TOBIN

Derryhinch, Drumman, Derryarkin, Ballybeg and Toar Bogs – Application for Derrygreenagh Substitute Consent

Remedial Appropriate Assessment Screening Report

September 2026

BnM

BUILT ON KNOWLEDGE

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1. INTRODUCTION

1.1 OVERVIEW OF PROJECT, SUBSTITUTE CONSENT AND REGULATORY CONTEXT

This remedial Appropriate Assessment Screening Report (remedial AASR) has been prepared by TOBIN on behalf of Bord na Móna Biomass Limited (Bord na Móna) to assess an application for Substitute Consent to An Coimisiún Pleanála (ACP) under Section 177E of the Planning and Development Act 2000 (as amended).

The Substitute Consent application relates to historic peat extraction activities and associated ancillary works undertaken from June 1994 to the present day at Derryhinch, Drumman, Derryarkin, Ballybeg and Toar Bogs, Counties Offaly, Meath and Westmeath (collectively referred to as the 'Application Site'). This assessment also considers the likely significant effects associated with current decommissioning and management measures and the proposed future rehabilitation activities across the Application Site. The application Site is shown in Figure 1-1.

The bogs comprising the Application Site form part of the wider Derrygreenagh Bog Group, a group of bogs owned and operated by Bord na Móna. Site preparation works including vegetation clearance and drainage insertion commenced in 1950 across all bogs, with industrial peat extraction and associated ancillary activities were undertaken from 1958 onwards. Peat extraction activities continued for varying durations across the individual bogs, as follows:

- Derryhinch Bog - peat extraction occurred from 1958 to 2017
- Drumman Bog - peat extraction occurred from 1958 to 2018
- Derryarkin Bog - peat extraction occurred from 1958 to between 1988 and 1991
- Ballybeg Bog - peat extraction occurred from 1958 to 2020
- Toar Bog – peat extraction occurred from 1958 to 2018

Following the cessation of peat extraction at the Application Site, Bord na Móna is required under Condition 10 of EPA IPC Licence P0501-01 (Derrygreenagh Bog Group) to implement Cutaway Bog Decommissioning and Rehabilitation Plans. Since extraction ceased, activities have focused on decommissioning and site rehabilitation, including the removal of peat stockpiles (completed in 2021), infrastructure decommissioning, water level management, environmental monitoring, and maintenance of drainage and access networks to support restoration. All elements of historic peat extraction and ancillary activities, together with decommissioning, site management, and measure implemented or proposed as part of the Cutaway Bog Decommissioning and Rehabilitation Plans at the Application Site, are referred to herein collectively as the "Project". Section 2 below provides a detailed summary of the Project.

It should be noted that application for Substitute Consent is also supported by a remedial Environmental Impact Assessment Report (remedial EIAR).





Legend

- Application Site Boundary
- Derrygreenagh Work Location
- Towns

0 1.5 3
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community.

Rev	Date	Description	By	Chkd.
A	16/09/2026	First issue	S.P	B.K

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 1-1:
Site Location Map

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
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Map Ref: 12334-024-P.App.BO-OSM-TOB-A

Draft: A

1.2 NEED FOR REMEDIAL APPROPRIATE ASSESSMENT

1.2.1 Legislative Requirement

Appropriate Assessment (AA) is a requirement of Article 6(3) of the Habitats Directive and is the process by which the potential effects of a plan or project on European sites, which collectively comprise the Natura 2000 network, are assessed in view of their conservation objectives. Article 6(3) of the Habitats Directive states that:

- '*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public'.*

The Habitats Directive came into force in Ireland on 10 June 1994. Consequently, June 1994 represents the earliest date from which AA requirements may have applied to activities associated with the Project at the Application Site. Although the Directive was subsequently transposed into Irish law through the European Communities (Natural Habitats) Regulations 1997, the commencement of the assessment period from June 1994 represents the earliest point at which AA of effects associated with the Project could have been required. Accordingly, a remedial AA has been undertaken for the Project to assess the potential effects arising from the Project on European sites from June 1994 onwards.

The first stage of the AA process is screening, which is required pursuant to Article 6(3) of the Habitats Directive and Part XAB of the Planning and Development Act 2000 (as amended), is to determine, on the basis of objective scientific information, whether **likely significant effects** of the Project on any European site can be excluded.

This remedial AASR assesses the potential for likely significant effects on European sites arising from historic peat extraction and associated ancillary activities, subsequent decommissioning and site management activities, and the future implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans at the Application Site.

1.2.2 Project Phases

In order to appropriately assess the potential for likely significant effects on European Sites, the Project is considered across three distinct temporal phases reflecting the changing of activities at the Application Site and the corresponding potential impact pathways to European sites. The phases distinguish between the period of active peat extraction, the subsequent transition to decommissioning and site management following cessation of peat extraction, and the future implementation of rehabilitation measures, providing a clear framework for assessing how activities, pressures, and potential impact pathways have changed over time and ensuring that all relevant stages of the Project from 1994 to the present, and into the future, are appropriately considered. The three distinct Project phases are:

- **Peat Extraction Phase (June 1994 – June 2020)**
  This phase includes all works undertaken from 1994 to the cessation of peat extraction at the bogs across the Application Site. As outlined above, June 1994 is the earliest date by which AA would have been required, while 2020 is a precautionary and conservative date by which all peat extraction activity across all bogs comprising the Application Site is considered to have ceased. Some rehabilitation was also carried out in this phase at Derryarkin and Drumman. At Derryarkin, rehabilitation measures undertaken in 2001-2002, including drain-blocking and main-outfall modifications, facilitated the development of extensive wetland, fen and scrub habitats across areas of former cutaway bog. At Drumman, rehabilitation trials undertaken between 2010 and 2014, involving fertiliser applications, nursery crops and later grass-seed trials, successfully established vegetation cover and stabilised previously bare peat areas.
- **Current Phase (June 2020 – Present Day)**
  This phase covers all works from the cessation of peat extraction in June 2020 to the present, including the implementation of the Cutaway Bog Decommissioning Plans under Condition 10 of EPA Licence P0501-01, which to date has included infrastructure decommissioning, removal of peat stockpiles, and ongoing site management measures such as water level control, environmental monitoring, and maintenance of drainage network to support future site rehabilitation efforts.
- **Remedial Phase (Future)**
  This phase comprises the future implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site, which will include measures such as hydrological restoration, habitat establishment, and ecological enhancement, aimed at supporting the long-term recovery, stabilisation, and sustainable after-use of the site following peat extraction.

1.3 APPROPRIATE ASSESSMENT PROCESS

1.3.1 Stage 1 Appropriate Assessment - Screening Stage

Screening is a fundamental process used to determine whether an AA is required for a particular plan or project.

Article 6(3) of the Habitats Directive provides that any plan or project not directly connected with or necessary to the management of a European site, but likely to have a significant effect on the site, must be subject to an AA in view of the site's conservation objectives.

According to Part XAB of the Planning and Development Act 2000, as amended, the screening process must be carried out by the Competent Authority. In line with Section 177U of the Act, it states:

> *'A screening for appropriate assessment shall be carried out by the competent authority to assess, based on the best available scientific knowledge, whether the land use plan or proposed development, either alone or in combination with other plans or projects, is likely to have a significant effect on a European site'.*

The screening process is critical in ensuring that any potential **likely significant effects** on European sites are adequately considered before progressing with any development activities.

The Competent Authority's decision to determine if an AA is necessary must be based on objective, reliable, and verifiable information, and it should be properly recorded for transparency.

If needed, the Competent Authority has the right to request further information from the project proponent or consultant to facilitate the screening process and ensure that a thorough assessment is undertaken.

The European Commission's '*Assessment of Plans and Projects in Relation to Natura 2000 Sites - Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC'* (EC, 2021) provides a clear and structured approach to Stage 1 Screening, which consists of the following four main steps:

1. **Ascertain if the plan or project is directly connected to, or necessary for, the management of a European site**.

   This step seeks to determine whether the proposed plan or project is specifically linked to the management or conservation efforts of a European site, and whether it is an essential part of maintaining the site's conservation objectives.

2. **Provide a detailed description of the plan or project and its potential impact factors.**

   This step involves the provision of a clear and comprehensive description of the proposed plan or project, including its scope, activities, and potential impacts. This will help in identifying possible interactions between the plan or project and European sites, and how these could influence the conservation values of the sites.

3. **Identify which European site may be impacted by the plan or project.**

   This step involves using the source-pathway-receptor (SPR) model to identify all the European sites that could potentially be affected by the proposed plan or project, either alone or in combination with other plans or projects. This includes evaluating the geographical proximity and the nature of any potential impacts on the European sites.

4. **Assess whether likely significant effects can be ruled out in light of the conservation objectives set for the European sites.**

   The final step evaluates whether the proposed plan or project is likely to have significant effects on European sites, having regard to their specific conservation objectives. Where no significant effects on European sites are identified, or where identified effects can be excluded, the Competent Authority may determine that an AA is not required. Conversely, where likely significant effects on European sites cannot be ruled out, the Competent Authority may require that the plan or project be subject to AA, supported by the preparation of a NIS (or in the case of this Substitute Consent application, a remedial NIS).

Remedial AA Screening for the Project

In relation to **Step 1** above, the Project is not, nor was it, directly connected with, or necessary for, the management of any European site. Consequently, the Project has been subject to a **remedial AA Screening** process.

To address **Step 2**, a description of the Project is provided in **Section 2** below.

Step 3 and **Step 4** are addressed in **Section 6** and **Section 7.** These sections identify the European sites that may be affected by the Project and assess the potential for likely significant effects, both alone and in combination with other plans and projects, having regard to the conservation objectives of the relevant European sites.

This remedial AASR has been prepared in compliance with Section 177U[1] of the Planning and Development Act 2000 (as amended), and in accordance with the wider requirements of Part XAB of the Act, the Planning and Development Regulations 2001 (as amended), relevant jurisprudence of the European and Irish Courts, and the guidance documents referenced in Section 1.3.3 below.

1.3.2 Stage 2 Appropriate Assessment - Natura Impact Statement Stage

Where it cannot be excluded beyond reasonable scientific doubt at the Screening stage, that a plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European site, an AA is required (or in this case, a remedial AA).

Where an AA is required, the Competent Authority may require the applicant to prepare a NIS. In accordance with Section 177T of the Planning and Development Act 2000 (as amended), the NIS is prepared to provide the scientific information necessary for the Competent Authority to carry out a Stage 2 Appropriate Assessment under Article 6(3) of the Habitats Directive. Specifically, the NIS evaluates:

1. the implications of the **Project, alone or in combination** with other plans or projects, for each relevant European site in view of its **conservation objectives**; and
2. whether the Project would **adversely affect** the **integrity of any such European site.**

The NIS should be underpinned by best scientific knowledge, objective information and adopt the precautionary principle.

Section 177G of the Planning & Development Act 2000 (as amended) states the following with respect to the **revised NIS**[2] shall contain:

- *a statement of the significant effects, if any, on the relevant European site which have occurred or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out*
- *details of any appropriate remedial or mitigation measures undertaken or proposed to be undertaken by the applicant to remedy or mitigate any significant effects on the environment or on the European site;*
- *details of the period of time within which any such proposed remedial or mitigation measures shall be carried out by or on behalf of the applicant.*

To address requirements of Section 177G of the Planning & Development Act 2000 (as amended) for the Substitute Consent application a remedial NIS has been prepared.

[1] While the Planning and Development Act 2000 (as amended), specifically Section 177G of the Act, refers to 'revised Natura Impact Statements' in relation to Substitute Consent applications the Act does not specifically refer to Appropriate Assessment Screening. Section 177G of the Act is discussed in Section 1.3.2.
[2] Section 177G uses the term '*revised Natura Impact Statement*'.

1.3.3 Guidance and Methodological Framework

This remedial AASR has been prepared in compliance with Part XAB of the Planning and Development Act 2000 (as amended), including the requirements of Section 177U relating to Appropriate Assessment, the Planning and Development Regulations 2001 (as amended) and relevant jurisprudence of the European and Irish Courts, and in accordance with the following guidance and legislation:

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission (EC), 2021)
- Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2019)
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Department of the Environment, December 2009, amended 11 February 2010)
- Appropriate Assessment Screening for Development Management (Office of the Planning Regulator (OPR), 2021)

1.4 Statement of Authority

This remedial AASR was authored by Ecologist Aaron McCormick (B.Sc. (Hons), M.Sc.) and reviewed by Senior Ecologist Dr. James Forde (B.Sc. (Hons), M.Sc., Ph.D., MCIEEM).

Aaron is an Ecologist in TOBIN. Aaron holds a B.Sc. (Hons) in Marine Science from the University of Galway (previously National University of Ireland, Galway), and an M.Sc. in Risk, Resilience, and Sustainability from University College Dublin. Aaron has a wide-ranging academic experience, from taxonomic identification of marine organisms to anthropogenic effects on river basins and hydromorphology. Aaron has 5 years' post graduate experience in environmental work including conservation of habitats in Greece, marine and freshwater fisheries studies, and catchment-wide climate change monitoring/mitigation techniques back in Ireland, and he has contributed to multiple NGO and state-level reports on the same.

James is Senior Ecologist and Technical Director in TOBIN. James holds a B.Sc. (Hons) and M.Sc. degrees in marine ecology, and a Ph.D. in ecology. James is also a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). James has almost 20 years' academic and environmental consultancy experience. He has an extensive understanding of ecology and appreciation of the objectives and mechanisms of national and international environmental legislation and policy. He has significant experience in preparing and reviewing ecological reports including Screenings for AA, NIS and Ecological Impact Assessment (EcIA) reporting, and EIAR. James has provided strategic technical and environmental advice for developments across a wide range of sectors, including onshore and offshore renewables, telecommunications, flood relief schemes, port and harbour developments, energy generation and transmission.

2. DESCRIPTION OF THE PROJECT

2.1 OVERVIEW

This section provides a description of the Project for the purposes of the remedial AA. The Project comprises peat extraction and ancillary activities, current decommissioning and environmental management measures, and future peatland rehabilitation works undertaken within Derryhinch, Drumman, Derryarkin, Ballybeg and Toar Bogs (collectively referred to as the Application Site). The Application Site forms part of the wider Derrygreenagh Bog Group and extends across Counties Offaly, Westmeath and Meath.

For the purposes of AA, the assessment period commences on 10 June 1994. This is the latest date by which the Habitats Directive (92/43/EEC) was required to be transposed into Irish law. Accordingly, this remedial AASR assesses the relevant peat extraction and ancillary activities that were undertaken at the Application Site from 10 June 1994 onwards, which consists of the following:

- Industrial scale peat extraction (milled peat);
- Use and maintenance of pre-existing surface water drainage infrastructure (drains, silt ponds, pumps) at the Application Site to facilitate peat extraction activity from 1994 to present day;
- Use and maintenance of pre-existing railway infrastructure to facilitate peat extraction from 1994 to present day;
- Provision of 2 no. vehicular bridges, 2 no. rail bridges and 2 no. gated access points;
- Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0501-01) which commenced from 2000 onwards to the present day; and,
- All associated site development and ancillary works.

These peat extraction activities are referred to as the 'Project' as appropriate.

The Project is considered under three distinct phases:

- Peat Extraction Phase (June 1994 to June 2020)
- Current Phase (June 2020 to Present Day)
- Remedial Phase (Future Rehabilitation)

These phases collectively encompass all activities capable of influencing hydrology, hydrogeology, water quality, habitats and species relevant to European sites.

2.2 SITE CONTEXT AND HISTORICAL DEVELOPMENT

The Application Site comprises five former industrial peat production bogs:

- Derryhinch Bog
- Drumman Bog
- Derryarkin Bog
- Ballybeg Bog
- Toar Bog

Before industrial activities commenced these bogs formed part of an extensive raised bog landscape typical of the Irish midlands.

The peatlands would have originally supported active peat-forming habitats maintained by naturally elevated water tables and rainfall-fed hydrological conditions.

Industrial activities commenced during the 1950s. This involved substantial modification of the natural peatland environment. To allow industrial extraction of peat the Application Site was subject to preparation works included drainage installation, vegetation clearance, removal of surface peat layers, peat field preparation. Other activities included railway construction and the development of water management infrastructure. Peat extraction commenced in 1958 and continued across the bogs compromising the Application Site for varying durations.

Due to these activities, the majority of land-use change at the Application Site occurred prior to June 1994. This would have occurred through the drainage of the raised bog habitat and its preparation for industrial peat extraction. Extensive peat extraction fields, drainage infrastructure, railway infrastructure, stockpile areas and ancillary operational features had already been established by the date of June 1994 when the Habitats Directive was in place.

By 10 June 1994, the Application Site had already been extensively modified through historical drainage and peat extraction activities, with the principal land-use change from raised bog habitat to industrial peat extraction having already occurred. Accordingly, the baseline condition for AA is the industrial peat extraction landscape that existed in June 1994. The historical development of the Application Site is described above to give context for understanding the environmental conditions and impact pathways that existed at the commencement of the Habitats Directive period (June 1994).

2.3 Peat Extraction Phase (10 June 1994 to June 2020) and Habitats Directive Baseline Conditions

The Habitats Directive came into force on 10 June 1994, and this date forms the commencement of the assessment period for AA. At that time, the Application Site comprised a predominantly industrial peat extraction landscape containing some active peat production areas, cutaway peatlands and extensive drainage, water management and transport infrastructure developed to facilitate peat extraction. Accordingly, the relevant baseline condition for AA is not an intact raised bog ecosystem, but rather a substantially modified peat extraction landscape. The landscape would have been at that time characterised by active peat production areas, cutaway peatlands, drainage and water management infrastructure, transport infrastructure and associated ancillary features.

At the commencement of the assessment period, peat extraction was actively ongoing at Derryhinch Bog, Drumman Bog, Ballybeg Bog and Toar Bog, while peat extraction at Derryarkin Bog had ceased between 1988 and 1991, prior to June 1994. A summary of peat extraction cessation dates and the subsequent transition to site management during the Phase is presented in Table 2.1.

Between 10 June 1994 and June 2020, peat extraction and associated ancillary activities represented the principal land use across much of the Application Site. The principal features present at the commencement of the assessment period included:

- active peat extraction fields maintained for industrial milled peat production;

- areas of cutaway peatland where peat reserves had been exhausted and varying degrees of natural revegetation had commenced;
- an extensive drainage and water management network comprising field drains, collector drains, outfall drains, culverts, pumping infrastructure and associated water management features;
- silt ponds established to promote settlement of suspended solids prior to discharge to receiving waters;
- an extensive narrow-gauge railway network including permanent and temporary rail infrastructure, bridges, crossings, locomotives, wagons and loading facilities used for peat transportation;
- associated access tracks and operational infrastructure; and
- peat stockpile areas used for the storage of harvested peat prior to transportation for end use.

Throughout the Peat Extraction Phase, peat extraction activities relied upon the continued operation and maintenance of the drainage network, silt ponds, pumping infrastructure, railway system, access infrastructure and peat storage areas. Ancillary activities included drain maintenance, silt pond management, pumping operations, railway maintenance, stockpile management, machinery operation, environmental monitoring and surface water management.

Milled peat extraction generally involved:

- maintenance of drainage infrastructure and water levels
- milling of the peat surface
- drying of peat by solar and wind exposure
- harvesting of dried peat
- transportation of peat to stockpiles
- storage of peat within stockpiles
- transport for end use

The activities associated with peat extraction included:

- maintenance of drains and outfalls
- maintenance and cleaning of silt ponds
- operation of pumps
- maintenance of railway infrastructure
- stockpile management
- operation and maintenance of machinery
- fuel storage and refuelling
- environmental monitoring
- surface water monitoring
- waste management

As peat became progressively depleted at the Application Site the extent of active peat extraction reduced. Peat extraction ceased at Derryarkin Bog between 1988 and 1991. Extraction activities continued at Derryhinch Bog until 2017, at Drumman Bog and Toar Bog until 2018, and at Ballybeg Bog until June 2020. The cessation of peat extraction activities at Ballybeg Bog in 2020 marked the end of the Peat Extraction Phase across the entire Application Site.

The differing cessation dates influenced the ecological condition of the individual bogs during the assessment period. Ecological surveys undertaken by Bord na Móna between October 2009 and February 2012. Detailed reports of the surveys are included in the Cutaway Bog Decommissioning and Rehabilitation Plans presented in Appendix A. In summary, the surveys recorded a mosaic of active peat production areas, cutaway peatlands and associated drainage infrastructure across the Application Site. The surveys identified extensive areas of bare peat, naturally colonising vegetation, wetlands, open water, scrub and developing woodland habitats. The most advanced stages of ecological succession were generally associated with older cutaway areas including those at Derryarkin, Drumman and parts of Derryhinch Bogs, where peat extraction had ceased earlier or where trial rehabilitation measures and natural recolonisation had progressed for longer periods. In comparison, Ballybeg and Toar Bogs were characterised by active peat production and extensive areas of exposed peat at the time of the surveys, reflecting their continued operational status until 2020 and 2018 respectively.

It should be noted that while peat extraction remained the dominant land use at the Application Site from 1994 until 2020, some trial rehabilitation measures were implemented within certain bogs during that time period. These included:

- Derryarkin Bog where trial rehabilitation measures were undertaken during 2001-2002 included drain blocking and hydrological management measures that facilitated the development of wetland, fen and scrub habitats across former cutaway peatland.
- Drumman Bog where trial rehabilitation trials were undertaken between 2010 and 2014, including vegetation establishment measures that stabilised bare peat areas and promoted natural recolonisation.

Table 2.1: Summary of Peat Extraction Cessation Across the Application Site Since the Habitats Directive came into force (10 June 1994)

Bog	Peat Extraction Period	Ecological Condition Recorded During BnM Surveys
Derryhinch	Active peat extraction continued for the majority of the Peat Extraction Phase until 2017.	Ecological surveys undertaken in October 2009 recorded extensive areas of bare peat associated with active production areas within the bog. Developing poor fen vegetation, birch scrub, wetland habitats, silt ponds and drainage features. More advanced ecological succession was recorded within former cutaway and sod-peat areas, where a mosaic of wetland, scrub, developing woodland and bog regeneration habitats had become established.
Drumman Bog	Active peat extraction continued for the majority of the Peat Extraction Phase until 2018.	Ecological surveys undertaken in October 2009 and June 2010 recorded a mosaic of active production areas, cutaway peatland, rewetted wetlands, open water habitats, poor fen vegetation, birch scrub and areas of developing woodland within the bog. Extensive habitat development and natural regeneration had occurred in many former cutaway areas, particularly within rewetted sections supporting wetland and successional habitats.
Derryarkin Bog	Peat extraction had ceased between 1988 and 1991, prior to commencement of	Ecological surveys undertaken in October 2009 recorded a large cutaway peatland complex supporting advanced ecological succession. Habitats within the bog

Bog	Peat Extraction Period	Ecological Condition Recorded During BnM Surveys
	the Habitats Directive assessment period (June 1994).	included extensive poor fen vegetation, birch scrub, wetlands, open water, developing woodland, heather vegetated bog, quarry habitats and exposed mineral substrates. Significant habitat diversity had developed following the long period since peat extraction ceased.
Ballybeg Bog	Active peat extraction continued until June 2020, representing the final operational peat extraction area within the Application Site.	Ecological surveys undertaken in August 2010 recorded a mixture of active peat production areas and former cutaway peatland within the Application Site. Habitats included bare peat, poor fen vegetation, birch scrub, wetland habitats, open water, reedbeds, Alder plantation, gravel extraction areas and areas of developing ecological succession. While extensive habitat development had occurred within older cutaway areas, significant parts of the bog remained under active peat production at the time of survey.
Toar Bog	Active peat extraction continued for the majority of the Peat Extraction Phase until 2018.	Ecological surveys undertaken in February 2012 recorded a landscape largely dominated by active peat production and extensive bare peat. Habitat development within the Application Site was mainly confined to marginal areas and included poor fen vegetation, heather vegetated bog, birch woodland, wet grassland, cutover bog and remnant raised bog habitats. Ecological succession was less advanced than at the neighbouring bogs due to the continued operational status of the site at the time of survey
Application Site Overall	The Application Site comprised a combination of active peat extraction areas, former cutaway peatlands, drainage and water management infrastructure and naturally regenerating habitats throughout the assessment period. Active commercial peat extraction ceased progressively between 1988 and 2020, with complete cessation across all bogs occurring in June 2020.	Ecological surveys undertaken between October 2009 and February 2012 recorded a range of habitats development across the Application Site, ranging from active production fields and extensive bare peat to cutaway peatland supporting wetlands, open water, poor fen vegetation, scrub, woodland and other naturally regenerating habitats. The degree of ecological regeneration generally reflected the time elapsed since peat extraction had ceased within individual bog units.

It should be noted that prior to and throughout the Peat Extraction Phase, Bord na Móna implemented a range of operational and environmental management measures to minimise risks to water quality, hydrology, habitats and species. These measures included drainage and silt pond maintenance, machinery management, refuelling, waste management and spill response procedures, together with environmental monitoring. The assessment of Peat Extraction Phase impacts presented in this Stage 1 AA in Section 6 has been undertaken without reliance on these measures. Their contribution to the avoidance or reduction of potential effects on European sites are only considered within the Stage 2 NIS.

2.4 Current Phase (June 2020 to Present Day)

The Current Phase commenced following the cessation of peat extraction in June 2020. During this Phase activities at the Application Site include a programme of decommissioning, environmental management and preparation for rehabilitation.

Activities undertaken during this phase include:

- removal of remaining peat stockpiles
- decommissioning of redundant peat extraction infrastructure
- maintenance of drainage networks
- maintenance of silt ponds
- water level management
- environmental monitoring
- water quality monitoring
- ecological monitoring;
- implementation of licence requirements

The current ecological condition of the Application Site was established though a series of ecological surveys undertake between 2023 and 2026. The ecological surveys are described in detail in 4 below of this AASR-NIS. In summary, the Application Site currently comprises a predominantly cutaway peatland landscape containing a mosaic of naturally revegetated peatland habitats, wetlands, open water, drainage features, scrub vegetation and remaining peat extraction infrastructure. Natural colonisation and habitat development continue to occur across substantial areas of the former peat extraction landscape.

Table 2.2 provides a summary of the principal activities undertaken during the Current Phase and the current condition of the Application Site following the cessation of peat extraction. The table illustrates the transition from active peat production to a phase characterised by decommissioning, environmental management, ecological monitoring and preparation for rehabilitation.

Table 2.2: Summary of Current Phase Activities at the Application Site (June 2020 to Present)

Current Phase Activity	Description
Cessation of Peat Extraction	Commercial peat extraction ceased progressively across the Application Site, with final cessation occurring at Ballybeg Bog in June 2020.
Decommissioning	Decommissioning of redundant peat extraction infrastructure and associated facilities.
Stockpile Removal	Removal of remaining peat stockpiles, completed in 2021.
Drainage Management	Maintenance of existing drainage networks and associated water management infrastructure.
Silt Pond Management	Inspection, maintenance and operation of silt ponds and sediment management infrastructure.

Current Phase Activity	Description
Water Level Management	Ongoing management of site hydrology and water levels during decommissioning and preparation for rehabilitation.
Environmental Monitoring	Surface water, ecological and environmental monitoring programmes undertaken across the Application Site.
Current Ecological Condition	The Application Site currently comprises a predominantly cutaway peatland landscape supporting a mosaic of naturally regenerated peatland habitats, wetlands, open water, scrub, woodland and drainage features.
Ongoing compliance and Preparation for Future Rehabilitation	Current activities are focused on environmental management, regulatory compliance and preparation for implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans.

It should be noted that in 2000 the EPA issued an Integrated Pollution Control (IPC) Licence P0501-01 to regulate peat extraction activities and associated environmental management measures within the Derrygreenagh Bog Group (see Appendix B). The IPC Licence included requirements relating to the management of suspended solids, monitoring of emissions to water, inspection and maintenance of drainage and sediment control infrastructure. The IPC also require the implementation of environmental monitoring programmes, reporting of environmental performance, waste management, incident response procedures and rehabilitation-related management measures. The operational and environmental management measures implemented by Bord na Móna prior to and throughout the Peat Extraction Phase remained in place following the introduction of the IPC Licence and operated alongside the licence requirements as part of the overall environmental management framework for the Application Site. The assessment of the Current Phase presented in this Stage 1 AA (see Section 6) has been undertaken without reliance on either the IPC Licence requirements or the operational and environmental management measures. Their contribution to the avoidance, reduction or management of potential effects on European sites are only considered within the Stage 2 NIS).

2.5 Remedial Phase (Future Rehabilitation)

The Remedial Phase comprises implementation of peatland rehabilitation measures across the Application Site in accordance with the objectives of the Cutaway Bog Decommissioning and Rehabilitation Plans presented in Appendix A. The overall objective is environmental stabilisation of hydrological conditions and the promotion of self-sustaining wetland habitats across the former peat extraction landscape.

Proposed rehabilitation measures are expected to include:

- drain blocking;
- hydrological restoration;
- rewetting of cutaway peatlands;
- water level management;
- modification of drainage infrastructure where required;

- habitat enhancement;
- ecological restoration;
- continued maintenance of silt ponds where necessary;
- adaptive management; and
- long-term monitoring.

The rehabilitation measures proposed for each bog unit have been developed in response to local site conditions, including residual peat depth, hydrology, topography, existing habitats and land-use constraints.

While the overarching objective is environmental stabilisation through peatland re-wetting and habitat restoration, the specific measures vary between bog units. A summary of the decommissioning activities proposed within the Derrygreenagh Bog Group is provided in Table 2.3.

These measures are designed to reduce the influence of artificial drainage and restore more natural hydrological conditions across the Application Site. Through drain blocking, re-wetting and water level management, the rehabilitation programme will support the continued development of wetlands, marsh, scrub and other naturally colonising habitats across the former cutaway peatland. Over time, this will enhance habitat diversity, ecological connectivity and biodiversity, while promoting the establishment of stable, self-sustaining ecosystems and supporting the long-term ecological recovery of the Application Site.

Table 2.3: Future Decommissioning for Application Site

Item	Description	Application Site Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Relevant to All Bogs
2	Clean silt ponds	Relevant to All Bogs
3	Decommission peat stockpiles	Completed in 2021
4	Decommission or remove buildings and compounds	Relevant to All Bogs
5	Decommission fuel tanks and associated facilities	Not relevant
6	Decommission and removal of septic tanks	Not relevant
7	Decommissioning and removal of a number of existing bog pumps where suitable/necessary	Ballybeg Bog

2.6 Components of the Project Relevant to Appropriate Assessment

The principal components of the Project relevant to the AA are:

- historical peat extraction and ancillary activities undertaken since 10 June 1994;
- drainage and water management infrastructure;
- surface water discharges;
- silt ponds and sediment management measures;
- hydrological and hydrogeological modifications;
- activity disturbance to fauna
- current decommissioning and environmental management measures;

- proposed drain blocking and rewetting measures; and
- future peatland rehabilitation works.

These components form the basis of the assessment presented in the subsequent sections of this AASR-NIS, which evaluates potential effects on European sites, their QI and SCIs, and associated conservation objectives.

2.7 Bogs Comprising the Application Site

The following provides an overview description of the bogs comprising the Application Site.

Derryhinch Bog

Approximately 334 ha of the Application Site is located within Derrryhinch Bog, whichis located about 6km northeast of Rochfortbridge and 5km southwest of Kinnegad, Co. Westmeath, within the townlands of Pass of Kilbride, Rattin, Derryhinch, and Baltigeer. The bog is located within a landscape of former cutaway peatlands and agricultural land. The M6 motorway forms the western boundary, with agricultural fields to the north, east, and south, and the Kinnegad Quarry complex located approximately 2 km to the east. Access is provided primarily from the north via a track connecting to the L5010 road, with an additional route along the eastern boundary from Baltinoran. An industrial rail line runs along the southern boundary and continues southwards to connect with Drumman Bog and the wider Derrygreenagh Bog Group rail network.

Two rail and two vehicular bridges facilitate connectivity between Derryhinch and Drumman Bog, which cross over the Milltown River near Derryhinch Bog and Mongagh River near Drumman Bog. The installation date of the vehicle bridges is unknown although it is likely that the majority were in place prior to the commencement of the formal planning system.

Derryhinch is a gravity-drained bog. Most of the site currently comprises bare peat, with a small portion of cutaway out of extraction for over 20 years and developing typical pioneer cutaway habitats, including poor fen, scrub, and areas of regeneration along the motorway boundary. Several ridges and mounds of higher ground, as well as exposed gravel or gravelly tills, underlie parts of the cutaway. At present, no extraction-related cutaway areas are of sufficient scale to warrant targeted active management.

Milled-peat extraction at Derryhinch ceased in 2017.

Drumman Bog

Approximately 830 ha of the Application Site is located within Drumman Bog, which is located east of the R400 and Derryarkin Bog, approximately 2 km east of Rochfortbridge and 5km north of Rhode at its closest point, within the townlands of Farthingstown, Drumman, Derrygreenagh, Knockdrin, Garr, Carrick, and Corbetstown. The site comprises a former cutaway bog situated on the border of Counties Offaly and Westmeath, with the Mongagh River delineating the county boundary, and the Substitute Consent site extending to lands both north and south of the river. A historic industrial rail track links Drumman Bog to Derryhinch Bog to the northeast, and an existing forestry plantation is located within the boundary to the north of the Mongagh River.

Certain lands within the wider area have existing planning permissions but are excluded from the Substitute Consent application boundary and are considered only in the in-combination effects assessment (see Section 7), including permitted sand and gravel extraction pits (Offaly CC ref: 01/365; Westmeath CC ref: 01/444), a 2019 extension to these pits (Offaly CC ref: 19/25), a biomass storage facility granted retention in 2021 (Offaly CC ref: 20/329), and a weighbridge and control rooms permitted in 2018 (Offaly CC ref: 18/209).

Derrygreenagh Works is also excluded, having been constructed prior to the Planning and Development Act 1963, as is the consented Derrygreenagh Power Plant which was consented by ACP in April 2026 (ACP ref: 319023). These lands fall outside the Substitute Consent boundary and are not assessed within this remedial AASR other than on an in-combination basis.

Milled-peat extraction continued on part of Drumman Bog until 2018, while large areas have been out of extraction since the early 1990s and are now considered cutaway. Approximately 8% of the cutaway in the northern section was developed by Coillte as a conifer plantation in the 1990s, comprising Lodgepole Pine (*Pinus contorta*), Sitka Spruce (*Picea sitchensis)*, Scots Pine (*Pinus sylvestris)*, Norway Spruce (*Picea abies)*, and Japanese Larch (*Larix kaempferi*). Some areas experienced tree failure due to wet conditions and poor soil nutrient status, while others remain stable. Rehabilitation trials were carried out on 19ha of bare-peat cutaway in the north, stabilising and re-vegetating these areas.

Drumman is a gravity-drained bog. Large parts of the cutaway are naturally regenerating, with pioneer wetlands—including developing reedbeds—forming where a main outfall was blocked in 2005, leading to raised water levels and re-wetting. Drier areas support birch scrub, woodland, and pioneer poor-fen habitats. Exposed gravel underlying former peat is colonised by species such as Blue Fleabane (*Erigeron acris)*.

Bare peat still forms a significant portion of ground cover. This peat consists of *Phragmites*-layered material over substantial gravel deposits, making natural colonisation and tree establishment particularly difficult. The substrate is prone to drying and mobility during summer, which slows successional development compared to most other cutaway bogs. Some localised basins hold temporary winter water but dry to bare peat in summer due to rapid percolation through underlying gravel, resulting in significant seasonal water-level fluctuations that constrain vegetation establishment. Rehabilitation trials using fertilisers and nurse-crops have successfully created vegetation cover in parts of the bare-peat areas.

Between 2010 and 2014, a series of rehabilitation trials were implemented at Drumman Bog, including the application of fertiliser, nursery crop establishment and subsequent grass-seed trials. These measures successfully promoted vegetation establishment and facilitated the stabilisation of previously exposed bare peat surfaces.

Derryarkin Bog

Approximately 400 ha of the Application Site is located within Derryarkin Bog, whichis located on the boundary of Counties Westmeath and Offaly, approximately 5 km east of Tyrellspass and 3 km south-southeast of Rochfortbridge, within the townlands of Derryarkin, Derrygreenagh, Farthingstown, Kiltotan and Collinstown, Rathincuill, Rathgarrett, and Bunsallagh. It comprises a former cutaway bog and is defined within the Application Site by three distinct parcels of land: an access track between Toar and Derryarkin Bog, and lands to the east and west of the existing sand and gravel extraction pits.

Following peat extraction, part of the central area was developed as a sand and gravel extraction pit permitted in 2001 (Offaly CC ref: 01/365; Westmeath CC ref: 01/444). Access to the site is primarily from the R400 via an existing track serving the extraction area, office, and weighbridge, with a secondary access point approximately 660m southeast of Derrygreenagh Works. Historic rail access also connects the site southwards to Toar Bog, with some rail infrastructure remaining along the southwestern and southeastern boundaries of the extraction pit.

A number of permitted developments fall outside the Application Site boundary and are considered only in terms of in-combination effects (see Section 6.5), including the sand and gravel extraction pit, a concrete batching plant (Offaly CC ref: 011163), a blacktop (asphalt) plant (Offaly CC ref: 05/1113), and a motocross facility permitted in 2011 (refs: 10/4078 and 10/391). The consented Derrygreenagh Power Plant (ACP Ref: 319023) is also located outside the Application Site boundary.

The surrounding landscape includes a forestry plantation to the north within the Application Site boundary, while lands to the south (outside Bord na Móna's ownership) have been developed for agricultural, industrial, and quarry-related uses, including facilities operated by Kilmurray Precast Concrete Ltd. The Yellow River Wind Farm, comprising 29 turbines, is located nearby, with the nearest turbine approximately 115m southwest of the Application Site.

Industrial milled-peat extraction ceased on Derryarkin in the 1990s. Large areas of cutaway developed subsequently, with scrub establishing in western sections and re-wetted wetlands forming to the southeast following drain-blocking and main-outfall modifications in 2001–2002 as part of rehabilitation works. Birch (*Betula sp.*) scrub, pioneer poor fen and small wetland complexes have since developed in this area, although substantial areas of bare peat remain.

A significant portion of the site (approximately 12%) has been developed as a Coillte conifer plantation since the 1990s, including cutaway north of the site and northeast of the R400. These plantations comprise Sitka Spruce and Lodgepole Pine and are generally of poor condition, with tree quality ranging from moderate to severely stunted or dying.

Large areas of Derryarkin and neighbouring Drumman Bog have been developed for sand and gravel extraction since 2001–2002 (Offaly CC Ref. 01/365; Westmeath CC Ref. 01/444). An Environmental Impact Statement (EIS) was prepared for this development. The former gravel pit now contains a large quarry lake (approximately 32 ha), surrounded by tall gravel piles, levelled extraction areas and spoil mounds that are slowly revegetating. Part of the extraction area extends into the former conifer plantation. A private tarred road connects the quarry to the R400. Much of the site is zoned by Bord na Móna for continued or future expansion of sand and gravel extraction.

The remainder of Derryarkin is cutaway peatland supporting a mosaic of pioneer habitats, including pioneer poor fen, small open-water pools, birch scrub and wetland complexes. Several higher cutaway fields remain largely unvegetated, and abandoned stockpiles are slowly colonising. Exposed gravel underlying former peat is now colonised by species such as Blue Fleabane. Bare peat remains widespread, composed of *Phragmites*-layered material over gravel, a substrate known to be difficult for natural colonisation and tree establishment. Large areas have remained unvegetated for over 20 years. Localised basins hold temporary winter water but dry rapidly in summer due to high percolation through the underlying gravel.

Rehabilitation trials was undertaken in 2016, when approximately 30 ha of cutaway in the northeast portion of the site (adjacent to the R400) received fertiliser treatment to promote vegetation establishment.

Ballybeg Bog

Approximately 673 ha of the Application Site is located within Ballybeg Bog, whichis located about 5km southeast of Rochfortbridge and 2km west of Rhode, County Offaly, adjoining the southeastern boundary of Derryarkin Bog and situated entirely within County Offaly, in the townlands of Derryarkin, Ballybeg, Derrygreenagh, Derryiron, Coolcor, Clonin, Barrysbrook, Toberdaly, and Togher. It comprises a former cutaway bog and forms the southernmost of the five bog units at the Application Site, with the application boundary consisting of two distinct land parcels located to the east and west of the consented Derrygreenagh Power development (application reference 319023).

Historically, access to Ballybeg Bog was provided from the north via Derryarkin Road, which connects to the R400, and from the east via a separate connection to the R400. The site was formerly served by an extensive industrial rail network forming part of the Bord na Móna system, with lines entering from Derryarkin Bog to the north, crossing Derryarkin Road and continuing south toward the former Rhode Power Station, approximately 300 m west of the bog, and further linking to other bogs and the Croghan Briquette Factory located approximately 5 km to the south.

Ballybeg Bog is located within a predominantly rural landscape characterised by agricultural, quarrying, and energy-related land uses. The R400 defines the eastern boundary, while the L1010 borders the southern edge, and surrounding lands comprise agricultural fields interspersed with renewable energy developments, quarries, and rural dwellings. Croghan Hill lies approximately 850m to the west. The Yellow River Wind Farm is located on either side of the bog, with the nearest turbine approximately 135 m away. A solar photovoltaic development is situated to the east, having received planning permission from Offaly County Council in 2016 and 2019 (refs: 16/246 and 19/194).

Bord na Móna began pre-development gravity drainage at Ballybeg in 1950, with peat extraction commencing in 1958 and ceasing in 2020. Ballybeg is part of a group of Bord na Móna bogs including Derryarkin to the north and Cavemount to the south. The most southern area of the site lies adjacent to the Grand Canal pNHA, although none of the Bord na Móna–owned lands are designated. Ballybeg is a pumped bog with the main pumps located near the centre, discharging through a drainage system and silt ponds to the Yellow River via a tributary.

The Coolcor Stream, a canalised tributary of the Yellow River, bisects the bog flowing west to east and is assigned to the Castletown Tara Stream_010 waterbody.

A large area in the northern part of the bog has been out of extraction for some time. Cutaway maturity decreases southwards, where areas likely ceased extraction later. The cutaway supports a complex mosaic of Birch scrub, dry grassland and poor fen dominated by Soft Rush (*Juncus effusus*), interspersed with significant areas of bare peat and zones where scattered Soft Rush grows among exposed peat. The north-east section is used for gravel extraction for railway-grade material and contains a series of old and recent spoil heaps.

Approximately 60ha of cutaway east of the main railway line were planted with Alder (*Alnus glutinosa*) as a biomass trial for East Offaly Power. The southern half of the site remains dominated by bare peat associated with milled-peat extraction fields.

Toar Bog

Toar Bog measures approximately 400ha and is located entirely in County Westmeath, approximately 2km south of Tyrrellspass, within the townlands of Rathgarrett, Montrath, Pallasboy, Killavally, and Cornaher. The site lies east of the M6 motorway and the L1024 road, west of the L1113 road, and north of the Mullagharush, Montrath, and Pallasboy townlands, and is the most westerly of the five bogs included in this Substitute Consent application.

The bog comprises a predominantly cutaway landscape, historically used exclusively for milled peat extraction from 1958 until operations ceased in 2018, and is characterised by an extensive network of north–south oriented drainage channels. It supports a mosaic of bare peat, partially revegetated areas, and milled fields at varying stages of regeneration, along with smaller areas of trees, scrub, internal roads, yard areas, and a remnant raised bog section at its southern extent, which slightly encroaches into County Offaly. Drainage commenced in 1950, and by 1973 the bog was under active peat extraction, with five silt ponds and five surface water emission points recorded by 1988. The site remains connected to the wider Derrygreenagh network a service road (approximately 3km) linking it to the southwestern extent of Derryarkin Bog, and historic mechanised peat extraction has resulted in a fragmented bog surface.

Access to Toar Bog is provided from the north via the L1113 Ballykilmore Road, with a secondary access point to the east via the L1113/L1019 Derrycoffey Road, which was consented in 2012 to facilitate peat out-loading activities (Westmeath CC application reference 124018). Historic industrial rail infrastructure runs along the northern boundary, extending eastwards and northeastwards to Derryarkin Bog, including a rail crossing over the L1113 permitted in 1983; parts of this network lie within the boundary of a consented biomass storage facility and are therefore excluded from the Substitute Consent application area.

A number of developments fall outside the Application Site boundary and are considered only in terms of in-combination effects (see Section 6.5), including the Toar biomass storage facility (granted retention permission in 2020 and subsequent permission with revised conditions in 2021, valid to 2030 – ACP reference 309112), a consented access track for peat out-loading (Westmeath CC application ref: 124018).

2.8 Overview of Peat Extraction Activity at the Application Site

Understanding the historical pattern of land use within the Application Site is important in establishing how the bog has changed over time and in providing context for its current condition. Historical land use within the Application Site has been categorised based on the presence or absence of drainage and active peat extraction activities at the time of each assessment. The land-use categories are defined as follows:

- **Subject to Peat Extraction** – extent of area in that assessment year that was being used for active peat extraction.
- **Neither Drained nor Subject to Peat Extraction** - extent of area in that assessment year that were undrained and had not subjected to active peat extraction.

- **Drained - Not Subject to Peat Extraction** - extent of areas in that assessment year that had been drained but were not being used for active peat extraction

Figure 2-1 through Figure 2-5 illustrate the extent of historical land-use areas within the Application Site in 1973, 1988, 1995, 2004 and 2020 providing a series of temporal snapshots that demonstrate the evolution of land use across the site. Table 2-4 summarises the estimated extent of each historical land-use category within the Application Site at these time intervals.

The mapping and table provide context for the historical evolution of land use across the Application Site. The changes in land use reflect the progressive development and expansion of peat extraction activities across the bogs, followed by their gradual cessation, extraction, including Derryarkin Bog (between 1988 and 1991), followed by Derryhinch (2017), Drumman and Toar (2018), and finally Ballybeg, where extraction ceased in 2020.

The temporal changes in the land-use categories illustrate the evolution of the bog landscape over time and provide important context for understanding the factors that have influenced the current ecological condition of the Application Site. In particular, the declining extent of areas subject to peat extraction, coupled with the increasing extent of areas no longer actively worked, illustrates the progressive transition of the Application Site from active peat extraction to post-extraction. The cessation of extraction pressures and associated disturbance allowed natural ecological succession to proceed across portions of the site, resulting in the gradual colonisation of formerly worked peat surfaces by pioneer vegetation, including rushes (*Juncus* spp. and *Luzula* spp.), scrub, and other early successional plant communities. Areas classified as drained but not subject to peat extraction represent lands where drainage infrastructure was present but active peat extraction was not occurring during the assessment year, while areas classified as neither drained nor subject to peat extraction represent portions of the site that remained unaffected by both drainage and peat extraction activities at the time of assessment.

Table 2-4: Bord na Mona Estimates of Peat Extraction Extents (ha) at the Application Site

Area Type	1973	1988	1995	2004	2020
Subject to Peat Extraction	2,011	2,285	2,267	1,025	301
Neither Drained nor Subject to Peat Extraction	566	269	269	248	367
Drained - Not Subject to Peat Extraction	60	83	101	1,364	2,389

2.9 Peat Extraction Volumes 1994 - 2020

Bord na Móna records indicate that from 1994 to 2020 (inclusive) the average extraction was at the Application Site was approximately 226,541 tonnes per year, with a total of 6,116,599 tonnes extracted over the period (see Table 2-5).

