Moderate/Good	Good	Good
Deel(Raharney)_040	IE_EA_07D010300	Moderate/Good	Good	Good
Deel(Raharney)_050	IE_EA_07D010400	Moderate/Good	Moderate	Moderate
Deel(Raharney)_060	IE_EA_07D010600	Moderate/Good	Moderate	Moderate
Boyne_050	IE_EA_07B040800	Good	Good	Good
Boyne_060	IE_EA_07B040900	Moderate/Good	Moderate	Moderate
Stonyford_030	IE_EA_07S020100	Moderate/Good	Good	Good
Stonyford_040	IE_EA_07S020400	Moderate/Good	Good	Good
Boyne_070	IE_EA_07B041000	Good	Good	Good
Boyne_080	IE_EA_07B041200	Moderate	Moderate	Moderate

4.2.1.4 Effects on River Boyne and River Blackwater SAC & SPA

The surface water connections from the Application Site to the Deel, Stonyford and Boyne rivers could potentially have transferred poor quality surface water that may have affected the conservation objectives of the downstream designated sites throughout its Peat Extraction Phase.

The qualifying interests of the SAC, as listed below, have the potential to be affected as these are associated directly with the river system.

- [7230] Alkaline Fens
- [91E0] Alluvial Forests
- [1099] River Lamprey (*Lampetra fluviatilis*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1355] Otter (*Lutra lutra*)

With regards the SPA, it is noted that even if some material was to enter the local watercourses of the Deel, Stonyford and Boyne rivers throughout its peat extraction phase, the actual Special Conservation Interests of the SPA, as listed below, would not be affected as the species are not associated with watercourses:

- A229 Kingfisher

However, during this period 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 control measures are outlined above in **Section 4.1.1**. Therefore, it can be concluded that the potential to affect the qualifying interests of the River Boyne and River Blackwater SAC throughout the

Peat Extraction Phase was significantly reduced due to the implementation of control measures throughout this phase.

4.2.1.5 Effects on Stonyford_040 DWPA

Peat extraction activities could potentially have resulted in an increase in the suspended sediment load, resulting in increased turbidity, increased pH and contamination which could have affected the water quality in the Stonyford River, therefore impacting on the Stonyford_040 DWPA.

However, during this period 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 control measures are outlined above in **Section 4.1.1**. Therefore, it can be concluded that the potential to affect the Stonyford_040 DWPA throughout the Peat Extraction Phase of the Ballivor Bog Group was significantly reduced due to the implementation of the control measures throughout this phase.

4.3 CURRENT PHASE (JUNE 2020 – PRESENT DAY)

The Current Phase includes all activities carried out at the Application Site from the cessation of peat extraction in June 2020 to the present day.

During this time period the decommissioning activities at the Application Site have been limited to the removal of stockpiled peat with no peat extraction occurring during this phase. From mid-2020 to mid-2021 operations at the Application Site comprised of the removal of stockpiled peat to the Ballivor Works for processing prior to transportation to Kilberry Horticulture Works in Co. Kildare the Edenderry Power Plant and Derinlough Briquette Factory, both in Co. Offaly. The Ballivor Works ceased operation in mid-2021 and from this date any stockpiled peat removed from the bogs is transported directly to the same above locations. The last stockpiled peat was removed from Ballivor Bog in June 2022 and the last of the stockpiles at Bracklin, Lisclogher and Carranstown bogs were removed by the end of 2023.

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

The Peatland Action Scheme (PCAS) is a programme of enhanced peatland rehabilitation measures, which is in addition to the IPC licence requirement (does not form part of this Substitute Consent application) and is 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 in Carranstown East, Lisclogher West and Bracklin West (refer to Section 4.7.2 for further details in relation to PCAS) during this phase.

4.3.1.1 Surface Water Quality Effects from Bog Drainage

With the cessation of peat extraction, there is less potential for disturbance of peat and elevated concentrations of suspended sediments entering surface watercourses. During this period the site drainage still operated 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.

During this period the Application Site also continued to operate under IPC licencing requirements with respect to surface water discharge quality and quantity.