Table 2-5: Annual Peat Extraction Quantities for the Period 1994 to 2020

Year	Extraction (Tonnes)	Year	Extraction (Tonnes)
1994 - 1995	400,097	2007 - 2008	240,958
1995 - 1996	316,376	2008 - 2009	220,690
1996 - 1997	156,079	2009 - 2010	263,199
1997 - 1998	216,365	2010 - 2011	189,302

Year	Extraction (Tonnes)	Year	Extraction (Tonnes)
1998 - 1999	332,543	2011 - 2012	39,409
1999 - 2000	310,259	2012 - 2013	218,854
2000 - 2001	293,565	2013 - 2014	185,143
2001 - 2002	278,202	2014 - 2015	158,376
2002 - 2003	272,783	2015 - 2016	194,944
2003 - 2004	265,865	2016 - 2017	210,919
2004 - 2005	254,691	2017 - 2018	134,171
2005 - 2006	260,807	2018 - 2019	55,551
2006 - 2007	234,106	2019 - 2020	13,248*
Total	**6,116,599**		

***** Peat extraction at the Application Site came to an end in June 2020, resulting in significantly lower extraction volumes compared to previous year





Legend

- Application Site Boundaries

Peat Production Areas 1973

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd
A	28/09/2026	First issue	K.K	J.F

Client: BnM

Project:

Derrygreenagh Substitute Consent

Title:

Figure 2-1:
Peat Production Areas 1973

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
K.Kale	J.Forde	September 2026

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Map Ref:	Draft:
12334-004..AASR-Peat.D..73-P.App.BO-TOB-A	A





Legend

- Application Site Boundaries

Peat Production Areas 1988

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	28/09/2026	First issue	K.K	J.F

Client: BnM

Project:

Derrygreenagh Substitute Consent

Title:

Figure 2-2:
Peat Production Areas 1988

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
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Legend

- Application Site Boundaries

Peat Production Areas 1995

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
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A	28/09/2026	First issue	K.K	J.F

Client: BnM

Project:

Derrygreenagh Substitute Consent

Title:

Figure 2-3:
Peat Production Areas 1995

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
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Legend

- Application Site Boundaries

Peat Production Areas 2004

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

0 1 2
Kilometers

Spatial Reference
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Client: BnM

Project:

Derrygreenagh Substitute Consent

Title:

Figure 2-4:
Peat Production Areas 2004

Scale @ A3: 1:60,000

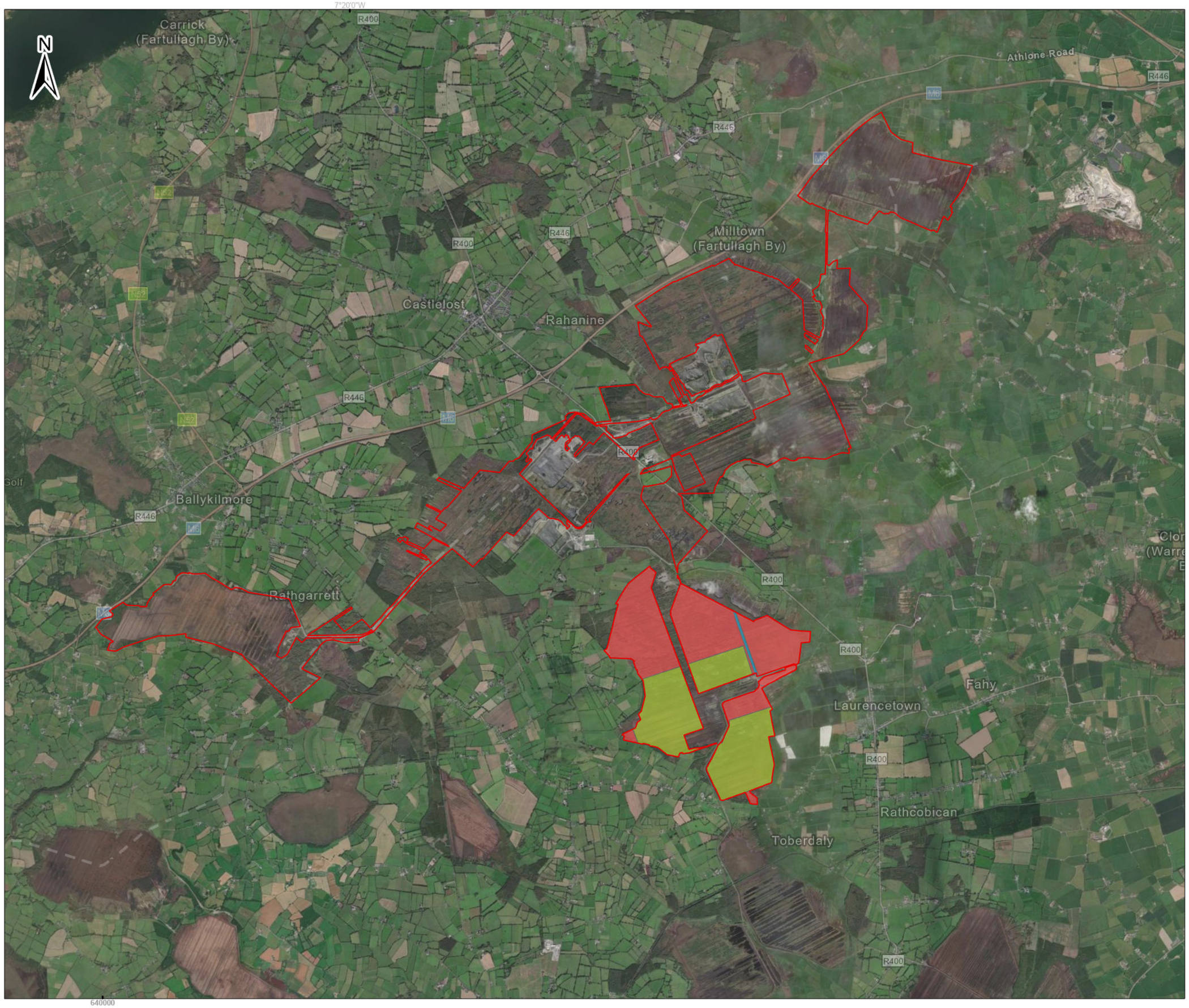
Prepared by:	Checked by:	Date:
K.Kale	J.Forde	September 2026

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Map Ref: 12334-007..AASR-Peat.D..04-P.App.BO-TOB-A

Draft: A





Legend

- Application Site Boundaries

Peat Production Areas 2020

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

0 1 2
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community,

Rev	Date	Description	By	Chkd
A	29/09/2026	First issue	K.K	J.F

Client: BnM

Project:

Derrygreenagh Substitute Consent

Title:

Figure 2-5:
Peat Production Areas 2020

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
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Map Ref: 12334-008..AASR-Peat.D..20-P.App.BO-TOB-A

Draft: A

3. METHODOLOGICAL APPROACH

This remedial AASR has been prepared to determine, on the basis of objective scientific information and applying the precautionary principle, whether the Project, either alone or in combination with other plans and projects, has the potential to result in **likely significant effects** on any European site.

The assessment has been undertaken in accordance with Article 6(3) of the Habitats Directive and the requirements of Part XAB of the Planning and Development Act 2000 (as amended).

The legislative and policy framework informing the assessment is described in Section 1.2, while a summary description of Project is provided in Section 2.

The remedial AASR was informed by a combination of desktop studies and ecological field surveys. The desktop review included geospatial, ecological, historical, planning and policy datasets relevant to the Application Site and the surrounding area, while targeted ecological surveys were undertaken where required. Together, these data sources were used to establish the environmental baseline and assess the potential for **likely significant effects** on European sites. The assessment has been informed by the information sources outlined in Section 4 and follows established European and national AA guidance. The methodology comprised the following and is described in Section:

- Identification of potential sources of effect associated with the Project;
- Identification of pathways linking the Project to European sites;
- Identification of European site receptors with potential connectivity to the Project;
- Establishment of the Project's Zone of Influence (ZoI);
- Assessment of the potential for likely significant effects, alone and in combination with other plans and projects; and
- Determination of whether any European sites require progression to Stage 2 Appropriate Assessment.

3.1 SOURCE-PATHWAY-RECEPTOR APPROACH

A source-pathway-receptor (SPR) approach was used as the primary framework for identifying potential interactions between the Project and European sites. Under this approach, a likely significant effect can only occur where all three elements of the SPR linkage are present:

- Source: an activity or pressure associated with the Project capable of causing an ecological effect;
- Pathway: a mechanism by which that effect could be transmitted from the Project to a European site; and
- Receptor: a European site, or its QIs or SCIs, that could be affected by the identified pathway.

Where a credible SPR linkage could not be established, the relevant European site was excluded from further consideration. Where a plausible linkage existed, the European site was carried forward for further assessment.

Potential pathways considered during the assessment included:

- Surface-water connectivity;
- Groundwater and hydrogeological connectivity;
- Water-quality pathways;
- Ecological connectivity associated with mobile species;
- Habitat loss and fragmentation;
- Disturbance effects; and
- Other indirect pathways relevant to QIs and SCIs.

3.2 Establishment of the Zone of Influence

For the Project, the Zone of Influence (ZoI) was not defined by distance alone. Instead, the ZoI was established through consideration of the identified SPR linkages.

An initial search area was used to identify European sites within the wider receiving environment. This preliminary search area provided a starting point for the assessment but did not represent the final ZoI.

Following review of hydrological, hydrogeological and ecological connections, the ZoI was refined to include only those European sites for which a plausible pathway linking the Project to qualifying interests or special conservation interests could reasonably be identified.

Consequently, the extent of the ZoI varies depending on the impact pathway under consideration. In some cases, European sites located relatively close to the Application Site were excluded due to the absence of connectivity, while more distant sites were retained where a hydrological or ecological pathway existed.

3.3 Assessment of Likely Significant Effects

The assessment considered whether activities associated with the Project had the potential to give rise to likely significant effects on European sites.

For the purposes of this assessment, a likely significant effect is any effect that cannot be excluded, on the basis of objective scientific evidence, as being capable of undermining the conservation objectives of a European site.

The assessment applied the precautionary principle throughout. Accordingly, where uncertainty existed regarding the presence of a SPR linkage or the potential for an effect, the relevant European site was carried forward for further consideration.

Potential effects were considered in relation to the three Project phases identified in Section 1.2.2:

- Peat Extraction Phase (June 1994 to June 2020)
- Current Phase (June 2020 to present)
- Remedial Phase (Future)

The assessment considered both:

- In-situ effects, being effects occurring within the boundaries of a European site; and
- Ex-situ effects, being effects on mobile QIs or SCIs occurring outside of the boundaries of the European site.

3.4 In-Combination Assessment

In accordance with Article 6(3) of the Habitats Directive, the assessment considered the potential for effects arising from the Project in combination with other plans and projects.

The in-combination assessment included consideration of relevant plans and projects identified through review of planning records, statutory plans and other available information sources. The assessment examined whether effects associated with the Project could interact with effects arising from other activities to give rise to likely significant effects on European sites.

Where the potential for in-combination effects could not be excluded on the basis of objective scientific information, the relevant European site and pathway were carried forward for further assessment.

4. BASELINE DATA COLLECTION

4.1 OVERVIEW

The ecological baseline for this AASR was established through a combination of 1) desktop studies and 2) targeted ecological field surveys. Section 4.1 outlines the sources consulted as part of the desk study, including a comprehensive review of geospatial, ecological, historical, planning and policy datasets relevant to the Application Site and its surrounding area. Based on the findings of the desktop study and consideration of the potential impact pathways associated with the Project, a series of targeted ecological surveys were undertaken, as summarised in Section 4.3. The desktop sources, together with the findings of the ecological field surveys, were used to establish the environmental context of the Project and assess the potential for likely significant effects on European sites. This AASR also takes into account relevant consultations undertaken for the Project (see Section 4.4).

4.2 DESKTOP SOURCES

The desk study aimed to establish an understanding of the Application Site, and the environmental context and potential likely significant effects associated with the Project on relevant European sites. The desktop sources consulted are listed below, while the findings of the desktop review are presented in Section 5.1

The desk study encompassed a review of the following:

- Bord na Móna Cutaway Bog Rehabilitation Plans (included in Appendix A)
    - Derryhinch Bog - Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026
    - Drumman Bog – Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026
    - Derryarkin Bog - Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026
    - Ballybeg Bog - Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026
    - Toar Bog - Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026
- Aerial Maps from 1973 – 2020 (see Section 2.8)
- Review of historic 6 inch and 25-inch maps of the Application Site and surrounding area available through Ireland's National Geospatial Data Hub[3].
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper[4].
- Review of online web-mappers and datasets from key environmental agencies, including the National Parks and Wildlife Service (NPWS)[5], EPA[6,7], and Inland Fisheries Ireland[8] (IFI).

[3] Available at: https://www.geohive.ie/. Accessed July 2026.
[4] Available at: https://maps.biodiversityireland.ie/Map. Accessed July 2026.
[5] Available at: https://www.npws.ie/maps-and-data. Accessed July 2026.
[6] Available at: https://gis.epa.ie/EPAMaps/. Accessed July 2026.
[7] Available at: https://www.catchments.ie/maps/. Accessed July 2026.
[8] Available at: https://www.fisheriesireland.ie/Research/interactive-mapping.html. Accessed July 2026.

- Review of NPWS Article 17[9] and Article 12[10] reporting and mapping
- IFI Reports, where available

Consideration of relevant of publicly available national, and county-level plans and strategies including:

National

- Ireland's 1st National Biodiversity Plan 2002–2006[11]
- Actions for Biodiversity 2011–2016: Ireland's National Biodiversity Plan[12]
- Ireland's 3rd National Biodiversity Action Plan[13]
- Ireland's 4th National Biodiversity Action Plan 2023-2030[14]
- Ireland's National Peatlands Strategy 2015[15]

Offaly County Development Plans

- Offaly County Development Plan 1967
- Offaly County Development Plan 1987
- Offaly County Development Plan (Draft) 1995
- Offaly County Development Plan 2003–2009
- Offaly County Development Plan 2009-2015[16]
- Offaly County Development Plan 2014 – 2020[17]
- Offaly County Development Plan 2021-2027[18]

Offaly County Action Plans

- Offaly Biodiversity Action Plan 2025–2030[19]

Meath County Development Plans

- Meath County Development Plan 1994

[9] Available at: https://www.npws.ie/publications/article-17-reports. Accessed July 2026
[10] Available at: https://www.npws.ie/status-and-trends-ireland%E2%80%99s-bird-species-%E2%80%93-article-12-reporting. Accessed in July 2026
[11] Available at: https://www.npws.ie/sites/default/files/publications/pdf/DAHGI_2002_NBP.pdf . Accessed in July 2026
[12] Available at: https://www.npws.ie/sites/default/files/general/national-biodiversity-plan-english.pdf. Accessed in July 2026
[13] Available at: https://www.gov.ie/en/department-of-housing-local-government-and-heritage/publications/irelands-4th-national-biodiversity-action-plan-20232030. Accessed in July 2026
[14] Available at: https://assets.gov.ie/233057/f1a92f68-e668-498d-a56c-df777a19b549.pdf. Accessed July 2026.
[15]. Available at: https://www.npws.ie/sites/default/files/publications/pdf/NationalPeatlandsStrategy2015EnglishVers.pdf. Accessed July 2026.
[16] Online copy not available. Hard copy location information available at National Library of Ireland: https://catalogue.nli.ie/Record/vtls000300543/TOC
[17] Available at: https://docslib.org/doc/8784760/offaly-county-development-plan-2014-2020. Accessed July 2026
[18] Available at: https://www.offaly.ie/stage-4-final-plan/ Accessed July 2026
[19] Available at: https://www.offaly.ie/offaly-heritage-plan/offaly-biodiversity-action-plan/ Accessed July 2026

- Meath County Development Plan 2000 (Draft)
- Meath County Development Plan 2007 - 2013[20]
- Meath County Development Plan 2013-2019[21]
- Meath County Development Plan 2021-2027[22]

Offaly County Action Plans

- Meath Biodiversity Action Plan 2008–2012
- Meath Biodiversity Action Plan 2015–2020
- Westmeath County Development Plan
- Westmeath County Development Plan 1986
- Westmeath County Development Plan 1994
- Westmeath County Development Plan 2002–2008
- Westmeath County Development Plan 2008 - 2014[23]
- Westmeath County Development Plan 2014 - 2020[24]
- Westmeath County Development Plan 2021-2027[25]

Westmeath County Action Plans

- Westmeath Biodiversity Action Plan 2014–2020[26]
- Westmeath Biodiversity Action Plan 2025–2031[27]

4.3 ECOLOGICAL FIELD SURVEYS

The following section summarises the ecological baseline survey undertaken for the Derrygreenagh Substitute Consent application.

The Application Site substantially overlaps with the proposed Derrygreenagh Wind and Solar Project. Consequently, ecological survey data collected within these shared areas have been

[20] Available at https://www.meath.ie/council/council-services/planning-and-building/development-plans/meath-county-development-plan/previous-development-plans/meath-county-development-plan-2007-2013. Accessed July 2026

[21] Available at https://countydevelopmentplan.meath.ie/adoptedplan/. Accessed July 2026

[22] Available at: https://www.meath.ie/council/council-services/planning-and-building/development-plans/meath-county-development-plan Accessed July 2026

[23] Available at https://www.westmeathcoco.ie/en/ourservices/planning/developmentplans/archivedplans/countydevelopmentplan2008-2014/. Accessed July 2026

[24] Available at: https://www.westmeathcoco.ie/en/ourservices/planning/developmentplans/archivedplans/countydevelopmentplan2014-2020/. Accessed July 2026

[25] Available at https://www.westmeathcoco.ie/en/ourservices/planning/developmentplans/countydevelopmentplan2021-2027/ Accessed July 2026

[26] Available at https://www.westmeathcoco.ie/en/ourservices/planning/biodiversity/westmeathbiodiversityactionplan2014-2020/. Accessed July 2026

[27] Available at https://www.westmeathcoco.ie/en/ourservices/planning/biodiversity/westmeathbiodiversityactionplan2025-2031/ . Accessed July 2026

used to inform both the Derrygreenagh Wind and Solar Project and the Substitute Consent application. These surveys included avifauna, habitat, flora and fauna assessments and provide comprehensive ecological information across the overlapping areas. Collectively, the Derrygreenagh Wind and Solar and Application Site survey datasets provide a comprehensive baseline for the ecological assessments presented in support of the Substitute Consent application. Table 4.1 lists the suite of ecological surveys undertaken at the Application Site between 2023 and 2026. Summaries of the survey are presented in Section 4.3.1 through Section 4.3.3 below while findings of the surveys are provided in Section 5.1.4.

Table 4.1: Summary of surveys used to inform this remedial Ecological Impact Assessment

Survey	Date
Ecology Survey Derryhinch Bog	Multidisciplinary Surveys 19/09/2023-20/09/2023 15/04/2026
Ecology Survey Drumman Bog	Multidisciplinary Surveys 22/08/2023 – 23/08/2023 28/04/2026 – 30/04/2026
Ecology Survey Derryarkin Bog	Multidisciplinary Surveys 14/08/2023 – 15/08/2023 30/04/2026 – 01/05/2026
Ecology Survey Ballybeg Bog	Multidisciplinary Surveys 08/08/2023 - 14/08/2023 27/04/2026 - 30/04/2026
Ecology Survey Toar Bog	Multidisciplinary Surveys 13/04/2026 - 17/04/2026
Aquatic Surveys	River Habitat Survey 12/06/2023 – 16/06/06/2023 June and July 2026
	Water Quality Assessment 12/06/2023 – 16/06/06/2023 June-July 2026
	Electrofishing: 06/07/2026 – 08/07/2026
	White Clawed Crayfish Survey 15/06/2026 - 19/06/2026
	Environmental DNA (eDNA) Survey 06/07/2026
Bird Surveys	Surveys undertaken at Derryarkin Bog, Drumman Bog, Derryhinch Bog and Ballybeg Bog - Breeding Season 2024 Bird Surveys (April to September 2024)

Survey	Date
	Winter Season 2024-2025 Bird Surveys (October 2024 to March 2025) Breeding Season 2025 Bird Surveys (April to September 2025)
	Surveys undertaken at Toar Bog: Winter Bird Surveys (December 2025 to March 2026) Breeding Bird Surveys (April to June 2026)

4.3.1 Habitats and Flora

Habitat and flora surveys were undertaken by TOBIN ecologists across the Application Site on various dates between 2023 and 2026. Multidisciplinary ecological surveys were completed at Derryarkin Bog, Ballybeg Bog, Drumman Bog, Derryhinch Bog and Toar Bog to characterise habitats and flora present within the site and establish baseline ecological conditions. Survey dates are summarised in Table 5.16.

The study area for habitat surveys comprised the Application Site and adjoining lands. Surveys focused on peatland habitats, drainage features, watercourses, hedgerows, treelines, scrub, woodland, grassland and other habitats occurring within the Application Site.

Habitats were classified in accordance with the Heritage Council publication A Guide to Habitats in Ireland (Fossitt, 2000) and were assigned ecological importance following the Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018; updated 2024). Particular attention was given to habitats of conservation importance, Annex I habitats, peatland habitats, invasive alien plant species, and habitats with the potential to support protected fauna species.

The objectives of the surveys were to establish the distribution and condition of habitats within the Application Site, identify habitats and flora of conservation significance.

During the surveys, records were made of notable and invasive plant species where encountered.

4.3.2 Protected Species

Protected species surveys were undertaken by TOBIN ecologists on various dates between 2023 and 2026 as part of the multidisciplinary ecological surveys and directed bird survey listed in Table 5.16.

Surveys focused on mammal species protected under the Wildlife Acts, the Habitats Directive and other relevant legislation, with survey effort informed by desk study findings, habitat suitability assessments and field observations. Surveys were undertaken concurrently with habitat surveys and included the inspection of suitable habitats and features such as drainage channels, watercourses, scrub, woodland, hedgerows, treelines and other habitats with the potential to support protected species.

The objectives of the protected species surveys were to establish baseline conditions, identify the presence or likely presence of protected species.

Survey findings were used to inform the identification of ecological receptors and the assessment of potential impact pathways associated with the Project. Target species were assessed using recognised survey methodologies appropriate to the species concerned. Evidence such as direct sightings, field signs, tracks, feeding remains, burrows, holts, nests, roosting features and other indicators of species activity were recorded where encountered. The extent and quality of habitats suitable for protected species were also evaluated to inform the assessment of likely usage of the site.

The ornithological baseline was informed by a comprehensive programme of bird surveys undertaken during the Breeding Season 2024 (April to September 2024), Winter Season 2024-2025 (October 2024 to March 2025), and Breeding Season 2025 (April to September 2025). Collectively, these surveys provide extensive seasonal ornithological data across two consecutive breeding seasons and one wintering season, ensuring that both breeding and wintering bird populations utilising the Application Site were comprehensively characterised and taken into account in establishing the ecological baseline.

4.3.3 Aquatic Surveys

Aquatic surveys were conducted by TOBIN between in June 2023 and again in June and July 2026. A detailed aquatic habitat and macroinvertebrate survey was conducted at 13 sites in 2026 and 18 sites (10 biologically sampled) in June 2023.

Electrofishing surveys were carried out by TOBIN ecologists between the 6-9th July 2026. Crayfish surveys were carried out 15-19th June and eDNA sampling was carried out on the 6th of July.

These were conducted at representative locations on watercourses draining the Application Site and within the wider study area selected for surveying. The study area for aquatic surveys is defined as the surface waters potentially affected by the proposed project, including watercourses within the proposed project site as well as those downstream of the proposed project with hydrological connectivity. A baseline aquatic ecological assessment was carried out at a total of n=14 representative aquatic survey site locations in 2026 (Table 7 5). These sites are located within the WFD watercourses: Castlejordan_020, Castlejordan_030, Yellow (Castlejordan)_010, Yellow (Castlejordan)_020, Yellow (Castlejordan)_030, Kinnegad_010, and Castletown Tara Stream_010 river waterbodies (RWB) relevant to the proposed project and downstream. The aquatic survey sites were located within the Yellow [Castlejordan]_SC_010, Figile_SC_020 and Boyne_SC_030 subcatchments. These were on known watercourses mapped by the Environmental Protection Agency (EPA)/Ordnance Survey Ireland (OSI). All aquatic survey sites were accessed using public roadways, forest tracks and across lands where permitted.

Aquatic surveys consisted of an evaluation of the aquatic habitats, fisheries assessment (fisheries habitat appraisal, salmonid nursery and spawning habitat), as per McGarrigle *et al.,* (2002), a biotic assessment using aquatic macroinvertebrates and an analysis of the biological water quality of the watercourse, invasive species presence and electrofishing for the presence/absence of protected fish species. Rare / protected / conservation interest aquatic species were searched for at each survey site. Field surveys were carried out during base flow conditions, where the flow of water within the stream or river has not increased from the contribution of direct runoff from rainfall.

The objective of the surveys was to provide the baseline conditions of the existing freshwater ecology and potential fisheries value of the riverine watercourses, specifically in terms of their importance for species of conservation importance which are listed in Annex II of the Habitats Directive, such as Atlantic Salmon (*Salmo salar*), Lamprey (*Lampetra spp.*) and White-clawed Crayfish (*Austropotamobius pallipes*) as well as salmonid nursery and spawning habitat.

Survey effort focused on both instream and riparian habitats at each aquatic sampling location. Surveys at each of these sites included a fisheries assessment (fisheries habitat appraisal), macrophyte and (where suitable) biological water quality sampling (Q-sampling), and electrofishing and eDNA. This approach informed the overall aquatic ecological evaluation of each site and ensured that any habitats and species of high conservation value would be detected to best inform mitigation for the project.

4.3.3.1 River Fisheries Assessment

River fisheries assessment was carried out utilising elements of the approaches in the Fishery Assessment Methodology (O'Grady, 2006) and '*Ecology of the Atlantic Salmon'* (Hendry & Cragg-Hine, 2003) to broadly characterise the river sites (i.e. channel profiles, substrata etc.).

A broad appraisal/overview of the upstream and downstream habitat at each aquatic site was undertaken to evaluate the wider contribution to salmonid and Lamprey spawning, to assess if the watercourse could support salmonids and to access the general fisheries habitat.

An assessment was made on the suitability of the habitat to support aquatic species of conservation concern listed in Annex II of the Habitats Directive (e.g. White-Clawed Crayfish, River Lamprey (*Lampetra fluviatilis)*, Brook Lamprey (*Lampetra planeri*), Atlantic salmon and Freshwater Pearl Mussel (*Margaritifera margaritifera*). Suitable salmonid spawning and nursery habitats were assessed.

An evaluation of potential Lamprey habitats within the study area was made with reference to methodologies outlined in '*Ecology of the River, Brook, and Sea Lamprey'* (Maitland, 2003) and also NPWS Irish Wildlife Manuals Lamprey surveys (O'Connor, 2007). A visual assessment was carried out on the habitat suitability for Lamprey such as slower flowing water, nursery areas of sandy silt beds, an assessment on potential barriers on migration route, potential spawning areas, suitable hiding places and clean spawning gravels over stretches of running water. Juvenile Lamprey (River/Brook Lamprey ammocetes) habitat was identified from the descriptions given in Maitland (2003).

4.3.3.2 Biological Water Quality Sampling

The water quality within each site was obtained from Q-values obtained at each accessible site from kick sampling as part of additional aquatic surveys in relation to the proposed project. Semi-quantitative sampling of benthic (or bottom dwelling) macroinvertebrates was undertaken at seven sites using standard EPA kick-sampling methods (Toner *et al.*, 2005). The Biological River Quality Classification System Quality Rating (Q) System (Toner *et al.*, 2005) was used to obtain a water quality rating and risk status for each site. The resulting species list was used to assign a Biotic Index value (Q-Value) to the sampled streams.

4.3.3.3 Fish Stock Assessment

Electrofishing surveys were carried out to establish the presence of support aquatic species of conservation concern listed on Annex II of the Habitat Directive (e.g. White-Clawed Crayfish, River Lamprey, Brook Lamprey and Atlantic Salmon).

Ten-minute electrofishing following the methodology set out by Beaumont (2016) and Matson *et al.*, (2018). The electrofishing methodology and technique also complied with the European Committee for Standardisation (CEN) guidelines for fish stock assessment in wadable rivers (CEN, 2003) and Section 14 licensing requirements. A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) and electrofishing dip nets were used to electrofish sites on watercourses in the vicinity of the proposed project. Electrofishing was conducted under license following a Section 14 application to the Department of the Environment, Climate and Communications (DoECC) to conduct the surveys.

4.3.3.4 Protected Aquatic Species Survey

White-clawed Crayfish habitat and presence were assessed at each survey site. An assessment of the habitat to support White-clawed Crayfish (*Austropotamobius pallipes*) was undertaken following methodologies outlined in '*Guidance on Habitat for White-clawed Crayfish'* (Peay, 2002). This included a visual and hand search for suitable refuge such as boulders, crevices, burrows in the bank, the presence of a partial, or even a complete barrier, food source including leaf litter, instream macrophytes, aquatic invertebrates and fish and good water quality absent of pollution.

4.3.3.5 Environmental DNA

Environmental DNA sampling to detect the presence/absence of protected aquatic species including White-clawed crayfish, Atlantic Salmon (*Salmo salar*), Lamprey species, Freshwater pearl mussel (*Margaritifera margaritifera*) (FWPM) was carried out at four of the 14 sites.

4.3.3.6 Biosecurity Measures

Strict biosecurity measures were carried out during all surveys, with particular consideration made during the aquatic surveys. All equipment and PPE used was inspected and disinfected with 1% Virkon® solution prior to, and post-survey completion.

4.4 Scoping and Consultation

For the Project consultation requests were issued to a broad range of 53 statutory and non-statutory stakeholders between 9 and 11 June 2026. The consultees included government departments, local authorities, environmental bodies, infrastructure providers, prescribed bodies and non-governmental organisations with potential interests in the Project.

Responses were received from An Coimisiún Pleanála (ACP), the Department of Climate, Energy and the Environment (DCEE), the Geological Survey of Ireland (GSI), the Health & Safety Authority (HAS), Inland Fisheries Ireland (IFI), Meath County Council Heritage Office (MCCHO) and Transport Infrastructure Ireland (TII). No response was received from the remaining consultees. Any comments received were reviewed and have informed the preparation of the assessments for the Project, where relevant.

Table 4.2 summarises the consultation responses of relevance to the AA process. In particular, the responses received from IFI and MCCHO were taken in account in the assessment of potential effects on European sites. The response addressed matters relating to aquatic ecology, protected species, hydrological pathways, ecological rehabilitation, and long-term habitat management.

Table 4.2: Scoping and Consultation Reponses

Consultee Name	Date Consultation Letter Issued	Date Consultation Response Received	Summary of Response Received	Where Addressed in this AASR
Inland Fisheries Ireland	11/06/2026	13/06/2026	An email response dated 13/06/2026 from Inland Fisheries Ireland (IFI) stated that the Yellow River at this site has poor status. It contains stocks of fish such as Atlantic Salmon, Brown Trout, Eel and Lamprey. A copy of Guidelines on Protection of Fishing During Construction works in and adjacent to waters (Inland Fisheries Ireland, 2016) was also provided.	Section 5.1.1 Hydrology and Hydrogeology, Sections 5.2.2 Aquatic Ecology, and Section 6.4 Potential Likely Significant Effects to European Sites, particularly the assessment of aquatic Annex II species including Atlantic Salmon and Lamprey species within the River Boyne and River Blackwater SAC and River Barrow and River Nore SAC.
Meath County Council Heritage Office (MCCHO)	11/06/2026	13/07/2026	In an email response dated 13/07/2026 the MCCHO suggested that it was appropriate for the EIAR to also include a Decommissioning Plan to outline: • Removal of Infrastructure: Plans for the removal, decontamination, or repurposing of ancillary infrastructure (e.g., railway lines, silt ponds, site workshops, and machinery). • Pollution Control: Measures to manage runoff and protect downstream water quality during and	Rehabilitation Measures are outlined in Sections 2 Project Description. Section 6.3 Impact Sources and Pathways, and Section 6.4 Potential Likely Significant Effects to European Sites are considered in relation to rehabilitation, hydrological management, water quality protection and

			immediately after the decommissioning process. • Site Rehabilitation Measures: Details on how the bog will be restored or re-wetted (e.g., blocking drains, raising the water table) to promote the growth of peat-forming vegetation and reduce carbon emissions. • Long-Term Monitoring: A framework for long-term ecological and hydrological monitoring, including greenhouse gas flux, to ensure the site stabilizes as a functioning wetland or carbon sink. • Safety and Public Access: Outline areas that may be retained as undisturbed ecological refugia and other areas managed for public access that ensures safe access and egress.	long-term habitat rehabilitation.

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1 DESKTOP REVIEW RESULTS

5.1.1 Hydrology and Hydrogeology

The following provides an overview of Water Framework Directive (WFD) Surface Water Bodies (SWBs) (including River Water Bodies (RWBs) and Lake Water Bodies (LWBs)) and WFD Ground Water Bodies (GWB) at the Application Site.

5.1.1.1 Hydrology

5.1.1.1.1 Rivers

The Application Site is situated at the boundary between three WFD catchments (see Figure 5-1):

- The Boyne [07] WFD Catchment contains most of the site and most of the water from the site drains into this catchment
- The Barrow [14] WFD Catchment is situated to the south of the Application Site and contains a small southern tip of Ballybeg Bog
- To the west, a small section of Toar Bog is situated in the Lower Shannon [25A] WFD Catchment

The Application Site is predominantly situated in one WFD sub-catchment, the Yellow [Castlejordan]_SC_010 WFD sub-catchment; however, peripheral sections of the Application Site extend into four neighbouring subcatchments (see Figure 5-1). The five WFD subcatchments containing the Application Site are as follows:

- Yellow [Castlejordan]_SC_010 (situated in the Boyne [07] Catchment) which encompasses most of the Application Site and receives most of site drainage.
- Boyne_SC_030 (situated in the Boyne [07] Catchment) which receives drainage from a small northeastern section (54ha) of Derryhinch Bog.
- Silver [Tullamore]_SC_010 (situated in the Lower Shannon [25A] Catchment) which contains a small section of Toar Bog in the south west of the Application Site.
- Brosna_SC_020 (situated in the Lower Shannon [25A] Catchment) which contains approximately 0.6 ha of Toar Bog.
- Figile_SC_020 (situated in the Barrow [14] Catchment) which contains a small southern section of Ballybeg Bog.

These catchments contain several directly connected surface RWBs. RWBs are grouped below by sub-basin rather than listing individual watercourses. The principal RWB sub-basins connected to, or located in proximity to, the Application Site are:

- Boyne [07] Catchment:
  - Yellow (Castlejordan)_010, 020, 030
  - Castlejordan_020, 030
  - Kinnegad_010, 020
  - Castletown Tara Stream_010
- Lower Shannon [25A] Catchment

    - Brosna_060
    - Cornaher_010
    - Silver (Tullamore)_010
- Barrow [14] Catchment:
    - Esker Stream_010

5.1.1.1.2 Surface Water Flow

The Application Site contains a network of artificial drains, peat field drains and associated watercourses which ultimately discharge to receiving rivers within the Boyne, Barrow and Lower Shannon catchments.

- Surface water flow across much of the Application Site has been modified by historic peat extraction activities and the associated drainage infrastructure, which directs water towards receiving drainage channels and downstream river networks.Boyne [07] Catchment:
    - Yellow (Castlejordan) River and Castlejordan River networks (tributaries of the Boyne) - Located within and flowing through Derryarkin, Drumman, Ballybeg, and Toar Bogs, and flow generally eastward.
- Lower Shannon [25A] Catchment
    - Silver (Tullamore) River network (headwaters of the Brosna River, a tributary of the River Shannon) is located to the west and southwest of the Application Site and flows generally southwest.
- Barrow [14] Catchment
    - Esker Stream network (tributaries of the Figile, which ultimately drains to the River Barrow) is located to the south of the Application Site flowing east before turning south downstream of the Application Site.

5.1.1.1.3 Lakes

Lough Ennell (IE_SH_25_188) (see Figure 5-1) is situated 8 km north of the Application Site at the nearest point. The lake is located within the Brosna_SC_010 sub-catchment and the Lower Shannon [25A] WFD Catchment.

Lough Ennell and some of its surrounding landscapes contain the two European sites of Lough Ennell SAC (000685) (NPWS, 2024a) and Lough Ennell SPA (004044) (NPWS 2024b). Lough Ennell SAC and SPA is located approximately 6.7 km from the Application Site. Lough Ennell is not surface-water connected to the Application Site, as it lies upstream of all downstream river body connections and therefore Lough Enell SAC and SPA cannot receive surface water, sediment, or pollutants from the Application Site.

5.1.1.1.4 Surface Water Quality

A search of the EPA Unified GIS Application and the EPA Catchments database (EPA 2025) was conducted for the water quality status of watercourses located within the ZoI. As outlined in above the Application Site is not connected via surface water to Lough Ennell SAC and SPA.

The Application Site is however hydrologically connected to river waterbodies within the Boyne, Barrow and Lower Shannon catchments via artificial drainage channels, peat drains and natural watercourses.

These watercourses therefore represent key hydrological receptors with the potential to receive changes in flow, suspended solids, nutrients or other contaminants arising from activities within the Application Site.

In contrast the Application Site is however hydrologically connected to a network of river water bodies within the Boyne, Barrow and Lower Shannon catchments through a series of artificial drainage channels, peat drains and natural watercourses. Consequently, these watercourses represent key hydrological receptors with the potential to receive changes in flow regime, suspended solids, nutrients or other contaminants arising from activities within the Application Site.

Current WFD classifications indicate that receiving water bodies within the wider study area are subject to a range of existing pressures, including agricultural activities, drainage modification and hydromorphological alterations. Surface water quality and WFD status within downstream receiving waters have therefore been considered in the assessment of potential effects associated with the Project.

5.1.1.2 Hydrogeology - Ground Water

The western extent of Toar Bog overlies part of the Clara Groundwater Body (IE_SH_G_240), which also extends beneath land surrounding Lough Ennell, the lake is not connected to the Application Site via any direct surface water pathway.

Groundwater connectivity to the Application Site is assessed to determine potential effects of the Project. Alterations to drainage regimes may affect groundwater levels and water availability in adjacent areas.

The Application Site is underlain by five Groundwater Bodies (GWBs) (see Figure 5.2). The GWBs are:

- Athboy (IE_EA_G_001) – underlies the majority of the Application Site
- Trim (IE_EA_G_002) – underlies a small eastern section of Ballybeg Bog
- Daingean (IE_SE_G_049) – underlies a small southern section of Ballybeg Bog
- Geashill (IE_SH_G_103) – underlies a small southern section of Toar Bog
- Clara (IE_SH_G_240) – underlies a western portion of Toar Bog

Adjacent GWB are also considered on a precautionary basis to assess potential impacts on European Sites. This includes consideration of whether Groundwater Dependent Terrestrial Ecosystems (GWDTEs), and the SACs for which they are QIs, within the potential Zone of Influence (ZoI) of the activities at the Application Site could be affected by alterations in drainage regimes or water quality arising from the Project.

5.1.1.2.1 Groundwater Quality

According to EPA WFD GWB information, the GWB underlying the Application Site generally achieve Good Status. Groundwater quality within the area is influenced by the interaction between extensive peat deposits, underlying glacial materials and locally important bedrock aquifers.

Historic peatland drainage has altered natural hydrological conditions across much of the Application Site; however, groundwater quality pathways remain largely localised and are primarily linked to groundwater-surface water interactions within peat deposits, drainage channels and receiving watercourses. Receptors of GWDTE associated with the underlying and adjacent GWBs have therefore been considered in the assessment of potential effects.

5.1.1.2.2 Groundwater Flow

Groundwater flow within the Application Site is strongly influenced by the presence of extensive peat deposits and the historic drainage network associated with peat extraction activities. Groundwater movement is therefore expected to be predominantly shallow and localised, with flow generally following topographic gradients towards adjacent drains, streams and rivers.

The principal groundwater discharge pathways are to surface water features within the Boyne, Barrow and Lower Shannon catchments. As a result, groundwater and surface water interactions are expected to occur primarily within local peatland and drainage systems rather than through long-distance regional groundwater flow.

Although a small portion of Toar Bog overlies the Clara GWB, which also extends into the wider area surrounding Lough Ennell, meaningful hydrogeological connection between the Application Site and Lough Ennell has not been identified. The limited overlap with the Clara GWB, combined with the intervening GWBs and hydrogeological units, substantially reduces the potential for any meaningful groundwater pathway between the Application Site and Lough Ennell SAC. While significant effects on Lough Ennell SAC and SPA via groundwater pathways are considered unlikely, they are considered here.

5.1.2 Flora and Fauna

5.1.2.1 Protected Flora and Fauna

A search of the National Biodiversity Data Centre (NBDC) mapping portal was undertaken to identify historical and current records of Annex II species protected under the Habitats Directive and Annex I species protected under the Birds Directive within and surrounding the Application Site. The search focused on the 10 km × 10 km hectads (N33, N43, N44, N53 and N54) encompassing the Application Site and its wider surroundings. Records of Annex II terrestrial species are presented in Table 5-1 and Annex I bird species are presented in Table 5-2. These species are of relevance to the assessment of potential impact pathways to Irish SACs and SPAs.

Table 5-1: Previous Records of Habitat Directive Annex II, V and IV species of SACs recorded within the 10km Grid Squares

Species name	(Hectad – No. Record – Last Record Date)
Marsh Fritillary (*Euphydryas aurinia*)	(N43 - 11 - 22/05/2023) (N44 - 16 - 30/05/2020) (N53 – 3 -31/12/1982)
Otter (*Lutra lutra*)	(N43 – 19 - 23/03/2015) (N44 – 9 - 28/10/2014) (N53 - 17 - 05/04/2015) (N54 – 7 -23/03/2015)

Table 5-2: Previous Records of Birds Directive Annex I species of SPAs recorded within the 10km Grid Squares

Species common name	Species scientific name	Hectads (Number of Records) [Date of Last Record]
Bewick's Swan	*Cygnus columbianus bewickii*	N44 (1) [31/12/2001]
Great Northern Diver	*Gavia immer*	N44 (5) [22/01/2021]
Little Egret	*Egretta garzetta*	N44 (17) [27/02/2024]; N54 (4) [15/01/2021]
Peregrine	*Falco peregrinus*	N43 (1) [29/02/1984]; N44 (7) [30/12/2024]; N53 (3) [15/03/2021]; N54 (1) [21/08/2016]
Golden Plover	*Pluvialis apricaria*	N43 (5) [31/12/2011]; N44 (7) [30/10/2024]; N53 (2) [31/12/2011]; N54 (3) [31/12/2011]
White-fronted Goose	*Anser albifrons*	N44 (2) [02/04/2018]
Common Tern	*Sterna hirundo*	N44 (6) [05/05/2021]
Corncrake	*Crex crex*	N43 (1) [31/07/1972]; N44 (1) [31/07/1972]; N53 (1) [31/07/1972]; N54 (1) [31/07/1972]
Dunlin	*Calidris alpina*	N44 (1) [31/07/1972]
Hen Harrier	*Circus cyaneus*	N53 (1) [31/07/1972]; N54 (1) [02/05/2018]
Kingfisher	*Alcedo atthis*	N44 (9) [03/03/2024]; N53 (7) [28/07/2024]; N54 (9) [14/05/2020]
Merlin	*Falco columbarius*	N43 (1) [29/02/1984]; N53 (1) [31/12/2011]
Whooper Swan	*Cygnus cygnus*	N43 (20) [25/03/2024]; N44 (8) [09/10/2022]; N53 (5) [23/10/2019]; N54 (2) [31/12/2011]
Mallard	*Anas platyrhynchos*	N43 (9) [05/05/2019]; N44 (39) [03/03/2024]; N53 (14) [14/04/2022]; N54 (12) [31/12/2011]
Coot	*Fulica atra*	N43 (4) [31/12/2011]; N44 (37) [29/06/2024]; N53 (1) [29/02/1984]; N54 (1) [31/12/2011]
Pintail	*Anas acuta*	N44 (3) [22/02/2019]
Pochard	*Aythya ferina*	N43 (1) [31/12/2011]; N44 (9) [10/02/2024]
Teal	*Anas crecca*	N43 (4) [31/12/2011]; N44 (10) [18/01/2024]; N53 (6) [31/12/2011]; N54 (5) [31/12/2011]
Tufted Duck	*Aythya fuligula*	N43 (5) [05/05/2019]; N44 (15) [10/02/2024]; N53 (2) [31/12/2011]
Wigeon	*Mareca penelope*	N43 (3) [31/12/2011]; N44 (6) [31/12/2020]; N53 (1) [29/02/1984]
Shoveler	*Spatula clypeata*	N44 (4) [22/02/2019]

Species common name	Species scientific name	Hectads (Number of Records) [Date of Last Record]
Gadwall	*Mareca strepera*	N44 (1) [31/12/2011]
Red-breasted Merganser	*Mergus serrator*	N44 (1) [31/07/1972]
Common Scoter	*Melanitta nigra*	N44 (1) [31/07/1972]
Scaup	*Aythya marila*	N44 (4) [08/01/2024]
Curlew	*Numenius arquata*	N43 (11) [20/10/2019]; N44 (7) [26/01/2023]; N53 (9) [21/08/2015]; N54 (10) [31/12/2011]
Goldeneye	*Bucephala clangula*	N44 (14) [09/12/2024]
Lapwing	*Vanellus vanellus*	N43 (22) [25/03/2024]; N44 (31) [30/12/2023]; N53 (20) [06/06/2021]; N54 (17) [31/12/2011]
Common Gull	*Larus canus*	N44 (4) [18/01/2024]
Cormorant	*Phalacrocorax carbo*	N43 (1) [25/03/2024]; N44 (21) [02/12/2024]; N53 (4) [12/03/2022]; N54 (1) [31/12/2011]
Great Crested Grebe	*Podiceps cristatus*	N43 (5) [26/05/2021]; N44 (36) [29/06/2024]
Lesser Black-backed Gull	*Larus fuscus*	N43 (7) [27/10/2009]; N44 (10) [19/01/2024]; N53 (1) [16/10/2010]
Little Grebe	*Tachybaptus ruficollis*	N43 (4) [31/12/2011]; N44 (32) [10/02/2024]; N53 (1) [31/12/2011]; N54 (6) [31/12/2011]
Ringed Plover	*Charadrius hiaticula*	N43 (7) [05/07/2024]; N44 (1) [31/07/1972]; N53 (1) [17/06/2024]; N54 (2) [31/12/2011]
Slavonian Grebe	*Podiceps auritus*	N44 (1) [31/12/2001]
Shelduck	*Tadorna tadorna*	N44 (2) [26/01/2023]
Black-headed Gull	*Chroicocephalus ridibundus*	N43 (7) [31/12/2011]; N44 (34) [22/03/2024]; N53 (5) [19/05/2018]; N54 (11) [31/12/2011]
Herring Gull	*Larus argentatus*	N44 (7) [07/05/2020]
Redshank	*Tringa totanus*	N44 (5) [26/01/2023]

5.1.2.2 Protected Aquatic Species

5.1.2.2.1 White Clawed Crayfish

Existing data on the presence and distribution of White-clawed Crayfish (*Austropotamobius pallipes)* within the Study Area was consulted on the NBDC mapping portal.

Current records show the presence of White-clawed Crayfish within watercourses within the study area. NBDC shows records of White-clawed Crayfish within grid squares N43, N53, and N53 at seven locations, with several records from different locations within the same river. Additionally, records from Article 17 spatial data (NPWS, 2019b) were also reviewed.

5.1.2.2.2 Freshwater Pearl Mussel

The study area is located within a Margaritifera Sensitive Area. NPWS Margaritifera Sensitive Area map shows that the Barrow catchment to which the site is hydrologically connected to, is mapped as sensitive with previous records of Margaritifera, however the current status unknown. There is no record of 'FPM sensitive areas' in the Yellow [Castlejordan]_SC_010 subcatchment. There is no record of FPM in the water courses located within and downstream of the study area.

5.1.3 Fisheries

The Kinnegad_030, Yellow (Castlejordan)_030 and the Castlejordan_030 RWB are known to support Lampetra sp. (O'Connor, 2006) as well as good stocks of small-sized Brown trout (*Salmo trutta*) (O'Reilly, 2009).

The Kinnegad_030 and Castlejordan_030 RWB support a genetically distinct sub-population of Brown trout within the Boyne catchment (Massa-Gallucci & Mariani, 2011).

IFI assessed the status of fish stocks in the Yellow (Castlejordan)_020 and Yellow (Castlejordan)_030 RWB as part of the WFD fish stock assessment in 2022. A total of one Habitats Directive Annex II fish species, Atlantic Salmon was recorded in the Yellow (Castlejordan)_030 RWB. No other Annex II fish species were recorded within the catchment.