The status of SWBs during the Current Phase is likely to be unchanged from those recorded during the most recent WFD round (2016-2021). A summary of status change to SWBs arising from bog drainage during the Current Phase are outlined in **Table L**.

Table L: Surface Water Quality Effects from Bog Drainage during the Current Phase

SWB	WFD Code	Status (2016-2021)	Assessed Change
Deel(Raharney)_030	IE_EA_07D010200	Good	Good
Deel(Raharney)_040	IE_EA_07D010300	Good	Good
Deel(Raharney)_050	IE_EA_07D010400	Moderate	Moderate
Deel(Raharney)_060	IE_EA_07D010600	Good	Good
Boyne_050	IE_EA_07B040800	Good	Good
Boyne_060	IE_EA_07B040900	Good	Good
Stonyford_030	IE_EA_07S020100	Poor	Poor
Stonyford_040	IE_EA_07S020400	Moderate	Moderate
Boyne_070	IE_EA_07B041000	Moderate	Moderate
Boyne_080	IE_EA_07B041200	Moderate	Moderate

4.3.1.2 Contamination of Groundwater by Leakages and Spills

Despite the cessation of peat extraction at the Application Site, there was still some limited activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Bord na Móna depot remained occupied and discharges from wastewater systems (septic tanks) etc. have the potential to cause surface water and groundwater contamination. However, the risks are of a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase.

A summary of potential status change to GWBs arising from potential groundwater quality impacts during the Current Phase are outlined in **Table M**.

Table M: Groundwater Quality Impacts during the Current Phase

GWB	WFD Code	Status (2016-2021)	Assessed Change
Athboy	IE_EA_G_001	Good	Good

4.3.1.3 Contamination of Surface Water by Leakages and Spills

Despite the cessation of peat extraction at the Application Site, there is still some limited activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Bord na Móna depot remain occupied and discharges from wastewater systems (septic tanks) etc. have the potential to cause surface water and groundwater contamination. These risks of a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase.

A summary of status change to SWBs arising from bog drainage during the Current Phase are outlined in **Table N**.

Table N: Surface Water Quality Effects from Bog Drainage during the Current Phase

SWB	WFD Code	Status (2016-2021)	Assessed Change
Deel(Raharney)_030	IE_EA_07D010200	Good	Good
Deel(Raharney)_040	IE_EA_07D010300	Good	Good
Deel(Raharney)_050	IE_EA_07D010400	Moderate	Moderate
Deel(Raharney)_060	IE_EA_07D010600	Good	Good
Boyne_050	IE_EA_07B040800	Good	Good
Boyne_060	IE_EA_07B040900	Good	Good
Stonyford_030	IE_EA_07S020100	Poor	Poor
Stonyford_040	IE_EA_07S020400	Moderate	Moderate
Boyne_070	IE_EA_07B041000	Moderate	Moderate
Boyne_080	IE_EA_07B041200	Moderate	Moderate

4.3.1.4 Effects on the River Boyne and River Blackwater SAC & SPA

With the cessation of peat extraction, there is less potential for disturbance of peat and elevated concentrations of suspended sediments and contaminants entering surface watercourses and downstream designated sites. During this period the Application 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.

During this period the Application Site also continues to operate under IPC licensing requirements with respect to surface water discharge quality and quantity.

Therefore, it can be concluded that the potential to affect the qualifying interests of the River Boyne and River Blackwater SAC & SPA throughout the Current Phase is significantly reduced due to the reduced activity at the Application Site and the continued implementation of mitigation measures.

4.3.1.5 Effects on the Stonyford_040 DWPA

Despite the cessation of peat extraction, there was still some limited activity at the Application Site that could potentially have resulted in an increase in the suspended sediment load, resulting in increased turbidity, increased pH and contamination which could have affected the water quality in the Stonyford River, therefore impacting on the Stonyford_040 DWPA.

However, the risks are of a lesser extent due to the lower volumes of plant, machinery and workers operating at the Application Site during the Current Phase and during this period the Application Site continues to operate in accordance with IPC licence conditions which put in place a series of mitigation measures designed for the protection of surface water quality in the vicinity and downstream of the Application Site. These mitigation measures are discussed above in **Section 4.1.1**. Therefore, it can be concluded that the potential to affect the

Stonyford_040 DWPA throughout the Current Phase is significantly reduced due to the reduced activity at the Application Site and the continued implementation of mitigation measures.

5. WFD COMPLIANCE ASSESSMENT (REMEDIAL PHASE)

5.1 REMEDIAL MEASURES PHASE

It is currently proposed to implement a Cutaway Bog Decommissioning and Rehabilitation Plan at each of the bogs comprising the Application Site. The plans use bespoke interventions designed to first stabilise the environment and secondly to rehabilitate the Application Site as much as possible by placing the existing peatland environments on a path towards naturally functioning peatlands. Rehabilitation allows a site to naturally colonise with vegetation to stabilise the bare peat extraction fields and minimise water pollution. Whilst the proposed rehabilitation plans have a ~5 year timeframe, in general Bord na Móna peatlands cannot be restored back to the raised bog in a reasonable timeframe as their environmental conditions have been so radically altered from its natural state. Rehabilitation has already commenced on a section of Carranstown and Lisclogher bogs. These Decommissioning and Rehabilitation Plans are required in order to fulfil the requirements of Condition 10.2 of the IPC licence No. P0501-01. These Cutaway Bog Decommissioning and Rehabilitation Plans, attached as Appendix 4-2, will be subject to agreement with the EPA prior to their implementation across the Application Site (Note that the Decommissioning and Rehabilitation Plans for Lisclogher West and Carranstown have been agreed and are no longer in draft).

The proposed rehabilitation plans at the Application Site will be undertaken using standard best practices (refer to Appendix III of the Cutaway Bog Decommissioning and Rehabilitation Plans included as Appendix 4-2). Each individual bog comprising the Ballivor Bog Group has its own unique history of peat extraction activities, therefore the most appropriate rehabilitation approach is bog specific reflecting local ecological and hydrological factors. For example, the rehabilitation of the milled peat extraction area in western Bracklin will be different to that of Lisclogher West, which was never subject to industrial scale peat extraction.

Bord na Móna's rehabilitation plans identify two scenarios present at the Application Site which will determine any additional targeted revegetation or rewetting measures to be implemented. Firstly, in the case that significant acid peat remains at the surface, there will be an assessment of the area to implement an intensive programme of drain-blocking and promote the re-establishment of more typical bog communities. Secondly, where alkaline peat is exposed at the surface the land is likely to revert to more alkaline poor fen/wetland or Birch dominated scrub ecosystems where the development of these communities will depend on the potential to rewet the site.

The greatest hydrological/hydrogeological effects will be experienced in those areas selected for rewetting following ecological surveying. Rewetting would be achieved through measures such as drain blocking. This would raise the local peat water table, establishing a more suitable hydrological/hydrogeological regime, making these areas suitable for colonisation by more typical bog communities. Elsewhere where rewetting is not suitable the drainage regimes will remain relatively unchanged.

The rehabilitation plans comprise of short term planning actions, short term practical actions and long-term actions. The initial short-term planning actions will involve seeking approval of the rehabilitation plans from the EPA. In addition, detailed site plans of how the various rehabilitation measures will be applied will be developed for each bog and a review of all issues and constraints which may impact the proposed rehabilitation plans will be completed. The short-term planning actions will ensure that all activities associated with the rehab plans will be completed in accordance with the requirements of the IPC licence. Several short-term actions will be completed in the first 2 years following EPA approval of the rehabilitation plans. These actions will include intensive drain blocking and monitoring of the rehabilitation measures. Silt ponds will continue to function during this phase of the rehabilitation plans. Longer term actions (>3 years) include the evaluation of the success of the short-term rehabilitation measures and undertake further remediation where necessary. Long-term monitoring, aftercare and

maintenance will be completed until the IPC licence is surrendered. We understand that during this phase of the rehabilitation plans, silt ponds will be decommissioned if necessary.

Much of the work associated with the rehabilitation plans will occur during the initial stages of the plan. Once drain blocking and other measures have been implemented the operational activities will comprise non-intrusive ecological and hydrological monitoring and may also include minimal maintenance and repair works if/as those works are deemed necessary.