These waterbodies received a WFD Moderate fish ecological status. Fisheries data for the other watercourses within the survey area was not available at the time of survey. There are no other records of fish within the study area available.

5.1.4 Invasive Flora and Fauna Species

Table 5-3: Records of Invasive Flora and Fauna Species Listed on the Third Schedule Part 1 of the Birds and Habitats Regulations (2011) as amended and listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024), recorded within the 10km Hectads encompassing the Application Site.

Table 5-4: Records of Protected Fauna Species Recorded within the 10km Hectads Surrounding the Study Areas

Species common name	Species scientific name	Hectads (Number of Records) [Date of Last Record]
Cherry Laurel	*Prunus laurocerasus*	N43 (1) [06/04/2016]; N44 (3) [23/05/2020]
Canadian Waterweed	*Elodea canadensis*	N54 (1) [31/12/1999]
Giant Hogweed	*Heracleum mantegazzianum*	N54 (1) [20/07/2014]
Japanese Knotweed	*Fallopia japonica*	N43 (10) [15/11/2022]; N44 (6) [15/07/2024]; N53 (2) [31/12/1999]
Rhododendron	*Rhododendron ponticum*	N43 (3) [22/11/2022]; N44 (1) [29/06/2005]; N53 (1) [18/06/2021]; N54 (1) [16/05/2020]
Butterfly-bush	*Buddleja davidii*	N44 (1) [08/09/2019]; N54 (1) [27/11/2022]
Himalayan Honeysuckle	*Leycesteria formosa*	N44 (1) [29/06/2005]

Species common name	Species scientific name	Hectads (Number of Records) [Date of Last Record]
Sycamore	*Acer pseudoplatanus*	N43 (3) [13/05/2020]; N44 (10) [29/06/2024]; N53 (7) [12/10/2001]; N54 (2) [20/06/2019]



Legend

- Application Site Boundaries
- WFD - River Water Bodies
- WFD - Lake Water Bodies

0 1.75 3.5
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community.

Rev	Date	Description	By	Chkd.
A	24/09/2026	First issue	S.P	J.F

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 5-1:
Hydrological Features at the Application Site

Scale @ A3: 1:100,000

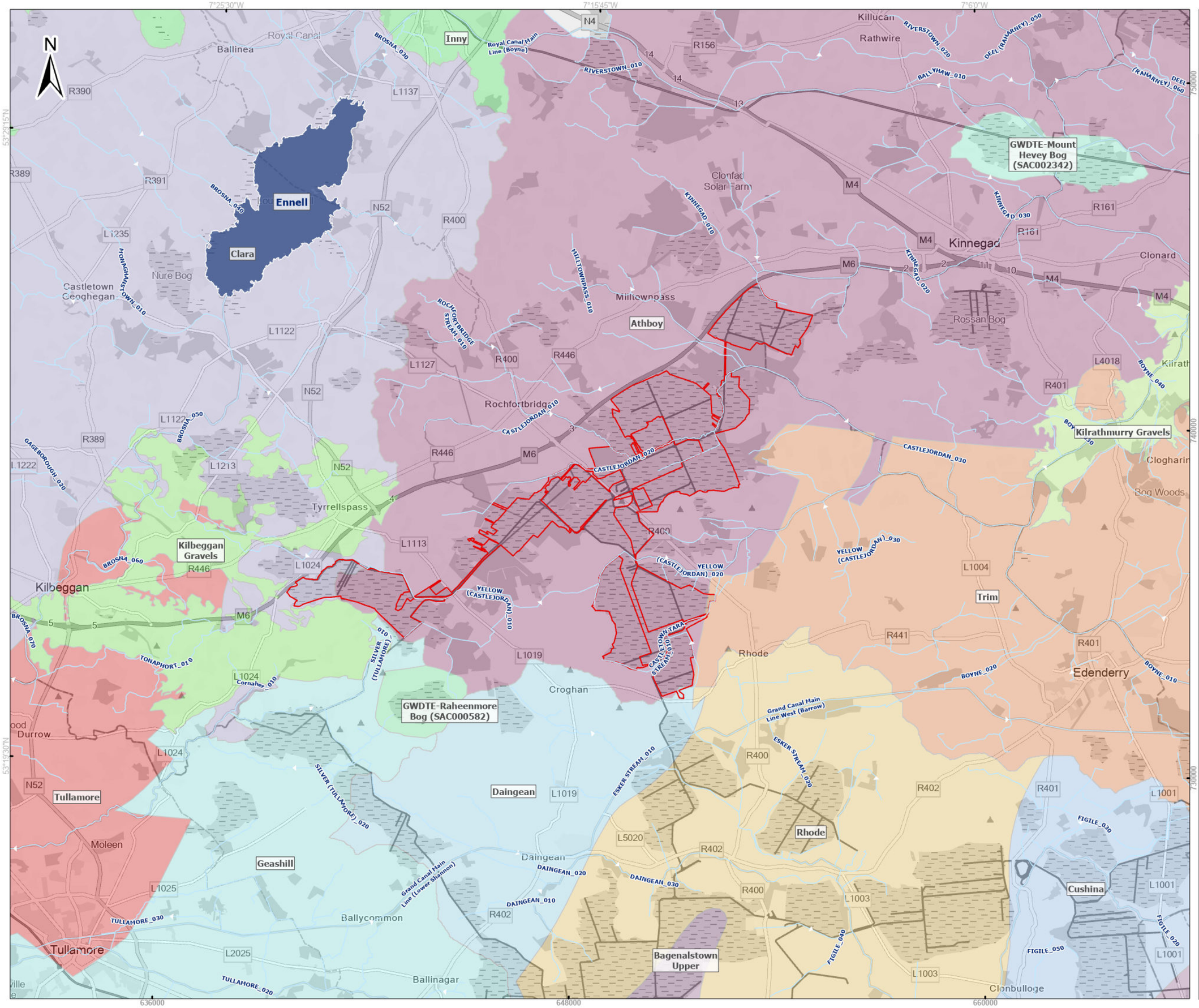
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Forde	September 2026

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Map Ref: 12334-002..AASr-RWB-LWB-TOB-A

Draft: A



Legend

- Application Site Boundaries
- WFD - River Water Bodies
- WFD - Lake Water Bodies

WFD - Groundwater Bodies

- Athboy
- Bagenalstown Upper
- Clara
- Cushina
- Daingean
- Geashill
- GWDTE-Mount Hevey Bog (SAC002342)
- GWDTE-Raheenmore Bog (SAC000582)
- Inny
- Kilbeggan Gravels
- Kilrathmurry Gravels
- Rhode
- Trim
- Tullamore

0 1.75 3.5
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	24/09/2026	First issue	S.P	J.F

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 5-2:
Ground Water Bodies at the Application Site

Scale @ A3:	1:100,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Forde	September 2026

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Map Ref: 12334-003..AASr-GWB-P.App.BO-TOB-A

Draft: A

5.2 Ecological Field Survey Results

This section presents the findings of the ecological baseline surveys undertaken across the Application Site between 2023 and 2026. The surveys characterised the habitats, flora, fauna and bird communities present within and adjacent to the Application Site and provide the basis for the ecological and ornithological impact assessments.

5.2.1 Habitats, Flora and Fauna

5.2.1.1 Polygon Habitats

5.2.1.1.1 Habitat Surveys

Multidisciplinary surveys were undertaken at the Application Site between August 2023 and May 2026.

The site is characterised by an extensive mosaic of habitats associated with former industrial peat extraction landscapes. The dominant habitat throughout the survey area is PB4 Cutover Bog, occurring as both bare peat and revegetating peat surfaces. Large areas of cutover bog are undergoing varying stages of ecological succession, resulting in widespread development of scrub, bog woodland, wetland habitats and heather vegetated bog communities. Numerous records describe former peat workings with drainage ditches, peat banks, turf cuttings, recolonising vegetation and emerging wetland features associated with rewetting and blocked drains.

The Application Site is dominated by cutover bog (PB4), which represents the most frequently recorded habitat and occurs throughout much of the survey area. Extensive areas of scrub (WS1) and bog woodland (WN7) are also present, reflecting ongoing ecological succession on previously cutaway peatlands. Other commonly recorded habitats include artificial lakes and ponds (FL8), dry meadows and grassy verges (GS2), dry siliceous heath (HH1) and immature woodland (WS2). Smaller areas of raised bog (PB1), wet woodland (WN6), reed and large sedge swamp (FS1), recolonising bare ground (ED3), plantation woodland and anthropogenic habitats such as tracks, buildings and quarry areas were also recorded. Collectively, the habitat resource is characteristic of a modified peatland landscape with extensive areas undergoing natural regeneration and succession towards scrub, woodland and wetland communities

5.2.1.1.2 PB4 Cutover Bog

Cutover bog represents the dominant habitat type across the Application Site. These areas generally comprise former peat extraction surfaces that vary from largely unvegetated peat to well-established recolonising vegetation. Areas heavily drained habitats with extensive networks of drains occurring at regular intervals across the bog surface. Vegetation associated with cutover bog includes:

Characteristic species recorded within peatland habitats included Common Bog Cotton (*Eriophorum angustifolium*), Purple Moor-grass (*Molinia caerulea*), Ling Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Soft Rush (*Juncus effusus*), White-beaked Sedge (*Rhynchospora alba*), Round-leaved Sundew (*Drosera rotundifolia*), Bog Asphodel (*Narthecium ossifragum*), Reindeer Lichen (*Cladonia portentosa*), together with regenerating Downy Birch (*Betula pubescens*) and Willow (*Salix* spp.) scrub.

5.2.1.1.3 PB1 Raised Bog

Smaller areas of Raised Bog (PB1) were recorded within the Application Site. These areas support vegetation characteristic of relatively intact bog habitats, including Ling Heather, Cross-leaved Heath, Common Bog Cotton, Deergrass, White-beaked Sedge, Reindeer Lichen, Sphagnum mosses (*Sphagnum* spp.), Bog Asphodel (*Narthecium ossifragum*) and Round-leaved Sundew. These species are indicative of bog-forming and peatland communities and contrast with the more modified vegetation assemblages recorded within surrounding cutover bog habitats.

The raised bog habitats are assessed as being of comparatively higher ecological value than the surrounding cutover bog areas, reflecting the presence of characteristic peatland vegetation and, in places, features indicative of active peat-forming processes.

5.2.1.1.4 WN7 Bog Woodland

Bog Woodland (WN7) is one of the most ecologically valuable habitats recorded within the Application Site. It occurs widely throughout the site, typically on former cutover bog surfaces where natural succession has facilitated the establishment of woodland communities. The habitat ranges from immature scrubby stands to more mature birch-dominated woodland and is generally characterised by an unmanaged structure, diverse age classes and a mosaic with adjacent scrub and cutover bog habitats.

Characteristic species recorded within WN7 habitats include Downy Birch, Grey Willow (*Salix cinerea*), Eared Willow (*Salix aurita*), Lodgepole Pine (*Pinus contorta*), Scots Pine (*Pinus sylvestris*), Ling Heather, Purple Moor-grass (*Molinia caerulea*), Bramble (*Rubus fruticosus agg.*), Holly (*Ilex aquifolium*), Broad Buckler-fern (*Dryopteris dilatata*) and Rowan (*Sorbus aucuparia*). The woodland understorey frequently supports heather vegetated bog and bog-associated species, reflecting its origin on former peatland habitats.

The habitat commonly occurs as a transition from scrub and revegetating cutover bog, with many survey polygons noting ongoing woodland expansion along former drainage features and cutover areas. Woodland stands vary considerably in structure, ranging from sparse developing woodland with scattered tree cover to more established stands with mature birch canopies and a well-developed shrub layer.

WN7 Bog Woodland provides a habitat resource within the Application Site and contributes to habitat connectivity across the wider peatland landscape. The habitat supports a range of ecological functions, including nesting, sheltering and foraging opportunities for fauna associated with woodland, scrub and peatland environments.

5.2.1.1.5 WD1, WD2 and WD4 Woodlands

Additional woodland types at the Application Site include WD1 (Mixed) Broadleaved Woodland, WD2 Mixed Broadleaved/Conifer Woodland and WD3 (Mixed) Conifer Woodland. Conifer stands are generally considered to be of lower ecological value due to species uniformity and plantation management, whereas broadleaved woodland habitats support greater structural diversity and associated biodiversity value.

5.2.1.1.6 WS1 Scrub

Scrub (WS1) occurs extensively throughout the Application Site. It is typically associated with former cutover peatlands and recolonising areas, where natural succession has facilitated the establishment of woody vegetation. The habitat commonly occurs as discrete stands or as part of a mosaic with cutover bog, heather vegetated bog communities, grassland and developing woodland habitats.

Characteristic species recorded within WS1 habitats include Gorse (*Ulex europaeus*), Willow species, Birch (*Betula* spp.), Hawthorn (*Crataegus monogyna*), Ling Heather and Purple Moor-grass (*Molinia caerulea*). Additional associated species recorded include Meadowsweet (*Filipendula ulmaria*), Knapweed (*Centaurea nigra*), Soft Rush, Ribwort Plantain (*Plantago lanceolata*) and Common Bent (*Agrostis capillaris*).

The habitat is generally characterised by structurally diverse vegetation ranging from low gorse-dominated scrub to denser willow and birch stands. Throughout the Application Site, scrub frequently occurs as a transitional habitat between cutover bog (PB4) and developing bog woodland (WN7), reflecting ongoing natural succession within formerly extracted peatland areas. Many scrub areas show evidence of progressive woodland colonisation, particularly along former drainage features and revegetated peat surfaces.

Scrub (WS1) contributes to diversity at the Application Site and provides habitat connectivity between peatland, woodland and wetland habitats. The habitat supports a range of ecological functions, including nesting, sheltering and foraging opportunities for fauna associated with scrub, woodland and peatland environments. As such, scrub habitats form an important component of the wider habitat mosaic present across the Application Site and contribute to the ongoing ecological regeneration of the former peatland landscape.

5.2.1.1.7 ED3 Recolonising Bare Ground

ED3 Recolonising Bare Ground occurs throughout the Application Site in areas associated with former peat extraction, quarrying activities, rail infrastructure, spoil deposits and other previously disturbed ground. These habitats are characterised by ongoing natural revegetation of exposed substrates and typically represent an early stage of ecological succession. As a result, habitat structure and species composition vary considerably depending on the age of disturbance and the degree of vegetation establishment.

5.2.1.1.8 Wetland and Aquatic Habitats

Other Artificial Lakes and Ponds (FL8) are widespread throughout the Application Site and comprise a network of open waterbodies, shallow pools and wetland features associated with historical peat extraction and quarrying activity. Many of these waterbodies have developed through peatland rewetting, drain blocking, quarry excavation, local subsidence and the accumulation of water within former cutover bog areas. As a result, they vary considerably in size, depth, hydroperiod and vegetation cover, ranging from open water habitats to heavily vegetated wetland systems. The quarry areas are outside of the Application Site boundary and are not included for in the Substitute Consent.

Characteristic vegetation recorded within FL8 habitats includes Common Bog Cotton, Bulrush (*Typha latifolia*), Common Reed (*Phragmites australis*), Jointed Rush (*Juncus articulatus*), Soft Rush, Bottle Sedge (*Carex rostrata*), Water Mint (*Mentha aquatica*), Pondweeds (*Potamogeton*

spp.) and Water Plantain (*Alisma plantago-aquatica*). Additional species recorded around pond margins include Bog Asphodel, Willow species, Purple Moor-grass and various rush and sedge species.

At several locations, rewetting measures and drain blocking have facilitated the establishment of wetland communities. A number of ponds support extensive marginal and emergent vegetation and display characteristics consistent with developing peat-forming wetland habitats.

The habitat contributes to ecological diversity within the Application Site providing suitable habitat for amphibians, opportunities for foraging and nesting birds, and habitat for aquatic invertebrates and other wetland-associated fauna.

5.2.1.1.9 FS1 Reed and Large Sedge Swamp

Reed and Large Sedge Swamp (FS1) occur locally within the Application Site, primarily in association with wet depressions, pond margins, and areas of standing water. These habitats typically comprise dense stands of emergent vegetation and are often associated with developing wetland features within former peat extraction areas.

Characteristic species recorded within FS1 habitats include Common Reed, Bottle Sedge, Common Bog Cotton, Bulrush, Soft Rush and Willow species. In several locations, reedbed habitats occur as transitional communities between open water habitats (FL8), cutover bog (PB4) and scrub vegetation.

These habitats are generally associated with permanently or seasonally wet conditions and contribute to habitat diversity within the Application Site. Reedbeds and sedge-dominated wetlands provide structural complexity within the wider peatland landscape.

5.2.1.1.10 Ecological Value

The habitats recorded within the Application Site are predominantly associated with a modified peatland landscape that has been influenced by historical peat extraction, drainage, infrastructure development and, in places, quarrying activity. Consequently, much of the habitat resource is assessed as being of **Local Importance (Lower Value)**, including habitats such as cutover bog (PB4), recolonising bare ground (ED3), artificial surfaces (BL3), improved grassland (GA1), and other heavily modified or disturbed habitats. These habitats are generally characterised by evidence of disturbance and modification and so hold much reduced ecological complexity compared other natural habitat types within the Application Site.

A number of habitat types recorded within the Application Site are assessed as being of **Local Importance (Higher Value)**. This is due to structural complexity, biodiversity value, and contribution to habitat diversity within the wider landscape. These habitats include raised bog (PB1), bog woodland (WN7), wet heath (HH3), wet woodland (WN6), established ponds and wetland habitats (FL8 and FS1), and structurally diverse scrub communities (WS1). Raised bog (PB1) support characteristic peatland vegetation and, in places, retain features associated with peat-forming habitats. Bog woodland and wet woodland habitats provide diverse woodland communities and contribute significantly to habitat connectivity across the Application Site. Ponds, wetlands and reedbed habitats also provide important wetland features within the wider peatland landscape.

5.2.1.2 Linear Habitats

Multidisciplinary surveys were undertaken identified linear habitat features at the Application Site including drainage ditches, modified watercourses, treelines and hedgerows. These features are strongly influenced by historic peat extraction and associated land drainage activities. The linear habitat features include FW4 Drainage Ditches, which occur extensively throughout the cutover peatland areas and form an interconnected network of drainage channels. Other commonly recorded linear habitats include FW2 Depositing/Lowland Rivers, WL2 Treelines and WL1 Hedgerows. Smaller linear sections of scrub, grassland, woodland and artificial habitats were also recorded as secondary habitat types associated with these linear features.

5.2.1.2.1 FW4 Drainage Ditches

Drainage Ditches (FW4) represent the most widespread linear habitat recorded within the Application Site. These features are largely associated with historical peat extraction and comprise a network of drainage channels extending throughout the cutover bog landscape. The ditches range from narrow shallow drains to larger channels with steep peat banks, and vary considerably in terms of water levels, flow conditions and vegetation cover. Many drains remain permanently wet, while others are partially infilled, stagnant or heavily revegetated.

Characteristic species recorded within FW4 habitats include Common Reed, Bulrush, Common Bog Cotton, Purple Moor-grass, Soft Rush, Bottle Sedge, Water Mint, Fools Watercress (*Apium nodiflorum*), Pondweeds, Water Starwort (*Callitriche* spp.), Grey Willow (*Salix cinerea*), Willow species and Downy Birch.

Many drainage ditches support emergent and aquatic vegetation and have undergone varying levels of natural colonisation following reductions in drainage maintenance. Several drains are support wetland vegetation characteristic of developing peatland wetlands. The drainage ditches are an important resource for amphibians, birds and mammals.

5.2.1.2.2 FW2 Depositing/Lowland Rivers

Depositing/Lowland Rivers (FW2) were recorded at several locations within and adjacent to the Application Site. These habitats comprise modified watercourses and larger drainage channels associated with the wider drainage network. While many channels exhibit evidence of historic modification, culverting and bank reinforcement, they continue to support aquatic and riparian vegetation communities.

Characteristic species recorded within FW2 habitats include Bulrush, Common Reed, Flag Iris (*Iris pseudacorus*), Watercress (*Nasturtium officinale*), Water Mint, Purple Loosestrife (*Lythrum salicaria*), Pondweeds, Duckweed (*Lemna* spp.) and Water Starwort.

5.2.1.2.3 WL2 Treelines

Treelines (WL2) occur throughout the Application Site, typically along drainage corridors, field boundaries, access routes and margins of former peat extraction areas. These features comprise both naturally regenerating and established tree lines and vary from narrow linear stands to wider woodland edge habitats.

Characteristic species recorded within WL2 habitats include Birch, Willow, Hawthorn, Ash (*Fraxinus excelsior*), Holly, Rowan (*Sorbus aucuparia*), Scots Pine, Lodgepole Pine and Bramble.

5.2.1.2.4 WL1 Hedgerows

Hedgerows (WL1) occur principally along roads, agricultural field boundaries and access routes within and adjacent to the Application Site. The majority comprise mixed native shrub communities and vary from dense continuous features to more fragmented and gappy sections.

Characteristic species recorded within WL1 habitats include Hawthorn, Willow, Ash, Gorse (Ulex europaeus), Bramble, Blackthorn (*Prunus spinosa*), Holly and Birch. Other species associated with hedgerows include Ivy (*Hedera helix*), Bracken (*Pteridium aquilinum*), Knapweed and various grass species.

5.2.1.2.5 Ecological Value

Most Drainage Ditches (FW4) habitats are assessed as being of **Local Importance (Lower Value)** due to their origin as historical drainage.

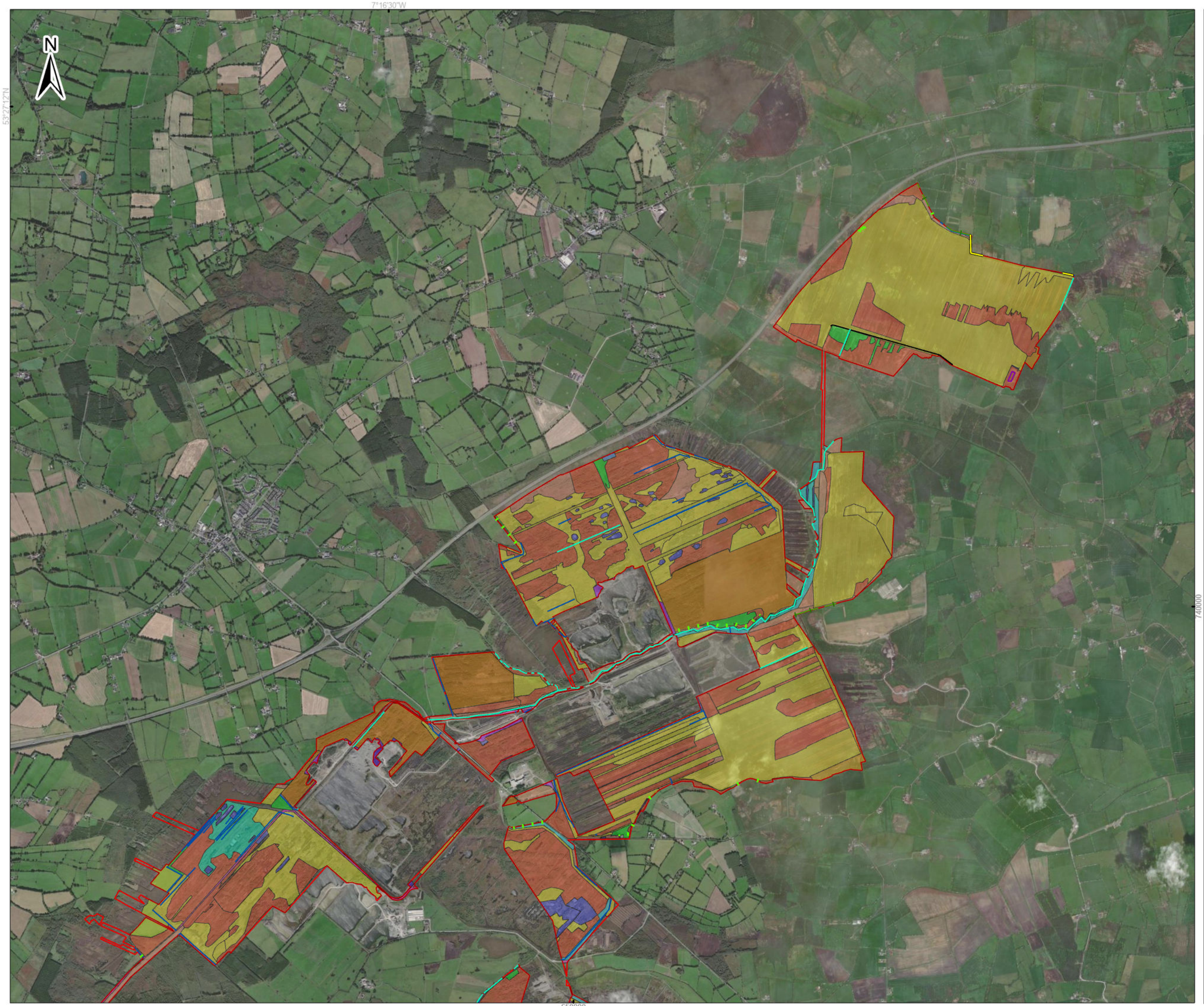
Several sections of Depositing/Lowland Rivers (FW2) habitat were identified as supporting potential habitat for aquatic and riparian fauna, providing suitable habitats for species such as otter and amphibians. These habitats also contribute to hydrological connectivity between the Application Site and the wider receiving environment. Consequently, many FW2 habitats were assessed as being of **Local Importance (Higher Value).**

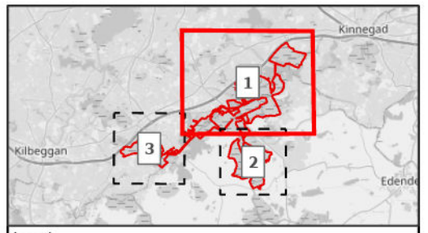
Many Treelines (WL2) are unmanaged and display a diverse structure, including mature trees, regenerating saplings and well-developed understorey vegetation. These habitats are frequently identified as providing nesting opportunities for birds, commuting and foraging habitat for bats, and movement corridors for mammals. Treelines also contribute significantly to habitat connectivity throughout the wider peatland landscape and are generally assessed as being of **Local Importance (Higher Value).**

Hedgerow (WL1) habitats provide screening, shelter and connectivity within the wider landscape. These linear feature support nesting birds, and mammal movement corridors. Hedgerows are generally assessed as being of **Local Importance (Higher Value)**.

7°16'30"W

53°27'12"N





Legend

Application Site Boundaries

HABITAT
- BL3 - Buildings and artifical surfaces
- FL8 - Other artificial lakes and ponds
- FW2 - Depositing/ lowaland rivers
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines
- WS1 - Scrub

HABITAT
- BC2 - Horticultural land
- BL3 - Buildings and artifical surfaces
- ED3 - Recolonising bare ground
- ED4 - Active quarries and mines
- FL8 - Other artificial lakes and ponds
- FS1 - Reed and large sedge swamps
- GA1 - Improved agricultural grassland
- GS2 - Dry meadows and grassy verges
- GS4 - Wet grassland
- HD1 - Dense bracken
- HH1 - Dry siliceous heath
- HH3 - Wet heath
- PB1 - Raised bog
- PB4 - Cutover bog
- WD2 - Mixed broadleaved/ conifer woodland
- WD4 - Conifer plantation
- WN7 - Bog woodland
- WS1 - Scrub
- WS1 - Scrub / PB4 - Cutover bog
- WS2 - Immature woodland

0 500 1,000
Meters

Spatial Reference
Datum: IRENET95
EPSG: 2157

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Rev	Date	Description	By	Chkd.
A	24/09/2026	First issue	S.P	B.K

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 5-3
Bog Drainage Network
Sheet 1 of 3

Scale @ A3: 1:35,000

Prepared by:	Checked by:	Date:
S.Pezzetta	B.Kasonde	September 2026

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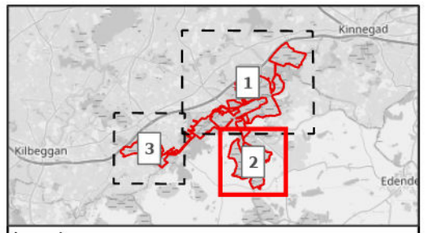
Draft: A

7°16'30"W

53°21'5.4"N

650000





Legend

- Application Site Boundaries

HABITAT

- FW2 - Depositing/ lowaland rivers
- FW4 - Drainage ditches
- WL1 - Hedgerows
- WL2 - Treelines

HABITAT

- BL3 - Buildings and artifical surfaces
- ED3 - Recolonising bare ground
- ED4 - Active quarries and mines
- FL8 - Other artificial lakes and ponds
- FS1 - Reed and large sedge swamps
- GA1 - Improved agricultural grassland
- GS2 - Dry meadows and grassy verges
- HD1 - Dense bracken
- HH1 - Dry siliceous heath
- PB1 - Raised bog
- PB4 - Cutover bog
- WD1 - (Mixed) broadleaved woodland
- WN6 - Wet willow-alder-ash woodland
- WN7 - Bog woodland
- WS1 - Scrub
- WS2 - Immature woodland

0 500 1,000
Meters

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A	24/09/2026	First issue	S.P	B.K

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 5-4
Bog Drainage Network
Sheet 2 of 3

Scale @ A3: 1:21,000

Prepared by:	Checked by:	Date:
S.Pezzetta	B.Kasonde	September 2026

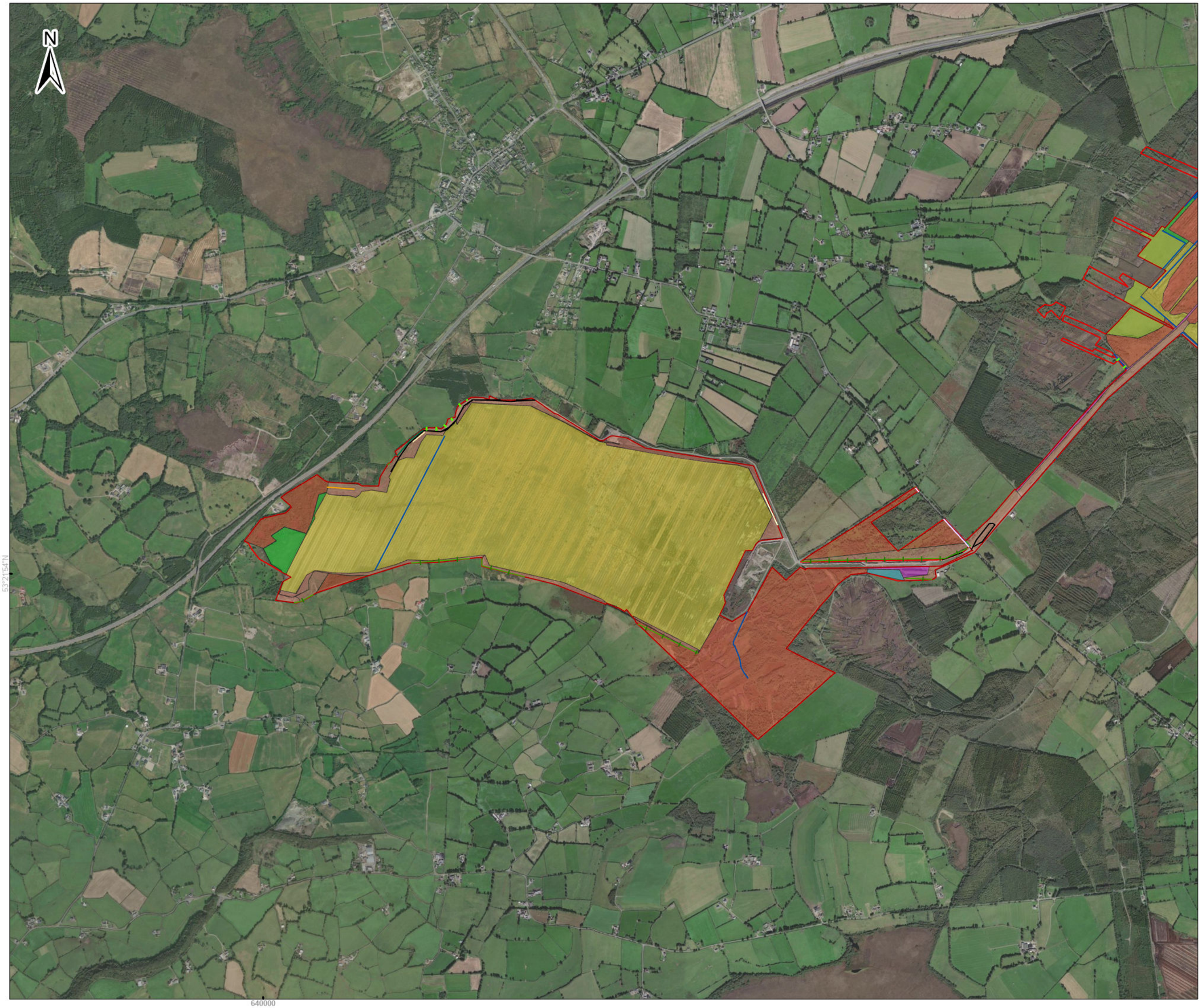
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Draft: A





Legend

- Application Site Boundaries

HABITAT

- <Null>
- BL2 - Earth banks
- BL3 - Buildings and artifical surfaces
- FW4 - Drainage ditches
- GS2 - Dry meadows and grassy verges
- WL1 - Hedgerows
- WL2 - Treelines
- WN7 - Bog woodland
- WS2 - Immature woodland

HABITAT

- BL3 - Buildings and artifical surfaces
- ED1 - Exposed sand, gravel or till
- FL8 - Other artificial lakes and ponds
- GA1 - Improved agricultural grassland
- HH1 - Dry siliceous heath
- PB1 - Raised bog
- PB4 - Cutover bog
- WD1 - (Mixed) broadleaved woodland
- WN7 - Bog woodland
- WS1 - Scrub

0 500 1,000
Meters

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Derrygreenagh Substitute Consent

Title:
Figure 5-4
Bog Drainage Network
Sheet 3 of 3

Scale @ A3: 1:23,000

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Draft: A

7°15'45"W

N

7400000

648000

Legend

- Application Site Boundaries
- Otter Holt (Inactive)

0 1.5 3
Kilometers

Spatial Reference
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Project:

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Title:

Figure 5 6:
Otter Recorded Over the Survey Period

Scale @ A3:	1:50,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Forde	September 2026

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Draft: A

7°15'45"W

7400000

648000







Legend

- Application Site Boundaries
- Cherry Laurel
- Cherry Laurel

0 1.5 3
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

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A	24/09/2026	First issue	S.P	J.F

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 7-16:
Location of Invasive Non-native Species

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
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Draft: A

5.2.2 Invasive Non-Native Species

Multidisciplinary surveys undertaken in April and May 2026 recorded a small number of invasive non-native plant species within the Application Site. Surveys were undertaken across a range of habitat types including treelines, scrub, recolonising bare ground and river corridors.

Only three invasive plant species were recorded during the surveys:

- Cherry Laurel (*Prunus laurocerasus*)
- Japanese Knotweed (*Fallopia japonica*)
- Butterfly-bush (*Buddleja davidii*)

The limited number of records indicates that invasive non-native plant species are not widespread within the Application Site. Records were generally associated with disturbed habitats, treelines and areas adjacent to existing linear features.

Of these species above, only Japanese Knotweed is listed under Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). Cherry Laurel and Butterfly-bush, while recognised as invasive non-native plant species, are not currently included on the Third Schedule.

The spread of the species does not represent a potential impact pathway associated with the Project and can therefore be excluded from further consideration.

5.2.2.1 Cherry Laurel

Cherry Laurel was recorded on both a point and linear basis within the Application Site. The most significant occurrence comprised a dense hedgerow along a riverbank, approximately 5 m in height, recorded within a river and bog landscape setting. Additional smaller occurrences comprising three individuals were recorded within a treeline habitat. Survey notes indicate that the plants were not in flower at the time of survey.

5.2.2.2 Japanese Knotweed

A single occurrence of Japanese Knotweed was recorded within a scrub habitat. Survey notes indicate that only a single plant was observed, with identification based on leaves visible from a distance. The record suggests a highly localised occurrence within the Application Site.

5.2.2.3 Butterfly-bush

Butterfly-bush was recorded at two locations within the Application Site. One record comprised a single immature stand associated with recolonising bare ground habitat, while a second record was noted adjacent to an access track.

5.2.3 Birds

5.2.3.1 Overview

Between 2024 and 2026, TOBIN ecologists undertook a comprehensive programme of breeding and wintering bird surveys (see Appendix C) to characterise bird assemblages, identify important habitats, and assess the occurrence and activity of target bird species within and surrounding the Application Site).

The ornithological surveys provided an evaluation of bird species occurring within the Application Site and surrounding habitats of ecological value. The principal survey area comprised Derryarkin Bog, Drumman Bog, Derryhinch Bog and Ballybeg Bog, together with associated quarry ponds, wetlands, drainage features and adjacent habitats. As the surveys were undertaken at a landscape scale, the resulting survey reports include records from both within and beyond the Application Site boundary, including areas such as the quarry ponds which **do not** form part of the substitute consent Application Site boundary. These additional records do however provide important context for understanding species distribution, habitat use and movement patterns. Survey coverage extended beyond the core development area to include appropriate buffer zones for breeding and wintering bird surveys, undertaken in accordance with established survey guidance and best practice. Survey methodologies included vantage point (VP) surveys, breeding and winter bird transects, waterbird surveys, breeding raptor surveys, Hen Harrier roost surveys, Woodcock surveys and incidental records.

At Toar Bog, a targeted programme of ornithological surveys was undertaken between December 2025 and June 2026. The survey programme comprised monthly VP surveys and bird transect surveys to characterise bird activity and habitat use across the site. Additional dusk and dawn transect surveys were undertaken during the breeding season to assess the occurrence of crepuscular species, particularly Woodcock, while a targeted Kingfisher survey was completed in May 2026 to investigate the significance of records obtained during earlier surveys. Incidental observations of species of conservation concern were also recorded throughout the survey programme. The surveys were designed to supplement the wider ornithological baseline for the project and provide site-specific information on bird assemblages, habitat utilisation and the occurrence of notable species within Toar Bog, Derryarkin Bog, Drumman Bog, Derryhinch Bog and Ballybeg Bog.

5.2.3.1.1 Breeding Season 2024

VP Survey Effort

13 Vantage Points surveyed monthly between April and September 2024.

Target Species in Flight

The following SCI species of Irish SPAs were recorded: Black-headed Gull (131 sightings), Lesser Black-backed Gull (104), Mallard (87), Lapwing (48), Golden Plover (32), Peregrine (6), Tufted Duck (6), Cormorant (6), Common Gull (4), Little Grebe (4), Merlin (2), Curlew Red (1), Ringed Plover (1)

Target Breeding Waterbirds Species non flying

The following SCI species of Irish SPAs were recorded: Mallard Amber (39), Great Crested Grebe (14), Whooper Swan (3), Tufted Duck (2), Ringed Plover Amber (2), Kingfisher (2), Peregrine (1). The principal breeding areas were at areas outside of the Application Site boundary at Derryarkin Quarry Ponds, Drumman Quarry Ponds and at wetlands south of Ballybeg Bog.

Breeding Waders

The following SCI species of Irish SPAs were recorded: Mallard (571), Lapwing (229), Black-headed Gull (147), Tufted Duck (131), Little Grebe (69), Lesser Black-backed Gull (65), Ringed Plover (56), Great Crested Grebe (33), Teal (24), Cormorant (8), Kingfisher (1)

Raptors

Peregrine (4) was the only SCI raptor of Irish SPAs recorded during the surveys.

Breeding Bird Transects

The following SCI species of Irish SPAs were recorded: Mallard (341), Black-headed Gull (107), Lapwing (45), Tufted Duck (42), Teal (35), Ringed Plover (21), Little Grebe (18), Common Gull (15), Lesser Black-backed Gull (10), Peregrine (6), Cormorant (5), Great Crested Grebe (2), Redshank (2),

5.2.3.1.2 Winter Season 2024-2025

VP Survey Effort

13 Vantage Points surveyed monthly.

Target Species in Flight

The following SCI species of Irish SPAs were recorded: The following SCI species of Irish SPAs were recorded: European Golden Plover (3686), Northern Lapwing Red (2938), Black-headed Gull (399), Whooper Swan (121), Mallard Amber (45), Great Cormorant (36), Hen Harrier (25), Lesser Black-backed Gull (15), Peregrine Falcon (10), Eurasian Curlew (8), Merlin (7).

Target Breeding Waterbirds Species non flying

The following SCI species of Irish SPAs were recorded: Tufted Duck Amber (103), Eurasian Wigeon (26), Eurasian Teal (16), Great Cormorant (14), Mallard (8), Whooper Swan (7), Great Crested Grebe (4), Merlin Amber (2), Redshank Red (1),

I-WEBS/Waterbird Survey

The I-WeBS/Waterbird survey involves conducting monthly counts during the survey season. Counts were conducted in wetland habitat locations within a Zone of Influence (ZoI), encompassing the proposed development site and within a 10km buffer. A total of 34 sites were surveyed.

The following SCI species of Irish SPAs were recorded: European Golden Plover (916), Northern Lapwing (498), Mallard Amber (495), Tufted Duck Amber (490), Whooper Swan Amber (345), Eurasian Teal Amber (247), Eurasian Wigeon (165), Little Grebe (71), Great Cormorant (45), Black-headed Gull (30), Great Crested Grebe (28), Common Ringed Plover (14), Eurasian Curlew (12), Common Goldeneye (8), Northern Shoveler (8), Common Redshank (4), Common Pochard Red (3), Merlin (2), Common Kingfisher (1), Common Greenshank (1), Hen Harrier (1).

Hen Harrier Roost Surveys

Hen Harrier roost watches were undertaken, following methodologies outlined within Hardey et al. (2013), as recommended by SNH (2017). Roost surveys were conducted at a vantage point an hour before the sunset and until last visible light.

Information recorded at vantage points included a number of Hen Harrier entering a roost, time, age and sex, where it was possible to discern. The aim of this survey was to establish the distribution and abundance of Hen Harrier and other wintering raptors.

Hen Harrier was recorded throughout the survey period (13), with two potential roosting areas identified. The first was located in the north-west of Drumman Bog, west of the quarry ponds and near the track. The second potential roosting area was identified in the southeastern part of Derryarkin Bog.

Winter Bird Transect Survey

Wintering Bird transect surveys were conducted to establish the distribution and abundance of birds within the Application Site, and to allow the evaluation of the site's importance. The transect survey was adapted from CBS (2012) and involved 12 representative transects.

The following SCI species of Irish SPAs were recorded: European Golden Plover (234), Northern Lapwing Red (193), Mallard Amber (133), Eurasian Teal (48), Tufted Duck (39), Great Cormorant (31), Black-headed Gull (19), Whooper Swan Amber (12), Common Ringed Plover (7), Great Crested Grebe (6), Common Pochard (4)), Peregrine Falcon (4), Hen Harrier (2), Eurasian Wigeon (2), Merlin (2).

5.2.3.1.3 Breeding Season 2025

VP Survey Effort

13 Vantage Points surveyed monthly between April and September 2024.

Target Species in Flight

The following SCI species of Irish SPAs were recorded: Northern Lapwing (289), Black-headed Gull (194), European Golden Plover (139), Mallard (98), Lesser Black-backed Gull (65), Peregrine Falcon (16), Common Ringed Plover (6), Eurasian Teal (4), Tufted Duck (4), Great Cormorant (3), Greylag Goose (2), Eurasian Curlew (1), Hen Harrier (1).

Target Breeding Waterbirds Species non-flying

The following SCI species of Irish SPAs were recorded: Mute Swan (185), Mallard (6), Common Ringed Plover (5), Tufted Duck Amber (5), Northern Lapwing (4), Great Crested Grebe (4), Peregrine Falcon (2), Great Cormorant (1).

The principal breeding areas were at areas outside of the Application Site boundary.

Breeding Waders

The following SCI species of Irish SPAs were recorded: Mallard (707), Tufted Duck (198), Northern Lapwing (117), Eurasian Teal (95), Common Ringed Plover (89), Black-headed Gull (83), Great Crested Grebe (40), European Golden Plover (27), Lesser Black-backed Gull (8), Eurasian Curlew (4), Common Kingfisher (4), Dunlin (2), Common Redshank (2), Great Cormorant (2), Black-tailed Godwit (1).

Raptors

Peregrine (2) was the only SCI raptor of Irish SPAs recorded during the surveys.

Breeding Bird Transects

The following SCI species of Irish SPAs were recorded: Black-headed Gull (143), Mallard Amber (95), Northern Lapwing Red (58), Tufted Duck (56), European Golden Plover (27), Common Ringed Plover (22), Eurasian Teal Amber (14), Great Crested Grebe (5), Whooper Swan (4), Peregrine Falcon (1), Common Gull (1).

5.2.3.1.4 Breeding Season Conclusion

Breeding season surveys undertaken in 2024 and 2025 recorded a range of SCI species associated with Irish SPAs across the wider survey area. The highest levels of activity and evidence of breeding were generally associated with habitats located outside the Application Site, particularly the quarry ponds and wetland habitats at Derryarkin and Drumman, and wetlands south of Ballybeg Bog. Species recorded regularly during the breeding seasons included Mallard, Lapwing, Black-headed Gull, Tufted Duck, Ringed Plover, Teal, Great Crested Grebe and Lesser Black-backed Gull, while Annex I species such as Peregrine, Kingfisher, Whooper Swan and Golden Plover were recorded at lower frequencies. Peregrine was the only SCI raptor recorded consistently during breeding-season surveys.

Overall, the survey results indicate that the Application Site and surrounding bog complex support a diversity of breeding and breeding-season bird species, although the principal breeding concentrations occurred within quarry ponds and wetland habitats in the wider survey area rather than within the Application Site itself.

5.2.3.1.5 Non-breeding Season Conclusion

Winter surveys undertaken during the 2024-2025 season confirmed the importance of the wider bog and wetland complex for a range of wintering SCI species associated with Irish SPAs. European Golden Plover and Northern Lapwing were the most numerous species recorded, with large flocks observed across the survey area, demonstrating the value of the habitat for wintering waterbirds and waders. Additional SCI species recorded during winter surveys included Whooper Swan, Hen Harrier, Merlin, Peregrine, Curlew, Kingfisher, Tufted Duck, Wigeon, Teal and Great Cormorant. Hen Harrier was recorded regularly throughout the survey period, with two potential roost locations identified within the wider bog complex. I-WeBS surveys further confirmed the importance of wetlands within the Zone of Influence for wintering waterbirds.

5.2.3.2 Toar Bog

Following an initial walkover survey conducted on the 17th of December 2026 two suitable vantage points and transect routes were established. Two vantage points ('VPs'), located at 53.36820, -7.348594 and 53.37324, -7.380712, were deemed potentially suitable and were subsequently surveyed during follow-up visits on the 18th and 19th of December. The two transect routes were selected ensuring adequate coverage of habitats representative of the site and the bird species associating with each habitat type.

5.2.3.2.1 Winter Bird Surveys (December 2025 to March 2026)

Wintering bird surveys undertaken between December 2025 and March 2026 recorded a range of species at Toar Bog. Annex I species recorded included European Golden Plover, Merlin, Peregrine and Kingfisher.

European Golden Plover were recorded in all survey months, with peak numbers occurring in January (52 individuals) and February (49 individuals). While some birds were observed flying over the site, others were recorded foraging on the bog, indicating direct use of the habitat. A single Merlin was recorded in December utilising the site for hunting, while a single Peregrine was observed perched within the bog in January. A single Kingfisher was recorded in February flying over an artificial pond and was considered to be transiting through the site rather than actively foraging.

Other species of Irish SPAs recorded comprised Northern Lapwing and Mallard. Northern Lapwing were recorded in December as a flock of 90 birds flying over the site, while Mallard were recorded in low numbers and were associated with drainage ditches, artificial ponds and the wider surrounding landscape.

5.2.3.2.2 Conclusion

Overall, the surveys confirmed that Toar Bog supports a range of wintering bird species, including several SCI species, with European Golden Plover representing the most regularly recorded species.