The Cutaway Bog Decommissioning and Rehabilitation Plans contain enhanced rehabilitation measures associated with the Peatland Climate Action Scheme (PCAS). The proposed enhanced measures include intensive drain blocking, reprofiling of peat fields, fertilizer application and seeding of vegetation. Note that some of these measures have already been implemented in some areas of the Application Site (eastern portion of Carranstown, Lisclogher West and western Bracklin during the Current Phase).

5.2 POTENTIAL EFFECTS (UNMITIGATED)

The Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site cannot be implemented without mitigation measures. 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.

5.3 POTENTIAL EFFECTS (MITIGATED)

5.3.1 Surface Water Quality Effects and Mitigation Measures

Whereas draining the Application Site to facilitate peat extraction has likely had a negative impact on downstream surface watercourses, improvements in flow and water quality can be achieved through bog rehabilitation and rewetting.

International studies have shown a long-term reduction in pollutant concentrations, including nitrate and ammonia, following rewetting in comparison to drained peatlands (Pschenyckyj, C. et al. 2021). Several studies have shown that the magnitude of these positive effects depends on site-specific factors such as the degree of degradation and local peat characteristics. Some studies have shown a short-term increase in phosphorous and suspended solids following restoration linked to initial drain-blocking activities before the hydrogeological regime of the site becomes stabilised (Pschenyckyj, C. et al. 2021). These will be short term impacts and will not impact the overall status of downstream waterbodies.

The greatest improvement in water quality will occur in the receiving waterbodies directly downstream of the Application Site (Deel(Raharney)_030, Deel(Raharney)_040, Deel(Raharney)_060, Boyne_060, Stonyford_030 and Stonyford_040). In the long term, enhanced water quality associated with bog rehabilitation will aid these waterbodies in achieving an improved WFD status. "High" status may be achieved in the Deel(Raharney)_040, Deel(Raharney)_060 and Boyne_060 river waterbodies which are currently of "Good" status. Further downstream the magnitude of the positive impact associated with bog rehabilitation will likely be reduced and these waterbodies (Boyne_050, Boyne_070 and Boyne_080) will not experience a change in WFD status as a direct result of the Remedial Phase, and other existing catchment pressures are likely to continue to dominate future status assignments.

Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with BnM reporting to the EPA until the IPC Licence is surrendered. The existing drainage systems which have proven effect will continue to operate during this period. Including the operation, maintenance and monitoring of silt ponds to prevent silt-run-off from the Application Site.

The Cutaway Bog Decommissioning and Rehabilitation Plans state that the effects of any management activities will be monitored and assessed.

5.3.2 Groundwater Quality Effects from Leakages and Spills

During the Remedial Phase, there will be some activity at the Application Site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. This activity will be greatest during the initial stages of rehabilitation when works associated with rewetting and revegetation such as drain blocking will be completed. Once this work has been completed there will only be very limited activity at the Application Site which will mainly comprise of non-intrusive monitoring and minimal repairs to peat blockages and or additional fertilization to aid the development of successional vegetation communities.

Due to the presence of peat at the Application Site and the bulk low permeability of the underlying mineral soil deposits, groundwater recharge at this site is limited. A shallow perched groundwater table exists in the peat and this is isolated from the underlying regional groundwater system and the Athboy GWB. Therefore, even in an unmitigated scenario any groundwater contamination will occur within the perched water table which discharges to nearby surface watercourses. No deterioration in groundwater quality in the underlying bedrock aquifer or the Athboy GWB will occur.

Mitigation measures will be implemented and adhered to until the IPC Licence for the Application Site is surrendered. These measures significantly decrease the risk of groundwater contamination. No further mitigation measures, beyond those implemented to date, are deemed necessary.

5.3.3 Surface Water Quality Effects from Leakages and Spills

As stated in **Section 5.3.2** above, there is a risk of accidental spillage of hydrocarbons during initial rehabilitation works. Due to the local hydrogeological regime and low rates of groundwater recharge, contaminants will enter the bog drainage network and downstream river waterbodies, resulting in a deterioration in surface water quality. This will have a potential negative effect on the WFD status of river waterbodies directly downstream of the Application Site (Deel(Raharney)_030, Deel(Raharney)_040, Deel(Raharney)_060, Boyne_060, Stonyford_030 and Stonyford_040). Due to the persistent nature of hydrocarbons in the environment this adverse effect may extend to downstream watercourses including the Deel(Raharney)_050 and the Boyne_070 SWBs.

Mitigation measures will be implemented and adhered to until the IPC Licence for the Application Site is surrendered.

5.3.4 Effects on the River Boyne and River Blackwater SAC and SPA

The surface water connections from the Application Site to the Deel, Stonyford and Boyne rivers that are associated with and mapped within the River Boyne and River Blackwater SAC and SPA may improve in water quality due to improvements in flow and water quality that can be achieved through bog rehabilitation and rewetting.

Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with BnM reporting to the EPA until the IPC Licence is surrendered. The existing drainage systems which have proven effect will continue to operate during this period. Including the operation, maintenance and monitoring of silt ponds to prevent silt-run-off from the Application Site.

Therefore, it can be concluded that the potential to negatively affect the qualifying interests of the River Boyne and River Blackwater SAC & SPA throughout the Remedial Phase is significantly reduced. On the contrary, the potential for the Cutaway Bog Decommissioning and Rehabilitation Plans to positively affect the qualifying interests of the River Boyne and River

Blackwater SAC & SPA is a more likely outcome as improvements in flow and water quality can be achieved through bog rehabilitation and rewetting, which in turn will positively affect the watercourses and associated qualifying interests of the River Boyne and River Blackwater SAC & SPA.

5.3.5 Effects on the Stonyford_040 DWPA

The surface water connections from the Application Site to the Stonyford River may improve in water quality due to improvements in flow and water quality that can be achieved through bog rehabilitation and rewetting.

The greatest improvement in water quality will occur in the receiving waterbodies directly downstream of the Application Site including the Stonyford_040 SWB, therefore impacting on the Stonyford_040 DWPA. In the long term, enhanced water quality associated with bog rehabilitation will aid the improvement of water quality within the Stonyford_040 DWPA.

Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation Plans will be completed under licence from the EPA with BnM reporting to the EPA until the IPC Licence is surrendered. The existing drainage systems which have proven effect will continue to operate during this period. Including the operation, maintenance and monitoring of silt ponds to prevent silt-run-off from the Application Site.

However, as stated in **Section 5.3.2** above, there is a risk of accidental spillage of hydrocarbons during initial rehabilitation works. Due to the local hydrogeological regime and low rates of groundwater recharge, contaminants will enter the bog drainage network and downstream river waterbodies, resulting in a deterioration in surface water quality. This will have a potential negative effect on the river waterbodies directly downstream of the Application Site, including the Stonyford_040, therefore impacting on the Stonyford_040 DWPA.

Mitigation measures will be implemented and adhered to until the IPC Licence for the Application Site is surrendered.

5.3.6 Summary Potential Effects of Remedial Phase

In all instances, the mitigation measures described above are sufficient to meet the WFD Objectives. The assessment of WFD elements for the WFD waterbodies for the short-term and long-term is summarised in **Table O** 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 SWBs and/or jeopardise their attainment of good surface water status. The long-term impacts of the Application Site 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.

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

WFD Element	WFD Code	Current Status (2016-2021)	Assessed Short-term Status	Assessed Long-term Status
Deel(Raharney)_030	IE_EA_07D010200	Good	Good	Good/High
Deel(Raharney)_040	IE_EA_07D010300	Good	Good	Good/High
Deel(Raharney)_050	IE_EA_07D010400	Moderate	Moderate	Moderate/Good
Deel(Raharney)_060	IE_EA_07D010600	Good	Good	Good/High
Boyne_050	IE_EA_07B040800	Good	Good	Good
Boyne_060	IE_EA_07B040900	Good	Good	Good/High
Stonyford_030	IE_EA_07S020100	Poor	Poor	Poor/Moderate
Stonyford_040	IE_EA_07S020400	Moderate	Moderate	Moderate/Good
Boyne_070	IE_EA_07B041000	Moderate	Moderate	Moderate
Boyne_080	IE_EA_07B041200	Moderate	Moderate	Moderate

6. SUMMARY & CONCLUSION

WFD status for SWBs (Surface Water Bodies) and GWBs (Groundwater Bodies) hydrologically linked to the Application are defined in **Section 2** above.