5.2.3.2.3 Breeding Bird Surveys (April to June 2026)

At Toar Bog, targeted ornithological surveys undertaken between April and June 2026 recorded a limited assemblage of bird species of conservation interest. SCI species of recorded included Common Kingfisher and Mallard. Kingfisher was recorded on multiple occasions associated with an artificial pond in the eastern section of the site; however, no evidence of breeding behaviour was observed and the species is considered more likely to be breeding elsewhere within the wider area.

5.2.3.2.4 Conclusion

Overall, the surveys indicate that Toar Bog supports limited SCI species activity, with the site used principally for foraging, commuting and localised breeding by certain other species.

5.2.4 Aquatic Ecology

5.2.4.1 Biological Water Quality

Macroinvertebrate sampling was undertaken at 12 out of the 14 aquatic survey sites (see Appendix D). The macroinvertebrate communities recorded at survey sites comprised of a range of macroinvertebrate taxa and generally confirmed the local pressures to the aquatic environment, as well as the failure of the majority of the WFD river water bodies to achieve the WFD objectives. The macroinvertebrate assemblages were dominated by Group C taxa, with frequent assemblages of D were present, whereas only a limited number of sites supported Group A and B taxa in low abundance and an absence of E taxa.

Of the 12 sites sampled, the target of Q4 unpolluted water was not achieved at any of the sampling sites. Site 10 received a Q3-Q4 (moderate status), slightly polluted water. Site 4 received a Q2 bad status of seriously polluted, a site dominated by Group D taxa. All remaining sites achieved a Q3 poor status of moderately polluted water due to the paucity of pollution sensitive taxa, as well as the degree of siltation (considerable) and algal growth (luxuriant).

The current survey results indicate that the overall biological water quality in the watercourses draining the application site is poor and moderately polluted. The sampled watercourses do not provide water of a quality adequate to support a range of pollution sensitive mayfly and stonefly larvae, as well as salmonids.

5.2.4.2 Fisheries Habitat

An appraisal of suitable salmonid spawning and nursery habitat was carried out at all aquatic survey sites (with the exception of site 2 and 9) whereby spawning gravels, riffles and holding pools providing suitable nursery and spawning habitat was noted. Suitable spawning and nursery habitat was recorded present at Sites 1, 3, 6, 10, 12 and 14, with young brown trout recorded present at all these sites.

There is an absence of heterogenous fluvial habitat at the remaining sites that would provide ideal rearing conditions for salmonids. The limited presence of riffle and complete absence of pool habitat, modified banks provide limited salmonid nursery habitat in these watercourses. The larger watercourses, such as Sites 2, 4, 7, 8 and 9 provided adequate deeper holding pools for adult salmonids. Based on the habitats present at the sites surveys, as well as the poor to moderate water quality, the watercourses draining the site are considered poor for the early life stages of salmonids. There was evident of substrate siltation at numerous sites. Silt clogs the interstices at the surface of the riverbed. This can prevent or disrupt alevin emergence and reduce the fitness of the fry and parr, and hence their ability to cope with the natural pressures faced within the riverine environment.

These sites were of poor quality salmonid nursery being degraded due to historical drainage, poor flow rates, heavy siltation and evident enrichment. The quality of spawning habitat was also poor (for salmonids) being reduced by the deterioration of the bed from algae and sedimentation.

Many sites were assessed as being of poor to moderate value for salmonid species. This was attributed to historical channel modification (e.g. straightening and deepening), reduced hydromorphological heterogeneity, low flow conditions, and widespread siltation. These pressures resulted in limited availability of clean gravels suitable for spawning habitat, nursery habitats, and deeper pools and refugia for use as holding habitat.

In many instances, spawning habitat quality was reduced due to sedimentation, with channel substrates dominated by fine material or compacted sediments. Additionally, the prevalence of slow-flowing, low-energy channel conditions and dense macrophyte growth further reduced habitat suitability for salmonids.

Suitable lamprey ammocete silt habitat was recorded within the application site (e.g. likely due to the modification of the watercourse channels creating low energy within the channel, as well as cattle access, causing bank tramping and siltation into the watercourse. The slow to moderate flowing low gradient nature of modified watercourses in the study area provided suitable conditions for lamprey larvae, which require soft substrates into which they can burrow.

Habitat suitability for lamprey was generally moderate across the survey area. Suitable clean gravel spawning habitat was sparse and frequently impacted by siltation, while peat-dominated sediments were often unsuitable for ammocoete burrowing due to their fine structure.

Although some sites contained localised soft sediment deposits that could support ammocoetes, overall habitat quality for lamprey was limited by low flows, poor hydromorphology, and the dominance of peat-derived substrates.

Spawning habitat for lamprey was recorded present at a number of sites, 1, 3, 6, 10, 12 and 14.

5.2.4.3 Fish Species

Sampling sites 2, 4 and 9 returned no electrofishing results, as sites 2 and 9 were unsuitable for electrofishing due to been excessive deep heavily modified channels. Site 4 was dry at the time of survey.

Two Annex II fish species, Atlantic Salmon and *Lampetra sp,* was recorded during the electrofishing surveys, Salmon (n=1), and lamprey (Lampetra sp,) (n=24) across all 11 sampled sites. One Salmon was captured at one site (site 14) and 24 River/Brook lamprey ammocetes were captured at five sites.

The salmon was 13.5cm in length, a 2+ aged fish. Its present this far up into the midlands is an indication there is limited barriers upstream for this fish species to migrate from the sea.

The River/Brook lamprey ammocetes length frequency ranged from 2.5-15cm in length (0+ to 4+ years) indicating ongoing recruitment in these watercourses, suitable spawning habitat and silts and well as no barrier to migration through these watercourses.

5.2.4.4 White-clawed Crayfish

Crayfish traps were set and collected at all 14 sites. No crayfish were captured in the traps during the survey. A habitat assessment and manual search was carried out at all accessible sites for the presence of white-clawed crayfish (with exception of Sites 2, 8 and 9 due to deep unwadable waters). No white-clawed crayfish were recorded present at any of the sites, nor were any captured during kick sampling or electrofishing surveys. No evidence of white-clawed crayfish carapace or claw remains were recorded on the riverbanks or bridge ledges in the form of Otter scat or remains from predation.

Potential suitable habitat to support crayfish was assessed as moderate at several sites, particularly where suitable refugia and calcareous influences were present.

5.2.4.5 Freshwater Pearl Mussel

A broad appraisal/overview of the upstream and downstream habitat at each aquatic survey site was undertaken to evaluate the wider contribution to FWPM and the potential for this species to be present within the Application site. Based on the general riverine habitat, topography, low gradient, substrate, water quality and surrounding habitat, it was determined that the watercourses within the site and downstream do not contain suitable habitat. No FWPM were recorded during aquatic surveys for the proposed project and no FWPW were recorded present within the eDNA samples collected from sites 2, 5, 10 and 13.

5.2.4.6 Environmental DNA

An eDNA sampling survey was carried out to detect the presence of River/Brook lamprey, Salomon and FWPM presence out at four survey sites within the study area of the Application site.

The number of replicates that show a positive result may indicate a lower or higher amount of eDNA presence in the water body. However, even a score as low as 1/12 is a positive result indicating species present. A negative result, where eDNA is not detected or is present below the threshold of detection, should be interpreted with caution. A negative result does not necessarily confirm species absence, as the species may still be present below the limit of detection. Note there is no evidence FWPM is present within the study site. Lamprey DNA was collected at sites 2, 5 and 10. This corresponds with their presence at these sites were electrofished (with exception to site 2 which could not be electrofished due to depts). A very low eDNA presence of Salmon has shown this species to be present at sites 2 and 5.

6. IDENTIFICATION OF LIKELY SIGNIFICANT EFECTS TO EUROPEAN SITES

This section provides an overview of the assessment framework of the remedial AASR, setting out the methodology applied, the identification of European sites within the potential ZoI of the Project, the key impact sources and pathways considered, and the assessment of European site receptors to determine the potential for likely significant effects.

- **Section 6.1** outlines the assessment approach applied in the remedial AASR, describing the source–pathway–receptor (SPR) methodology used to identify potential connectivity, potential impact pathways, and the resulting ZoI for European sites, in accordance with Habitats Directive requirements.
- **Section 6.2** identifies the European sites within the Project's potential ZoI, detailing how an initial screening area was refined to account for SPR linkages and to determine European sites remote to the Application Site requiring further assessment for likely significant effects.
- **Section 6.3** summarises how activities associated with Peat Extraction Phase, Current Phase and Remedial Phase (Future) at the Application Site may give rise to hydrological, water-quality, habitat, and disturbance pathways, with historical impacts identified and current and future effects assessed.
- **Section 6.4** identifies and assesses the relevant European site receptors within the likely ZoI, evaluating potential in-situ and ex-situ effects on SAC and SPA qualifying features across the Peat Extraction Phase, Current Phase and Remedial Phase (Future) of the Project to determine whether likely significant effects can be excluded or require further assessment in the rNIS.

6.1 ASSESSMENT APPROACH OVERVIEW

To inform this remedial AASR, a range of Geographic Information System (GIS) spatial datasets and mapping tools were utilised to identify potential interactions between activities at the Application Site and European sites.

The methodology was based on relevant guidance outlined in Section 1 above. The key steps undertaken in this assessment are outlined below. The structured approach applied ensures that all potential interactions between the Project and European sites were systematically evaluated, in line with the requirements of the Habitats Directive and relevant national legislation.

Spatial Data Collection and Mapping

The most up-to-date GIS spatial datasets for European sites (sourced from the NPWS website[28]), along with WFD SWB, LWB and GWB (from the EPA[29]), were integrated to inform the assessment of potential hydrological and ecological impact pathways.

[28] Available at: https://www.npws.ie/maps-and-data. Accessed July 2026.
[29] Available at: https://gis.epa.ie/GetData/Download. Accessed July 2026.

Identification of European Sites Using a Source-Pathway-Receptor Model

A SPR model was applied to identify European sites with potential connectivity to the Application Site. To provide spatial context for the assessment, European Sites of the wider area surrounding the Application Site are mapped in Figure 6-1.

Assessment of Connectivity with SACs

Hydrological and hydrogeological connectivity was assessed through analysis of surface water flow paths, groundwater interactions and catchment linkages (Figure 6-1).

Ecological connectivity was considered separately, focusing on species movement via features such as riparian corridors, wetlands and other linear habitats.

Assessment of Connectivity with SPAs

In the absence of specific European or Irish guidance on assessing connectivity between projects and SPAs, the NatureScot (formally Scottish Natural Heritage [SNH]) document *Assessing Connectivity with Special Protection Areas* (SPA) (SNH, 2016[30]) was consulted. This document provides a framework for assessing connectivity between a project and SPAs by considering the dispersal and foraging ranges of bird species protected under the Birds Directive. It accounts for movements beyond SPA boundaries. Species-specific information was applied to determine whether qualifying bird species could be affected by the Project. For context Figure 6-1 below shows SPAs mapped relative to the Application Site.

Assessment of Likely Significant Effects on European Sites

The Application Site does not spatially overlap any European sites, and therefore are no direct effects are anticipated. There is however potential for **indirect in-situ and ex-situ effects** to QIs and SCIs of European sites.

The assessment evaluates how European sites could be impacted by indirect in-situ and ex-situ effects.

Indirect In-situ and *Ex-situ Effects*

Indirect in-situ effects are those that occur within the boundaries of a European site. Such effects can only arise where a demonstrable link exists between activities at the Application Site and the designated habitats or species within the European site. This may include changes in water quality, hydrological regime, or sediment and pollutant loadings originating from the Application Site that could feasibly effect QIs for which SACs are designated, or SCIs for which SPAs are designated, and thereby influence the conservation objectives of the sites.

Indirect ex-situ effects relate to impacts on mobile QIs and SCIs that occur outside the boundaries of the SACs or SPAs for which they are designated, and concern species that utilise habitats beyond the designated sites for foraging, roosting, commuting or dispersal. In such cases, activities at the Application Site may result in disturbance, displacement, loss or degradation of supporting habitat, or changes in environmental conditions, thereby influencing the conservation objectives of the European site.

[30] Available at: https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf. Accessed March 2026.

By considering both indirect in-situ and indirect ex-situ effects, the assessment ensures that potential effects are appropriately identified and evaluated, rather than being excluded solely because the Project is located outside the boundaries of European sites.

Habitat Loss and Fragmentation

Although the Project does not directly impact European sites, activities at the Application Site, including land-use change and peat removal, have the potential to indirectly affect mobile QI and SCI species that use these habitats for foraging, breeding, or migration. Such activities may result in habitat loss or fragmentation and could disrupt ecological corridors, thereby affecting species that depend on these areas.

Disturbance to Species

Operations associated with peat extraction, including machinery use, increased human activity and noise, could result in disturbance to mobile species associated with European sites that utilise the Application Site. Such disturbance may give rise to ex-situ effects, including behavioural changes, displacement, or reduced foraging efficiency.

Dust Emissions,

Given that dust effects are generally localised and confined to the immediate surroundings of operational areas, and that all European sites are located well beyond the likely dust zone of influence, no credible dust-related pathway exists between the Application Site and any European site. Consequently, there is no potential for in situ effects on the QIs and SCIs of European sites. However, certain mobile species associated with European sites may utilise habitats within the Application Site and are therefore considered separately within the assessment of potential ex situ effects...

Hydrological Changes

Although the Project is located outside European sites, peat extraction and ancillary activities may alter surface water flows, groundwater levels and recharge, with potential to affect nearby aquatic and wetland habitats. Where such habitats are hydrologically connected to European sites, changes in flow regime or water quality could give rise to indirect in-situ effects on designated habitats or species.

In addition, water bodies, wetlands and aquatic habitats within or near the Application Site may function as supporting habitats for mobile QI and SCI species associated with European sites. Changes in hydrological or hydrogeological conditions could affect habitat availability or quality, giving rise to indirect ex-situ effects, including impacts on foraging, breeding or other life cycle requirements, even where European sites themselves remain unaffected.

Water Quality Changes

Activities associated with the Project could result in increased runoff or the mobilisation of pollutants, with the potential to affect nearby watercourses and wetlands. Where such features are hydrologically connected to European sites, changes in water quality, sediment load or flow regime could give rise to in-situ effects on designated habitats or species.

In addition, the affected aquatic habitats at the Application may function as supporting habitat for mobile species associated with European sites.

As a result, there is potential that impacts such as nutrient or sediment enrichment could give rise to ex-situ effects by degrading feeding or breeding resources relied upon by qualifying species.

Consideration of In-combination Impacts

The assessment examined the potential for in-combination impacts resulting from historical peat extraction activities and associated works at the Application Site. When considered together with other projects in the region, the cumulative effects of the Project could exacerbate indirect impacts on European sites.

Nearby projects might amplify hydrological changes, habitat fragmentation, or disturbance to species. For example, multiple developments in the area could further disrupt ecological corridors or increase pressures on species that use both the Project site and European sites during various stages of their life cycle. The potential for in-combination effects with other historic, ongoing or planned projects and plans was also considered, with findings detailed in Section 7 of this report.

Review of Site Synopsis Report, Site Conservation Objectives and Supporting Documentation:

The site synopses, conservation objectives and conservation objectives supporting documents for the relevant European Sites, as published by the NPWS[31], were reviewed at the time of preparing this report. These documents provided essential information on the ecological sensitivities and conservation priorities of sites, informing the assessment of potential impacts.

Establishing the Likely Zone of Influence:

Where pathways for potential likely significant effects were identified, such as habitat loss, hydrological connectivity, or disturbance to qualifying species of a European site, the affected site was included within the likely ZoI for further assessment.

Section 6.2 below provides an analysis of the SPR linkages used to identify relevant European sites, while Section 6.4 assesses the potential for significant effects.

Specifically, Section 6.4 outlines how activities associated with the Project from 1994 to the present day, as well as future rehabilitation efforts, could result in significant effect on designated European sites, their habitats, and species. It describes the mechanisms through which these impacts could occur and the associated receptors that may be affected.

6.2 European Sites within the Potential Zone of Influence of the Project

6.2.1 Overview

The identification of European sites requiring consideration in this remedial AASR was undertaken in two stages. An **initial screening area** of 15 km was first applied as a precautionary search area to identify European sites potentially requiring consideration. This screening area did not represent the definitive ZoI.

[31] Available at: https://www.npws.ie/protected-siteshttps://www.catchments.ie/maps/. Accessed July 2026.

Subsequently, SPR analysis was undertaken to establish the definitive ZoI, identifying those European sites with potential hydrological, hydrogeological and/or ecological connectivity to the Application Site and therefore requiring assessment.

6.2.2 Initial Screening Area

An initial 15km distance was applied to define an **initial screening area** for the identification of European sites. This initial screening area was used for preliminary screening purposes only and does **not represent the definitive ZoI**.

Within the initial screening area, eleven European sites were identified, comprising nine SACs and two SPAs. The European sites are:

- **SACs**
  - Raheenmore Bog SAC [0000582] (NPWS, 2015)
  - Split Hills and Long Hill Esker SAC [0001831] (NPWS, 2018)
  - Mount Hevey Bog SAC [0002342] (NPWS, 2016a)
  - Lough Ennell SAC [0000685] (NPWS, 2024a)
  - Wooddown Bog SAC [0002205] (NPWS, 2023)
  - River Boyne and River Blackwater SAC [0002299] (NPWS, 2021a)
  - Clara Bog SAC [000572] (NPWS, 2016b)
  - Charleville Wood SAC [000571] (NPWS, 2021a)
  - The Long Derries, Edenderry SAC [0000925] (NPWS, 2021b)
- **SPAs**
  - Lough Ennell SPA [0004044] (NPWS, 2024b)
  - River Boyne and River Blackwater SPA [004232] (NPWS, 2024c)

The location of the SACs and SPAs listed above relative to the Application Site are shown in Figure 6-1 while Table 6-1 list the distance of the SACs and SPAs from the Application Site and the years when the sites were designated.

Assessment of potential likely significant effects to receptors of these European sites within 15km of the Application Site is presented in Section 6.4 below.

Table 6-1: Special Areas of Conservation within 15km of Application Site

SAC [Site code]	Distance (as the crow flies) from Application Site	References	Year Designated
Raheenmore Bog SAC [000582]	1.30 km south west	(NPWS 2015)[32]	1997
Split Hills and Long Hill Esker SAC [0001831]	1.35km west	(NPWS, 2018)[33]	1997
Mount Hevey Bog SAC [002342]	6.64km north east	(NPWS 2016a)[34]	2003
Lough Ennell SAC [000685]	6.72km west	(NPWS, 2024a)[35]	1998
Wooddown Bog SAC [002205]	10.14km north	(NPWS, 2023)[36]	2016

[32] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000582.pdf
[33] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001831.pdf
[34] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002342.pdf
[35] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000685.pdf
[36] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002205.pdf

SAC [Site code]	Distance (as the crow flies) from Application Site	References	Year Designated
River Boyne and River Blackwater SAC [002299]	9.34km north east	(NPWS, 2021a)[37]	2003
Clara Bog SAC [000572]	12.89km west	(NPWS, 2016b)[38]	2022
Charleville Wood SAC [000571]	12.64km south west	(NPWS, 2021a)[39]	1998
The Long Derries, Edenderry SAC [000925]	14.26km south east	(NPWS, 2021b)[40]	1995

Table 6-2: Special Protection Areas within 15km of Application Site

SPA [Site code]	Distance (as the crow flies) from Application Site	References	Year Designated
Lough Ennell SPA [0004044]	7.83km west	(NPWS, 2024b)[41]	1995
River Boyne and River Blackwater SPA [0004232]	9.34km north east	(NPWS, 2024c)[42]	2010

6.2.3 Definitive ZoI

Based on the SPR analysis, potential pathways extending beyond the initial screening area were identified. This informed the definition of the **definitive ZoI**. The assessment considered hydrological linkages between the Application Site and European sites **beyond the initial screening area**. The analysis also considered ecological linkages where the QI and SCI of European sites may utilise the Application Site for foraging, breeding, migration, or other ecological functions. Where such use occurs, a functional ecological linkage is considered to be potentially present. SPR analysis identified potential linkages to a further three European sites, comprising two SACs and one SPA. The European sites are:

- **SACs**
  - River Barrow and River Nore SAC [0002162] (NPWS, 2025)
  - River Shannon Callows SAC [000216] (NPWS, 2022a)

Table 6-1 lists the distance of the above SACs, including their distance from the Application Site and the years when the sites were designated.

Assessment of potential likely significant effects to receptors of these SACs for which potential SPR linkages to the Application Site is presented in Section 6.4 below.

[37] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002299.pdf
[38] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000572.pdf
[39] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000571.pdf
[40] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000925.pdf
[41] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004044.pdf
[42] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004232.pdf

SAC [Site code]	Distance (as the crow flies) from Application Site	References	Year Designated
River Barrow and River Nore SAC [002162]	19.56km south	(NPWS, 2025)[43]	1998
River Shannon Callows SAC [000216]	32.95km west	(NPWS, 2022a)[44]	2002

It is noted that the Application Site is hydrologically linked to the following SACs:

- Boyne Coast and Estuary SAC [001957] (NPWS, 2026)
- Lough Derg, North-east Shore SAC [002241] (NPWS, 2019a)

While a hydrological connection exists between the Application Site and these SACs via the wider catchment network, the hydrological pathway is highly attenuated and indirect. The Application Site is located a considerable distance upstream of these SACs and any water runoff arising from the Application Site would be subject to substantial dilution, dispersion and natural attenuation processes as it passes through the intervening watercourses.

Therefore, likely significant effects on Boyne Coast and Estuary SAC, and Lough Derg, North-east Shore SAC can be objectively excluded, and the European sites are not considered further in this assessment.

Similarly, that the Application Site is hydrologically linked to the following SPAs:

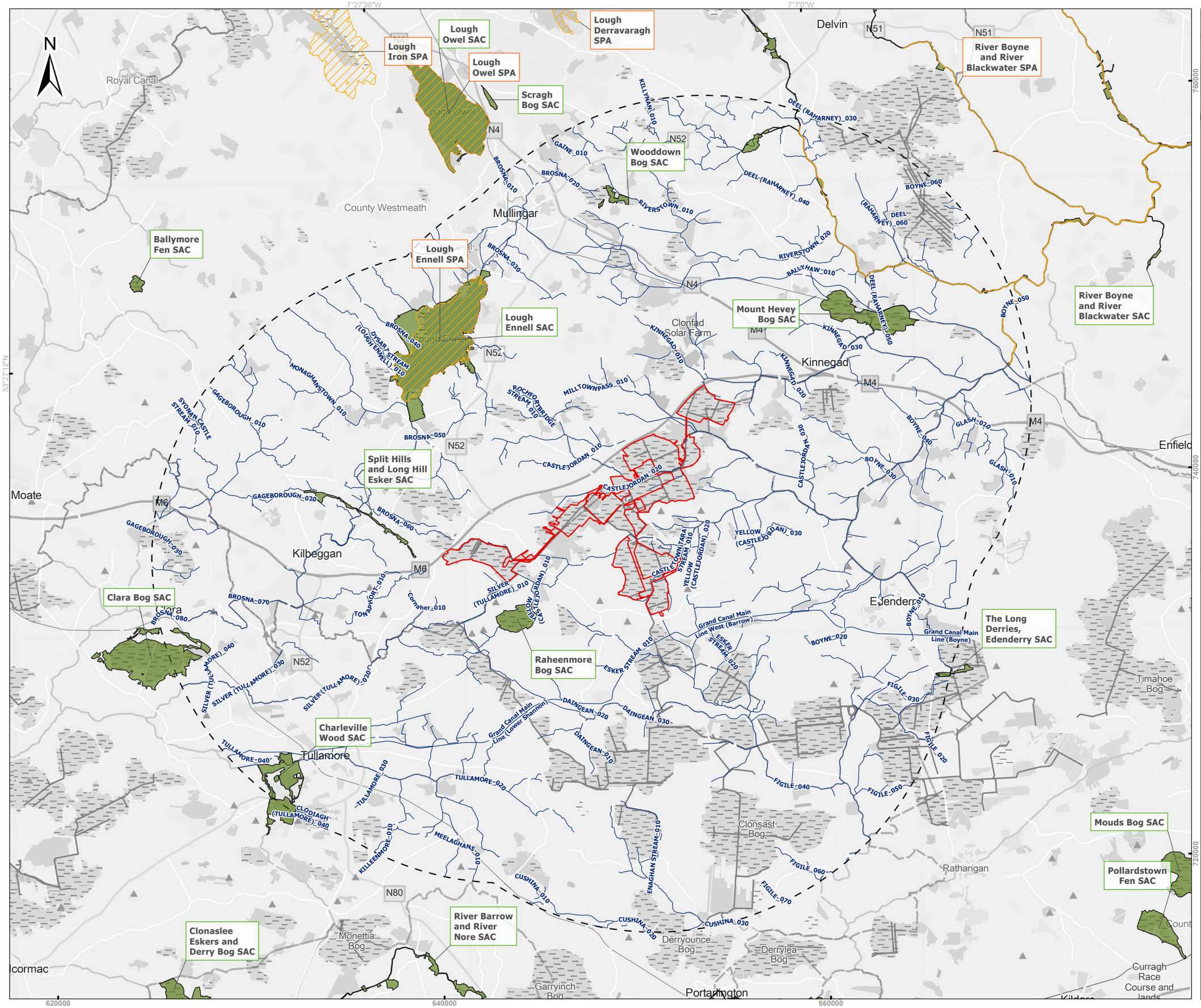
- Boyne Estuary SPA [004080] (NPWS, 2013)
- Middle Shannon Callows SPA [004096] (NPWS, 2022b)

The SPA are indirectly connected to the Application Site via the wider catchment network. As is the case for the above SACs the hydrological pathway is highly attenuated due to the considerable separation distances involved and the extensive intervening watercourse network. Any runoff originating from the Application Site would be subject to substantial dilution, dispersion and natural attenuation before reaching these European sites.

Furthermore, ecological connectivity is considered unlikely, as the SCI bird species for which these SPAs are designated are not expected to utilise or forage within the Application Site, given its distance from the SPAs.

Accordingly, no source-pathway-receptor linkage has been identified and likely significant effects, either alone or in combination with other plans or projects, on Boyne Estuary SPA or Middle Shannon Callows SPA can be objectively excluded. Therefore, these European sites are not considered further in this assessment.

[43] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf
[44] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000216.pdf



Legend

- Application Site Boundaries
- 15km Buffer

Designated Sites

- WFD - Rivers
- Special Protected Areas (SPAs)
- Special Areas of Conservation (SACs)

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Map data © OpenStreetMap contributors, Microsoft, Facebook, Google, Esri Community Maps contributors, Map layer

Rev	Date	Description	By	Chkd.
A	20/08/2026	First issue	S.P	J.F

Client: BnM

Project:

Derrygreenagh Substitute Consent

Title:

Figure 6-1:
Designated Sites within 15km of the Application Site

Scale @ A3: 1:180,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Forde	August 2026

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Map Ref: 12334-005..AASr-EU.S-P.App.BO-TOB-A

Draft: A

6.3 Impact Sources and Pathways

6.3.1 Peat Extraction Phase (June 1994 – June 2020)

Between 1994 and 2020 the Application Site was subject to industrial peat extraction activities, with peat extraction remaining the primary function of the site. During peat extraction, impacts on hydrology, water quality, and habitat quality occurred at the Application Site disrupting natural drainage patterns, altered water retention, and degraded local ecosystems.

Activities during this phase likely altered drainage patterns, potentially increasing water flow to European sites or changing their hydrological conditions, affecting wetland habitats and species. It also likely increased sedimentation, peat silt, and nutrient runoff, deteriorating water quality in hydrologically linked European sites and impacting sensitive aquatic habitats. These effects may have indirectly impacted the European sites due to water quality deterioration in watercourses within and downstream of the Application Site, which discharge European sites. Changes in water quality, habitat structure, or hydrology at the Application Site could have had consequences for the SCI and QI species designated within these linked European sites.

Operational noise and increased human activity during peat extraction may have potentially disturbed birds species of European sites that may have been using the Application Site. This disturbance could have impacted their foraging, breeding, and movement patterns, potentially displacing species from suitable habitats.

Habitat loss resulting from peat removal at the Application Site may have affected habitats used by species associated with European sites that may use aquatic and peatland ecosystems at the Application Site potentially experiencing a reduction in suitable habitat for breeding, feeding, roosting, and other essential life-cycle activities.

6.3.2 Current Phase (June 2020 – Present Day)

Since June 2020, activities at the Application Site have focused on decommissioning. The potential for the release of suspended sediments and the reduction of water quality due to pollution, including both watercourses and groundwater, had been greatly reduced compared to the Peat Extraction Phase.

Effects from historical activities during the Peat Extraction Phase may continue to affect habitat suitability for species dependent on water quality and the hydrological conditions at the Application Site, including mobile species from European sites.

Ongoing decommissioning and required drainage infrastructure maintenance activities are unlikely to transfer pollutants at levels that would disrupt aquatic habitats or species at the European Sites. Consequently, no likely significant effects on adjacent or connected European sites are anticipated.

Decommissioning activities may temporarily generate noise and human disturbances, potentially affecting sensitive species at the Application Site, including Otters and birds from European sites that rely on the area for feeding, breeding, and movement. Disturbance could displace species and interfere with their normal behaviours.

6.3.3 Remedial Phase (Future)

Restoration of natural conditions in watercourses or changes in drainage infrastructure will improve water retention on the site allowing for rehabilitation of habitats at the Application Site. These changes may enhance water quality and availability, benefiting species dependent on stable aquatic habitats, such as water-dependent species within the locality. No negative effects to European sites are anticipated, with potential benefits to European Sites being considered due to the improvement of water quality and a return to more natural condition for downstream hydromorphology.

Future rehabilitation activities may result in temporary, localised disturbances to the mobile species from SACs or SPAs using the habitats at the Application Site. Habitat connectivity and species movement routes will remain intact, and no habitat fragmentation is anticipated. Consequently, disturbance effects will be negligible to low in magnitude and insufficient to adversely affect the conservation status or viability of local ecological receptors. Significant effects are therefore not predicted.

Activities during the Remedial Phase are unlikely to result in release of suspended sediments and the pollution of water, including both watercourses and groundwater, connected to European Sites.

Habitat rehabilitation works, including rewetting, drain blocking and the promotion of natural revegetation, will alter the vegetation structure and hydrological regime across portions of the Application Site. These measures are intended to facilitate the gradual development of wetland and peatland-associated habitats and to improve habitat connectivity, water retention and ecological resilience. As succession progresses, habitat composition and suitability for certain species will change, with different species potentially benefiting from different stages of habitat development. While some existing habitats and associated species assemblages may decline locally as conditions become wetter, these changes will occur within the context of a planned rehabilitation programme aimed at establishing more natural and self-sustaining habitats. The resulting habitat changes are therefore considered beneficial overall, contributing to improved ecological condition, reduced surface water runoff and erosion, and increased habitat diversity across the Application Site. Accordingly, no significant adverse effects on ecological receptors are predicted as a result of the rehabilitation works.

Operational noise and human activity during rehabilitation works will be at levels that are unlikely to disturb mobile species of SACs and SPAs that may be using the Application Site.

Rehabilitation activities may involve the use of plant, machinery and vehicles, giving rise to a theoretical risk of accidental spillages or the generation of sediment-laden runoff. However, these activities will be temporary, localised and limited in scale, and will largely occur within previously disturbed areas. Given the nature and extent of the proposed works, the limited quantities of fuels and oils required, the separation distance to European sites, and the absence of a credible pathway by which any minor and localised release could adversely affect the QIs and SCIs of European Sites, the potential for significant effects is considered negligible. Accordingly, likely significant effects on European sites are not anticipated.

6.4 POTENTIAL LIKELY SIGNIFICANT EFFECT TO RECEPTORS OF EUROPEAN SITES

Respectively Table 6-3 and Table 6-4 below provide an evaluation of indirect in-situ and ex-situ effects to SAC and SPAs associated with activities undertaken at the Application Site, during the Peat Extraction Phase (1994 to June 2020), the Current Phase (2020 to the present day), and the Remedial Phase (planned future rehabilitation works).

Table 6-3: Special Areas of Conservation within the Likely Zone of Influence

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
Raheenmore Bog SAC [000582]	1.30km south west	Active raised bogs [7110]* Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]	Raheenmore Bog SAC lies within the IE_EA_G_074 WFD GWB, which is adjacent to but hydrologically distinct from the GWBs underlying the Application Site (IE_SH_G_240, IE_SE_G_049, IE_EA_G_001, & IE_EA_G_002). Although the WFD RWB of YELLOW (CASTLEJORDAN)_010 (IE_EA_07Y020070) provides a surface-water connection between Raheenmore Bog and the Application Site, the bog is situated approximately 1230m upstream of a confluence with a stream of the same name which flows out of Toar Bog. Furthermore, Raheenmore Bog is situated within a separate groundwater body and is not hydrogeologically connected to the Application Site via groundwater pathways. As a result, no SPR linkage exists between Raheenmore Bog SAC and the Application Site. Drainage activities at the Application Site cannot influence the SAC, as the bog is sustained by its own separate GWB, and any potential pollutants arising on site would not affect the SAC because it is located upstream of any such events. <u>Potential in-situ Effects QI Habitats</u> 1) Peat Extraction Phase Effects Peat extraction and drainage activities at the Application Site between 1994 and 2020 took place downstream of the SAC. As a result, there was no potential for pollutant runoff or hydrological alteration to the SAC that could have affected water levels or water quality. Therefore, no likely significant in-situ effects on the SAC are considered to have occurred. 2) Current Phase Effects: During this phase, activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. As the current phase of the project focuses on decommissioning and management of the Application Site, and no works are being carried out on the Raheenmore Bog, no SPR link exists for the current phase to result in likely significant effects to the European Site. As a result, no likely significant effects to the sites QI habitats are considered to exist from these activities. 3) Remedial Phase Effects

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			The remedial (future) phase of the project focuses on rehabilitation of the habitats at the Application Site. As Raheenmore Bog is within its own groundwater body and not hydrologically connected to the Application Site, and as no works are being carried out on the Raheenmore Bog, no SPR link exists for the remedial phase to impact this European Site. As a result, no likely significant effects to European site are considered to exist during this Phase. <u>Assessment Conclusion</u> No likely significant effects from either the Extraction Phase, Current Phase or Remedial Phase on QIs are considered to exist.. Accordingly, the European site is screened out and **further assessment in the remedial NIS is not required.**
Split Hills and Long Hill Esker SAC [001831]	1.35km west	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (important orchid sites) [6210]*	The Split Hills and Long Hill Esker SAC is separated from the Application Site by approximately 1.35km and located upstream of the Application Site's effects of pollution and hydrological changes on the linked WDF RWBs. The SAC is dissected by the BROSNA_060 (IE_SH_25B090400) RWB, which flows over 23km before its confluence (as the BROSNA_100 (IE_SH_25B090761)) with the SILVER (TULLAMORE)_040 (IE_SH_25S030500) RWB (of which the SILVER (TULLAMORE)_010 (IE_SH_25S030010) is a tributary) which intersects the southern border of Toar Bog. The SAC predominantly lies within the Kilbeggan Gravels (IE_SH_G_242) and Clara (IE_SH_G_240) WFD GWBs, suggesting a potential GWB linkage with the Application Site (which also lies in the Clara GWB). The QI of the SAC are situated on the esker itself, uphill of any influence or connection to any groundwater or surface water connection and are rainwater fed habitats (due to their elevation). Therefore, no SPR link can be established and no hydrogeological connection with the Application Site is thought to exist. <u>Potential in-situ Effects to QI Habitats</u> 1) Peat Extraction Phase Effects The activities undertaken at the Application Site between 1994 and 2020 are not considered capable of affecting the QI habitat of the SAC. The SAC is located approximately 1.35 km from

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			the Application Site and is hydrologically separate, lying upstream of any potential changes in water quality or hydrological conditions arising from activities at the Application Site. Furthermore, the QI habitat occurs on the elevated esker landform itself and is not dependent on hydrological conditions within the watercourses or groundwater bodies associated with the Application Site. Consequently, no credible SPR linkage has been identified through which peat extraction activities could have affected the SAC. 2) Current Phase Effects: Activities during this phase are limited to the decommissioning and maintenance of the existing drainage infrastructure. Given the absence of any credible source-pathway-receptor linkage between these activities and the European site, no likely significant effects are considered to exist during the Current Phase3) Remedial Phase Effects No likely significant effects are considered to exist. **Assessment Conclusion:** No likely significant effects from either the Peat Extraction Phase, Current Phase or the Remedial Phase on the SAC are considered to exist . Accordingly, the European site is screened out and **further assessment in the remedial NIS is not required.**
Mount Hevey Bog SAC [002342]	6.64km north east	Active raised bogs * [7110] Degraded raised bogs still capable of natural regeneration [7120]	Mount Hevey Bog SAC is located within the IE_EA_G_072 WFD GWB. This SAC is connected to the WFD RWB streams of IE_EA_07K010200, part of the KINNEGAD_030 river network, and the IE_EA_07B340940, part of the BALLYHAW_010 river network, both of which further connect to the Boyne River. This SAC lies upstream of any connecting RWBs connected to the Application Site and occupies a separate WFD GWB from the Athboy (IE_EA_G_001) GWB that encompasses the majority of the Application Site. It is therefore hydrologically independent and is not linked to or effected by the Application Site.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
		Depressions on peat substrates of the *Rhynchosporion* [7150]	Potential in-situ Effects to QI Habitats 1) Peat Extraction Phase Effects The upstream location and separation of Mount Hevey Bog's GWB from the Application Site's own Athboy WFD GWB. Given the location and separation of the SAC means no credible SPR linkage exists. Accordingly, no likely significant effects are considered to have occurred. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant effects to this SAC are considered to exist from these activities. 3) Remedial Phase Effects No likely significant effects to this SAC are considered to exist during this phase. **Assessment Conclusion:** No likely significant effects from either the Extraction Phase, Current Phase or the Remedial Phase on QIs are considered to exist. Accordingly, the European site is screened out and **further assessment in the remedial NIS is not required.**
Lough Ennell SAC [000685]	6.72km west	Alkaline fens [7230] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]	Lough Ennell SAC occupies a different WFD subcatchment (BROSNA_SC_010) and is separated from the Application site by a distance of 6.72km. Although a small portion of the Application Site overlies the Clara Groundwater Body (GWB), which also extends into the wider area surrounding Lough Ennell, no direct hydrogeological connection between the Application Site and Lough Ennell SAC has been identified. The limited overlap with the Clara GWB, together with intervening groundwater bodies and hydrogeological units, substantially reduces the potential for any meaningful groundwater pathway. Consequently, no SPR link is thought to exist due to distance of separation and lack of hydrological connection. Potential in-situ Effects to QI Habitats 1) Peat Extraction Phase Effects

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			Given the lack of hydrological connectivity between the Application Site and Lough Ennell SAC, peat extraction activities undertaken between 1994 and 2020 are not considered to have affected the habitat quality of the groundwater-dependent qualifying interest (GWDTE) habitat Alkaline Fens [7230]. Accordingly, no likely significant effects are considered to have occurred. While a small area of the Application Site overlies the Clara GWB, no direct hydrogeological connection to Lough Ennell SAC has been identified. The limited groundwater body overlap, intervening groundwater units and separation distance. Accordingly, no credible SPR linkage has been identified through which activities at the Application Site could affect the QIs of Lough Ennell SAC. Likely significant groundwater-mediated effects can therefore be excluded at the screening stage. No further assessment of likely significant effects is required. 2) Current Phase Effects: Activities during this phase focus on decommissioning and maintenance of the existing drainage infrastructure. Given the absence of any identified hydrological or hydrogeological pathway linking the Application Site to Lough Ennell SAC, no likely significant effects on European sites are considered to exist from these activities. 3) Remedial Phase Effects No likely significant effects are considered to exist as no hydrological or hydrogeological connectivity has been identified between the Application Site and Lough Ennell SAC. **Assessment Conclusion:** Although a small portion of the Application Site overlies the Clara GWB, no direct hydrogeological connection with Lough Ennell SAC has been identified. Furthermore, intervening groundwater bodies and hydrogeological units substantially limit the potential for groundwater-mediated effects.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			Accordingly, no source-pathway-receptor linkage has been identified between the Application Site and Lough Ennell SAC. No likely significant effects from either the Extraction Phase, Current Phase or the Remedial Phase on QIs are considered to exist. Accordingly, the European site is screened out and **further assessment in the remedial NIS is not required.**
River Boyne and River Blackwater SAC [002299]	9.34km north east	Alkaline fens [7230] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) *[91E0]	The Application Site sits upstream of the River Boyne and River Blackwater SAC. The YELLOW (CASTLEJORDAN)_010 (IE_EA_07Y020070) and CASTLEJORDAN_020 (IE_EA_07C040100) streams both flow through and away from the Application Site in a southeasterly direction. The CASTLEJORDAN_020 flows into the CASTLEJORDAN_030 (IE_EA_07C040190), which in turn flows into the BOYNE_030 (IE_EA_07B040400) sub-basin. The YELLOW (CASTLEJORDAN)_010 continues downstream as the YELLOW (CASTLEJORDAN)_020, then YELLOW (CASTLEJORDAN)_030 before joining the BOYNE_030 which becomes BOYNE_040 (IE_EA_07B040600) and at the BOYNE_050 (IE_EA_07B040800) which form part of the SAC Therefore, the Application Site is hydrologically connected to the SAC via a network of drainage ditches and watercourses that ultimately discharge to the River Boyne catchment. <u>Potential in-situ effects QIs Habitats:</u> 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 had the potential for pollutant runoff that could have negatively influenced the water quality of hydrologically linked watercourses at the European Annex I GWDTE QIs of Alkaline fens and Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*), resulting in **potential likely significant effects.** 2) Current Phase Effects: During this phase, activities are limited to the decommissioning of peat extraction infrastructure and maintenance of existing drainage features. The works are temporary,

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			localised and of limited scale, occurring within an already modified environment. While a theoretical risk of accidental fuel spills or minor runoff associated with machinery remains, any such incidents would be exceptional, highly localised and short-term in nature. Although a hydrological pathway exists between the Application Site and the SAC, the works would not generate emissions, alter flows, or result in changes to water quality of a scale, extent, duration or magnitude capable of affecting the conservation objectives or qualifying interests of the SAC. Any incidental emissions, should they occur, would be subject to substantial dilution and attenuation within the intervening watercourse network prior to reaching the SAC. Furthermore, the proposed activities would not alter the hydrological regime or supporting ecohydrological conditions of the SAC and therefore cannot affect the structure, function or conservation objectives of its qualifying interest habitats. Consequently, no credible source-pathway-receptor linkage exists between this phase of the Project and Alkaline Fens [7230], Alluvial Forests [91E0], or any other qualifying interests of the River Boyne and River Blackwater SAC. Accordingly, likely significant effects on the QI habitats of the SAC during this phase can be excluded. 3) Remedial Phase Effects: The Remedial Phase will involve the implementation of rehabilitation measures, including targeted drain blocking, hydrological management, localised earthworks and the use of heavy machinery. As with the Current Phase, there is potential for minor, localised pollution events associated with construction plant, including accidental fuel spills or short-term sediment mobilisation during works. However, unlike the Peat Extraction Phase, which involved extensive peat extraction activities undertaken across large areas of the Application Site over prolonged periods, the Remedial Phase comprises targeted restoration measures of limited spatial extent and duration. The works are focused on restoring peatland hydrological conditions, re-wetting previously drained areas and

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			reducing ongoing drainage from the bog. As such, the potential for emissions to surface waters is substantially lower than that associated with the historical peat extraction activities. Any emissions arising during implementation of the remedial works would be localised and subject to substantial dilution, attenuation and settlement within the intervening watercourse network prior to reaching the River Boyne and River Blackwater SAC. Furthermore, the remedial measures are not expected to result in changes to hydrology or water quality within the catchment that could affect the SAC's QI habitats, including Alkaline Fens [7230] and Alluvial Forests [91E0]. Rather, the measures are intended to restore more natural hydrological conditions and reduce the potential for peat erosion and associated sediment losses over the longer term. Consequently, having regard to the limited scale and duration of the remedial works, the low likelihood of significant emissions, and the substantial attenuation available along the hydrological pathway to the SAC, likely significant effects on the qualifying interests of the River Boyne and River Blackwater SAC can be excluded. Accordingly, no likely significant effects to European site are anticipated during this phase and no further assessment is required. **Assessment Conclusion:** Applying the precautionary principle, likely significant effects on the QI habitats of the River Boyne and River Blackwater SAC **cannot be excluded for the Peat Extraction Phase and are therefore carried forward for further assessment in the remedial NIS.** In contrast, no credible source-pathway-receptor linkage has been identified for either the Current Phase or the Remedial Phase, and accordingly no likely significant effects on QI habitats are considered to exist during these phases. **The Current Phase and Remedial Phase are therefore screened out and do not require further assessment in the remedial NIS.**

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
		River Lamprey (*Lampetra fluviatilis*) [1099] Salmon (Salmo salar) [1106] Otter (*Lutra lutra*) [1355]	<u>Potential in-situ effects on QI species</u> 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 had the potential for pollutant runoff that could have negatively influenced the water quality of hydrologically watercourses leading to the SAC, resulting in **potential likely significant effects** to the QI species. 2) Current Phase Effects: As outlined above, the Current Phase is limited to decommissioning and maintenance activities associated with the existing drainage infrastructure. While limited risks associated with mechanical works remain, including accidental fuel spills and runoff from routine maintenance activities, such activities are localised, intermittent and of substantially lower scale than historical peat extraction activities. As described above, any potential emissions would be temporary, limited in magnitude and subject to substantial dilution and attenuation prior to reaching the SAC. Furthermore, these activities do not result in hydrological alterations capable of affecting the ecological requirements of QI species River Lamprey, Atlantic Salmon or Otter. Accordingly, there is no potential for likely significant effects on the QI species of the SAC and this phase is screened out. 3) Remedial Phase Effects: As outlined above, the Remedial Phase will involve targeted rehabilitation works including the use of heavy machinery. While there is limited potential for localised pollution incidents arising from accidental fuel spills or temporary sediment mobilisation, the works are of limited extent and duration and are confined to discrete areas of the Application Site. Any potential emissions would therefore be temporary and localised and subject to substantial dilution, attenuation and settlement within the intervening watercourse network before reaching the SAC. Furthermore, the remedial measures are not expected to result in sustained changes to water quality, hydrology or aquatic habitat conditions within the River Boyne catchment