From a hydrological perspective, the main impacts associated with the peat extraction activities at the Application Site occurred during the initial stages of peat extraction with the installation of the drainage infrastructure to facilitate peat extraction activities. The timing of drainage varied across the site with Ballivor Bog being the first bog subject to drainage in 1948. All remaining bogs were drained by the mid-1980s. Therefore, these activities and their potential effect on the underlying GWB and downstream SWBs pre-date the transposition of the WFD into Irish Law.

The WFD Directive came into effect in Ireland in 2003 and this report assesses the effects of the peat extraction activities at the Application Site from this date until the formal cessation of peat extraction in June 2020. During this time period, all activities at the Application Site were operating under IPC Licence requirements. The IPC Licence (P0501-01) sets out several conditions and emission limits designed to ensure the protection of surface and groundwaters. These measures likely led to an improvement in the status of local surface waterbodies in the vicinity of the Application Site.

Peat extraction ceased at the Application Site in June 2020 and no significant changes to the hydrological and/or hydrogeological environments will have occurred from the termination of peat extraction activities to the present day.

While no WFD status reports are available for the period predating 2010, the EPA have been completing ecological monitoring on downstream waterbodies since the 1970s. The Q-values suggest that the peat extraction activities from 2003 to 2010 did not have a significant negative impact before the first WFD cycle in 2010. Review of the available WFD reports show that many of the downstream SWBs achieved a good or moderate status during the Peat Extraction Phase (2003-2020). Whilst several waterbodies experienced a deterioration in WFD status this is unlikely to be related to peat extraction activities which were being scaled back at this time and operating in accordance with IPC requirements. It is important to note that river waterbodies upstream of the Application Site have experienced a similar trend in Q-values over time. Therefore, the trend is likely to reflect wider land-use changes in the Boyne catchment rather than any specific peat extraction related activities within the Application Site.

The Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site have also been assessed (Remedial Phase). The plans will generally involve the rewetting and revegetation of the drained bogs. These plans will likely have a positive effect on hydrogeology within the Application Site where groundwater tables in the peat bogs are stabilised and closer to the bog surface. However, the Application Site will never return to the original intact raised bog condition which was present before the commencement of the drainage/peat extraction activities. Studies from elsewhere (e.g., Pschenyckj, C. et al. 2021) have shown that bog rewetting can also result in improvements in local and downstream surface water quality.

During the Remedial Phase the Application Site will be operated in accordance with IPC Licence requirements. These mitigation measures will ensure the protection of downstream surface waterbodies.

3 no. SWBs (Surface Water Bodies) directly downstream of the Application Site are at risk of failing to meet their respective WFD objectives. Therefore, catchment pressures (on water quality and water quantity/volume) appear to be significant at present. Only 1 no. river waterbody downstream of the Application Site (Stonyford_030) is listed as being under significant pressure from peat related activities. However, the proposed rehabilitation plans for the Application Site will ease local peat extraction related pressures and likely improve the status of these SWBs.

The local hydrogeological regime at the Application Site with low permeability peat and glacial deposits ensure that the perched groundwater table within the bog is isolated from the underlying groundwater body. Therefore, historic peat extraction activities are unlikely to have impacted the qualitative (chemical) or quantitative (volume) status of the groundwater body. Similarly, there will be no change in GWB status associated with the Cutaway Bog Decommissioning and Rehabilitation Plans.

As such, the Cutaway Bog Decommissioning and Rehabilitation Plans will not negatively impact upon any surface or groundwater body as it will not cause a deterioration in the status of the body and/or it will not jeopardise the attainment of good status.

Furthermore, the Cutaway Bog Decommissioning and Rehabilitation Plans will not negatively impact upon any downstream protected areas.