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			that could affect the ecological requirements of QI species. Rather, the measures are intended to restore more natural hydrological conditions within the peatland and reduce the potential for peat erosion over the longer term. Consequently, there is no potential for likely significant effects on the QI species of the SAC and this phase is screened out. <u>Potential ex-situ effects to QI species</u> 1) Peat Extraction Phase Effects The peat extraction and drainage activities at the Application Site from 1994 to 2020 had the potential to result in **likely significant ex-situ** effects on aquatic habitats utilised by Annex II QI species occurring downstream of the Application Site. 2) Current Phase Effects: As outlined above, during this phase activities have transitioned from peat extraction to the decommissioning and maintenance of existing drainage infrastructure. While limited risks associated with mechanical works remain, including accidental fuel spills and runoff from routine maintenance activities, these activities are localised, intermittent and of a substantially lower scale and intensity than the historical peat extraction activities undertaken across the Application Site. Any potential emissions, if they were to occur, would be limited in magnitude and duration. Furthermore, these activities do not result in hydrological alterations of a scale, magnitude or duration capable of affecting the qualifying interests of the SAC. Accordingly, there is no potential for likely significant effects on the QIs outside of the River Boyne and River Blackwater SAC. Accordingly, no likely significant effects on QIs species are anticipated during this phase. 3) Remedial Phase Effects: As outlined above the Remedial Phase will involve limited, localised works using heavy machinery, which may give rise to minor risks such as accidental fuel spills or temporary sediment mobilisation. However, the risk of potential emissions would be short-term, confined to small areas of the Application Site, and would not result in likely significant effects to QI species.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			The rehabilitation measures are intended to restore natural hydrological conditions and reduce peat erosion and are not expected to cause sustained changes to water quality, hydrology or aquatic habitats within the River Boyne catchment. Consequently, no likely significant effects on the qualifying species of the SAC are anticipated and the Remedial Phase is screened out from further assessment. <u>Assessment Conclusion:</u> Applying the precautionary principle, likely significant in-situ effects on QI habitats, and both likely in-situ and ex-situ significant effects on QI species, cannot be excluded for the Peat Extraction Phase. Accordingly, the **potential for likely in-situ and ex-situ significant effects during the Peat Extraction Phase on the River Boyne and River Blackwater SAC is considered further within the remedial NIS**. **No likely significant effects from either the Current Phase or the Remedial Phase on QIs are anticipated. Therefore, further assessment of the phases in the rNIS is not required.**
Clara Bog SAC [000572]	12.89km west	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the	The Clara Bog SAC is located upstream from any hydrological influence from the Application Site and inhabits its own WDF GWB (GWDTE-Clara Bog (SAC000572)), so is completely separated from the Application Site hydrologically. 1) Peat Extraction Phase Effects: The peat extraction and drainage activities undertaken at the Application Site between 1994 and 2020 are not considered capable of affecting the qualifying interests or conservation objectives of Clara Bog SAC. The SAC is located upstream of the Application Site, occupies its own groundwater-dependent terrestrial ecosystem groundwater body, and is hydrologically separate from the Application Site. Consequently, no hydrological or hydrogeological pathway exists through which changes in water quality, groundwater levels, surface-water flows, sediment transport or other emissions arising from peat extraction activities could have influenced the SAC No likely significant effects to the European site are considered to exist from these activities.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
		Rhynchosporion [7150] Bog woodland [91D0]	2) Current Phase Effects: During this phase, activities have transitioned from peat extraction to the decommissioning of peat extraction infrastructure and the maintenance of existing drainage features. These activities are limited in scale, localised to the Application Site and do not give rise to emissions or hydrological changes capable of affecting the SAC. Furthermore, as the SAC is hydrologically and hydrogeologically separate from the Application Site, no pathway exists by which Current Phase activities could influence the qualifying interests of the European site. . No likely significant effects to the European site are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to the European site are considered to exist during this phase. **Assessment Conclusion:** No source-pathway-receptor (SPR) linkage has been identified between the Application Site and Clara Bog SAC. As a result, the SAC falls outside the likely Zone of Influence of the Application Site and no likely significant effects are identified for the Peat Extraction Phase, Current Phase or Remedial Phase are considered to exist. Accordingly, the European site is screened out and **further assessment in the remedial NIS is not required.**

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
Charleville Wood SAC [000571]	12.64km southwest	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016]	Charleville Wood SAC is separated from the Application Site by approximately 13km. It lies within a different WFD sub-catchment than the Application Site and also inhabits a separate WFD GWB (Geashill IE_SH_G_103). Any changes to the local hydrology or water quality due to peat extraction would not have had an effect on this SAC due to the lack of hydrological connectivity. 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 is unlikely to have affected the SAC due to the physical distance and lack of connectivity. Therefore, no likely significant in-situ effects to European sites are considered to have occurred from these activities. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant in-situ effects to European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant in-situ effects to European site are considered to exist during this phase. The Annex II QI of this SAC, the Desmoulin's Whorl Snail (*Vertigo moulinsiana),* is not considered to be a highly mobile QI, and therefore ex-situ effects are not applicable, as the application site is considered too far away to be a viably important site for the QI. **Assessment Conclusion:** The Charleville Wood SAC falls outside of the likely Zone of Influence of the Application Site. No likely significant in-situ or ex-situ effects to the SAC is considered to exist. Accordingly, the European site is screened out and **further assessment in the rNIS is not required.**

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
The Long Derries, Edenderry SAC [000925]	14.26km south east	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	The Long Derries, Edenderry SAC is separated from the Application Site by approximately 14.26km, and within a different WFD sub-catchment than the Application Site - Figile_SC_010. This dry habitat is not dependant on groundwater, therefore any changes to the local hydrology due to peat extraction would not have had an effect on this SAC. 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 is unlikely to have affected the SAC due to the physical distance and lack of connectivity. No likely significant effects to European sites are considered to have occurred from these activities. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant effects to European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to European site are considered to exist during this phase. **Assessment Conclusion:** No likely significant effects from either the Extraction Phase, Current Phase or the Remedial Phase on QIs are considered to exist. Accordingly, the European site is screened out and **further assessment in the remedial NIS is not required.**
River Barrow and River Nore SAC [002162]	19.56km south	Desmoulin's Whorl Snail (*Vertigo moulinsiana)* [1016]	The known populations of Desmoulin's Whorl Snail within the River Barrow and River Nore SAC are located within the Mountain (Carlow)_030 WFD river water body (IE_SE_14M010160) and within the Nore WFD Catchment (15). These locations are upstream from any hydrological influence from the Application Site. Desmoulin's Whorl Snail is a specialist wetland species associated with calcareous wetlands, particularly fens,

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			marshes, swamps and the margins of rivers and lakes where water levels remain consistently high. <u>Potential in-situ effects</u> 1) Peat Extraction Phase Effects: As a precaution the peat extraction and associated activities at the Application Site from 1994 to 2020 are considered here to had the potential to result pollutant runoff that could have negatively influenced the water quality of hydrologically linked watercourses and associated habitats utilised by the QI species of the SAC, resulting in **potential likely significant effects**. 2) Current Phase Effects: Activities during this phase have transitioned from peat extraction to the decommissioning of peat extraction infrastructure and the maintenance of existing drainage features. While limited risks associated with mechanical works remain, including accidental fuel spills and runoff from routine maintenance activities, these activities are localised, intermittent and of a substantially lower scale and intensity than the historical peat extraction activities undertaken across the Application Site. Any potential emissions, should they occur, would be temporary, limited in magnitude and duration, and would be subject to substantial dilution and attenuation within the receiving environment. Furthermore, these activities do not result in hydrological alterations of a scale, magnitude or duration capable of affecting habitats utilised by the qualifying interest species of the SAC. Accordingly, there is no potential for likely significant effects on the QI species of the SAC and this phase is screened out. 3) Remedial Phase Effects: As outlined above, the Remedial Phase will involve limited, localised works, including the use of heavy machinery, which may give rise to minor risks such as accidental fuel spills or temporary sediment mobilisation. However, any such emissions would be short-term, localised and limited in extent, with no potential to affect the habitats supporting the QI

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			species. Consequently, likely significant effects on qualifying interest species are not considered to exist during the Remedial Phase.
		Freshwater Pearl Mussel *Margaritifera margaritifera* [1029]	The known populations of Freshwater Pearl Mussel within the River Barrow and River Nore SAC are located within the Mountain (Carlow)_030 WFD river water body (IE_SE_14M010160) and within the Nore WFD Catchment (15), located upstream from any hydrologically influence from the Application Site. <u>Potential in-situ effects on QI species</u> 1) Peat Extraction Phase Effects: While the known populations of Freshwater Pearl Mussel are located upstream from any hydrologically influence from the Application Site and so will not be impacted by changes in water quality, the species are however dependent on suitable populations of host fish, principally Atlantic Salmon to complete its life cycle. As potential likely significant effects on Atlantic Salmon cannot be excluded at the screening stage, a potential indirect effect pathway to Freshwater Pearl Mussel via impacts on host fish populations also cannot be excluded. Applying the precautionary principle, and in the absence of sufficient information to definitively exclude the presence of additional Freshwater Pearl Mussel populations or indirect effects via host fish, the **possibility of in-situ likely significant effects** on these QIs cannot be ruled out. Accordingly, Freshwater Pearl Mussel are screened in for further assessment in the remedial NIS. 2) Current Phase Effects: The Current Phase does not involve peat extraction activities and there are no ongoing pathways by which the Application Site could adversely affect water quality, freshwater pearl mussel habitat, or host fish populations within the SAC. As no likely significant effects on Atlantic Salmon are considered to exist during the Current Phase, there is likewise no potential for indirect effects on Freshwater Pearl Mussel via impacts on host fish

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			populations. Consequently, no likely significant effects on Freshwater Pearl Mussel are considered to exist during the Current Phase. 3) Remedial Phase Effects: While the Remedial Phase will involve limited and localised restoration measures, including the use of heavy machinery, any potential emissions would be temporary, localised and subject to substantial attenuation within the receiving environment. Furthermore, as no likely significant effects on Atlantic Salmon are considered to exist during the Remedial Phase, there is no potential for indirect effects on 1029 through impacts on host fish populations. Accordingly, there is no potential for direct or indirect effects on these qualifying interest species and no likely significant effects on the species are considered to exist during the Remedial Phase.
		White-clawed Crayfish *Austropotamobius pallipes* [1092] Sea Lamprey *Petromyzon marinus* [1095] Brook Lamprey *Lampetra planeri* [1096] River Lamprey *Lampetra fluviatilis* [1099] Twaite Shad *Alosa fallax* [1103]	<u>Potential in-situ effects on QI species</u> 1) Peat Extraction Phase Effects: The peat extraction and drainage activities undertaken at the Application Site between 1994 and 2020 had the potential to result in sediment release, nutrient enrichment and other pollutant runoff to hydrologically connected watercourses. Such effects had the potential to adversely affect water quality, aquatic habitat condition, spawning and nursery habitats within the River Barrow and River Nore SAC. Consequently, **potential likely significant effects** on White-clawed Crayfish, Sea Lamprey, Brook Lamprey, River Lamprey, Twaite Shad, or Atlantic Salmon cannot be excluded at the screening stage. Accordingly, these QI species are screened in for further assessment in the remedial NIS. 2) Current Phase Effects: As outlined above, activities during the Current Phase have transitioned from peat extraction to the decommissioning of infrastructure and maintenance of existing drainage features. These activities are limited in extent, highly targeted and do not involve ongoing peat extraction or activities capable of resulting in measurable deterioration of downstream

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
		Atlantic Salmon (*Salmo salar*) (only in fresh water) [1106]	water quality. While limited risks associated with machinery remain, including accidental fuel spillages and runoff from routine maintenance activities, such events if they were to occur would be highly localised, temporary and of negligible magnitude. Although hydrological pathways remain present, the current activities would not result in changes to water quality, hydrology, aquatic habitat condition, migratory pathways or prey resources of a scale, magnitude or duration capable of affecting the conservation objectives of White-clawed Crayfish, Sea Lamprey, Brook Lamprey, River Lamprey, Twaite Shad, or Atlantic Salmon. Accordingly, no likely significant effects on these qualifying interest species are considered to exist during the Current Phase. 3) Remedial Phase Effects: The Remedial Phase will comprise limited and localised restoration measures. While the use of machinery gives rise to a theoretical risk of accidental pollutant release, any such emissions would be temporary, highly localised and subject to substantial attenuation within the receiving environment. The proposed remedial measures are not of a scale capable of causing measurable deterioration in water quality affect the aquatic species Consequently, the Remedial Phase would not affect the ecological conditions required to support White-clawed Crayfish, Sea Lamprey, Brook Lamprey, River Lamprey or Twaite Shad, Atlantic Salmon. Accordingly, no likely significant effects on these QI species are considered to exist during the Remedial Phase. <u>Potential ex-situ effects on QI species</u> Peat Extraction Phase Effects: The peat extraction and drainage activities undertaken at the Application Site between 1994 and 2020 had the potential to result in sediment release, nutrient enrichment and other pollutant runoff to hydrologically connected watercourses. Such effects had the potential to adversely affect water quality, aquatic habitat condition, spawning and nursery habitats, and migratory pathways utilised by highly the mobile fish species Consequently, **potential likely significant effects** to the QI species cannot be excluded at the screening

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			stage, and accordingly, the species are is screened in for further assessment in the remedial NIS. 2) Current Phase Effects: Although hydrological pathways remain present, the current activities would not result in changes to water quality, hydrology, aquatic habitat condition, migratory pathways. Accordingly, no likely significant effects the QI species are considered to exist during the Current Phase. 3) Remedial Phase Effects: The proposed remedial measures are not of a scale capable of causing measurable deterioration in water quality . Accordingly, no likely significant effects on the QI species are considered to exist during the Remedial Phase.
		Otter *Lutra lutra* [1355]	Otter is a highly mobile species capable of ranging over extensive lengths of connected aquatic habitat. Riverine territories can extend for several kilometres of watercourse, commonly in the order of 5-15 km, although territories exceeding 20 km may occur in less productive catchments and generally represent the upper end of the species' range. Consequently, Otter has the potential to utilise hydrologically connected habitats beyond the boundaries of the River Barrow and River Nore SAC. The Peat Extraction Phase activities undertaken at the Application Site between 1994 and 2020 had the potential to influence downstream water quality and aquatic habitat condition through sediment release, nutrient enrichment and other pollutant inputs. Such effects had the potential to affect fish and other aquatic fauna that form important prey resources for Otter result in **potential likely significant ex-situ effects**. In addition, peat extraction activities involved machinery operation, vehicle movements and associated human activity, which had the potential to result in disturbance or displacement of Otter from the SAC foraging, commuting and resting habitats within the Application Site and connected watercourses and riparian corridors. Accordingly, **potential ex-situ effects** on Otter cannot be excluded during the Peat Extraction Phase and, applying the

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			precautionary principle, the species is screened in for further assessment in the remedial NIS. In contrast, the Current Phase and Remedial Phase comprise limited and localised activities that do not involve peat extraction and are not of a scale or nature capable of causing measurable deterioration in water quality, aquatic habitat condition or prey availability, nor are they likely to result in significant disturbance to Otter within connected aquatic habitats. Accordingly, no likely significant effects on Otter are considered to exist during the Current Phase or Remedial Phase.
		Killarney Fern *Trichomanes speciosum* [1421]	Killarney Fern is reported to occur at three locations within the River Barrow and River Nore SAC, two of which located within the hydrological pathway from the Application Site (i.e. within the Barrow_230 [IE_SE_14B013514] and Barrow_240 [IE_SE_14B013600]). 1) Peat Extraction Phase Effects During the peat extraction phase, peat extraction, drainage and associated land management activities had the potential to alter local hydrological conditions within and surrounding the Application Site. Given the historic nature of these activities and the absence of detailed information on the species' distribution and local environmental conditions during much of this period, a precautionary approach has been adopted. Consequently, **potential likely significant effects** on Killarney Fern, including indirect effects arising from changes in groundwater, surface water regimes, humidity levels and supporting habitat conditions, cannot be excluded for this phase. 2) Current Phase Effects As outlined above, peat extraction activities have ceased and current activities are largely limited to the maintenance and decommissioning of existing drainage infrastructure. The current site activities are unlikely to affecting the environmental conditions required to support the species at any known location. Accordingly, no likely significant effects on Killarney Fern are predicted during the current phase.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			3) Remedial Phase Effects The remedial phase will involve limited, localised and temporary works within the Application Site. These works are targeted in nature and are not expected to result in significant changes to hydrological conditions, water quality, or other environmental conditions upon which Killarney Fern depends. As there is no pathway by which the proposed remedial works could affect any known population of the species, no likely significant effects on Killarney Fern are predicted during the remedial phase.
		Annex II QI summary: The Application Site sits upstream of the River Barrow and River Nore SAC and therefore is connected through a network of drainage ditches and watercourses that eventually discharge into these river systems. The mobile QIs of this SAC have the potential to inhabit river waters farther upstream, up to and including the area occupied by the Application Site. The QIs of limited or no mobility could have been affected by the pollution or runoff of activities on site. <u>Potential in-situ effects on QI species</u> 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 had the potential for pollutant runoff that could have negatively influenced the water quality of hydrologically linked watercourses at the SAC, resulting in **potential likely significant in-situ effects** to QI species. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant effects to European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to European site are considered to exist during this phase. <u>Potential ex-situ effects to QI species</u> 1) Peat Extraction Phase Effects	

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			The peat extraction and drainage activities at the Application Site from 1994 to 2020 could have resulted in **potential likely significant ex-situ effects** to Annex II QIs due to disturbance and impacts on aquatic habitats at the Application Site due to the deterioration of surface and groundwater quality caused by pollutant runoff. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant effects to European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to European site are considered to exist during this phase. **<u>Assessment Conclusion:</u>** Given these above potential effects, this SAC falls within the likely ZoI of the Application Site. Following the precautionary principle, the potential for likely significant effect of activities associated with the **Peat Extraction phase on QI species exists**. **Potential likely significant in-situ and ex-situ effects** to the QIs are considered further in the remedial NIS. **No likely significant effects to QIs species from either the Current Phase or the Remedial Phase on SCIs are considered to exist. Further assessment in the remedial NIS is not required.**
		Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs (1170) *Salicornia* and other annuals colonizing mud and sand [1310] Atlantic salt meadows (*Glauco-*	1) Peat Extraction Phase 2) Current Phase Effects and 3) Remedial Phase The QI habitats occur beyond the zone within which activities at the Application Site could result in measurable changes to hydrology, water quality, sediment transport or other ecological conditions relevant to their conservation objectives. No credible SPR linkage has been identified between the Application Site and these habitats. Accordingly, likely significant effects can be excluded for all project phases.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
		Puccinellietalia maritimae) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	
		Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]	1) Peat Extraction Phase Although the occurrence of this QI habitat of the River Barrow and River Nore SAC has not been completely described, its presence along a small tributary within the Nore (15) WFD Catchment is reported as QI of this European site, which is located upstream from any hydrological influence from the Application Site. In the absence of comprehensive habitat distribution data for this QI across the SAC, and applying the precautionary principle, the possibility of additional occurrences within hydrologically connected areas cannot be entirely excluded. Accordingly, **likely significant effects** during the Peat Extraction Phase cannot be ruled out at the screening stage and this QI is screened in for further assessment. 2) Current Phase Effects and 3) Remedial Phase In contrast to the Peat Extraction Phase, the Current Phase and Remedial Phase comprise limited, localised activities that do not involve peat extraction and are not of a scale or nature capable of resulting in measurable changes to downstream hydrology, water quality, sediment regimes or the ecological functioning of alluvial forest habitat. Accordingly, no likely significant effects on Alluvial forests [91E0] are considered to exist during the Current Phase or Remedial Phase.
		European dry heaths [4030]	1) Peat Extraction Phase, 2) Current Phase Effects and 3) Remedial Phase European dry heaths QI has been reported as occurring along river valley sides of tributaries in the foothills of the Blackstairs Mountains, within the Barrow WFD Catchment (14) – but upstream the hydrological pathway and away from any hydrological influence from the Application Site.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			Accordingly, no credible source-pathway-receptor linkage has been identified between the Application Site and this qualifying interest habitat. Likely significant effects on European Dry Heaths [4030] can therefore be excluded for the Peat Extraction Phase, Current Phase and Remedial Phase.
		Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	1) Peat Extraction Phase While the distribution of this habitat in this site is currently unknown, this QI habitat is considered to occur in association with some riverside woodlands, and other locations along the floodplain of slow-flowing stretches of river, which require winter inundation. Given the uncertainty regarding its distribution and the potential for hydrological connectivity between the Application Site and the SAC, the activities during the Peat Extraction Phase undertaken between 1994 and 2020 had the potential to affect habitat condition through hydrologically mediated changes in water quality and sediment inputs. Consequently, applying the precautionary principle, potential likely significant effects on this habitat during the Peat Extraction Phase cannot be excluded and the habitat is therefore screened in for further assessment in the remedial NIS. 2) Current Phase Effects and 3) Remedial Phase In contrast, the Current Phase and Remedial Phase comprise limited, localised activities that do not involve peat extraction and are not of a scale or nature capable of resulting in measurable changes to downstream hydrological conditions, water quality or habitat function. Accordingly, no likely significant effects on Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] are considered to exist during the Current Phase or Remedial Phase.
		Petrifying springs with tufa formation (*Cratoneurion*)* [7220]	1) Peat Extraction Phase, 2) Current Phase Effects and 3) Remedial Phase Having in consideration the QI habitat 7220 is groundwater-dependent (Denyer *et al.*, 2023), and that the River Barrow and River Nore SAC, at the nearest point to the Application Site, lies within the Bagenalstown Upper (IE_SE_G_153) WFD ground water body, there is no hydrogeological connectivity with the Application Site.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			Consequently, no SPR linkage exists through which activities associated with the Peat Extraction Phase, Current Phase or Remedial Phase could affect the QI. Accordingly, likely significant effects can be excluded for all project phases.
		Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	1) Peat Extraction Phase, 2) Current Phase Effects and 3) Remedial Phase Old Sessile Oak Woods with Ilex and Blechnum in the British Isles are not considered sensitive to the nature of the potential impact pathways identified for the Project, namely changes in water quality and sediment inputs within the receiving water environment. Consequently, no source-pathway-receptor linkage has been identified between the Application Site and this QI. Accordingly, likely significant effects can be excluded for all project phases
		Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)* [91E0]	1) Peat Extraction Phase Habitat 91E0 are associated with river channels, floodplains and riparian environments and are therefore sensitive to changes in hydrology, water quality and sediment deposition. As the Application Site is hydrologically connected to the River Boyne catchment, a source-pathway-receptor linkage cannot be ruled out. Consequently, **potential likely significant effects** during the Peat Extraction Phase on this QI cannot be excluded at the screening stage. The QI is screened in for further assessment in the remedial NIS. 2) Current Phase Effects and 3) Remedial Phase In contrast, the Current Phase and Remedial Phase activities are not of a scale or nature capable of resulting in measurable changes to downstream hydrology, water quality, sediment regimes or the ecological functioning of alluvial forest habitat. Accordingly, no likely significant effects on Alluvial forests [91E0] are considered to exist during the Current Phase or Remedial Phase.
		Annex I QI Summary: The Application Site sits upstream of the River Barrow and River Nore SAC and therefore is connected through a network of drainage ditches and watercourses that eventually discharge into the river system. This connectivity	

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			indicates a potential for alteration of water quality and water levels, potentially effecting the Annex I habitats mentioned. 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 had the potential for pollutant runoff that could have negatively influenced the water quality of hydrologically linked watercourses at the European Annex I GWDTE QIs potentially resulting in **potential likely significant effects.** 2) Current Phase Effects: During this phase, activities have transitioned from peat extraction to decommissioning and maintenance of existing drainage infrastructure. These activities do not give rise to pathways capable of having likely significant effect to habitats associated with European sites, either within or outside their boundaries. Accordingly, no likely significant effects on European sites or their qualifying interests are considered to exist during this phase. 3) Remedial Phase Effects: The remedial phase comprises habitat rehabilitation measures, including drain blocking, hydrological management and associated earthworks. These activities are intended to restore more natural hydrological conditions within the Application Site. Furthermore, the works are limited in extent and duration and are confined to discrete areas within the Application Site. There is no credible source-pathway-receptor linkage has been identified by which the remedial works could result in ex-situ effects on European sites or their QIs. Accordingly, no likely significant ex-situ effects on European sites are considered to exist during this phase. **Assessment Conclusion:** Given these above-mentioned potential effects, this SAC falls within the likely Zone of Influence of the Application Site. Following the precautionary principle, the potential for likely significant effect on QIs exists. Potential **likely significant in-situ and ex-situ effects** to the QIs are considered further in the rNIS. No likely significant effects from either the Current Phase or the Remedial Phase on QIs are considered to exist. Therefore, further assessment of the phases with respect to the QI habitats in the remedial NIS is not required.

SAC Name [Site code]	Distance (as the crow flies) from Application Site	Qualifying Interest (* indicates priority QI)	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
Wooddown Bog SAC [002205]	10.14km north	Degraded raised bogs still capable of natural regeneration [7120]	The Wooddown Bog SAC is located upstream from any hydrological influence from the Application Site. Also, although sharing its hydrogeological setting with the Application Site (the European site is also located within the Athboy WFD GWB - IE_EA_G_001), it mostly discharges to overlying rivers, which would not result in a connection between the two sites. 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 is unlikely to have affected the SAC due to the physical distance and lack of connectivity. No likely significant effects to European sites are considered to exist from these activities. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant effects to European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to European site are considered to exist during this phase. **Assessment Conclusion:** No likely significant effects from either the Extraction Phase, Current Phase or the Remedial Phase on QIs are considered to exists. Therefore, further assessment in the rNIS is not required.

Table 6-4: Special Protection Areas within the Likely Zone of Influence

SPA Name [Site code]	Distance (as the crow flies) from Application Site	Special Conservation Interest	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
Lough Ennell SPA [004044]	7.83km west	Pochard (*Aythya farina)* [A059] Tufted Duck (*Aythya fuligula)* [A061] Coot (*Fulica atra)* [A125] Wetland and Waterbirds [A999]	<u>Potential In-situ Effects</u> Lough Ennell SPA is located approximately 7.83 km from the Application Site and no hydrological or hydrogeological connection has been identified between the two areas. Consequently, no SPR linkage exists between the Application Site and the SPA. As a result, no likely significant in-situ effects on the SCI species, or the Wetland and Waterbirds SCI [A999], are predicted from the Peat Extraction Phase, Current Phase or Remedial Phase. Therefore, further assessment within the remedial NIS is not required. <u>Potential Ex-situ effects</u> In contrast, while no hydrological or hydrogeological pathway exists between the Application Site and Lough Ennell SPA, ex-situ effects on SCI species cannot be discounted solely on this basis. SCI species associated with the SPA may utilise habitats within the Application Site or adjacent connected watercourses for activities such as foraging, commuting, dispersal or temporary roosting. Where such use occurs, there is **potential for ex-situ effects** irrespective of the absence of a direct connection to the SPA itself. Therefore, the potential for ex-situ effects on SCI species requires separate consideration. Potential ex-situ effects are relevant to the historic Peat Extraction Phase, during which habitat loss, disturbance and alteration of foraging habitats may have occurred. In contrast, the Current Phase and proposed Remedial Phase comprise limited-scale maintenance, decommissioning and restoration activities. Given the nature, scale and duration of these activities, no likely significant ex-situ effects on SCI species are considered to exist during the Current or Remedial Phases.

SPA Name [Site code]	Distance (as the crow flies) from Application Site	Special Conservation Interest	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
River Boyne and River Blackwater SPA [004232]	9.34km north east	Kingfisher (*Alcedo atthis)* [A229]	The River Boyne and River Blackwater SPA and Application Site are connected through a network of drainage ditches and watercourses that eventually discharge into the Boyne Catchment river system. The SCI species of this SPA had the potential to inhabit river waters farther upstream up to and adjacent area to the Application Site. <u>Potential in-situ effects on SCI species</u> 1) Peat Extraction Phase Effects: The peat extraction and drainage activities at the Application Site from 1994 to 2020 had the potential for pollutant runoff that could have negatively influenced the water quality of hydrologically linked watercourses at the European site, resulting in **potential likely significant effects** to Kingfisher and their habitat. 2) Current Phase Effects: During this phase activities have switched from extraction to decommissioning and maintenance of existing drainage infrastructure. No likely significant effects to European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to European site are considered to exist during this phase. <u>Potential ex-situ Effects to SCI Species and Habitats</u> The Application Site features habitat types that could be used by the Kingfisher for which the SPA is designated. These habitats may support feeding grounds, roosting areas, or nesting sites. 1) Peat Extraction Phase Effects: Activities at the Application Site between 1994 and 2020 could have adversely affected habitats used by Kingfisher as supporting ecological resources. In the context of the Application Site, there is risk that **potential likely significant ex-situ effects** on Kingfisher

SPA Name [Site code]	Distance (as the crow flies) from Application Site	Special Conservation Interest	Source-Pathway-Receptor links and Assessment of Likely Significant Effects
			through degradation of aquatic habitats, associated with deterioration of surface water and groundwater quality arising from pollutant runoff. 2) Current Phase Effects: In this phase, the focus has transitioned from extraction to the decommissioning and maintenance of the existing drainage infrastructure. No likely significant effects on European sites are considered to exist from these activities. 3) Remedial Phase Effects: No likely significant effects to European site are considered to exist during this phase. <u>Assessment Conclusion:</u> Following the precautionary principle, the potential for likely significant effect of activities associated with the Peat Extraction Phase on the SCI exists. **Potential likely significant in-situ and ex-situ effects** to the SCIs are considered further in the rNIS. No likely significant effects from either the Current Phase or the Remedial Phase on the SCI species are considered to exist. Therefore, **further assessment of the phases in the rNIS is not required.**

6.5 Potential Impact Summary

Potential in-situ and ex-situ effects to European sites are confined to the Peat Extraction Phase (June 1994 – June 2020), with no viable SPR or likely significant effects identified during the Current Phase (June 2020 – Present Day) or the Remedial Phase (Future).

Likely in-situ effects are limited to hydrologically connected downstream European sites via water quality impacts, while ex-situ effects relate to impacts on mobile species or supporting habitats at the Application site.

The Table 6-5 and Table 6-6 below respectively summarise the presence of potential likely significant in-situ and ex-situ effects for SACs and SPAs within the likely Zone of Influence of the Application Site.

Table 6-5: Summary of Potential In-situ and Ex-situ Effects on QIs of Special Areas of Conservation

European Site	In-situ Effects	Ex-situ Effects
River Boyne and River Blackwater SAC	Alkaline fens [7230] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) *[91E0] River Lamprey (*Lampetra fluviatilis*) [1099] Salmon (*Salmo salar*) [1106] Otter (*Lutra lutra*) [1355]	River Lamprey (*Lampetra fluviatilis*) [1099] Salmon (*Salmo salar*) [1106] Otter (*Lutra lutra*) [1355]
River Barrow and River Nore SAC	Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016] Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*) [1990] White-clawed Crayfish (*Austropotamobius pallipes*) [1092] Sea Lamprey (*Petromyzon marinus*) [1095] Brook Lamprey (*Lampetra planeri*) [1096] River Lamprey (*Lampetra fluviatilis*) [1099] Twaite Shad (*Alosa fallax*) [1103] Atlantic Salmon (*Salmo salar*) (only in fresh water) [1106] Otter (*Lutra lutra*) [1355] Killarney Fern (*Trichomanes speciosum*) [1421] Water courses of plain to montane levels with the *Ranunculion fluitantis*	White-clawed Crayfish (*Austropotamobius pallipes*) [1092] Sea Lamprey (*Petromyzon marinus*) [1095] Brook Lamprey (*Lampetra planeri*) [1096] River Lamprey (*Lampetra fluviatilis*) [1099] Twaite Shad (*Alosa fallax*) [1103] Atlantic Salmon (*Salmo salar*) (only in fresh water) [1106] Otter (*Lutra lutra*) [1355]

European Site	In-situ Effects	Ex-situ Effects
	and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)* [91E0]	

Table 6-6: Summary of Potential In-situ and Ex-situ Effects on SCIs of Special Protection Areas

European Site	In-situ Effects	Ex-situ Effects
Lough Ennell SPA	None	Pochard (*Aythya farina)* [A059] Tufted Duck (*Aythya fuligula)* [A061] Coot (*Fulica atra)* [A125]
River Boyne and River Blackwater SPA	Kingfisher (*Alcedo atthis*) [A229]	Kingfisher (*Alcedo atthis*) [A229]

7. LIKELY CUMULATIVE IMPACTS OF THE PROJECT ON EUROPEAN SITES, IN-COMBINATION WITH OTHER PLANS AND PROJECTS

7.1 ASSESSMENT PROCESS

An assessment of likely potential in-combination effects of peat extraction activities and associated works, and proposed rehabilitation at the Application Site was conducted, taking into account historic, existing, and proposed plans (see Table 7-1) and projects (see Table 7-2) within the surrounding area.

This evaluation specifically focuses on how these activities, when considered together, could lead to combined environmental impacts that might not be evident when examining each project individually. To ensure a thorough assessment, an extensive review of online Planning Registers was carried out to identify past, present, and future plans and projects that could contribute to in-combination environmental effects. The analysis considered various factors, including:

- The nature of activities within the surrounding area,
- The spatial and temporal overlap of these activities with the Project,
- Their potential ecological consequences, particularly in relation to habitat integrity, water quality, hydrology, on European site conservation, and specifically the species and habitats for which the sites are designated.

Cumulative Effects refer to the combined impact of actions of plans or projects over time or in a specific area. These effects can result from individual developments or activities that, when taken together, cause a larger or more significant impact on the environment than they would have if considered separately. Cumulative effects can be both direct (e.g., habitat destruction) or indirect (e.g., water quality degradation). The evaluation also accounts for cumulative effects by considering the overall accumulation of impacts from past, present, and future activities in the region.

In-Combination Effects specifically refer to the impact that arises from the interaction of impact sources of two or more projects, plans, or activities. While a single project may not have significant effects, its combined effect with other projects, plans, or activities could give rise to significant effects that would not have occurred if the projects were assessed in isolation. In this context, the assessment focused on how the Project and plans and other projects that might interact to produce effects that would not have been anticipated from individual projects alone.

This holistic approach ensures a comprehensive understanding of peatland ecosystem alterations, which include:

- Loss and fragmentation of peatland habitats,
- Changes in hydrology and water retention capacity,
- Displacement of species reliant on intact peatland environments, and
- Potential knock-on effects on water quality and aquatic ecosystems downstream.

By integrating the analysis, the assessment ensures that all potential cumulative and in-combination environmental effects—such as habitat degradation, impacts to water quality, hydrological alterations, and species displacement are fully considered within the overall impact assessment.

In essence, cumulative effects look at the overall accumulation of impacts over time, while in-combination effects focus on the interaction between plans and project or activities.

7.2 Assessment of Plans

The review of relevant plans focused on evaluating policies and objectives that have the potential for impacting European sites in-combination with the peat extraction and associated activities at the Application Site. The sources of information on such policies and objectives are included in Section 4.2.

This assessment aimed to determine how existing regulatory frameworks support ecological preservation and mitigate potential environmental impacts. In addition to biodiversity-focused policies, the review examined objectives related to peatland conservation and sustainable land use practices, particularly those that influence the maintenance and enhancement of surface water quality.

To provide a structured summary of the findings, an overview of relevant plans and their key environmental considerations is presented in Table 7-1. This table outlines how various planning documents incorporate conservation principles, highlighting their relevance to biodiversity protection, peatland management, and water quality preservation. The insights gained from this review contribute to a broader understanding of the policy landscape influencing land-use decisions and environmental management in areas of ecological sensitivity.

A detailed review of the County Development Plans was conducted, including examining policies related to conservation and the protection of European sites. This assessment aimed to determine how these policies apply to historical and ongoing land-use activities within the Application Site and their alignment with broader environmental objectives. The peat extraction activities, has been assessed from 1994 until 2020 at varying levels of intensity across different sections of the bog, were carefully evaluated in this context. Based on this analysis, these activities are not considered to be in conflict with the relevant policies and objectives outlined in the County Development Plans.

The implementation of the Cutaway Bog Decommissioning and Rehabilitation Plans for the Application Site is expected to yield significant ecological benefits, contributing positively to European sites. Additionally, the rehabilitation of the bogs will enhance ecosystem functions, including carbon sequestration and water retention, further supporting regional conservation efforts. In particular, the rehabilitation plans also has the potential to generate positive effects on nearby European sites that are hydrologically connected to the Application Site. The restoration of natural hydrological conditions is expected to improve water quality, reduce sedimentation, and enhance habitat conditions for aquatic and wetland species. By minimising habitat fragmentation and mitigating historical environmental disturbances, the rehabilitation process will contribute to broader conservation objectives of the European sites. These anticipated outcomes align closely with the policies and objectives outlined within the County Development Plans, reinforcing commitments to sustainable land management, biodiversity protection, and ecological resilience.

Given the nature, scope and objectives of the relevant plans in Section 4.2Table 7-1, and their alignment with statutory environmental protection requirements, it is concluded that the plans considered are not likely to give rise to likely significant negative effects on European sites in combination with the Project at the Application Site. The most recent plans list in Section 4.2 are outlined in Table 7-1.

Table 7-1: Assessment of Plans

Plan	Details of plan
Offaly County Development Plan 2021–2027	The following provides a summary of key relevant Biodiversity and Landscape Objectives (BLOs) listed in Chapter 4 - Biodiversity and Landscape • General Natural Heritage Protection • BLO-01 – Ensure all development occurs within environmental limits, respecting environmental legislation and sustainable management of natural capital. • BLO-02 – Protect habitats and species listed under the **Habitats Directive**, **Birds Directive**, and Wildlife Acts. • Protection of Designated Sites • BLO-03 – Safeguard SACs, SPAs, NHAs, and proposed NHAs. Ensure developments comply with Appropriate Assessment (AA) and EU conservation laws. Establish buffer zones and undertake habitat surveys. • Conservation of Wetlands, Turloughs, and Watercourses • While OCDP does not label these as standalone numbered policies, equivalent protections occur in Chapter 4: Protect wetlands from degradation and require mitigation measures for developments near sensitive water habitats. Prevent unauthorised drainage of wetlands. • Peatland Conservation • **BLP-07** – Consider designation of the **North Offaly Esker Landscape** as a **UNESCO Geopark** (strongly peatland-linked landscapes). • **BLP-15** – Promote a **National Park designation** for Midlands **peatlands** and develop a **Regional Peatway**. • **Just Transition alignment** – Work with Transition stakeholders to manage, rehabilitate, restore and **re-wet peatlands**. • Above serves to conserve designated peatlands and support National Peatlands Strategy. Work with stakeholders for sustainable peatland management and require planning permission for wetland modifications. • Invasive Species Management • BLP-34 It is Council policy to continue to deliver and support measures for the prevention, control and/or eradication of invasive species within the county, and to seek details of how these species will be managed and controlled where their presence is identified. Biodiversity and Nature Conservation • **BLP-24** – Protect and manage **woodlands, trees, hedgerow networks** of biodiversity value and landscape character. • **BLO-16** – Encourage **preservation and enhancement of native and semi-natural woodlands**, tree groups and individual trees. • **Chapter 4 ecosystem services + action plans:** Support for the **National Biodiversity Action Plan** and integration with the **All-Ireland Pollinator Plan**
Meath County Development Plan 2021–2027	The following provides a summary of key relevant aspects from the Meath County Development plan regarding **Chapter 8 – Cultural and Natural Heritage Strategy**. This is the chapter where Meath places: • **Natural heritage policies** • **Biodiversity protection commitments** • **Landscape protection context** • **Statutory obligations under Habitats/Birds/Wildlife Acts** General Natural Heritage Protection • Meath aims *"to identify, protect, conserve and manage the cultural and **natural heritage** of the County and encourage its sensitive integration into sustainable development."* • Natural heritage includes *"scenic river valleys, rolling farmland, mature hedgerows and diverse coastal habitats."*

Plan	Details of plan
	• International and national obligations (e.g., **Convention on Biological Diversity**, **Wildlife Acts**, **EU environmental legislation**) guide natural-heritage protection. Protection of Designated Sites (SACs, SPAs, NHAs, pNHAs) ▪ The CDP explicitly references obligations under **EU Habitats Directive**, **Birds Directive**, and **Natura 2000 (SACs & SPAs)**. ▪ Chapter 8 states: *"Ireland gives effect to these obligations through the Wildlife Acts and Planning & Development Act… including protection of natural heritage."* Conservation of Wetlands, Turloughs & Watercourses • Meath's natural heritage includes *"scenic river valleys… diverse coastal habitats"* which require conservation as part of the heritage strategy. • The CDP is legally bound by the **EU Water Framework Directive**, **Appropriate Assessment**, and environmental protection provisions. Peatland Conservation • Meath's landscape includes *"tracts of peatland and raised bog in the southwest."* • These are identified as natural-heritage assets requiring conservation under the chapter's fundamental protection aim. Invasive Species Management • Under international obligations, Meath is bound by the **Convention on Biological Diversity**, which requires actions to *"halt the loss of biodiversity and reduce threats to ecosystems."* This includes invasive-species controls as part of national biodiversity strategies. Biodiversity & Nature Conservation / Ecological Networks • The CDP's vision is to **protect, conserve and manage natural heritage**, with a commitment to integrating biodiversity into sustainable development. • Natural features such as *hedgerows, river valleys, coastal habitats* are highlighted as key ecological corridors. • Statutory context includes the **Habitats Directive**, **Birds Directive**, and **EIA Directive**, requiring ecological assessments.https://consult.meath.ie/en/consultation/consolidated-meath-county-development-plan-2021-2027-incl-variations-1-2-3/chapter/a02-strategic-policy-guidance-and-legislation Landscape Protection • Meath recognizes its *"diverse range of landscapes, including uplands, peatlands, coast, hedgerow networks, river valleys"* as essential heritage assets. Protection of landscape character is central to the natural-heritage strategy.
Westmeath County Development Plan 2021–2027	The following provide summary of key relevant aspects from the Westmeath County Development plan regarding **Chapter 12 – Natural Heritage and Green Infrastructure**. General Natural Heritage Protection • CPO 12.13 – Protect, manage and enhance the natural heritage, biodiversity, landscape and environment of County Westmeath as a non-renewable natural asset. • Recognises peatlands, lakes, wetlands, woodlands, grasslands, eskers, hedgerows and canal networks as strategically important habitats. Protection of Designated Sites (SAC, SPA, NHA, pNHA) • CPO 12.1 – Contribute to protection of all designated sites in compliance with EU Directives and national legislation. • CPO 12.4 – Protect SACs, cSACs, SPAs and cSPAs designated under the Habitats and Birds Directives.

Plan	Details of plan
	• CPO 12.9 – Require appropriate buffer zones between designated sites and development. • Chapter 12 Framework: Identifies all relevant designations (SAC, SPA, NHA, Ramsar, Nature Reserves, Wildlife Sites, Tree Protection Orders). Conservation of Wetlands, Turloughs & Watercourses • Westmeath's natural heritage section highlights the importance of wetlands, rivers, lakes, springs and water-dependent ecosystems as critical components of the county's ecological network. • The chapter embeds mandatory compliance with the **Water Framework Directive (WFD)** to ensure protection and non-deterioration of all aquatic ecosystems. • Wetlands also protected through objectives to maintain ecological connectivity and ecosystem services. • *(Westmeath does not number wetland-specific CPOs, but these protections run through Chapter 12 and its policy framework.)* Peatland Conservation ▪ Peatlands are identified as a major habitat type within the county requiring protection and integration into the green-infrastructure network. ▪ **CPO 12.23** – Create and enhance **ecological linkages and buffer zones**, which include peatland landscapes. ▪ **CPO 12.24** – Protect and where possible enhance **wetlands, bogs, geological and geomorphological systems**, and features functioning as ecological corridors or stepping stones. Invasive Species Management ▪ Westmeath's Chapter 12 commits the county to compliance with national legislation (e.g., Wildlife Acts, Birds & Natural Habitats Regulations) that requires the control and prevention of invasive alien species. ▪ (*Westmeath does not assign a numbered invasive-species policy like Longford, but the legal obligation is embedded directly into the Natural Heritage Policy Framework.*) Biodiversity & Nature Conservation, Ecological Connectivity ▪ CPO 12.2 – Support the National Biodiversity Plan, All-Ireland Pollinator Plan, and National Peatlands Strategy ▪ CPO 12.3 – Support the Westmeath Biodiversity Action Plan. ▪ CPO 12.14 – Require new developments to identify, protect and enhance ecological features, contribute to biodiversity (e.g., swift boxes, bat roosts, green roofs) and link into the county's green-infrastructure network. ▪ CPO 12.23 – Create and enhance ecological linkages. ▪ CPO 12.24 – Protect connectivity features such as woodlands, hedgerows, watercourses, wetlands, springs, semi-natural grasslands and other ecological corridors. ▪ CPO 12.25 – Acknowledge the need to protect non-designated habitats and landscapes and conserve biological diversity across the wider countryside. Landscape Protection ▪ CPO 12.13 – Protect and enhance landscape character as part of natural heritage protection. ▪ Chapter 12 emphasises sensitive management of landscapes including eskers, peatlands, hedgerow networks, and lake basins as fundamental green infrastructure
Ireland's 4th National Biodiversity	Five strategic objectives to guide biodiversity conservation efforts:

Plan	Details of plan
Action Plan (NBAP) for 2023-2030	1. **Adopt a Whole of Government, Whole of Society Approach to Biodiversity**: This objective emphasises the need for collective action across all sectors of government and society to effectively address biodiversity challenges. 2. **Meet Urgent Conservation and Restoration Needs**: Focusing on immediate actions required to conserve and restore Ireland's biodiversity, this objective aims to halt further loss and promote recovery of vital ecosystems. 3. **Secure Nature's Contribution to People**: Recognising the essential services that nature provides, this objective seeks to ensure the sustainable use of natural resources, benefiting both people and the environment. 4. **Enhance the Evidence Base for Action on Biodiversity**: This objective highlights the importance of strengthening scientific research and data collection to inform effective biodiversity policies and actions. 5. **Strengthen Ireland's Contribution to International Biodiversity Initiatives**: Aiming to bolster Ireland's role in global biodiversity efforts, this objective focuses on active participation and contribution to international conservation initiatives. These objectives collectively aim to deliver transformative changes in how Ireland values and protects its natural heritage. The NBAP also introduces a public sector duty on biodiversity, as mandated by the Wildlife (Amendment) Act 2023. This legislation requires all public service bodies, including government departments, agencies, and local authorities, to integrate biodiversity considerations into their plans, policies, and programs, and to report on their progress.

The National Planning Framework: Project 2040	The National Planning Framework (NPF - Government of Ireland, 2018) as revised by the NPF First Revision (Government of Ireland, 2025) and the National Development Plan (NDP - Department of Public Expenditure and Reform, 2021) as updated by the NDP Review (Government of Ireland, 2025) together make up Project Ireland 2040. The NPF is a framework to guide Ireland's development and investment in the coming years. It is the Government's high-level strategic plan to shape Ireland's development until the year 2040. It contains a set of national objectives and key principles from which more detailed and refined plans will follow. The NPF sets out the key goals and objectives for the State, and central to this is the theme of *Realising Our Sustainable Future*. In particular, the NPF notes in 'Section 9.2: Resource Efficiency and Transition to a Low Carbon Economy' that our transition to a low carbon energy future requires: • *"A shift from predominantly fossil fuels to predominantly renewable energy sources;* • *Increasing efficiency and upgrades to appliances, buildings, and systems;* • *Decisions around development and deployment of new technologies relating to areas such as wind, smart grids, electric vehicles, buildings, ocean energy and bio energy; and* • *Legal and regulatory frameworks to meet demands and challenges in transitioning to a low carbon economy."* The NPF also states that "*Rural areas have significantly contributed to the energy needs of the country and will continue to do so, having a strong role to play in securing a sustainable renewable energy supply*". Furthermore, the NPF goes on to state that, "*In meeting the challenge of transitioning to a low carbon economy, the location of future national renewable energy generation will, for the most part, need to be accommodated on large tracts of land that are located in rural settings, while also continuing to protect the integrity of the environment and respecting the needs of people who live in rural areas*". The NFP also states that future renewable energy planning will focus "*in particular on the extensive tracts of publicly owned peat extraction areas in order to enable a managed transition of the local economies of such areas in gaining the economic benefits of greener energy*". Some of the key National Policy Objectives aimed at further achieving the transition to sustainable energy include: • National Policy Objective 23 of the NPF has a stated aim to: "*Facilitate the development of the rural economy through supporting a sustainable and economically efficient agricultural and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism*"; • National Policy Objective 52: "*The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital*"; • The NPF also states that's the Government will support the roll out of renewables and the protection of and enhancement of carbon pools including forests and peatlands. National Policy Objective 54 has a stated aim to "*Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions*"; and

Plan	Details of plan
	• National Policy Objective 55: "*Promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050*". The regularisation of historic peat extraction activity will contribute to achieving the key National Policy Objectives of the NPF; thus, no negative in-combination effects are anticipated.
Revised National Development Plan 2021 - 2027	The revised NDP 2021 – 2027 (Department of Public Expenditure and Reform, 2021) is aligned with the delivery of the objectives of the NPF. It sets out the significant level of investment, almost €165 billion, which will underpin the successful implementation of the NPF and drive it forward over the next 10 years. The NDP includes National Strategic Outcome 8 – Transition to Climate-Neutral and Climate Resilient Society. The NDP recognises that the national objective of transitioning by 2050 to a competitive low-carbon, climate resilient, and environmentally sustainable economy and society must influence public capital investment choices over the next 10 years. It acknowledges that Ireland's energy system requires a radical overhaul to achieve its energy and climate objectives by 2050. This means how energy in Ireland is generated and used needs to fundamentally change. Investment in renewable energy sources, ongoing capacity renewal, and future technology affords Ireland the opportunity to comprehensively decarbonise our energy generation. Renewable energy, including wind technology, will play a key role in helping to diversify away from a reliance on fossil fuels. The cessation of peat extraction and decommissioning of the extraction activities at the Application Site, followed by the future rehabilitation of the bogs and regularisation of historic peat extraction, will contribute to the achievement of several of the NDP objectives.
Climate Action Plan 2023	Ireland's Climate Action Plan 2023 (CAP - Department of Environment, Climate and Communications, 2022) is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The plan implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. CAP23 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development. CAP23 states that rehabilitation of peatlands and development of amenity and tourism opportunities will continue and the plan outlines the following actions in relation to meeting the required level of emissions reduction in relation to peatlands: • *Action JM/23/7 Support the enhanced rehabilitation and restoration of peatland sites in the Midlands, including raised and blanket bog, fens and other wetland types.* • *Action JM/23/8 Deliver the Enhanced Decommissioning, Rehabilitation and Restoration Scheme for Bord na Móna peatlands.* The EU's Recovery and Resilience Facility, through the National Recovery and Resilience Programme, is investing up to €108 million in the Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) to rehabilitate

Plan	Details of plan
	33,000 ha of peatlands over 82 no. Bord na Móna bogs, previously used for peat extraction for electricity generation. Key metrics to 2030 highlighted by CAP23 to deliver abatement in wetlands are as follows: 1. 35,900haof peatlands to be rehabilitated as part of Bord na Móna EDRRS and LIFE People and Peatlands, and 2. 41,700ha of additional peatlands, to provide a total of 77,600haof rehabilitated peatlands. Since 2021, approx. 350 no. Bord na Móna employees transitioned from working in peat extraction and haulage to operating the EDRRS. Another target of CAP23 is to improve peatland mapping by continuing to fund the RePEAT Project.

Plan	Details of plan
National Peatlands Strategy	The National Peatlands Strategy (NPWS, 2016c) aims to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations. In relation to the move away from peat extraction and a move toward bog rehabilitation and renewable energy, the Strategy noted: "*P24 As part of Ireland's commitment to move towards a cleaner, more carbon efficient economy, means to reduce the dependency on peat as a source of fuel and horticultural compost will be fully explored*"; "*P25 Consideration will be given to how best cut away bogs can contribute to a low carbon economy through their use as sites for renewable energy*"; "*A10 The National Raised Bog SAC Management Plan will provide for the restoration of raised bog SACs*"; and "*P30 Coillte and BnM as the managers of significant tracts of peatlands on behalf of the Irish people will continue to show leadership in responsible management, rehabilitation and restoration of peatlands*". It is noted that Bord na Móna have already committed and moved away from peat extraction. The date for this change was targeted as 2030. However, in October 2018, Bord na Móna announced its intention to accelerate this strategy stating: "*Decarbonisation is the biggest challenge facing this planet. For BnM it presents both a serious challenge and a national opportunity. By accelerating the move away from peat into renewable energy, resource recovery, and new businesses we are supporting national policy and seizing the opportunity presented by decarbonisation. Standing still is not an option for BnM. We are embarking on a transition phase now which will see us become a leading provider of renewable energy on the Island of Ireland by 2026, a leader in high-value recycling and provider of a range of new low carbon goods and services. Allied to all of this, a key focus of our decarbonisation plan is ensuring that BnM remains a very significant employer in the Midlands of Ireland for the decades to come*". In January of 2021, Bord na Móna formally ended all peat extraction on its lands, marking a key milestone in its transformation into Irelands leading climate solutions company. The company reiterated its commitment to the Brown to Green strategy that involves the transformation of Bord na Móna from a traditional peat business into a climate solutions company. The company is now fully focused on renewable energy generation, recycling and the development of other low carbon enterprises.

7.3 Assessment of Projects

For the assessment of in-combination effects, a review was undertaken of projects, including historic, existing, and permitted developments, with the potential to act in combination with peat extraction and ancillary activities during the Peat Extraction Phase.

Information on projects considered in the assessment was sourced from the following:

- Offaly County Council[45]

[45] Available at https://www.offaly.ie/planning-search/.

- Meath County Council Planning[46]
- Westmeath County Council Planning[47]
- An Bord Pleanála[48]
- EIA Portal[49]

Retention applications (i.e. developments where impacts had already occurred), as well as incomplete, withdrawn, or refused applications, were excluded from the assessment. It is also noted that the scope of the review was influenced by the availability of historical documentation, with records of cases appealed to An Coimisiún Pleanála generally available from 1995 onwards. Projects in the surrounding area relevant to this the assessment of in-combination effect in the AASR are listed in Table 7-2 below.

In summary the relevant projects primarily comprising peat-related infrastructure, sand and gravel extraction and processing facilities, waste management activities, energy generation infrastructure, agricultural development, and associated ancillary works. Many of these projects were granted permission between 2001 and 2022 and are largely industrial or extractive in nature, often located within or adjacent to previously disturbed lands associated with Bord na Móna or mineral extraction operations. The majority are spatially separated from the Application Site or operate within different hydrological sub-catchments. Extraction, waste, and energy-related developments were considered further in this in-combination assessment due to their potential to contribute to cumulative pressures on water quality, hydrology, on habitats, or mobile species associated with European sites.

[46] Available at https://www.eplanning.ie/MeathCC/searchtypes.
[47] Available at https://www.eplanning.ie/WestmeathCC/searchtypes.
[48] Available at https://www.pleanala.ie/en-ie/case-search.
[49] Available at https://www.gov.ie/en/publication/9f9e7-eia-portal/.

Table 7-2: Relevant Projects considered for the Peat Extraction Phase (from 1994 to June 2020)

Consenting Authority	Planning Reference	Description of Development	Final Grant Date	Address
Offaly County Council	19/25	An 87.6-hectare extension to the south-west, south and south-east of its existing sand and gravel put (within an application site of 146.1 hectares)	29/04/2019	Derrygreenagh, Knockdrin, Garr and Carrick townlands, Rhode, Co. Offaly
Offaly County Council	18/209	Derryarkin Sand and Gravel DAC for the construction of a weighbridge (90m^2) and 2 no. control rooms subject to 5 conditions.	09/08/2018	Derryarkin sand pit, Derrygreenagh, Rhode, Co. Offaly
Offaly County Council	15/330	An existing 30m high telecommunications support structure.	02/03/2016	Derrygreenagh, Rhode, Co. Offaly
Westmeath County Council	12/4018	Permission for site access works to allow for the out loading of peat. These works consist of; access works at junction with L-1113 Tyrrellspass to Rathgarrett Road and construction of a new access road to facilitate peat out loading.	11/06/2012	Rathgarrett, Tyrrellspass, Co. Westmeath
Westmeath County Council	10/4078	Temporary planning permission (duration 10 years) for construction of moto cross circuit and associated infrastructure.	02/08/2011	Derryarkin, Rochfortbridge, Co. Westmeath
Offaly County Council	10/391	Temporary planning permission (duration 10 years) – application running concurrently with Westmeath County Council planning application 10/4078. Planning permission is sought for permission to upgrade the existing site access, construction of a moto-cross circuit and ancillary infrastructure.	21/04/2011	Derrygreenagh, Rochfortbridge, Co. Offaly
Offaly County Council	05/1113	Installation of a fixed processing plant for the production of blacktop on a site of 0.875 ha at existing sand and gravel quarry.	26/04/2006	Derrygreenagh, Rhode Co. Westmeath

Consenting Authority	Planning Reference	Description of Development	Final Grant Date	Address
Offaly County Council	04/988	Retention of telecommunications mast	23/09/2004	Derrygreenagh, Co. Westmeath
Offaly County Council	02/172	Construction of an entrance to a sand and gravel extraction facility.	10/06/2002	Derrygreenagh, Co. Offaly
Offaly County Council	01/1163	Concrete batching plant, block yard, block storage area, site office building, effluent treatment system, ESB substation & bunded fuel storage tanks	16/10/2002	Derrygreenagh, Rhode

Table 7-3: Relevant Projects considered during the Current Phase (June 2020 to Present Day)

Application Reference	Development Description	Grant Date	Site Address	Reason for Inclusion
ABP-319023-24	Application for a Combined Cycle Gas Turbine and Open Cycle Gas Turbine Thermal Power Plant, Electricity Grid Connection including two substations, and associated buildings, plant, site works, services and ancillary development at Derrygreenagh, Co. Offaly.	Grant 10/04/2026	Lands within the townlands of Knockdrin, Derrygreenagh, Derryarkin, Derryiron, Ballybeg, Coolcor, Barrysbrook, Clonin, Togher and Coole, Co. Offaluy	Located adjacent to the Application Site. Considered due to its potential for cumulative effects and shared ecological receptors.
Offaly County Council 21/247	23-year permission for a 44.0-hectare extension to an existing authorised sand and gravel pit comprising of the following: an extraction area of 43.8 ha.; removal of 10.2 ha. of commercial forestry and removal of overburden material from the remaining 33.6 hectares of the proposed extraction area; extraction of sand and gravel by mechanical means; upgrading of the existing internal haul road measuring 0.2 ha.; transportation of extracted material to the existing authorised manufacturing area for processing via the internal haul road; landscaping and restoration of the site including screening berms; all associated ancillary facilities/works.	Granted 30/03/2022 – awaiting construction	Approximately 150m south of Derryarkin Bog	Proximity to the application site.
Offaly County Council 21/488	A 10-year permission for the construction of an extension to the permitted solar pv and battery storage development permitted at Srah, Greenhills and Wood, Rhode, Co. Offaly permitted under planning permission reference 20/494.	Granted 28/01/2022 – awaiting construction	Approximately 1.5km southeast of Drumman Bog.	Proximity to the application site.

Application Reference	Development Description	Grant Date	Site Address	Reason for Inclusion
Offaly County Council 21/247	A 23-year permission is sought for a 44-hectare extension to an existing approved sand and gravel pit.	Granted 30/03/2022 – awaiting construction	Approximately 630 m south of Derryarkin Bog.	Proximity to the application site.
Offaly County Council 24/60289	A CO_2 storage facility on a 22-hectare site designed to provide system support services to Derryiron 110kV substation. It includes (i) a single-storey and control building and (ii) internal site access roads and connection to existing and consented roads at Rhode Green Energy Park.	Granted 16/09/2025 – awaiting construction	<5 m south and east of Ballybeg Bog	Proximity to the application site.
Offaly County Council 24/60266	Planning permission for 20 no. dwellings and all associated ancillary siteworks to facilitate this development.	Granted 04/04/2025 – under construction.	Approximately 1.6km east of Ballybeg Bog.	Proximity to the application site.
Offaly County Council 25/60511	1. An overall application area of c. 19.5 hectares; 2. Phased extraction of sand and gravel (wet working) over an area of c. 11.7 hectares with processing that includes crushing and screening and all ancillary works and structures; 3. Provision of new site facilities to include wheel wash (c. 35m²), weighbridge (c. 69m²); mobile welfare pod facility (c. 16m²) consisting of office, canteen, toilet and drying room; dedicated parking area, perimeter vegetation planting and fencing; 4. Access to the site will be via an existing entrance onto the local access road to the north of the site; 5. Progressive restoration of the site to naturally	Pending decision	<10 m west of Ballybeg Bog	Proximity to the application site.

Application Reference	Development Description	Grant Date	Site Address	Reason for Inclusion
	regenerated wildlife habitat and a permanent water body; 6. The proposed development life is for 15 years to complete extraction and restoration operations.			
Westmeath County Council 25/60344	The development of a Data Centre Facility and Decentralised Energy Resource within an overall development boundary area of 243 hectares including solar farm.	Granted 02/06/2026	Proposed solar farm <10m north of Derryarkin Bog	Proximity to the application site.

Assessment of projects listed in Table 7-2 and Table 7-3 are presented below.

The following projects comprise a combination of extractive, industrial, energy and infrastructure developments located within or in close proximity to the Application Site, many of which have the potential to interact cumulatively with peat extraction activities and therefore bought forward to the rNIS.

- Offaly County Council Planning Ref: 01/365 (consented 2001) - Extraction of sand and gravel within Derryarkin and Drumman Bog contributed to cumulative habitat loss, hydrological alteration and sediment release, potentially acting in combination with peat extraction to increase pressures on water quality and downstream receptors. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council Planning Ref: 01/1163 (consented 2002) - The concrete batching plant and associated infrastructure had the potential to contribute additional pollutant loadings (e.g. suspended solids, hydrocarbons). In combination with peat extraction drainage, this could have increased cumulative risk of water quality deterioration. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council Planning Ref: 02/172 (consented 2002) - While minor in isolation, the development facilitated extractive operations and therefore contributed indirectly to cumulative disturbance and increased surface runoff pressures when considered in combination. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council Planning Ref: 05/1028 (consented 2006) - Sand and gravel extraction contributed to cumulative habitat loss, sediment mobilisation and hydrological changes, which, when combined with peat extraction, may have increased downstream sediment and nutrient loading. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council Planning Ref: 05/1113 (consented 2006) - the blacktop processing plant introduced potential emissions and hydrocarbon runoff, which, in combination with extractive activities, could have incrementally contributed to localised environmental pressures, particularly on water quality. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council Planning Ref: 10/391 (consented 2011) - The motorcross circuit resulted in noise, dust and surface disturbance, which in combination with ongoing industrial and extractive uses may have increased overall disturbance levels affecting fauna and habitat condition within the wider area. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council 12/207 (consented 2013) – Sand and gravel extraction and restoration activities contributed to additional sediment and runoff pressures, which in combination with peat extraction and other quarrying operations could have elevated cumulative impacts on receiving watercourses. The project has been brought forward

and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.

- Offaly County Council 16/246 (consented 2017) - The solar PV development contributed to land use change and habitat loss, which, although lower impact operationally, may have incrementally contributed to cumulative habitat fragmentation when considered alongside other developments. The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council 19/25 (consented 2019) – Extension to Drumman Sand and Gravel Extraction pit. An EIAR accompanied the planning application, which accounted for potential impacts due to: habitat loss, damage and fragmentation (potentially affecting (cutaway bog and river habitats); birds and Common Frog); disturbance (potentially affecting Otter and birds); dust deposition and changes in air quality (potentially affecting Cutaway bog and river habitats); local hydrological and/or hydrogeological effects, including water quality (potentially affecting cutaway bog and river habitat). Mitigation measures have been proposed (e.g. restriction of vegetation removal for birds non-breeding season; derogation licence to be sought for the capture and removal of spawn, tadpoles, froglets and adult Common Frog; mitigation for water protection50), deemed effective for the reduction of the significance of the almost all the impacts to not significant. The EIAR also identified impacts from 'habitat loss, damage and fragmentation'. Due to the nature of the quarrying operations and the location of the mineral resource, it was concluded that no mitigation could be proposed, and compensation measures would need to be sought. However, while no compensation measures were included to overcome the consequent biodiversity loss, measures were included for the "re-use of some of the excavated/stripped peat in the phased restoration of the pit". The project has been brought forward and assessed within the remedial NIS, which considers any in-combination effects arising from the Peat Extraction Phase.
- Offaly County Council - 18/49 and 18/324 – Although different planning applications, the EIAs that informed them identified similar impacts. Indirect impacts during construction on water quality, i.e. contamination and/or silt laden runoff. During the operational phase, potential impacts related to habitat loss and species disturbance (e.g. noise, vibration) were considered. However, these impacts were not considered significant due to design mitigation (e.g. screening berms) and the fact the surrounding habitats being already severely impacted (e.g. cutover bog), and the fragmentation of grasslands will lead to the formation of additional habitats and will actually increase the diversity of habitats present. Mitigation was proposed for the protection of breeding Common Frog, which encompassed a pre-construction survey and its relocation (i.e. adult individuals and/or spawn) to neighbouring drains and ponds. No further mitigation was deemed necessary.

[50] Not available from the Planning Portal- https://offalycoco.eplanning.ie/idocsweb/ViewFiles.aspx?docid=134263&format=djvu. Accessed in September 2023

For those projects outlined above where likely significant in-combination effects could not be ruled out in light of their interaction with peat extraction activities, the projects were brought forward to Stage 2 Appropriate Assessment and assessed in the remedial Natura Impact Statement (rNIS).

In addition to the above historic and existing projects described above, the in-combination assessment also had regard to potential planned future land uses within the Application Site insofar as they could be relevant to the consideration of cumulative effects. This includes the prospective development of the proposed Derrygreenagh Wind and Solar Project (as referenced in Section 4.3 above), which overlaps significant parts of the Application Site at Ballybeg, Derryarkin, Derryhinch and Drumman Bogs. The Derrygreenagh Wind and Solar does not form part of the current Substitute Consent application and will be subject to its own independent planning consent process, supported by a dedicated EIAR and NIS. Those assessments will address the construction, operation, and decommissioning of the proposed wind farm, including consideration of potential in-combination and cumulative effects, as required, within that separate consent process.

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7.4 Conclusion of Assessment on Cumulative and In-combination Effects

The projects described in the Sections above could have acted in-combination with the peat extraction and associated activities at the Application Site, resulting in more significant effects to European sites.

Based on the characteristics of the relevant projects listed in Table 4.2, in-combination effects arising from peat extraction and associated activities at the Application Site cannot be excluded at this stage for the following four European sites:

- River Boyne and River Blackwater SAC
- River Barrow and River Nore SAC
- River Boyne and River Blackwater SPA
- Lough Ennell SPA

Table 7-4 below presents conclusion of **1)** In-Combination Effects and **2)** Cumulative Effects.

Table 7-4: Assessment Conclusion

Aspect	Conclusion	Further Assessment Needed
1) Risk of In-Combination Effects	There is a potential risk of likely significant in-combination effects on the River Boyne and River Blackwater SAC, River Barrow and River Nore SAC, Lough Ennell SPA, River Boyne and River Blackwater SPA, when considered in combination with the projects listed in Section 7.3. This conclusion was derived from a comprehensive evaluation of potential environmental historic and future impacts from the Project, taking into account historic, current and future activities in the surrounding area. The risk is associated with the interaction between the Project and other project that may affect the integrity of these European sites. The assessment identifies the need for further investigation into potential in-combination effects, such as changes to hydrology and impacts.	Further investigation is required to evaluate specific in-combination effects including effects on water quality, hydrology, or species disturbance. These potential interactions should be monitored and analysed further, especially regarding temporal overlaps with surrounding developments. **Potential in-combination effects of project in Section 7.3 with the Peat Extraction Phase are assessed further in the rNIS**
2) No Significant Cumulative Effects	The assessment of other plans and projects in the surrounding area determined that the Project does not have the potential to contribute, nor has it contributed, to any significant negative cumulative effects on any European sites when considered in combination with other existing or proposed developments. No connections were identified between the Project and surrounding developments that could lead to additional or negative cumulative impacts on these sites.	Based on the assessment of surrounding plans and projects, no significant negative cumulative impacts on any European sites have been identified, and no connections were found between the Project and other developments that could lead to additional or adverse effects. Therefore, no further assessment is deemed necessary.
	Furthermore, no significant negative cumulative effects are expected from the combination of the future rehabilitation plans of the Project with other ongoing or future developments in the region. This conclusion emphasises that, despite the potential risk of in-combination effects (see 1 above) there are no significant cumulative impacts that would harm the integrity of the European sites. The integrity of the designated areas remains intact when all developments are considered together.	No significant cumulative effects are expected from the Project's rehabilitation plans combined with other developments. Therefore, no further assessment is deemed necessary. It should be noted that the rehabilitation plans for the Application Site include for ongoing monitoring. This will help ensure that no unforeseen cumulative impacts arise from the Project. This could include tracking any emerging impacts on water quality, habitat conditions, or species conservation.

8. APPROPRIATE ASSESSMENT SCREENING CONCLUSIONS

Following a thorough examination, analysis, and evaluation of the relevant data concerning the Application Site and its surrounding area, this remedial AASR has concluded that, based on the best available scientific knowledge, objective information, and the conservation objectives of the relevant European sites, it cannot be excluded beyond reasonable scientific doubt that the peat extraction activities and ancillary works undertaken during the Peat Extraction Phase (June 1994 –June 2020) either individually or in combination with projects, may have had significant effects on the integrity of River Boyne and River Blackwater SAC, River Barrow and River Nore SAC, Lough Ennell SPA, and River Boyne and River Blackwater SPA. This remedial AASR concludes that further assessment is required to understand the full scope of these potential impacts.

The European sites for which risk of potential likely significant effects to SCIs and QIs are deemed to exist are:

- River Boyne and River Blackwater SAC [002299] (Year Designated: 2003)
    - QIs brought forward to rNIS:
        - River Lamprey (*Lampetra fluviatilis*) [1099]
        - Salmon (*Salmo salar*) [1106]
        - Otter (*Lutra lutra*) [1355]
        - Alkaline fens [7230]
        - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) *[91E0]
- River Barrow and River Nore SAC [002162] Year Designated: 1998)
    - QIs brought forward to rNIS:
        - Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016]
        - Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029]
        - Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*) [1990]
        - White-clawed Crayfish (*Austropotamobius pallipes*) [1092]
        - Sea Lamprey (*Petromyzon marinus*) [1095]
        - Brook Lamprey (*Lampetra planeri*) [1096]
        - River Lamprey (*Lampetra fluviatilis*) [1099]
        - Twaite Shad (*Alosa fallax*) [1103]
        - Atlantic Salmon (*Salmo salar*) (only in fresh water) [1106]
        - Otter (*Lutra lutra*) [1355]
        - Killarney Fern (*Trichomanes speciosum*) [1421]
        - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]
        - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
        - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) * [91E0]
- Lough Ennell SPA [004044] (Year Designated: 1995)
    - SCIs brought forward to rNIS:
        - Pochard (*Aythya farina*) [A059]
        - Tufted Duck (*Aythya fuligula*) [A061]

        - Coot (*Fulica atra*) [A125]
- River Boyne and River Blackwater SPA [004232] (Year Designated: 2010)
    - SCI brought forward to rNIS:
        - Kingfisher (*Alcedo atthis)* [A229]

In light of this, it was concluded that a remedial NIS is required to assess whether activities associated with the Peat Extraction Phase (1994 to 2020) at the Application Site either alone and/or in-combination with extractive, industrial, energy and infrastructure developments in the area could have had potentially likely adverse effects on the integrity of the above listed European sites.

The Current Phase and Remedial Phase were screened out for further assessment in the remedial NIS, as no SPR linkages were identified that would give rise to likely significant effects on any European site.

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Appendix A Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plans

Ballybeg Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Ballybeg Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Ballybeg Bog.

BnM have defined the key rehabilitation outcome at Ballybeg Bog as environmental stabilisation.

*This rehabilitation plan has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. BnM expect to finalise these rehabilitation plans in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Ballybeg Bog, will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Document Control Sheet	
Document Name:	Ballybeg Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Z:\EPA draft rehab plans 2017 word docs\Derrygreenagh ref.501 (EPL)\Ballybeg\Ballybeg Sub Con Rehab Renewables
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	30	4	0	10

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):	IH	MMC	MMC
Date:	27/06/2023	26/07/2023	26/07/2023
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	JOS	MMC	
Date:	14/09/2023	9/03/2026	
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	CS		
Date:	07/05/2026		

Draft

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Non-technical summary

- BnM (formerly Bord na Móna) is updating the rehabilitation plan for Ballybeg Bog, located west of the R400 and between Croghan Hill and the town of Rhode in Co. Offaly.
- Ballybeg Bog was in industrial peat production since 1958 and supplied milled peat for electricity production.
- BnM Industrial peat extraction is now completely ceased at Ballybeg Bog since 2020.
- Much of the site is now vegetated and developing maturing fen and Birch scrub/woodland habitats. The southern section is still largely bare peat with pioneer vegetation developing.
- Part of the eastern portion of the site was planted with Alder as a biomass trial for electricity generation.
- Ballybeg Bog has a partially pumped drainage regime.
- The most southern part of the site is adjacent to the Grand Canal pNHA.
- This rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing vegetation and promoting re-establishment of more typical cutaway peatland communities such as Birch woodland and fen habitat.
- Rehab measures may include drain-blocking and other measures to optimise water levels at the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- Any future rehabilitation measures will be planned by a team consisting of expert ecologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- Peatland rehabilitation of this bog has brought a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Rehabilitation at Ballybeg Bog will result in improved water quality, climate benefits with the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like *Sphagnum* rich embryonic bog communities (on deeper peat); and wetlands with Reedbeds, fen and Birch woodland on shallower peat.
- The development of a range of habitats at Ballybeg Bog is support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

Draft

1. INTRODUCTION

BnM (formerly known as 'Bord na Móna' and used interchangeably in this report) operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh bog group (Ref. P0501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

Ballybeg Bog is part of the Derrygreenagh bog group (see Appendix I for details of the bog areas within the Derrygreenagh bog group). Ballybeg Bog is located in Co. Offaly between Croghan Hill and the village of Rhode.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix V).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This **draft** rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Ballybeg Bog and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

BnM are carrying out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) on its peatlands (2021-2026). This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the scheme are being supported by the Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) are acting as the scheme regulator. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part the PCAS project are **NOT** proposed as part of this draft Ballybeg rehabilitation plan at this stage.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This document covers the area of **Ballybeg Bog**. Parts of Ballybeg Bog (around the perimeter of the site) are currently being used by domestic turf cutters for intensive private sod peat production. These areas are

ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Ballybeg Bog that are outside of the control of BnM. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan'* (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2012 to 2023 inclusive), monitoring and desktop analysis, forms the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the references section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj *et al.,* (2021), Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland.
- Thom, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Derrygreenagh bog group Integrated Pollution Control Licence;
- Derrygreenagh bog group Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland (GSI) – Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);

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- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Report.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Ballybeg Bog was surveyed in August of 2010. Additional ecological walk-over surveys and visits have taken place at Ballybeg Bog between 2014-2026. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog – PB4).

A detailed ecological survey report for Ballybeg Bog is contained in Appendix II.

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3. SITE DESCRIPTION

Ballybeg is located between Croghan Hill and the town of Rhode in Co. Offaly. Ballybeg is situated in a group of BnM bogs that includes Derryarkin, Drumman and Derryhinch to the north, and Cavemount to the south. The most southern part of the site is adjacent to the Grand Canal pNHA. This is a partially pumped bog with one pump site located near the centre of Ballybeg Bog which houses two submersible 22kW pumps that operate on a duty and assist basis. This pump site is connected to a drainage system that flows through a series of silt ponds and onto the Yellow River via a tributary.

The northern part of the bog is now largely vegetated with a mosaic of scrub, woodland and open cutaway pioneer vegetation. This part of the site is largely drier cutaway and underlain with gravel. The southern part of the site is still mostly bare peat with developing pioneer vegetation. Part of the bog to the east of the site was planted with an Alder plantation back in 2007 and is largely vegetated.

See Drawing number BNM-ECO-26-18-01 titled *Site Location Map*, included in the accompanying Mapbook[1], which illustrates the location of Ballybeg Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

BnM Industrial peat production commenced at Ballybeg in the 1950s and ceased in 2020. Ballybeg Bog formerly supplied fuel peat for Rhode Power Station, and subsequently Edenderry Power Station in Offaly. Milled peat was also supplied to Croghan Briquette Factory to facilitate peat briquette production. Much of Ballybeg Bog is now cutaway and the majority of the original raised bog has now been removed. A former industrial rail line runs in a generally north-south orientation through Ballybeg Bog, and provides connectivity to Derryarkin, Drumman and Derryhinch Bogs to the north, Toar Bog to the west (via Derryarkin Bog) and Cavemount Bog to the south.

A small area located at the north-east corner of the site was used in the past for gravel extraction for the supply of gravel used for railways. This activity has ceased.

Part of the cutaway in the east of Ballybeg bog has been developed as an Alder biomass plantation. About 60 ha east of the main railway line was planted with Alder in 2007 as a biomass for an energy trial. This trail was ultimately not successful as the rate of Alder growth made biomass production commercially non-viable.

3.1.2 Current land-use

The main railway line on the site extends from Derryhinch Bog to the north through Drumman Bog, Derryarkin Bog, and Ballybeg Bog and down into Cavemount Bog to the south. Approximately midway through Ballybeg bog, a small section of the industrial rail deviates from the general north-south orientation to the east towards Rhode Power Station. This industrial railway will be decommissioned shortly.

Ballybeg also includes a small area of undeveloped raised bog (PB1) at the southern end, part of which is owned by BnM. The area is being cut for sod turf by private individuals. No drainage was carried out in this area by BnM. This area is adjacent to the Grand Canal pNHA (Site Code: 002104).

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Ballybeg Bog Map Book

There are some areas of active turbary outside the margins of the site, particularly in the East, West and Southern margins. These are mapped in the accompanying Mapbook.

There was hydrological management via pumping to support the former industrial peat production and its infrastructure. Pumping is ongoing during the decommissioning phase.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

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In respect of Ballybeg Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for the Rhode and Edenderry Power Stations, and Croghan Briquette Factory.

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including Education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas. These job numbers have now declined with the cessation of peat extraction at this bog.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology at Ballybeg Bog comprises Lucan Formation, dark limestone and shale, with some sections of agglomerate, volcaniclastic agglomerate, to the northwest of the site. Quaternary sediment maps indicate that Ballybeg is primarily underlain by peat, with till derived from limestones bordering the east and west flanks.

The site is underlain with peat subsoils. Sub-soil till is exposed in parts of the northern part of the site. Lacustrine marl and clay underlies the peat in the southern central part of the site.

3.2.2 *Peat type and depths*

Much of Ballybeg Bog is now cutaway and the majority of the original raised bog has now been removed. In some places there are exposed sub-soils. In general, between 0.5-2m of residual fen or minerotrophic peat remains to the north of the site. In the centre of the site, peat depths of between 2-3m have been recorded. There are also some isolated pockets with residual peat of deeper than 4m to the south of the site.

3.3 Key Biodiversity Features of Interest

The majority of Ballybeg Bog comprises a mosaic of bare peat along with post-production cutaway habitats including Birch scrub at various successional stages, wetlands and associated pioneer wetland habitats and calcareous grasslands. Part of the centre of the site has been cutaway for a number of years and has developed relatively mature dry cutaway habitats (mostly Birch woodland).

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

- Large area of undeveloped raised bog (PB1) (22.3 ha) (Coole Bog) at southern end of site. This portion of bog is in relatively good condition and is adjacent to the Grand Canal pNHA. There is ongoing turbary along the margins of this bog remnant.
- Large area of cutaway at northern end. This area is largely dry and developing a mosaic of Birch scrub and woodland with frequently un-vegetated open areas. There are small, scattered wetlands with small amounts of open water through this area.
- The bog is used by small flocks of Golden Plover in the winter and by breeding Snipe and Ringed Plover in the summer (Biosphere Environmental Services 2014).
- Blue Fleabane (*Erigeron acer*) recorded at several locations along old drains. This is a Red list (Wyse et al., 2016) species, whose status is now “least concern”.

A detailed ecological report is provided in Appendix II.

3.3.1 Current habitats

The most common vegetation communities/habitats[2] present include:

- Bare peat (BP) (Codes refer BNM classification of pioneer habitats of production bog. See Appendix II).
- Pioneer poor fen communities (pEang, pRos, pJeff) (frequently in mosaic with open Birch scrub) (PF2).
- Emerging, open and closed Birch scrub (WS1).

[2] Categories in brackets refer to the current BNM classification system for vegetation communities, along with an equivalent Heritage Council habitat classification or Fossitt Code, where relevant.

- Large area of cutaway planted with Alder as a biomass crop (WS2).
- Former gravel pit (ED2/3) with associated vegetation communities of disturbed areas (DisTuss, An-Ho-Eq, eBir) on some of the older spoil. There are also several flooded pits with permanent water and emergent Reedbeds (pTyph).
- Small patches of open water (OW). Minor amount of Reedbeds (pTyph) (FS1) and other pioneer poor fen such as Bottle Sedge dominated pioneer fen (PF2).
- Small amounts of dry Heather-dominated vegetation (dHeath) mainly in mosaic with Birch scrub.
- Silt Ponds (Silt) and Riparian zones (RIP) with associated habitats such as scrub (WS1), Bracken (HD1), rank grassland (GS2) and dry calcareous grassland (GS1).

The most common habitats found around the margins of the site include:

- Raised bog (PB1) (several fragments) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Birch woodland (WN7)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Dense Bracken (HD1)
- Cutover bog (PB4) (several small fragments)
- Improved grassland (GA1) and wet grassland (GS4) (minor areas along boundaries where boundary overlaps adjacent fields)
- Depositing river (Esker Stream) (FL2)

The development of cutaway habitats decreases towards the south of the site, where peat extraction has ceased more recently. This area has developed a complex mosaic of Birch scrub, dry grassland and poor fen dominated by Soft Rush. A significant area is still unvegetated with bare peat and there are also significant areas between the patches of scrub that have scattered Soft Rush in association with the bare peat. The northeastern section was used for gravel extraction for the supply of gravel used for railways. This area contains a series of old spoil heaps. A large area of cutaway (about 60 ha) east of the main railway line was planted with Alder as a biomass trial.

Ballybeg Bog also includes a small area of undeveloped raised bog (PB1) at the southern end, part of which is owned by BnM. This area is adjacent to the Grand Canal pNHA, although none of the area under BnM ownership is designated.

Other habitats along the margins of the site include Raised bog (PB1) (several fragments), bog woodland (birch dominated) (WN7), wet grassland (GS4), dry heath (HH1) and cutover bog (PB4). Overall, large areas of the site contain less than 2m of peat and contain exposed marl and gravel; however some small areas of the bog, in the south-western corner of the site, have only recently come out of industrial peat production and still contain some "red" or "*Sphagnum*" peat. There is one pump site located near the centre of Ballybeg Bog which manages the overall hydrology of the site.

See Appendix II for more detail on site, habitats and local features.

See Drawing number BNM-ECO-26-18-17 titled ***Habitat Map 2018***, included in the accompanying Mapbook, which illustrates the habitats at Ballybeg Bog.

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3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Ballybeg Bog. The following is a summary of the records of these species available within both BnM datasets and those of the National Biodiversity Data Centre (NBDC). Multiple mammal species have been recorded on or within 1 Km of the bog including Irish Hare (*Lepus timidus subsp. Hibernicus)*, Eurasian Badger (*Meles meles),* Brown Rat *(Rattus norvegicus),* Pine Marten (*Martes martes*), European Otter (*Lutra lutra*), Rabbit (*Oryctolagus cuniculus*), Red Fox (*Vulpes vulpes*) and Wood mouse (*Apodemus sylvaticus*). The invasive species' American Mink (*Neovison vison*) and Fallow Deer (*Dama dama*) have also been recorded on the bog in the past.

The butterfly species Common Blue (*Polyommatus icarus*), Green-veined White (*Pieris napi*), Orange-tip (*Anthocharis cardamines*), Peacock (*Inachis io*), Small Copper (*Lycaena phlaeas*), Small Heath (*Coenonympha pamphilus*), Small Tortoiseshell (*Aglais urticae*), Speckled Wood (*Pararge aegeria*) and Large white (*Pieris brassicae*) have been recorded at Ballybeg The Snout moth (*Hypena probscidalis*) has also been recorded within 1 Km of the bog.

Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Kestrel (*Falco tinnunculus*), Whooper swan (*Cygnus cygnus*), Wigeon (*Anas* penelope), Teal (*Anas crecca*), Snipe (*Gallinago gallinago*), Mallard (*Anas plathrhynchos*), Heron (*Ardea cinerea*), Moorhen (*Gallinula chloropus*), Skylark (*Alauda arvensis*), Wood Pigeon (*Columba palumbus*), Meadow Pipit (*Anthus pratensis*), Blackbird (*Turdus merula*), Hooded Crow (*Corvus cornix*), Magpie (*Pica pica*), Reed bunting (*Emberiza schoeniclus*), Goldfinch (*Carduelis carduelis*), Swallow (*Hirundo rustica*), Wheatear (*Oenanthe oenanthe*) and Chaffinch (*Fringilla coelebs*) have all been recorded during BnM ecology surveys.

NBDC records for red-listed[3] bird species of conservation concern recorded in the 10km squares (N43, N53) which Ballybeg intersects include; Barn Owl (*Tyto alba*), Curlew (*Numenius a*rquata), Grey Partridge (*Perdix p*erdix), Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Lapwing (Vanellus vanellus), Meadow Pipit (*Anthus pratensis*), Pochard (*Aythya ferina*), Quail (*Coturnix coturnix*), Red Grouse (*Lagopus lagopus*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola*) and Yellowhammer (*Emberiza citrinella*). Red-listed[4] listed bird species that are also Annex I listed species recorded include Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar (*Caprimulgus europaeus*) and Red Kite (*Milvus milvus*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinu*s), Spotted Crake (*Porzana porzana*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

The invasive mammal species American Mink (*Neovison vison*) and Fallow Deer (*Dama dama*) have been recorded on the bog in the past.

[3] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

[4] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Ballybeg Bog. The nearest European Designated sites to Ballybeg Bog are as follows:

- Raheenmore Bog SAC (Site Code: 000582) – 4.5km west of Ballybeg,
- Split Hills and Long Hill Esker SAC (Site Code: 001831) – 10.3 km west of Ballybeg,
- Lough Ennell SAC (Site Code: 000685) – 12.3km northwest of Ballybeg,
- Lough Ennell SPA (Site Code: 004044) – 13km northwest of Ballybeg,
- The Long Derries, Edenderry SAC (Site Code: 000925) – 14.2km southeast of Ballybeg and
- Mount Hevey Bog SAC (Site Code: 002342) – 15km northeast of Ballybeg.

A number of non-statutory designated sites also occur in the wider area around Ballybeg Bog, including:

- Grand Canal pNHA (NPWS Site Code: 002104), occurs approximately 735m to the south of Ballybeg,
- Raheenmore Bog NHA (NPWS Site Code: 000582), occurs approximately 4.5km west of Ballybeg,
- Black Castle Bog NHA (NPWS Site Code: 000570), occurs approximately 5.3km to the east of Ballybeg,
- Daingean Bog NHA (NPWS Site Code: 002033), occurs approximately 6.9km to the southwest of Ballybeg,
- Milltownpass Bog NHA (NPWS Site Code: 002323), occurs approximately 8km north of Ballybeg,
- Cloncrow Bog (NPWS Site Code: 006677), occurs 8.2km northwest of Ballybeg Bog,
- Rahugh Ridge (Lilleter Esker) (NPWS Site Code: 000918), occurs approximately 8.4km northwest of Ballybeg Bog and
- Split Hills and Long Hill Esker (NPWS Site Code: 001831), occurs approximately 10.3km northwest of Ballybeg Bog.

See drawing BNM-ECO-26-18-23: ***Proximity to Designated Sites*** in the accompanying map book.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. The closest Ramsar sites to Ballybeg Bog are Raheenmore Bog (Ramsar Site No. 3IE002) and Lough Ennell (Ramsar Site No. 3IE044) which are approximately 4.5km and 13km from the Ballybeg bog boundary respectfully.

3.5 Hydrology and Hydrogeology

Ballybeg bog is predominantly located in part of the Boyne Catchment (Catchment ID: 07) as defined by the EPA under the Water Framework Directive (WFD). The majority of the bog lies within the Yellow [Castlejordan]_SC_010 sub-catchment. The most southern extent of Ballybeg bog is located within the Barrow Catchment (Catchment ID: 14) and the Figile_SC_020 sub-catchment.

There are several rivers and streams within the site and around the margins that drain the site. The Yellow (Castlejordan) River (EPA code: 07Y02) runs along the northern boundary in an easterly direction eventually

discharging to the River Boyne_30 (EPA code: 07B04) approximately 26km downstream. The TEMP_07E24 stream (EPA Code: 07E24) rises within the northeast of the site and flows north then east to the Yellow (Castlejordan) River. The Derryiron Stream (EPA Code: 07D21) rises within the northeast of the site and flows east then north to the Yellow (Castlejordan) River. The TEMP_07D91 stream (EPA Code: 07D91) rises within the northeast of the site and flows northeast then north to the Yellow (Castlejordan) River. The Coolcor Stream (EPA code: 07C08) watercourse rises to the west of the site and enters the southern section of the site before running northeast towards the Yellow (Castlejordan) River. The TEMP_07E16 (EPA Code: 7E16) rises east of the southern section of the site and flows north into the southeastern section of the site, then flows west and north where it enters the Coolcor river (EPA code: 07C08) which flows east and then northeast before joining the Yellow (Castlejordan) River. The CLONIN stream (EPA Code: 07C74) rises approx. 90m to the east of the site and flows northeast into the Yellow [Castlejordan] River. The Toberdaly stream (EPA code: 14T28) rises to the south of the site and flows south.

The bog has field drains running in a general west to east orientation. Ballybeg Bog has a pumped drainage system and there is one pump site located near the centre of the site. This pump site houses two submersible 22kW pumps that operate on a duty and assist basis. This pump site facilitates drainage from several discharge points to the east of the site for the former peat production and support of infrastructure.

GSI data indicates that the majority of Ballybeg Bog lies within a Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones. The northwest section of the site lies within a Locally Important Aquifer – Bedrock which is Generally Moderately Productive. A small area of the eastern section of the site lies within a Locally important aquifer – Karstfield, a bedrock which is karstified to a limited degree or limited area. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSI's Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/day). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Regionally important aquifers are those in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow') and large (>2,000 m^3/day), dependable springs may be associated with these aquifers.

The majority of Ballybeg Bog is located in an area mapped by GSI as of low groundwater vulnerability (GSI Map viewer), with two areas of high vulnerability to the east and west boundaries. Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. This data indicates there is generally low risk of any groundwater contamination occurring at this site.

Quaternary sediment maps show that Ballybeg Bog is generally underlain by Lucan Formation limestones (Dark limestone & shale (Calp). The northwestern section of the site is underlain by Agglomerate (Volcanistic

agglomerate) rock and a small section of the eastern section of the site is underlain by Allenwood Formation (Thick-bedded limestone, locally peloidal) rock.

This combination of sediment is common in the wider context surrounding the site.

Geological Survey of Ireland (GSI) mapping identifies the nearest karst feature (a spring) as being located approximately 0.7km south of the bog.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control (IPC) licence, all drainage water from boglands in an IPC-licensed area is discharged via an appropriately designed silt pond treatment arrangement. This requirement for Ballybeg Bog is outlined in Condition 6.6. of the site's IPC licence (Reg. P0501-01). Industrial peat production has now permanently ceased at Ballybeg Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under BnM's IPC licences, BnM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a bi-annual basis by BnM to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Ballybeg Bog has four surface water outlets to the River Boyne (07) catchment and the Yellow (Castlejordan) River sub-catchment. Water discharges from the site to the Yellow River (Castlejordan) and from this river to the River Boyne. One of the outlets is from the Coolcor river, which flows through the site and discharges to the Yellow River. Coolcor Stream which becomes a river within the site (Coolcor river) is listed as being under pressure from peat extraction in the 2nd cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

Details of silt ponds, associated surface water emission points and monitoring and sampling locations are detailed in Drawing numbers BNM-ECO-26-18-02 titled ***Structures and Sampling*****,** along with Drawing number BNM-ECO-26-18-WQ01 titled*:* ***Water Quality Map*** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Ballybeg Bog.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Ballybeg has been completed. This discharge will have improved water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key watercourse receptors and the Yellow (Castlejordan) River sub-catchment and will support the future status of the watercourses achieving Good Status.

Water quality monitoring will be established. There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.

Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence (Reg. P0501-01) on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.

The parameters to be included (as per condition 6.2 of the IPC Licence 501-01) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther et al. 2020).

This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Ballybeg Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. The majority of the bog has potential to develop as Birch woodland on drier areas and peripheral headlands. Wetland mosaics are expected to develop on shallow peat with open water, Reed swamp and fen habitats with alkaline peatland emission factors. Part of this bog is expected to develop regenerating *Sphagnum*-rich vegetation on deep peat areas.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)[5]

Ecological value was assessed in accordance with the NRA (2009) Guidelines, taking account of habitat quality, naturalness, biodiversity, rarity, ecological function and the presence of species of conservation interest.

A large part of the site can be rated as having a low local ecological value (E) as it was in milled peat production until 2020 and can be rated as **Local Importance, lower value**. The large area of cutaway has a higher local ecological value (D), **Local Importance, higher value.**

The area of undeveloped raised bog (Coole Bog) also has a high local ecological value (C) (**County significance**), although its restoration prospects are poor.

The revegetated former production area that exists in the northern half of the site is dominated by Birch scrub/woodland and marginal habitats include woodland, scrub, pioneer cutaway habitats, fen, calcareous grassland, remnant raised bog, and wetlands. These habitats may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value).**

[5] https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf

4. CONSULTATION

4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by BnM over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs, and other environmentally focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity, and other general issues over the years about Derrygreenagh bog group, including Ballybeg Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan 2016-2021 Review – held in Lullymore in 2018.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Rehabilitation Plan, both national and local stakeholders, including neighbours whose land adjoins Ballybeg Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Ballybeg Bog.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Ballybeg Bog Rehabilitation Plan will contain a review of the consultation.

4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to issues raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation measures. These include:

- Meeting conditions of IPC Licence (Reg. P0501-01).
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- Stabilisation or improvement of water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Integrating rehabilitation measures with existing land-use (e.g. biomass plantation). It is not proposed to change or affect any plantation forestry.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of a peatland originally drained for industrial peat production, but not brought into production, in a manner that is acceptable to both external stakeholders and to BnM.

The rehabilitation goals and outcomes take account of the following issues.

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. However, this is dependant on the topography of the cutaway bog and the final drainage regime. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is already significant potential for the creation of wet cutaway habitats at this cutaway bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Ballybeg Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce Carbon emissions from the site from a larger carbon source to a smaller Carbon source.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

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- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Ballybeg Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).
- BnM are also planning and carrying out rehabilitation measures in some nearby bogs (e.g. Cavemount and Esker), and rehabilitation has previously been carried out at Derryarkin Bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Ballybeg Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Ballybeg bog is part of the Derrygreenagh bog group.
- The local environmental conditions of Ballybeg Bog mean that drain blocking and hydrological management to re-wet peat where possible is the most suitable rehabilitation approach for this site.
- The key goals and outcomes of rehabilitation set by BnM. BnM have defined the key goal and outcome of rehabilitation at Ballybeg Bog as **environmental stabilisation** and **optimising residual peat re-wetting,** to enhance the development of compatible habitats.
- The cutaway is already developing a mosaic of woodland, grassland, wetland and cutaway peatland habitats. A significant portion of this cutaway in the northern section of the bog has largely stabilised. Rehabilitation is proposed to enhance residual peat re-wetting in these areas while taking account of existing habitats and land-uses (e.g. biomass plantation).
- Rehabilitation of Ballybeg Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- The majority of this bog has been cutaway. Ballybeg bog has a partially pumped drainage regime, which will need to be considered as part of the wider rehabilitation. A mosaic of wetland habitats are the most compatible habitat that can be developed in response to re-wetting. There is potential to develop some wetland habitats across the site by adjusting/stopping pumping, adjusting main outfalls and raising the water-level somewhat.
- Ballybeg has some deeper residual peat present towards the eastern and southern end. This would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

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- **Turbary.** There are several main areas of turbary along the western, southern and northeastern boundaries of Ballybeg bog.
- **Archaeology**. A known archaeological constraint exists in the southern area of Ballybeg bog. This area will remain undisturbed. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to BnM Archaeological Liaison Officer and the National Museum of Ireland (Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remains intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here. Two rights of way exist at or around the margins of Ballybeg Bog.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to turf cutting are excluded.
- The longer-term development of stable naturally functioning habitats to fully develop at Ballybeg Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Ballybeg Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial drainage activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g., drain-blocking/re-wetting) slowing movement of water across the site and encouraging a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g., potential suspended solids run-off).