Table P presents a summary of the estimated WFD status of downstream SWBs and the underlying GWB as discussed in **Section** Error! Reference source not found., **Section 4.2**, **Section** Error! Reference source not found. and **Section 5.3** above.

Table P: Summary WFD Status

WFD Element	Assessed Pre IPC Licence Status (Pre 2000)	Assessed Post IPC Licence Status (2003-2010)	WFD Status (2010-2015)	WFD Status (2013-2018)	WFD Status (2016-2021)	Current Phase (2020-Present)	Short-term Remedial Phase	Long-term Remedial Phase
Deel(Raharney)_030	Moderate/ Good	Good	Good	Moderate	Good	Good	Good	Good/High
Deel(Raharney)_040	Moderate/ Good	Good	Good	Good	Good	Good	Good	Good/High
Deel(Raharney)_050	Moderate/ Good	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate/ Good
Deel(Raharney)_060	Moderate/ Good	Moderate	Moderate	Good	Good	Good	Good	Good/High
Boyne_050	Good	Good	Good	Good	Good	Good	Good	Good
Boyne_060	Moderate/ Good	Moderate	Moderate	Good	Good	Good	Good	Good/High
Stonyford_030	Moderate/ Good	Good	Good	Moderate	Poor	Poor	Poor	Poor/Moderate
Stonyford_040	Moderate/ Good	Good	Good	Moderate	Moderate	Moderate	Moderate	Moderate/ Good
Boyne_070	Good	Good	Good	Moderate	Moderate	Moderate	Moderate	Moderate
Boyne_080	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Athboy GWB	Good	Good	Good	Good	Good	Good	Good	Good

6.1.1 Conclusion

WFD status for SWBs (Surface Water Bodies) and GWBs (Groundwater Bodies) hydraulically linked to the Application Site are defined in **Section 2** above.

Historic peat extraction activities at the Application Site would have had the potential to impact on the status of downstream SWBs and the underlying GWB. However, since the transposition of the WFD into Irish Law in 2003, all peat extraction activities at the Application Site have been operating in under strict IPC Licence requirements designed for the protection of surface and groundwaters and the protection of the status of these waterbodies.

Therefore, there has been no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the historic peat extraction works. The mitigation measures have ensured that there was no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB, downstream SWBs and downstream protected areas have been protected from any potential deterioration.

As such, the Peat Extraction Phase (2003-2020) and the Current Phase (2020-Present):

- Have not caused a deterioration in the status of all surface and groundwater bodies assessed;
- Have not jeopardised the objectives to achieve 'Good' surface water/groundwater status;
- Have not jeopardised the attainment of 'Good' surface water/groundwater chemical status;
- Have not jeopardised the attainment of 'Good' surface water/groundwater quantity status;
- Have not permanently excluded or compromised the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- Have been compliant with the requirements of the Water Framework Directive (2000/60/EC); and,
- Have been consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC) (Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 9.1.4 of EIAR Chapter 9).

Furthermore the Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site will be completed in accordance with IPC Licence conditions and will not impact the status of any waterbody. In addition there will be no potential effects on any downstream protected areas as a result of the Cutaway Bog Decommissioning and Rehabilitation Plans. Indeed, the Cutaway Bog Decommissioning and Rehabilitation Plans will likely have a positive long-term effect to the Water Framework Directive Classification of downstream waterbodies.

As such, the Remedial Phase:

- will not cause a deterioration in the status of all surface and groundwater bodies assessed;
- will not jeopardise the objectives to achieve 'Good' surface water/groundwater status;
- does not jeopardise the attainment of 'Good' surface water/groundwater chemical status;
- does not jeopardise the attainment of 'Good' surface water/groundwater quantity status;
- does not permanently exclude or compromise the achievement of the objectives of the WFD in other waterbodies within the same river basin district;
- is compliant with the requirements of the Water Framework Directive (2000/60/EC); and,
- is consistent with other Community Environmental Legislation including the EIA Directive (2014/52/EU), the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC)

(Note that a full list of legislation complied with in relation to hydrology and hydrogeology is included in Section 9.1.4 of EIAR Chapter 9).

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