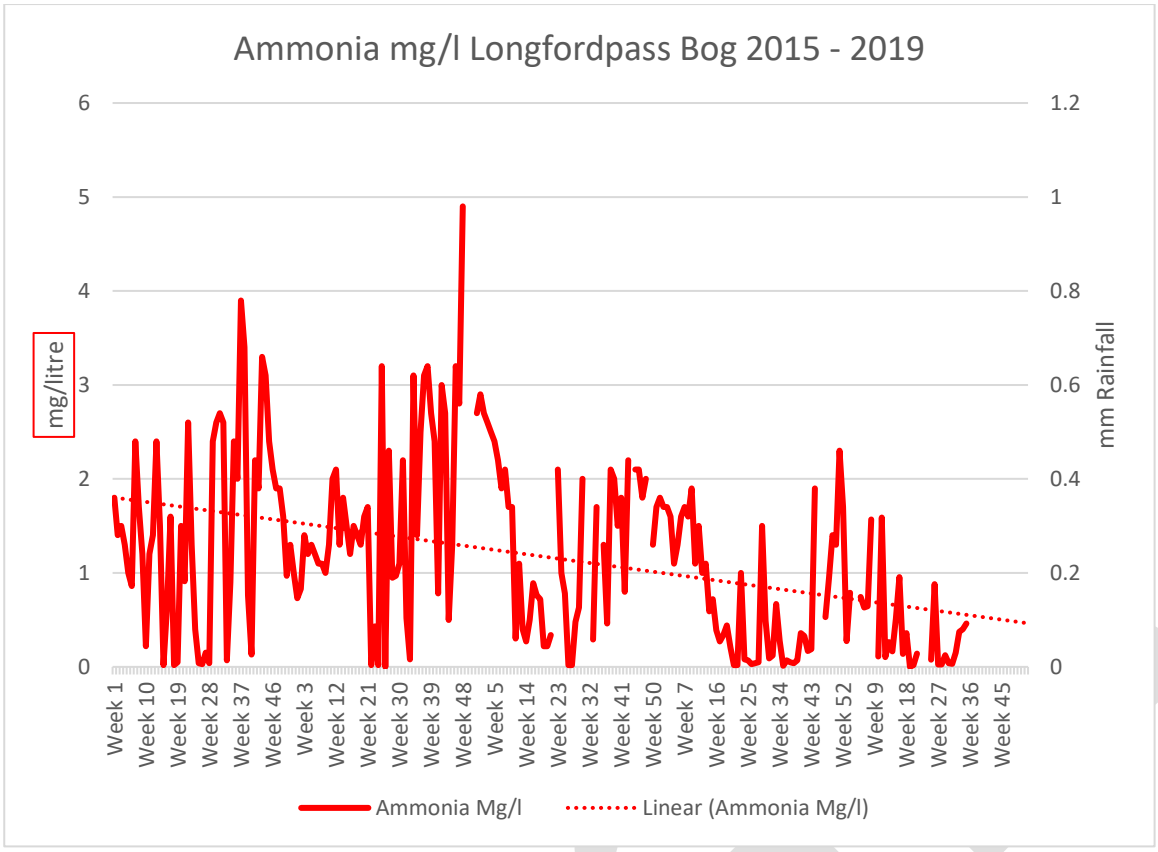
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the area originally drained for industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat-forming habitats. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are *At-Risk* from peatlands and peat extraction. The success criteria will be that the *At-Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At-Risk*, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longfordpass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These indicate a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillion over the 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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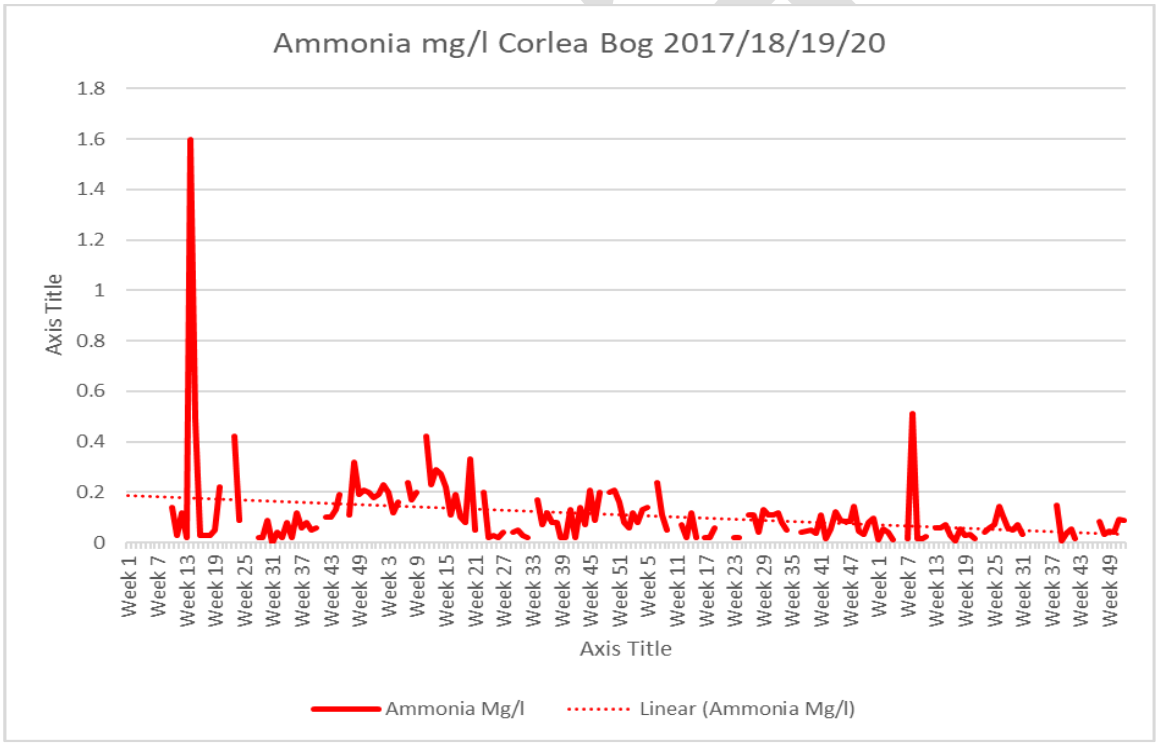


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7.1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	3 years
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2 years
IPC validation	Reducing pressure from drainage on the local water body catchment (WFD)	Where this section of the water body (that this bog drains to) has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

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7.2 Critical success factors needed to achieve successful rehabilitation as outlined in the plan.

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths and LiDAR Surface Maps, these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-18-21 titled ***Aerial Imagery2000***

BNM-ECO-26-18-22 titled***: Aerial Imagery2020***

BNM-ECO-26-18-04 titled: ***Peat Depths***

BNM-ECO-26-18-03 titled***: LiDAR Map***

BNM-ECO-26-18-09 titled: ***Depression Analysis***

The restoration and rehabilitation measures are provisionally outlined in drawing BNM-ECO-26-18-09 titled***: Standard Rehabilitation Measures*** in the accompanying Mapbook.

These rehabilitation measures for Ballybeg Bog will include (see Table 8.1):

- Re-assessment of the pumping regime and removing pumps if this is desired and has no significant external impact or impacts on proposed future land-uses. Initial hydrological modelling indicates that a part of the site will develop a mosaic of wetland habitats with some permanent deeper water if pumps are decommissioned. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths at < 0.5 m, where possible. It is inevitable that some sections will naturally have deeper water due to the topography at this site). Water-levels will be adjusted at outfalls and by adjusting piped drainage, where possible. More sustainable permanent gravity drainage solutions will be examined. Some targeted bunding may be required. It is expected that a natural seasonal regime of water fluctuation will develop, with water-levels fluctuating in association with levels of surrounding rivers.
- A widespread drain-blocking programme and hydrological management will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Hydrological measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes.
- The existing silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that the silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. The silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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Table 8.1: Types of and areas for rehabilitation measures at Ballybeg Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

Category	Type	Code	Description	Area (Ha)
Rehab	Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	111.4
	Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	195.4
	Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	246.9
Marginal	Marginal land	MLT1	No work required	22.9
Forestry	Forestry	Forestry	Forestry	78.9
Silt Pond	Silt Pond	Silt Pond	Silt Ponds	5.9
Constraint	Access			3.2
	Bog Remnant			2.4
	Cutover Bog			2.9
	Other			2.7
Total Area				**672.8**

8.1 Implemented and Ongoing

- A large area has already re-vegetated to the north of the site with woodland, scrub and open habitats. The southern section still has significant bare peat cover, with establishing cover of pioneer vegetation developing a mosaic of typical cutaway peatland and wetland habitats. Natural re-colonisation of the cutaway so far has been quite effective. Bare peat areas within the cutaway parts of the site are shrinking as vegetation develops and consolidates.
- A large section of the cutaway has already been developed as an Alder Biomass trial.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Ballybeg Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.

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- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g., breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Carry out Appropriate Assessment (AA) of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA (if required) in the plan for the delivery of rehabilitation and decommissioning across the site.
- A review of remaining milled peat stocks will be carried out.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

8.3 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in section 9.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.

8.4 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 9 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

8.5 Timeframe (to be adjusted when the rehabilitation plan is finalised)

- **Year 1 post finalisation:** Short-term planning actions.
- **Year 1-3 post finalisation**: Short-term practical actions.
- **Year 1-3 post finalisation:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3 post finalisation**: Decommission silt-ponds, if necessary.

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see

the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbouring lands, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up-to-date aerial photo when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended, and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

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9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC License Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed;
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

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APPENDIX I. BOG GROUP CONTEXT

The Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Cos. Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Derrygreenagh Group ceased in 2020. Decommissioning for the Derrygreenagh Group started in 2021 at a number of individual bogs and PCAS rehabilitation started in 2021.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The BnM Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carrenstown, Bracklin and Lisclogher East. Milled peat was supplied from Ballivor, Carrenstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford). Kinnegad Bog is an isolated bog unit with no industrial railway link to the other bogs. Kinnegad Bog is located to the south of Kinnegad in Co. Meath. This bog supplied mainly milled horticultural peat via road to various customers.

The Derrygreenagh Bogs sub-group is located to the south and east of Rochfortbridge (Co. Westmeath), along the borders of Co. Westmeath, Offaly and Meath. Four bogs (Ballybeg, Derryhinch, Drumman, Toar) supplied milled fuel peat via industrial railway to Edenderry Power.

Lisclogher East was never developed for milled peat production, but it was used for sod turf extraction until recently. A large section of Bracklin was formerly a sod peat production bog and was never converted to milled peat production. This area has developed as cutaway. Lisclogher West was drained in the 1980's but has never been put into industrial peat production. Bogs that have been in industrial peat production for decades (such as Ballybeg and Drumman) have become cutaway as peat was extracted from the sites and the active industrial peat production area shrunk. A large section of cutaway in Derryarkin and Drumman has been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd). A large section of Derryarkin was also rehabilitated in 2001-2002 with wetland development via outfall blocking.

There has already been significant rehabilitation work carried out within the Derrygreenagh Bog Group. BnM originally established a grassland research unit and farm at Derryarkin. This farm has now been closed for some time but grassland established from cutaway has been sold to local farmers. Older rehabilitation includes the establishment of confer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

During the 1980s/1990s about 176 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Drumman and Derryarkin in several different areas. There is ongoing management of these areas by Coillte.

One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Fertiliser and nursery crop trials were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

In Derryarkin, wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.

A small area of cutaway at Derryarkin has been leased to DAMX Ltd for the development of an off-road moto-cross track at Derryarkin.

An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.

Part of the cutaway at Ballybeg (76 ha) was planted with Alder (2008-2009) as a biomass trial (for fuel).

An area of marginal raised bog (19 ha) was restored at Bracklin Bog in 2016, as part of the BnM Raised Bog Restoration Programme. An extensive drain blocking programme was carried out to raise water levels and help re-wet the bog area, encouraging the development of Sphagnum-rich 'active' peat-forming raised bog. This area is of significant biodiversity and cultural interest to a local group called Meath-Westmeath Bog Group

Some rehabilitation was carried out in a small area of cutaway in Balivor Bog (9 ha) in 2015. This involved drain-blocking to maintain and enhance re-wetting of an area of cutaway with *Sphagnum*-rich poor fen peat-forming vegetation.

Rehabilitation and re-wetting as part of the Peatland Climate Action Scheme (PCAS) has been completed at Carrenstown and Lischogher West.

BnM is currently developing a wind energy project called Ballivor Wind farm (BnM Wind Farm | Ballivor Wind Farm). This proposed project has been submitted to the planning authority. The proposed location extends across parts of Bracklin, Lisclogher East, Carranstown and Ballivor Bogs.

BnM has secured planning consent for the Derrygreenagh Power Project (Drumman Bog), a thermal power plant. Planning consent included the associated infrastructure required to connect the development to the national gas and electricity transmission networks, enabling integration with the wider energy system

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC License Ref. P0-501-01 is outlined in Table Ap-1.

Table Ap-1: Derrygreenagh Bog Group names, area and indicative status (Derrygreenagh Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Bracklin	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats	2020	Draft 2023 Bracklin West (sub-site) rehabilitation completed.

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Bare peat is prevalent in the western section, which was in milled peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.		
Carranstown	306	Industrial peat production commenced at Carrenstown in the 1980s. The majority of the site has relatively deep peat.	Carranstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat. There are cutaway habitats developing on the eastern side. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Finalised 2022 Planned Rehab completed
Lisclogher East	486	Industrial peat production commenced at Lisclogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lisclogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Lisclogher West	239	Lisclogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lisclogher West was drained but never fully developed for industrial peat extraction.	N/A	Finalised 2023. Rehab completed
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat.	2020	Draft 2017
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	N/A
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s. Most of the site is cutaway	Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.	2020	Draft 2026
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction in past.	Between 1988 and 1991	Draft 2026
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.	2017	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Most of the site is bare peat with emerging cutaway habitats. Part of the site was used to trial herb production. This initiative has now ceased.		
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction. Part of the site was used to trial herb production. Part of the site is used for log storage (biomass).	2018	Draft 2026
Toar	445	Industrial peat production commenced at Toar in the 1950s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Most of the site is bare peat. Part of the site is used for log storage (biomass).	2018	Draft 2026

See Drawing number BNM-ECO-26-18-24 titled ***Bog Group Map***, included in the accompanying Mapbook which illustrates the location of Ballybeg bog and the Derrygreenagh Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Bog Name:	**Ballybeg**	**Area (ha):**	847ha
Works Name:	Derrygreenagh	**County:**	Offaly
Recorder(s):	MMC	**Survey/ monitoring Date(s):**	23-25/08/2010

Habitats present (in order of dominance)

The most common habitats present on production bog and cutaway at this site include:

- Bare peat (BP) (Codes refer BNM classification of pioneer habitats of production bog. See Appendix II).
- Pioneer poor fen communities dominated by Soft Rush (pJeff) in northern section of cutaway, frequently in mosaic with bare peat and Birch scrub. Smaller amounts of poor fen dominated by Bog Cotton (pEang) and sometimes associated with open water on the site. Small amounts of Marsh Arrowgrass-dominated vegetation in places (pTrig).
- Emerging, open and closed Birch scrub (eBir). Mainly in the northern cutaway area and in mosaic with poor fen (pJeff) and dry grassland (gAn-H-Eq, gMol).
- Large area of cutaway planted with Alder as a biomass crop (WS2).
- Former gravel pit (ED4) with associated vegetation communities of disturbed areas (DisTuss, An-Ho-Eq, eBir) on some of the older spoil. There are also several flooded pits with permanent water and emergent Reedbeds (pTyph).
- Small patches of open water (OW) or hollows with temporary open water (TOW) with emergent poor fen vegetation (pJeff). Minor amount of Reedbeds (pTyph) and other poor fen such as Bottle Sedge dominated community present (pRos).
- Small amounts of dry heather-dominated vegetation (dHeath) mainly in mosaic with Birch scrub along margins of northern cutaway and around silt ponds.
- Silt Ponds (Silt) and Riparian zones (RIP) with associated habitats such as scrub (WS1), Bracken (HD1), rank grassland (GS2), dry calcareous grassland (gCal), Purple Moorgrass-dominated grassland (gMol) and typical pioneer communities of disturbed areas (disTuss) developed on spoil heaps dug from the ponds and drainage areas.
- Access zones (Acc). These include the railway lines and permanent gravel tracks. These zones have associated vegetation communities such as scrub with Birch (oBir) and Gorse (eGor), grassland (gMol, gCal) and patches of Bracken (dPter).

The most common habitats present around the margins of the production bog and in other sections of this site include:

- Raised bog (PB1) (several fragments) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Birch woodland (WN7)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Dense Bracken (HD1)
- Cutover bog (PB4) (several small fragments)
- Improved grassland (GA1) and wet grassland (GS4) (minor areas along boundaries where boundary overlaps adjacent fields)
- Depositing river (Esker Stream) (FL2)

Description of site

Ballybeg is located between Croghan Hill and the town of Rhode in Co. Offaly. Ballybeg is situated in a group of BnM bogs that includes Derryarkin to the north and Cavemount to the south. The most southern part of the site is adjacent to the Grand Canal pNHA. This is a bog with partially pumped hydrology with one pump site located near the centre of the site. This pump site houses two submersible 22kW pumps that operate on a duty and assist basis. This pump site is connected to a drainage system that flows through a series of silt ponds and onto the Yellow River via a tributary. This bog can be more easily described by dividing it into four main sections according to the natural topography of the site.

Northern cutaway area

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Ballybeg has a large area to the north of the site that has been out of industrial peat production for some time. The maturity of the cutaway decreases further south, where fields probably came out of production at a later date. This area has developed a complex mosaic of Birch scrub, dry grassland and poor fen dominated by Soft Rush. A significant area is still unvegetated with bare peat and there are also significant areas between the patches of scrub that have scattered Soft Rush in association with the bare peat. The underlying topography seems to have had a significant influence on the development of various vegetation communities as a comparison of the aerial photos to the LIDAR map shows an unusual crescent-moon shape that remains largely unvegetated. This corresponds exactly to lower lying land on the LIDAR map. Higher ridges running through the site are vegetated with the Birch scrub, dry grassland and poor fen. The overall area is quite dry and similar to parts of Drumman with loose dry crumbly peat that is prone to be wind-blown. The topography also varies and there are a series of low mounds and small basins through-out this section.

The Birch scrub varies from small areas of dense closed and mature scrub to more prominent open areas of Birch scrub that are developing in association with dry grassland and or Soft Rush. Pine and Spruce are occasionally found through-out the cutaway but are more common towards the west and northern sides, where the cutaway is adjacent to conifer plantation. There are occasional sections where Spruce is frequent. The dry grassland (gAn-H-Eq) is never extensive and has developed on the drier mounds through the area. It is similar to the dry grassland communities that have developed at Drumman and Derryarkin and is dominated by Bentgrass with Yorkshire Fog, Thistle, Rosebay Willowherb, Colt's-foot. The grassland is quite open and there is significant cover of *Campylopus introflexus* moss. This community is quite disturbed in places and could be classified as disturbed vegetation (disCF, DisWill) in places. There is also a calcareous influence with species such as Knapweed prominent in places. Soft Rush and Purple Moorgrass are present and there is a subtle transition to poor fen dominated by Soft Rush in places. The east side of this cutaway area tends to be less developed and there is more emergent Birch scrub, poor fen with Soft Rush and bare peat present.

Small basins with impeded drainage have developed throughout the cutaway. There is not much open water and most of these basins could be classified as temporary open water with mainly Soft Rush-dominated vegetation. Wetland development is quite poor and the cover of Bottle Sedge and Bog Cotton around these small basins was relatively low. Part of the west side is some-what more diverse and dominated by Bog Cotton (pEang) in contrast with the rest of the cutaway. This area also contains some Reedbeds with Common Reed and some Bog Sedge.

Heather-dominated vegetation is more prevalent towards the northern end of the cutaway. Heather dominates in association with open Birch scrub and dry grassland dominated by Purple Moorgrass on fields that must not have been exploited very intensively. There are large areas of mainly bare peat between the vegetated fields, and these contain dry crumbly wind-blown peat. Some high fields are being colonised primarily by Spruce.

There are a series of deep drains with associated spoil heaps that run through this section. Some of these gravel spoil heaps have developed extensive populations of Blue Fleabane. Some of the older spoil is developing scrub in places and Blue Fleabane is absent or rare in these sections. Some iron-pan deposits are present at the southern end of the cutaway.

The north-east section was used for gravel extraction in the past. This area contains a series of old and newer spoil heaps. Older spoil heaps are being vegetated with disturbed vegetation (disTuss), open Birch scrub and some dry grassland (gMol, gCal) There are also some old gravel pits with permanent water. Some of these pits have developed Reedbeds with Reedmace and they also contain other aquatic and emergent vegetation with Pondweds, Watercress, Bottle Sedge and Bur-weed. One of the pits was being used by Moorhen and Mallard.

Eastern Alder Biomass plantation

A large area of cutaway (about 60 ha) east of the main railway line has been planted with Alder to supply a biomass crop to Edenderry Power Station. Some Birch was also planted. Saplings were planted in rows in bare peat and in typical pioneer cutaway communities in this area including poor fen dominated by Soft Rush and emerging and open Birch scrub with Birch and Willow. The topography of this area is variable with some naturally occurring small basins and low mounds. Some small hollows that generally were vegetated with poor fen (pJeff) but also become wet during the winter (tOW). Some of these hollows do contain permanent water (OW) but most have been planted with Alder. The mounds are generally developing Birch and Willow scrub in association with dry grassland (gAn-H-Eq). Alder saplings were growing best in the areas that have been already vegetated with dry grassland and open scrub. They are also growing in many of the small basins that were planted and are now infilled with poor fen.

This area also includes a large old silt pond and small area of unplanted cutaway to the north. Spoil heaps on both sides of the silt pond are developing scrub (oBir) and some dry grassland and disturbed vegetation (gMol, disTuss, gCal). Some of the open grassland developing on the gravel contains Blue Fleabane, which is widely scattered along the northern spoil heap. The small unplanted cutaway area includes a series of bare fields with little pioneer vegetation cover interspersed with higher fields that contain open Birch scrub and some pioneer dry heath. The unvegetated fields in this area contain dry crumbly peat that is similar to the cutaway of Drumman.

This area also contains a small portion of high bog at the northern end. Some of this high bog was ditched in the past but was never harvested. The high bog is quite dry and being invaded by Birch and Pine.

Southern production area

This area is dominated by bare peat as it was in peat extraction until 2020. It is divided into two main sections by a central travel path and railway. The main Works area is located at the east side and there are a series of silt ponds and associated long spoil heaps in this area that are vegetated along the main access route into the site. There are also old access routes and rail links into the old site of Rhode Power Station. This area is colonised with a range of typical cutaway communities of drier areas including Purple Moorgrass-dominated grassland (gMol), patches of dense Bracken (dPter) and some Gorse and Birch scrub. The old tracks are also developing some dry calcareous grassland that is species-rich in places. This calcareous grassland is replaced by

Purple Moor-grass dominated grassland in places and there is also some rank grassland dominated by species such as False Oatgrass and Cocksfoot that is developing. Silt ponds to the west and south of the access area are partially vegetating with similar communities. There are a series of fields to the south of the works area that are out of production. Some mounds of marl, and gravel are exposed in these fields, and these areas are partially vegetated with dry grassland (gAn-H-Eq) and emergent Birch scrub (eBir).

The southern part of this section still has deep peat and has not been as intensively exploited as other sites. Some of this peat is likely to be *Sphagnum* peat. Peat depths increase from the north to the south. Very little pioneer cutaway vegetation has developed along the southern margins in this section. Towards the northern end of this section (east side) there are some fields were beginning to develop pioneer poor fen communities. Reedmace is found in some of the drains and Marsh Arrowgrass and Soft Rush are beginning to colonise the fields. Shell marl is being exposed in some of these fields.

There is a small area of high bog at the west side of the site that is partially owned by BnM. This area has been ditched but was never harvested. It is relatively dry with heather dominating and scrub spreading along some sections. Parts have been cut by private individuals in the past and are re-colonising with Deergrass and other species. Some of this high bog is also grazed by cattle.

There are very little undeveloped marginal habitats around the remainder of this section. A riparian zone is present along the eastern boundary with a deep channel and associated long bank of spoil, now vegetated with Bracken and scrub. A minor band of scrub and Birch woodland can be found along the western margin.

Southern raised bog

Ballybeg also includes a small area of undeveloped raised bog (PB1) at the southern end, part of which is owned by BnM. This area is located south of the Rhode minor road and is adjacent to the travel path and rail-link into Cavemount. This area is adjacent to the Grand Canal pNHA, although none of the BnM part of the bog is designated. This area is also being cut by individuals for peat along the western margin. Private peat-cutting has intensified and spread south along the margins in recent years, although there is also some old regenerating cutover bog (PB4) to south, adjacent the Grand Canal. A powerline passes over the bog, and some pylons are located on it.

The high bog is in moderate condition and the majority of it would be classified as sub-marginal (Ecotope) quality. The bog was wet but not quaking. There are signs of degradation and drying in places. The high bog has been burnt in the past and the *Cladonia* sp. lichen cover is < 5%. The micro-topography is also degraded (by burning) with very few large hummocks or mounds present. *Sphagnum* cover is moderate and is dominated by hummocks of *S. capillifolium* and S. *papillosum*. There were very few hollows with *S. cuspidatum* present. This species was only really found along some of the infilled drains through this area. Pools were not present and some former pools are now dry hollows. Several Snipe were roosting on the high bog.

There were minor amounts of scrub (WS1) with Gorse and Birch on the edges of the high bog adjacent to the Grand Canal in places. The old face-bank at the south-western corner has developed into moderately sloping cutover bog and there is some regenerating cutover bog with high *Sphagnum* cover in this area. A drain along the edge of the track and the cutover bog has been cleaned recently.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

The Grand Canal pNHA (NPWS site code 002104) is located adjacent to the site at the southern end. There is no actual overlap between BNM property and the designated area even though the adjacent BNM area is undeveloped raised bog (Coole Bog). A large area of raised bog adjacent to the BNM property (and in the adjacent townland) has been included within the designation.

Adjacent habitats and land-use

The surrounding landscape is dominated by farmland with improved grassland. Adjacent habitats include those of reclaimed cutover bog such as conifer plantation (WD4), improved grassland (GA1) and wet grassland (GS4). There are also some high bog (PB1) remnants and active cutover bog (PB4) around the margins that are not in ownership by BNM. There has been some gravel extraction to the north (ED3) and some of the land adjacent to the east side is planted with broad-leaved forestry (WS2).

Watercourses (major water features on/off site)

- This site is located within the River Boyne catchment.
- A tributary of the Yellow River drains the eastern side of the bog and the channelised drainage that flows through the bog.
- A channelised drain flows south along the SE boundary and is a feeder for the Grand Canal.

Peat type and sub-soils

The main peat type exposed on this site is fen peat, although the peat towards the southern end of the site was red or *Sphagnum* peat. The site is likely to be underlain with limestone tills, as these sub-soils are exposed around the margins of the site. Glacial sub-soil/gravel deposits are exposed around the gravel pit to the north of the site and along some of the main drains through the cutaway area and Alder plantation. Shell Marl was exposed along some silt ponds in the centre of the site, as was blue-silty clay in places.

Fauna biodiversity (2012)

bird species were noted on the site during the survey.

- Kestrel
- Reed Bunting
- Flock of ~50 Goldfinches
- Snipe (3)
- Moorhen
- Mallard
- Other species present included Meadow Pipit, Blackbird, Rook, Wren, Skylark, Heron, Magpie, Pheasant, Wood Pigeon, Swallow, Wheatear and Chaffinch.
- The site also attracts some swans (Whooper Swans) and ducks (Teal, Mallard, Wigeon) in the winter, when there is standing water.

Mammals

- Signs of Fox, Rabbit and Badger were noted on the site.
- Hares were observed on the site and there are frequent signs of Hares around the site.
- Mink have been noted on the site in the past.

Other Species

- Green-veined White
- Large White
- Small Tortoise-shell
- Peacock
- Common Blue,
- Speckled Wood,
- Small Copper.

Blue Fleabane distribution

This Red List rare species (whose status is listed as least concern) was recorded at several locations around the site. It has not been recorded at this site before. Blue Fleabane (*Erigeron acer*) is an annual species that is found in dry pastures and sandy or gravely places such as eskers and its distribution is mainly confined to the central and south-eastern parts of Ireland (Webb *et al.* 1992). It has been recorded in several 10 km grid squares in Offaly in the past and has recently been recorded from Derryarkin and Drumman, to the north of this site.

Several populations were recorded on the site (see Habitat Map). The largest population was noted in the area around the gravel pit. Blue Fleabane has extensively colonised old spoil heaps and some of the disturbed ground where quarrying activity is low at present. It is widely distributed in this area. It also appears on several of the old spoil heaps that were dug out from silt ponds and some large drains.

This species is not likely to have been present on the site prior to the development of the cutaway. Subsequent development of the site including construction of railways on gravel embankments, construction of drains and silt ponds, and more recently the development of the quarry have created suitable exposed gravel banks made up of calcareous rich material that this species prefers. In the long-term, it could be expected that these spoil heaps and exposed gravel patches will re-vegetate with grassland and scrub, which will not favour this species.

References

Draft

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European Commission (2013). Interpretation manual of European Union Habitats. European Commission DG Environment Nature ENV B.3.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2). National Roads Authority.

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BnM habitat classification scheme

	General	Habitat [1]	BNM habitat code	Equivalent Heritage Council codes [2]
Pioneer habitats of industrial cutaway	Peatland	Bare peat (0-50% cover)	BP	ED2
		Embryonic bog community (containing *Sphagnum* and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer *Campylopus*-dominated community	pCamp	PF2
		Pioneer *Juncus effusus*-dominated community (Soft Rush)	pJeff	PF2
		Pioneer *Eriophorum angustifolium*-dominated community (Bog Cotton)	pEang	PF2
		Pioneer *Juncus bulbosus*-dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer *Triglochin palustris*-dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with *Cladium* (rich fen)	pCladium	PF1
	Emergent communities	Pioneer *Carex rostrata*-dominated community (Bottle Sedge)	pRos	FS1
		Pioneer *Phragmites australis*-dominated community (Common Reed)	pPhrag	FS1
		Pioneer *Typha latifolia*-dominated community (Reedmace)	pTyp	FS1
		Pioneer *Schoenoplectus lacustris*-dominated community (Bulrush)	pSch	FS1
	Open water	Charaphyte-dominated community	pChar	FL2
		Permanent pools and lakes	OW	FL2
		Temporary open water	tOW	
	Woodland and scrub	Emergent *Betula*/*Salix*-dominated community (A) (Birch/Willow)	eBir	WS1
		Open *Betula*/*Salix*-dominated community (B) (Birch/Willow)	oBir	WS1
		Closed *Betula*/*Salix*-scrub community (C) (Birch/Willow)	cBir	WS1
		Ulex europaeus-dominated community (Gorse)	eGor	WS1
		Betula/*Salix*-dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry *Calluna vulgaris*-dominated community (Heather)	dHeath	HH1
		Dense *Pteridium aquilinum* (Bracken)	dPter	HD1
	Grassland	Pioneer dry calcareous and neutral grasssland (Centaureo-Cynosuretum)	gCal	GS1
		Dactylis-Anthoxanthum-dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2
		Anthoxanthum-Holcus-Equisetum community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		Molinia caerulea-dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (Filipendulion ulmariae)	Mar	GM1
	Disturbed	*Tussilago farfara*-dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		Epilobium-dominated community (vegetation > 50%) (Willowherb spp.)	DisWil	ED3
	General	Riparian areas (streams or drain with associated edge habitats (e.g. FW2/4 + WS1, GS2 etc)	Rip	FW2 +
		Silt Ponds (artificial ponds with associated bank habitats (e.g. FL8 + WS1, GS2, ED2, ED3)	Silt	FL8 +
		Access (tracks or railways with associated edge habitats (e.g. BL3 + gCal, gMol, eGor etc)	Acc	BL3 +
		Works areas (predominately built land but can include landscaped and brownfield habitats (e.g. GA2, WS3, WD4, ED2, ED3)	Works	BL3 +

[1] These are generally pioneer habitats of bare peat and the communities can contain a significant proportion of bare peat. Some habitats are more developed than others. They frequently occur in mosaic with each other.
[2] Not all these communities are equivalent to habitat classes used by The Heritage Council habitat classification scheme (Fossitt 2000) as some are quite rudimentary and undeveloped.

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APPENDIX III. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

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APPENDIX IV. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e., Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[6] will be adhered with throughout all rehabilitation measures and activities.

[6] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security, In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh Bog group (Ref. P0-501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the

process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydro morphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 Agreed Archaeology Code of Practice

BnM operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht (National Monuments Service) and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2020, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna

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Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

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APPENDIX VI. DECOMMISSIONING

1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under section 95 of the EPA Acts. This is achieved by BnM identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Ballybeg Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

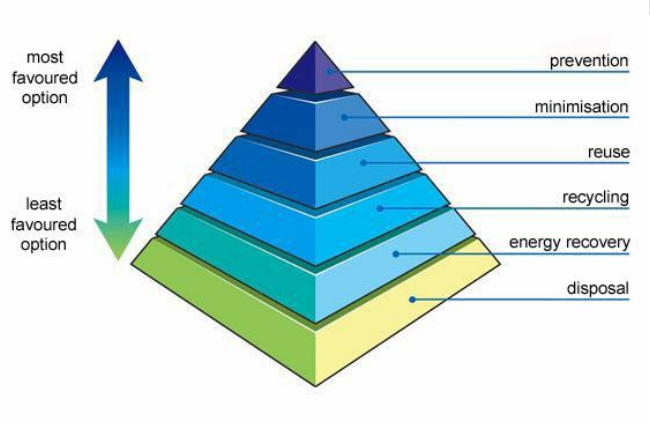
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, BnM will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary).

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BNM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BNM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration to defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BNM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPC Licence's Ref P0501-01, Derrygreenagh Group of Bogs located in Co. Offaly, Westmeath and Meath.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in the Derrygreenagh bog group are serviced by silt lagoons/ponds. During the excavation of these silt ponds, pre IPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or is levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Edenderry and Lough Ree Power Stations screens the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0501-01 IPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
IPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.
These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.
Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment
4.1 Silt pond excavation material and cleanings.
The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.
The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

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5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	**C**lassification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Derrygreenagh IPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Derrygreenagh IPC Licence P0501-01.

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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX X. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.



Code of Practice

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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

---

2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

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Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Ballybeg Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
Document Name:	Ballybeg Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	Draft v0.2

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	12	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	10/07/2026	10/07/2026	10/07/2026
Rev. 0.2	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	CS	MMcC
Date:	24/09/2026	24/09/2026	24/09/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			

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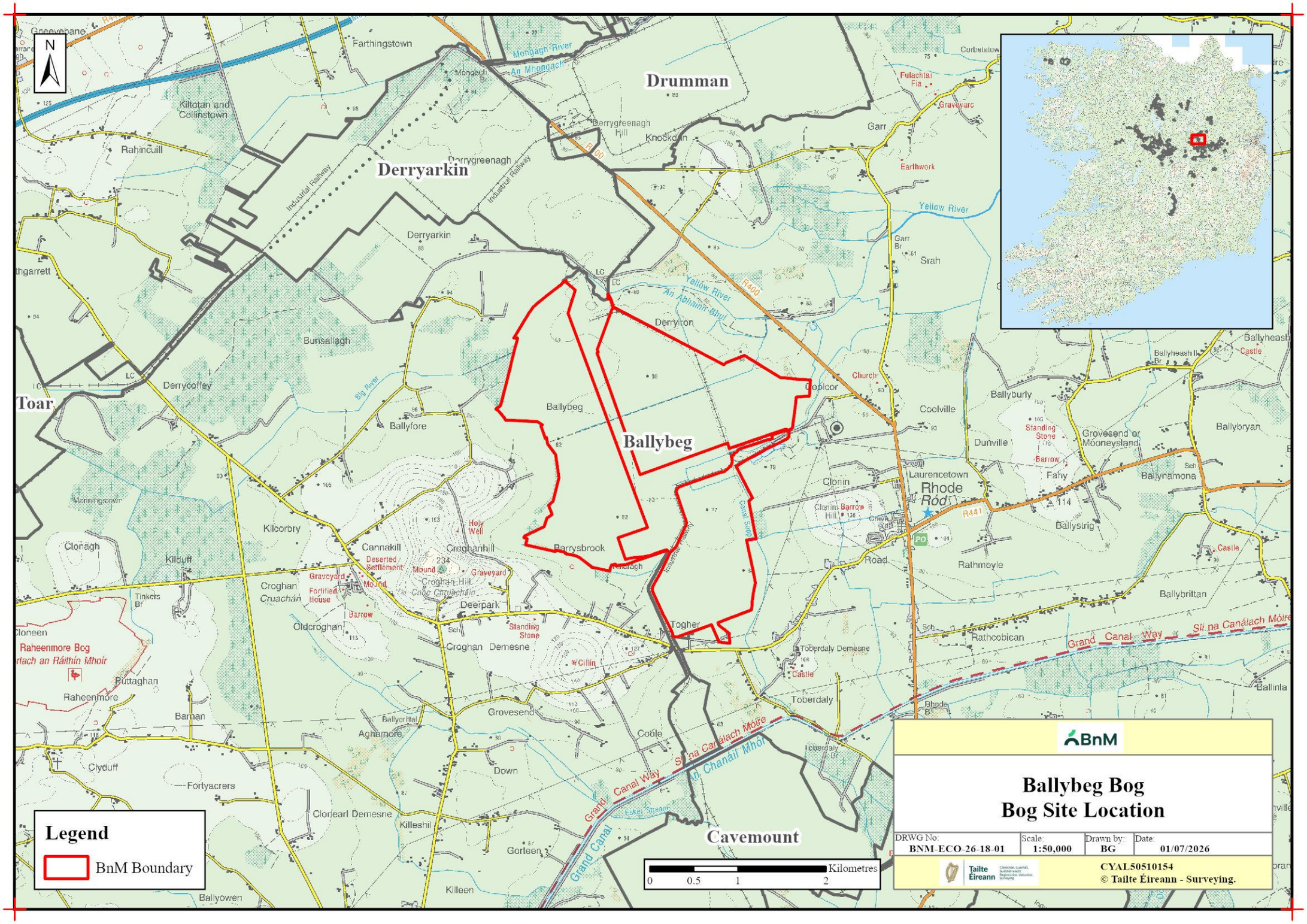
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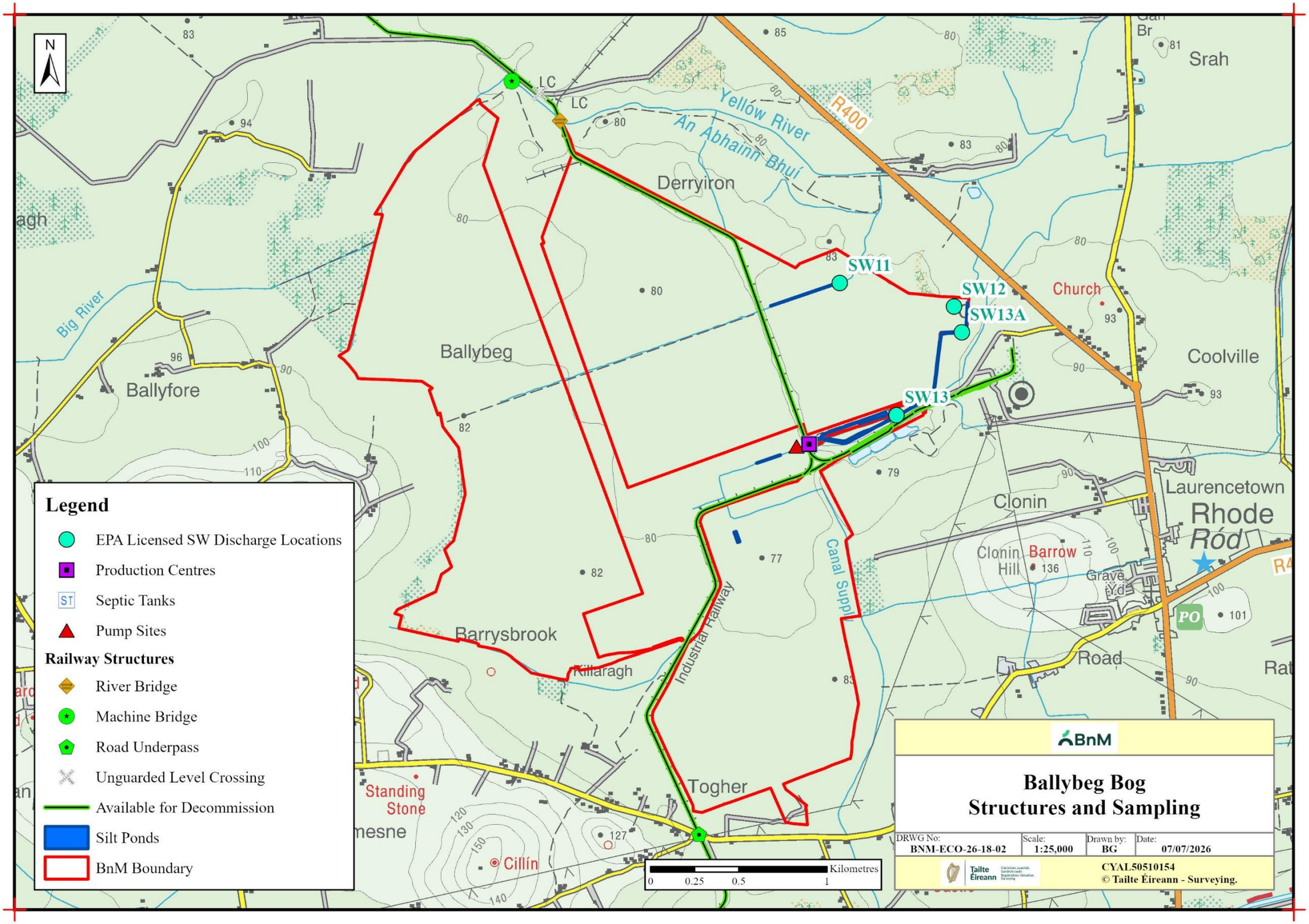
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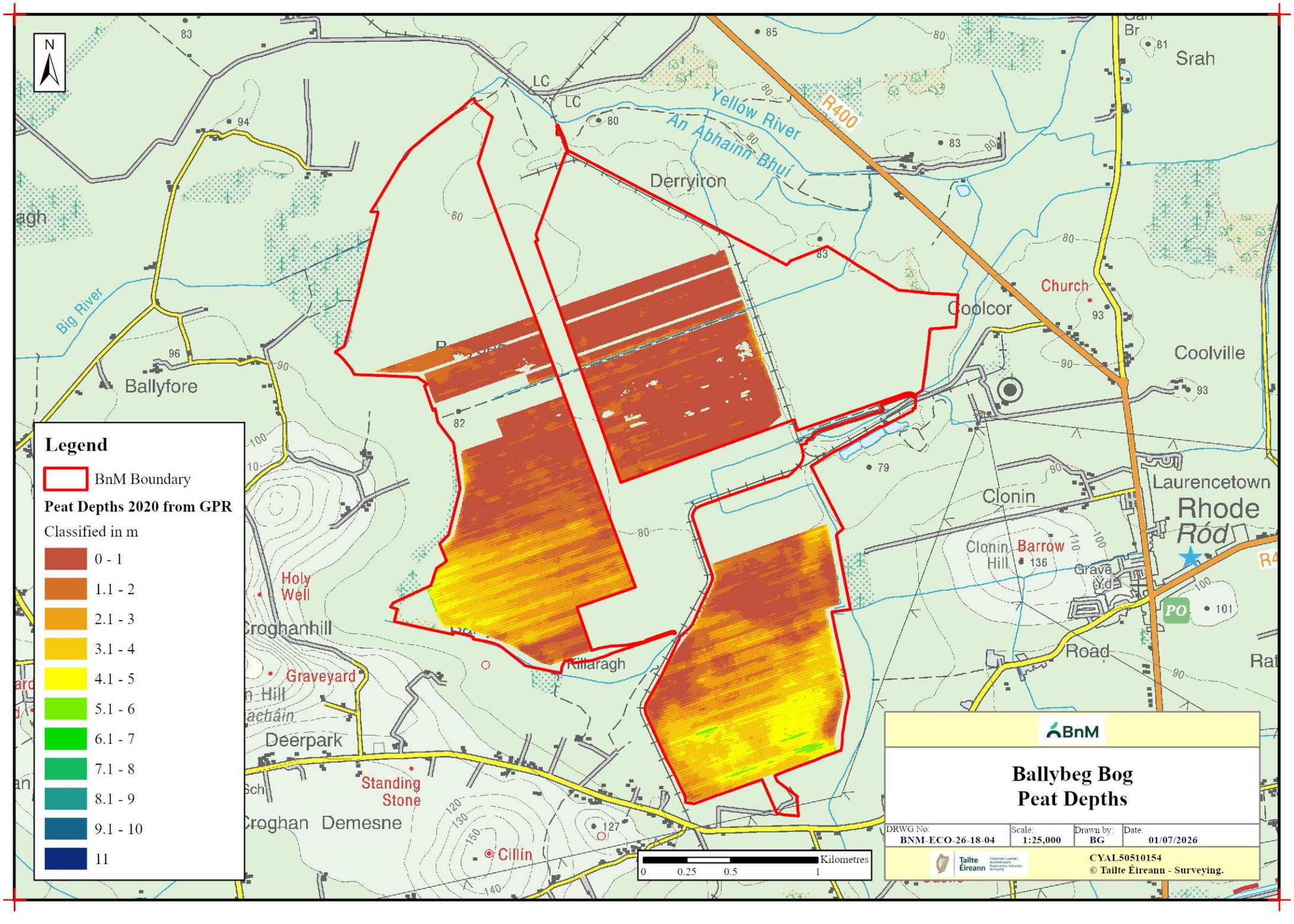
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An Abhainn Bhuí
R400
Derryiron
Ballybeg
Big River
Ballyfore
Barrysbrook
Killaragh
Industrial Railway
Canal Supply
Togher
Standing Stone
Cillín
Srah
Church
Coolville
Clonin
Clonin Hill
Barrow
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River Bridge
Machine Bridge
Road Underpass
Unguarded Level Crossing
Available for Decommission
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Kilometres
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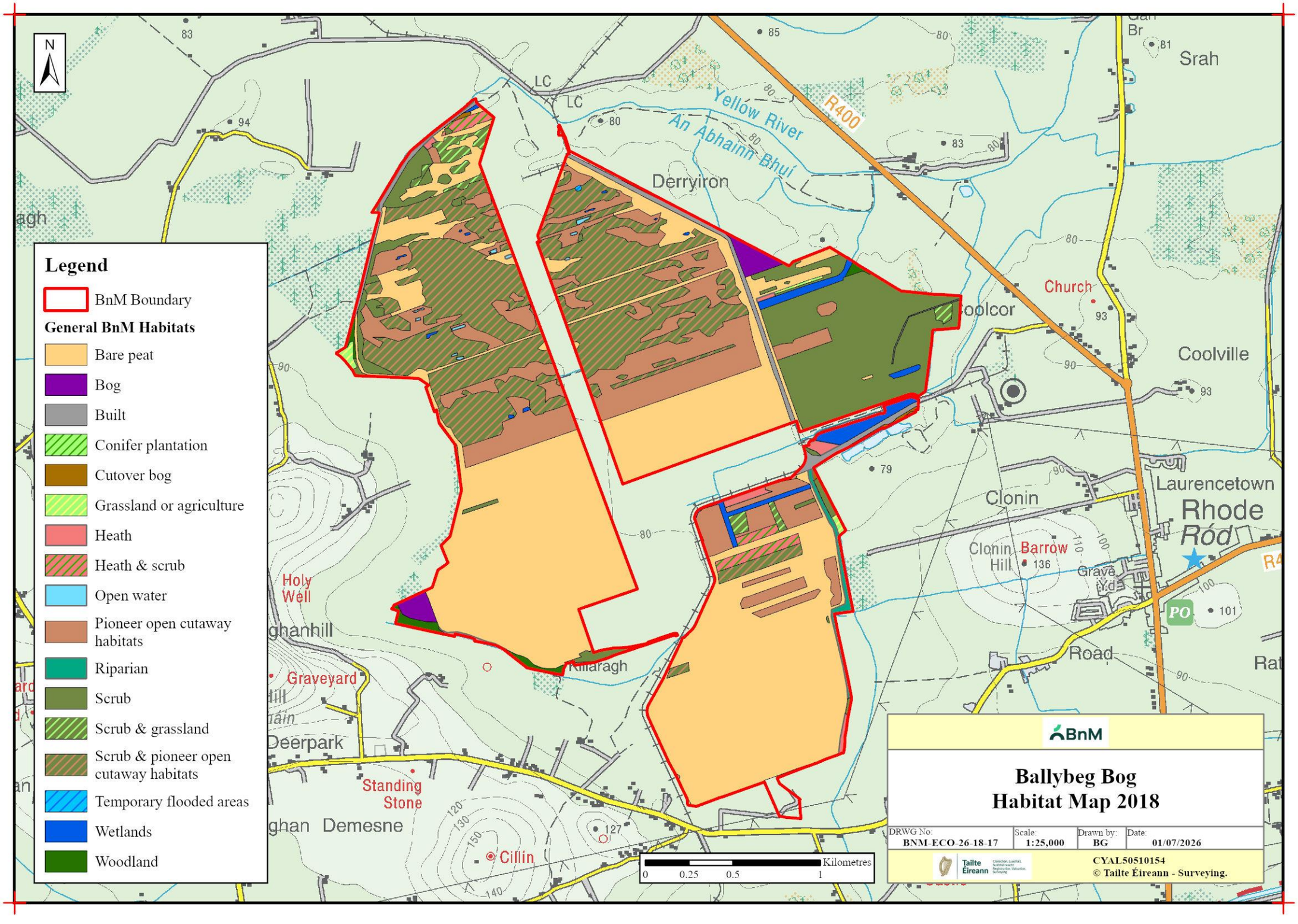
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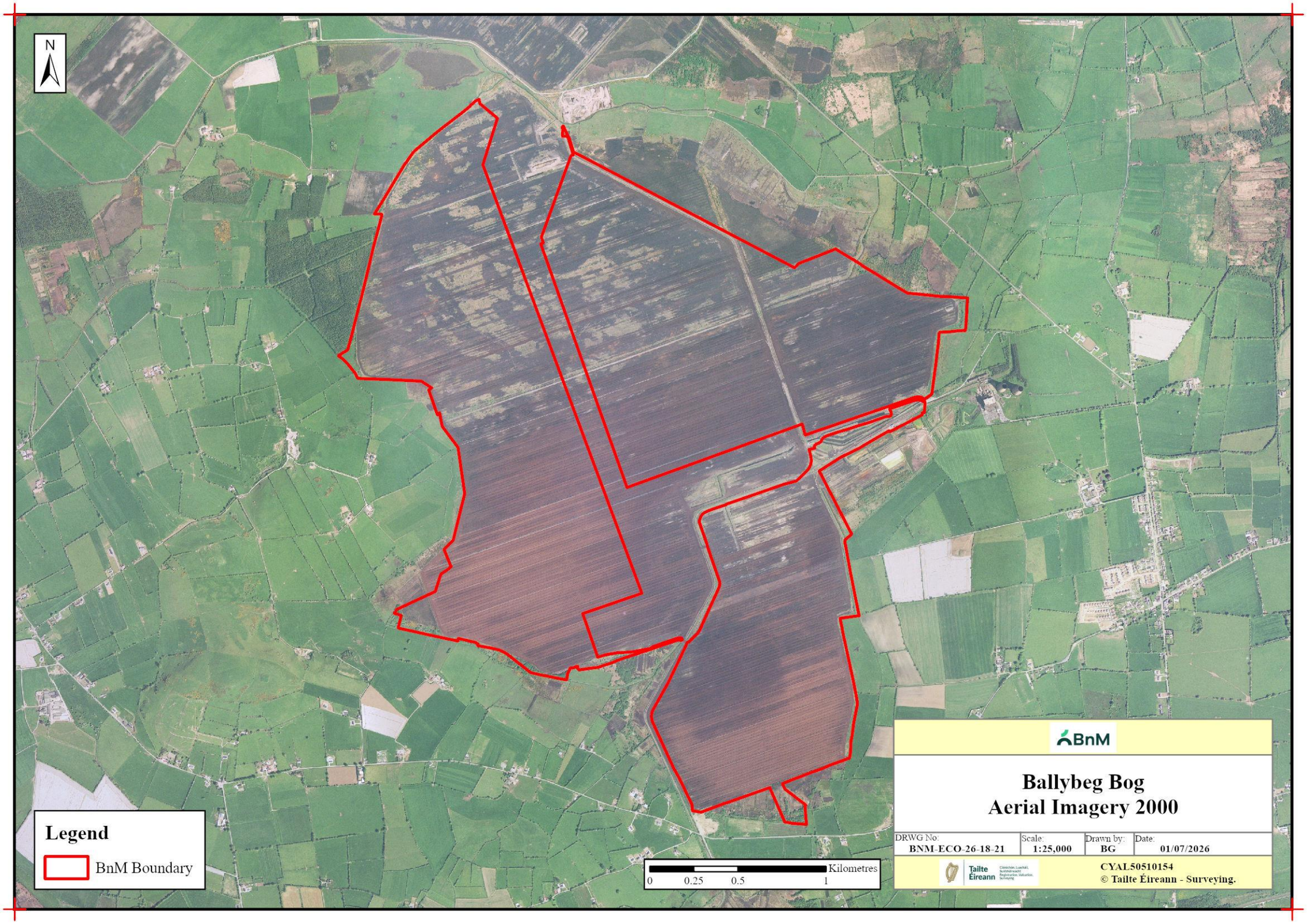
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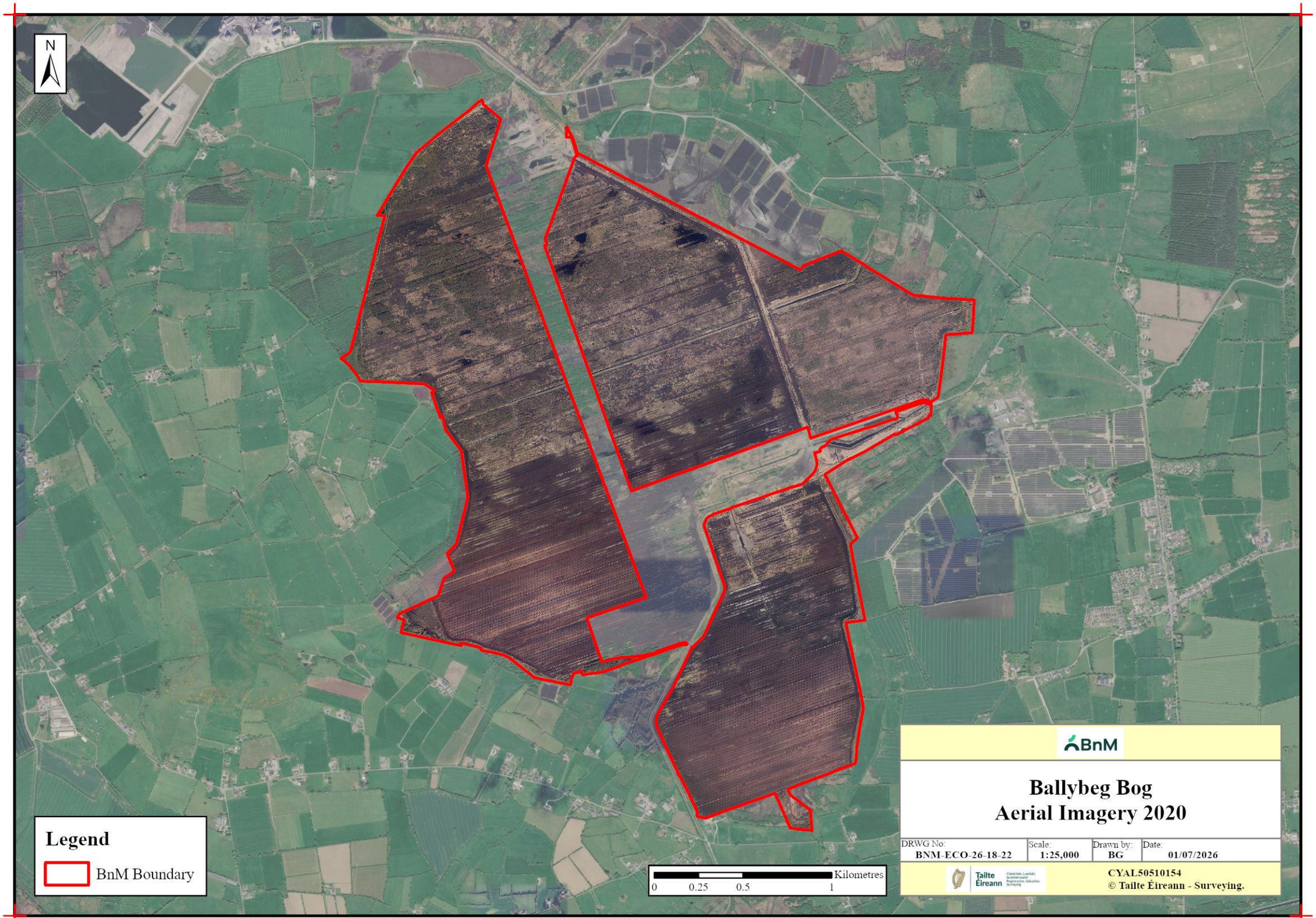
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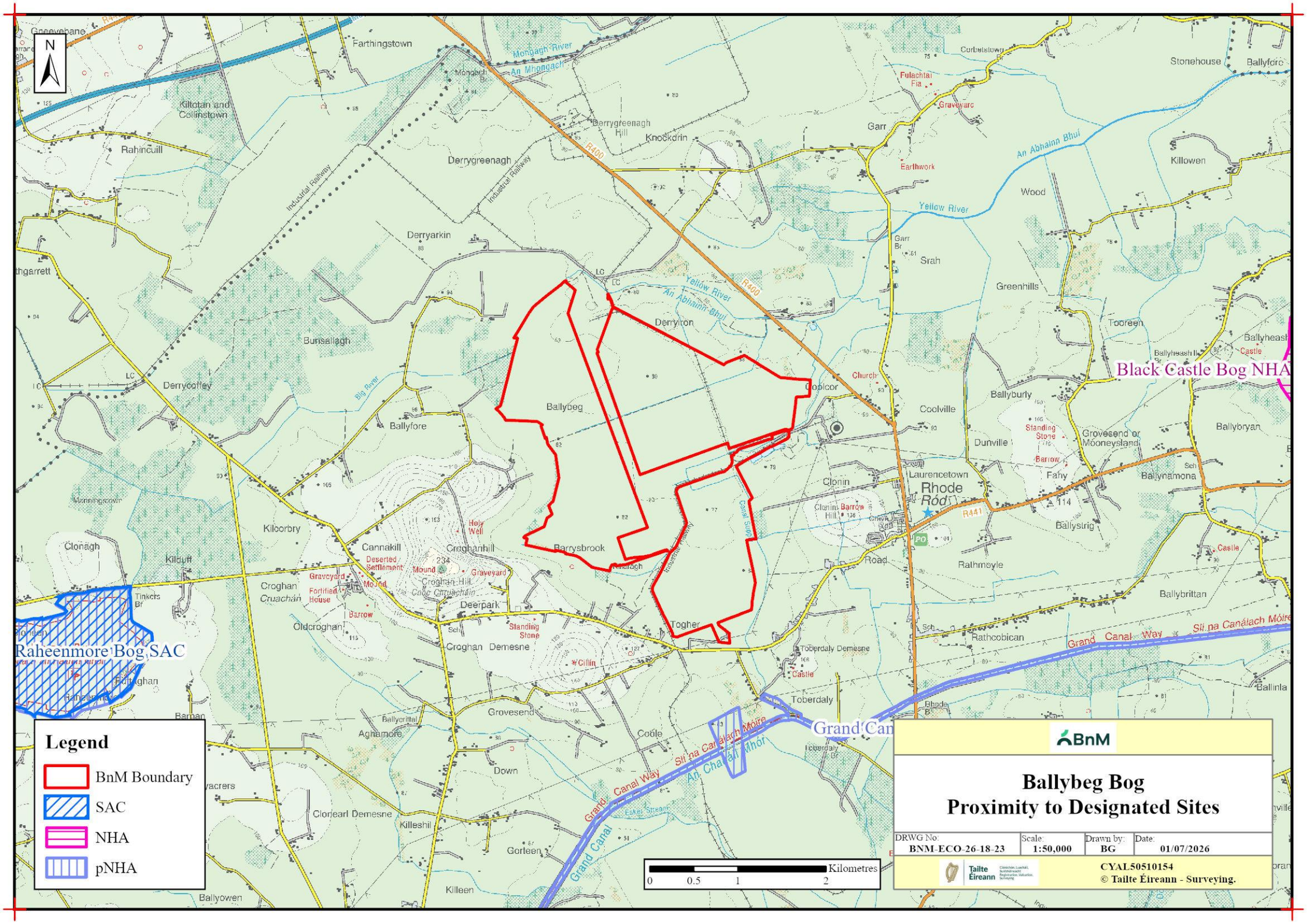
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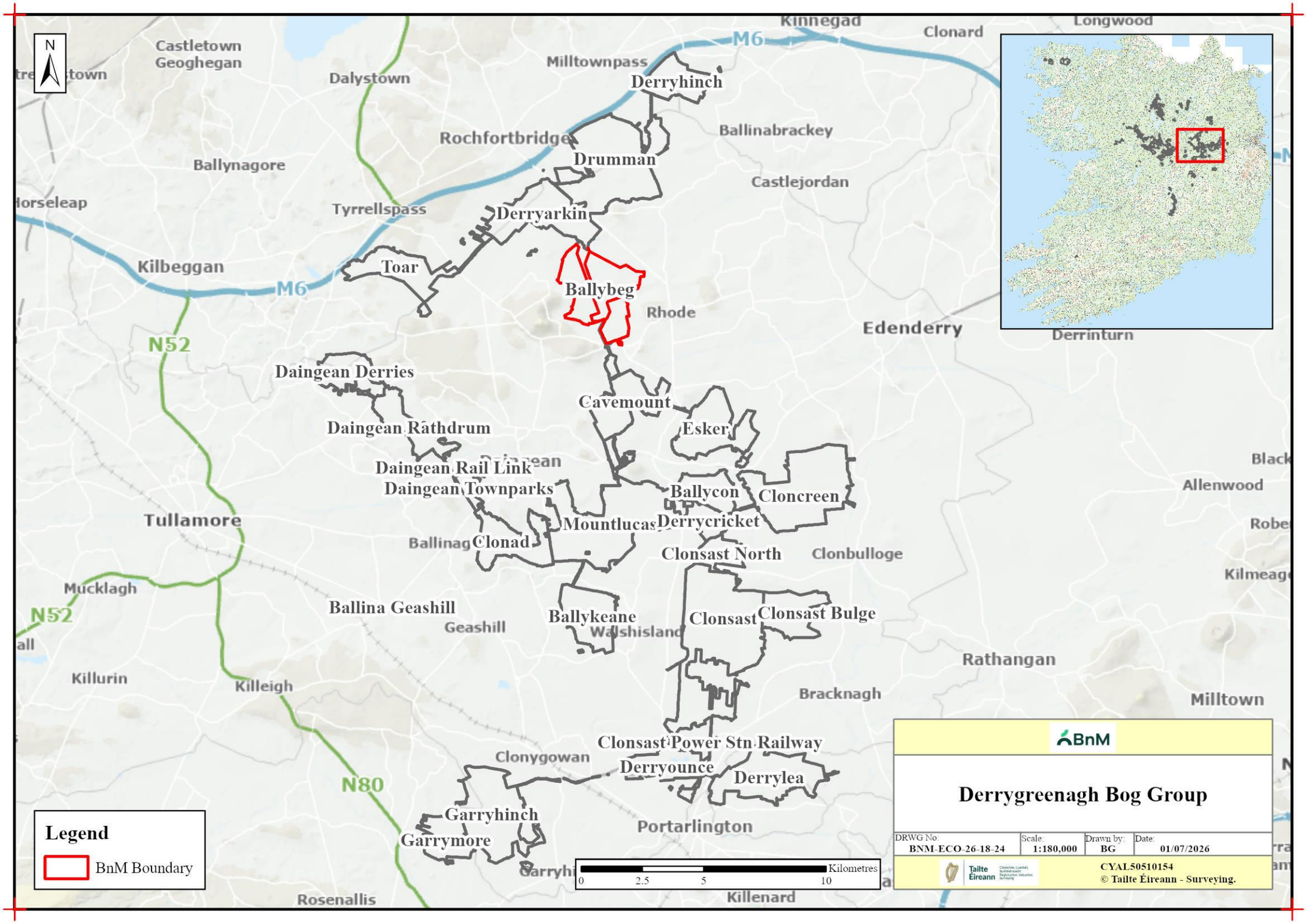
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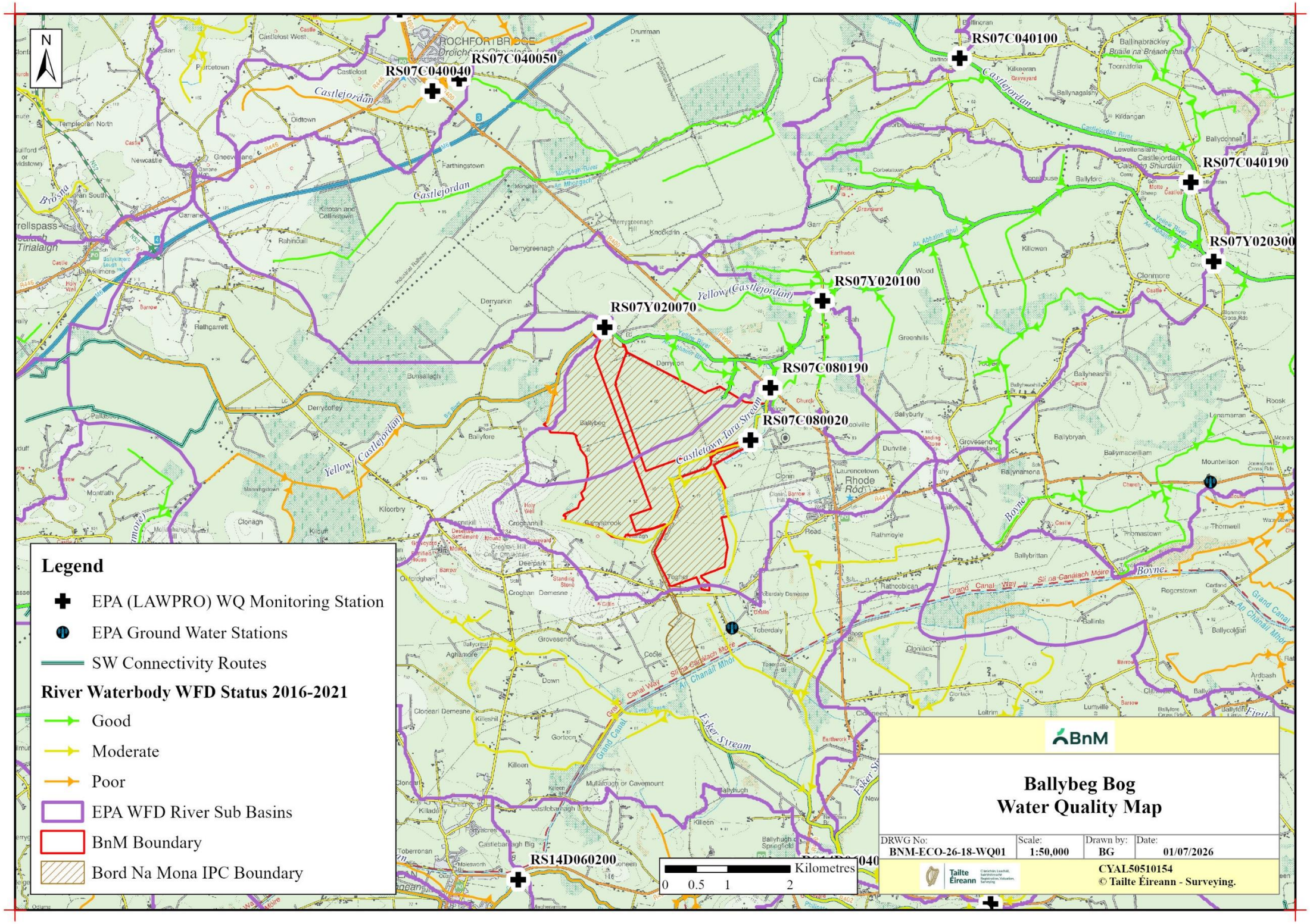
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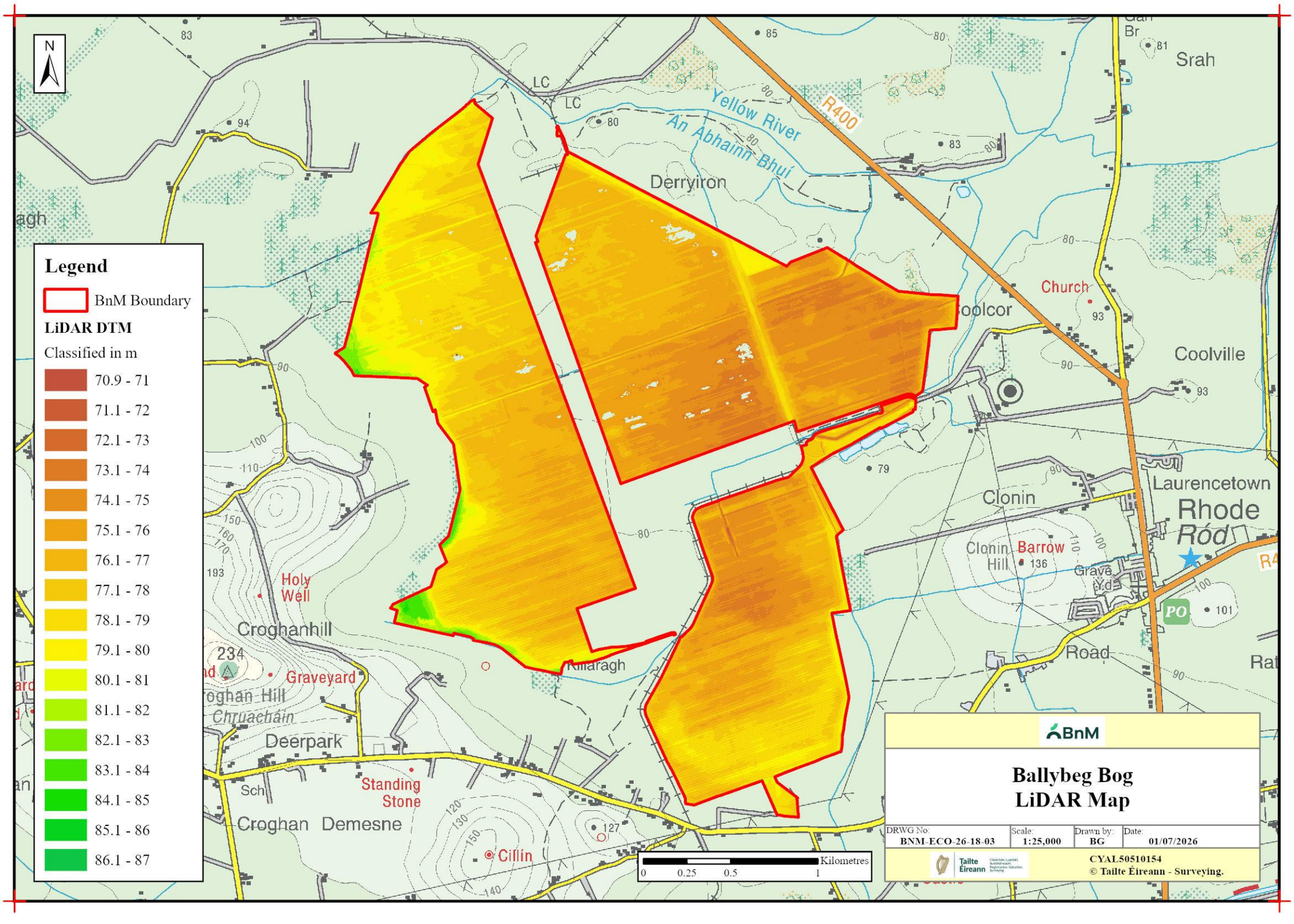
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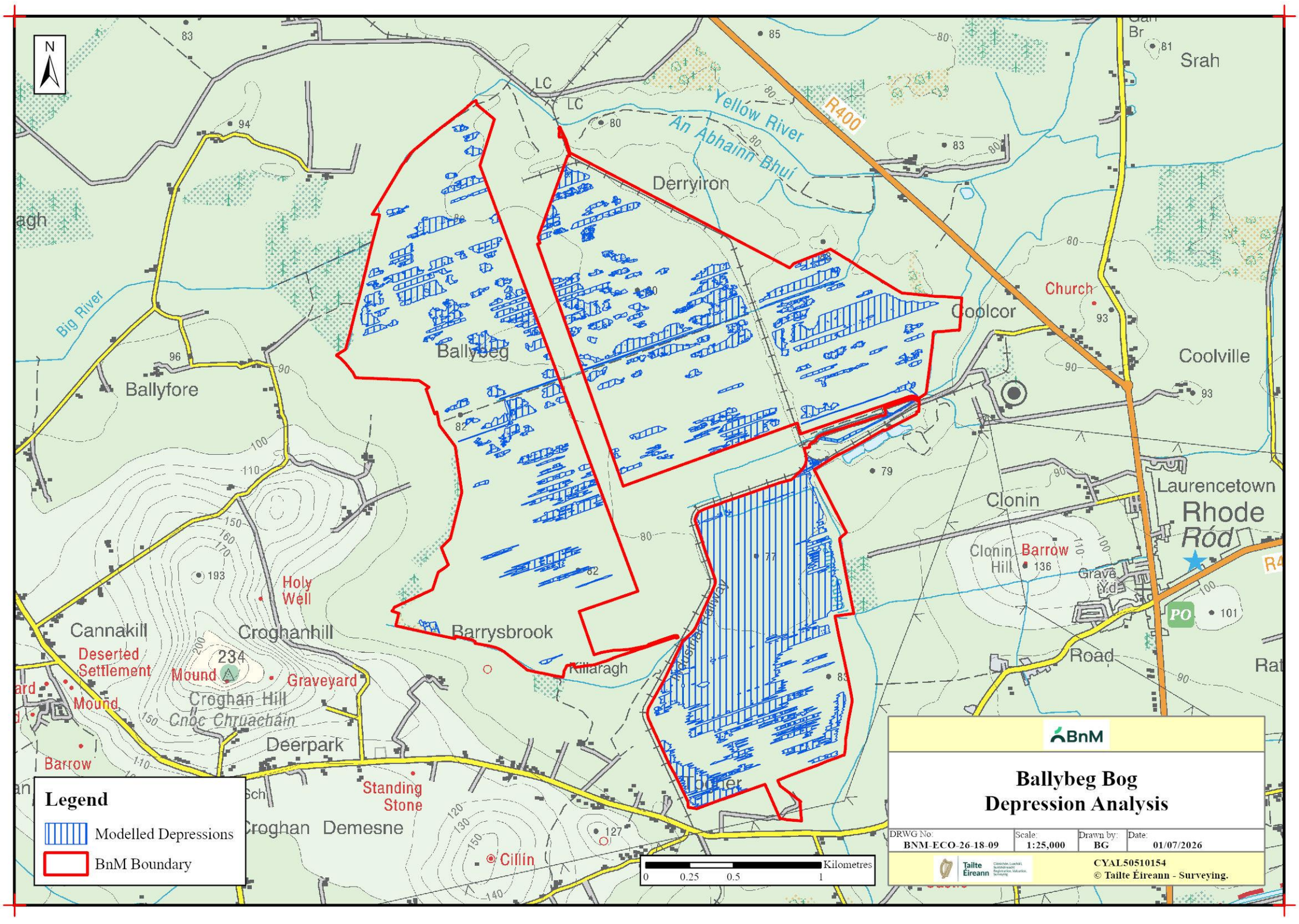
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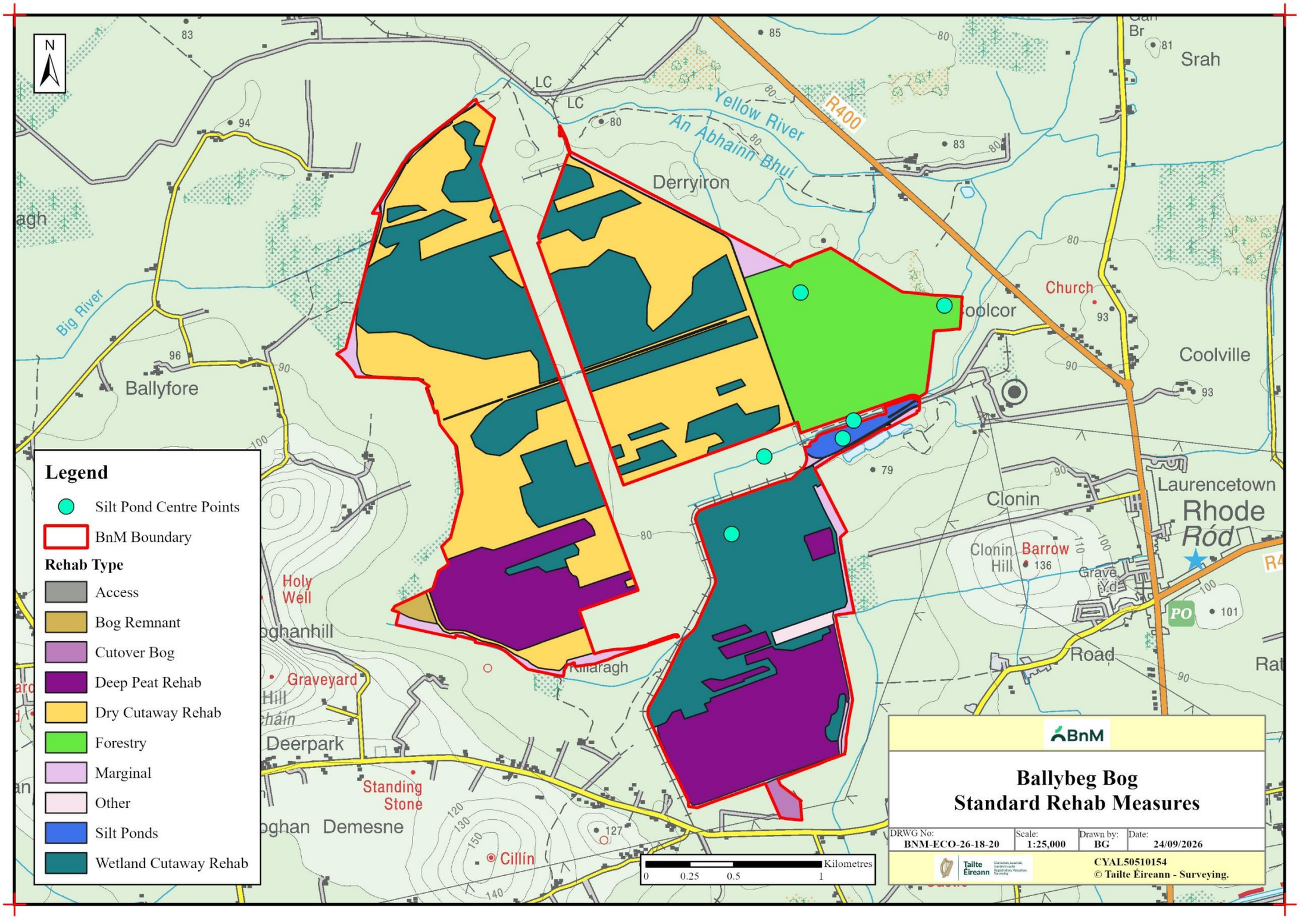



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Rhode
Ród
Clonin
Clonin Hill
Barrow
Grave Yds
PO
Road
Holy Well
Cannakill
Croghanhill
Deserted Settlement
Mound
Graveyard
Croghan Hill
Cnoc Chruachain
Deerpark
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Killaragh
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Rehabilitation Maps

BNM-ECO-26-18-20: Standard Rehab Measures

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Derryarkin Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Derryarkin Bog upon cessation of peat production and complements the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Derryarkin Bog.

BnM have defined the key rehabilitation outcome at Derryarkin Bog as environmental stabilisation.

*This rehabilitation plan for Derryarkin Bog has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. BnM expect to finalise these rehabilitation plans in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Derryarkin Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Document Control Sheet	
Document Name:	Derryarkin Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Derrygreenagh ref. 501 (EPL)\Derryarkin
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	30	4	0	11

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	LC	MMC	MMC
Date:	10/07/2023	26/07/2023	26/7/2023

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):	JOS	MMC	
Date:	28/09/2023	5/03/2026	
Rev. V4	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	CS		
Date:	11/05/2026		

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Non-technical Summary

- BnM (formerly Bord na Móna) is updating the draft rehabilitation plan for Derryarkin Bog, located in Counties Offaly and Westmeath, 2.5 km south-east of Rochfortbridge and, west of and adjacent to the R400 Rochfortbridge to Rhode road.
- Derryarkin Bog is located adjacent to the BnM offices at Derrygreenagh Works, and close to several other bogs in Derrygreenagh including Drumman and Ballybeg.
- BnM Industrial peat production commenced in Derryarkin Bog in the 1950s and formally ceased between 1988 and 1991.
- There is an industrial railway through the site that is part of the greater Derrygreenagh industrial rail network.
- Some cutaway bog was developed in the 1980s as farmland. These lands, which are located to the south of the site, have been sold to local farmers.
- Part of the cutaway bog across the site was developed as a conifer plantation by Coillte in the 1980s-1990s.
- A large section of cutaway bog has also been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd).
- The remainder of Derryarkin Bog has developed as cutaway bog. The site has developed a mosaic of cutaway habitats with wetland, fen, grassland, scrub and woodland that reflect the underlying environmental conditions and current land-use. Areas of bare peat are significantly reduced. The site is stabilising.
- There have been several phased pilot rehabilitation measures at Derryarkin Bog. These phases have encouraged natural colonisation and development of pioneer habitats.
- This draft rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a “skin” back onto the peat), and minimising effects to downstream waterbodies. Pioneer vegetation has already established across the majority of this site.
- Rehab measures will include targeted drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway habitats and re-wetting residual peat, encouraging biodiversity.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Rehabilitation at Derryarkin will result in improved water quality, climate benefits with the reduction of carbon emissions and enhanced biodiversity when the residual peat is re-wetted.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats can be developed, like poor fen and wetlands with reedbeds and Birch woodland on shallower peat.

- The development of a range of habitats at Derryarkin Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. Rehabilitation will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses, and peatland rehabilitation is an opportunity to create new wetland habitats.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM (formerly known as 'Bord na Móna' and used interchangeably in this report) operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh bog group (Ref. P0501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

Derryarkin Bog is a part of the Derrygreenagh bog group (see Appendix I for details of the bog areas within this Group). Derryarkin Bog is located in Counties Offaly and Westmeath, with the administrative boundary for both counties running across the northwest of the bog unit.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix V).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Derryarkin Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

There have been several pilot phases of rehabilitation across Derryarkin Bog including drain-blocking and fertiliser application across specific areas. Since industrial peat extraction ceased in the between 1988 and 1991, nearly all of the cutaway has revegetated with pioneer habitats and vegetation.

BnM are carrying out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) on its peatlands (2021-2026). This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the scheme are being supported by the Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) are acting as the scheme regulator. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part the PCAS project are **NOT** proposed as part of this draft Derryarkin rehabilitation plan at this stage.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This document covers the area of **Derryarkin Bog.**

Derryarkin Bog is part of the Derrygreenagh Bog Group. This bog supports numerous ongoing land-uses including quarrying, Coillte forestry and an industrial railway which is part of the greater Derrygreenagh industrial rail network. These land-uses have been included as constraints within the proposed rehabilitation plan.

There is some private sod-peat turbary currently being used by domestic turf cutters who have turbary rights around the margins of the high bog to the northwest of the site both inside and outside the ownership of BnM. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address private turf cutting issues on Derryarkin Bog. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

There are known rights of way around the margins of Derryarkin Bog. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remains intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

Rehabilitation in other areas of the bog may also be constrained due to other property issues.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA– '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive) and monitoring and desktop analysis, forms the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the references section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Derrygreenagh bog group Integrated Pollution Control Licence;
- Derrygreenagh bog group Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);

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- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Reports;
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Derryarkin Bog was surveyed in 2009. Habitat maps were updated in 2017. Additional ecological walkover surveys and visits have taken place between 2011-2026, in advance of the preparation of this rehabilitation plan. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

A detailed ecological survey report for Derryarkin Bog is contained in Appendix II.

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3. SITE DESCRIPTION

Derryarkin Bog is located approximately 2.5 kilometres to the south-east of Rochfortbridge and adjacent to the R400 Rochfortbridge to Rhode road. This site is situated close to several other BnM Bogs in Derrygreenagh including Drumman and Ballybeg and is also located adjacent to the BnM offices at Derrygreenagh Works. Derryarkin Bog is located in Counties Offaly and Westmeath, with the administrative boundary for both counties running across the northwest of the bog unit.

BnM Industrial milled-peat production began in the 1950s and ceased between 1988 and 1991. The majority of the site is cutaway bog and is developing a typical mosaic of cutaway habitats with woodland, fen, grassland, wetland and peatland habitats. The majority of bare peat has re-vegetated. An industrial railway is still present on the site that is part of the greater Derrygreenagh industrial rail network. Derryarkin Bog currently supports several land-uses including quarrying and Coillte forestry.

See Drawing number BNM-ECO-26-18-01: ***Site Location Map***, included in the accompanying Mapbook[1], which illustrates the location of Derryarkin Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

The majority of Derryarkin bog was in milled peat production from the 1950s until the 1990's. Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Briquette Factory and Edenderry Power Station.

BnM originally established a grassland research unit and farm at Derryarkin in the 1980's. This farm has now been closed for some time but grassland established from cutaway bog to the south of the site has been sold to local farmers.

Several rehabilitation trials (test programmes) have been developed more recently at Derryarkin where different techniques have been trailed and implemented.

Rehabilitation has been carried out at Derryarkin in the south-east portion of the cutaway to enhance wetland development and re-vegetation of the site. This part of the cutaway was re-wetted in 2001-2002 by blocking drains along with the main outfall. As a result, there has been significant development of Birch scrub, pioneer poor fen and wetland vegetation. Part of the ground scattered through this area is still bare peat, although this is reducing as the site and habitats mature.

Some additional rehabilitation was carried out in 2016 with a fertiliser treatment to approximately 30 ha of cutaway bog targeting mostly bare peat in the north-east part of the site adjacent to the Rochfortbridge to Rhode Road.

3.1.2 Current land-use

Derryarkin currently supports several land-uses including quarrying, Coillte forestry and an amenity project. Milled industrial peat production at Derryarkin Bog ceased between 1988 and 1991.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Derryarkin Bog Map Book

BnM, in partnership with Roadstone have over the years developed part of the site for sand and gravel extraction (Derryarkin Sand and Gravel Ltd). As part of the planning application for this development (Offaly Reg. Ref. 01/365) an Environmental Impact Statement was prepared. A planning application seeking permission to expand the footprint of this project into Drumman Bog to the east of Derryarkin Bog was lodged to Offaly County Council in 2019 (Offaly Reg. Ref. 19/25) which was granted permission for a period of 18 years. This permission remains active until January 2037. A remediation plan was prepared for the footprint of the gravel extraction as part of this consent, and this incorporates and enhances wildlife habitats that have already been developed along with regrading of some areas and the provision of public amenity with walking trails.

Part of the cutaway bog in the northern part of the site was developed as a conifer plantation by Coillte in the 1980's/1990's, as was cutaway bog located on the north-east side of the road. There is ongoing management of these areas by Coillte.

In Derryarkin, cutaway wetlands (143 ha) were created in 2001-2002 when main surface water outfalls were blocked, and cutaway bog was intentionally re-wetted.

A small area of cutaway bog at Derryarkin has been leased to DA Motorcross Ltd for the development of an off-road moto-cross track at Derryarkin. Planning permission for the construction of a motocross circuit was sought by DA Motorcross Ltd. in August 2010 (Westmeath Reg. Ref. 104078). Permission for a duration of 10 years was granted in June 2011. This community lease is currently awaiting renewal.

A BnM industrial railway line runs in a NE-SW direction through the site which is part of the greater Derrygreenagh bog group industrial rail network. This railway will be decommissioned shortly.

There is some private sod-peat production around the margins of the high bog, both inside and outside the ownership of BnM. Turbary is ongoing on an area of drained raised bog to the northwest of the site.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream

supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Derryarkin Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPS).

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas. These job numbers have now declined with the cessation of industrial peat extraction at this bog.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology[2] at Derryarkin Bog comprises Lucan Formation (dark limestone and shale), with some sections of Agglomerate, (volcaniclastic agglomerate), to the north and south of the site. A stripe of Basalt also exists within the southwest of the southern section of the site. Quaternary sediment maps indicate that Derryarkin is primarily underlain with peat subsoils. There are three small areas in the centre of the site that are underlain by Limestone till (Carboniferous). Gravel and sand-based till is exposed at several locations across the site and is a key resource for ongoing gravel extraction.

3.2.2 *Peat type and depths*

Derryarkin Bog is now cutaway and retains shallow residual peat depths across the site. Peat depths range in general < 1 m across the site with some small areas along headlands where there is deeper residual peat.

3.3 Key Biodiversity Features of Interest

The site can be divided into three mainland-uses for rehabilitation: sand and gravel extraction (50%), cutaway and conifer plantation. These activities affect the different cutaway habitats developing across the site and also reflect the underlying and varying environmental conditions.

Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All bogs have hydrological gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

A large lake has been created on the site with the development of the quarry in the past few years. This lake is attracting significant numbers of wintering and breeding waders and wildfowl. Biosphere Environmental Services (2014) have monitored wintering and breeding bird populations at this site. They have rated the overall site as having National ecological value (B) due to its usage by wintering Whooper Swans (*Cygnus cygnus*), Hen Harrier (*Circus cyaneus*), Peregrine (*Falco peregrinus*) and wintering and breeding wetland birds, including Black-headed

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

Gull. The lake holds a very significant breeding colony of Black-headed Gull (*Larus ridibundus*) (Red listed species) and the lake and wider site is used by breeding waders like Ringed Plover (*Charadrius hiaticula)* and Lapwing (*Vanellus vanellus)*. A flock of Whooper Swans uses this site in addition to the surrounding grassland and adjacent bogs such as Cavemount and Ballycon. Numbers of Whooper Swans using Derryarkin have declined in recent years. A large wetland area with open water was created on the eastern section, where cutaway was re-wetted. This area is developing a diverse mosaic of wetland habitats.

Blue Fleabane is a notable scarce national species (Red List – Least Concern) (Wyse et al., 2016) that is present on the site. Quarrying and the creation of new spoil heaps has the potential to provide new habitat for this species and preserve its status on the site.

Marsh Fritillary has recently been recorded on site using some of the vegetation along the former industrial railways.

There is some remnant undeveloped raised bog (PB1) around the margins of the site. Generally, the remnant patches of high bog are relatively small and are being cut from the outside for sod-peat.

Part of the cutaway in the northern part of the site was developed as a conifer plantation by Coillte in the 1990's, as was cutaway located on the north-east side of the R400 road. The plantation comprises Sitka Spruce and Lodgepole Pine.

3.3.1 Current habitats

The most common vegetation communities/ habitats[3] include:

- Bare peat (BP), pioneer Poor Fen communities (pJeff, pEang, pTrig, pRos) and Birch-dominated scrub (WS1) (eBir, oBir) in the naturally re-colonising areas. There are relatively small areas of other Poor fen (PF2) communities (pRos, pTrig) and other communities such as dry grassland (GS1) (gCal) and pioneer vegetation (DisCF) of glacial sub-soils. (Codes refer BnM classification of pioneer habitats of industrial cutaway. See Appendix II).
- There is a large wetland area with a significant area of shallow open water in the eastern section and smaller pools of open water scattered across the rest of the cutaway. Wetland complexes are developing around these open water areas and include emergent vegetation such as Tall Reeds (FS2) (pPhrag, pTyph) and fringing Poor fen communities and scrub noted above.
- A quarry is located in the northern section of the site. An artificial lake (FL8) has been developed with a large area of open water. No significant amount of riparian vegetation has developed in this area yet. Large areas of gravel spoil (both piles of gravel and areas of levelled gravel) are located in the area surrounding the lake and are at various stages of re-colonisation (ED2, ED3).
- Two blocks of conifer forestry (WD4) have been planted on the site. One in the north section and the other in the northeast section.
- Some dry Heather-dominated vegetation (dHeath) has developed on part of the mineral island in the north section and on a small knoll in the south-western cutaway in association with Dense Bracken.

[3] Codes refer BnM classification of pioneer habitats of production bog.

- A BnM industrial railway crosses the site and this can also be classed as built land along with some works areas with associated infrastructure (BL3).
- There is a small amount of raised bog (PB1) high bog around the margins of the site.
- Other fringe habitats around the margins of the bog include Scrub (Birch-dominated and Gorse dominated), Birch woodland (WN7), a Quarry (ED4), Conifer plantation (WD4) and Cutover Bog (active and abandoned).

The most common habitats found around the margins of the site include:

- Conifer plantation (WD4)
- Improved grassland (GA1)
- Hedgerows (WL1)
- Tree line (WL2)
- Cutover bog (PB4)
- Depositing/lowland river (FW2)
- Raised bog (PB1)
- Active quarry (ED4)
- Drainage ditches (FW4)
- Arable crops (BC1)
- Buildings and artificial surfaces (BL3) (Derrygreenagh works site)

See Appendix II for more detail on site, habitats and local features.

See Drawing number BNM-ECO-26-18-17 titled: **Habitat Map 2018**, included in the accompanying Mapbook, which illustrates the habitats at Derryarkin Bog.

3.3.2 Species of Conservation Interest

A number of species of conservation concern have been recorded at Derryarkin Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre. Evidence of multiple mammal species has been recorded on or in close proximity to the bog including Badger (*Meles meles*), Brown Rat (*Rattus norvegicus*), Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*), Daubenton's Bat (*Myotis daubentonii*), Greater White-toothed Shrew (*Crocidura russula*), Hedgehog (*Erinaceus europaeus*), Irish Hare (*Lepus timidus subsp. hibernicus*), Irish Stoat (*Mustela erminea subsp. hibernica*), Leisler's Bat (*Nyctalus leisleri*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Rabbit (*Oryctolagus cuniculus*), Red Fox (*Vulpes vulpes*), Red Squirrel (*Sciurus vulgaris*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Wood Mouse (*Apodemus sylvaticus*).

Several bird species have been noted during BnM ecological surveys at Derryarkin including, Blackbird (*Turdus merula*), Black-headed Gull (*Larus ridibundus*), Curlew (*Numenius arquata*), Goldfinch (*Carduelis carduelis*), Hen Harrier (*Circus cyaneus*), Heron (*Ardea cinerea*), Hooded Crow (*Corvus cornix*), Lesser Black-backed Gull (*Larus fuscus*), Lapwing (*Vanellus vanellus*), Mallard (*Anas plathrhynchos*), Meadow Pipit (*Anthus pratensis*), Mute Swan (*Cygnus olor*), Peregrine (*Falco peregrinus*), Reed Bunting (*Emberiza schoeniclus)*, Robin (*Erithacus rubecula*), Snipe (*Gallinago gallinago*), Thrush (*Turdus philomelos),* Whooper swans (*Cygnus cygnus*) and Wren (*Troglodytes troglodytes*).

Frogs (*Rana temporaria*) have been recorded at several locations on the site.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km squares (N43 and N53) in the past, which Derryarkin Bog intersects include; Barn Owl (*Tyto alba*), Curlew (*Numenius a*rquata), Grey Partridge (*Perdix p*erdix), Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Lapwing (Vanellus vanellus), Meadow Pipit (*Anthus pratensis*), Pochard (*Aythya ferina*), Quail (*Coturnix coturnix*), Red Grouse (*Lagopus lagopus*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola*) and Yellowhammer (*Emberiza citrinella*). Red-listed[5] listed bird species that are also Annex I listed species included on the NBDC database include: Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar (*Caprimulgus europaeus*) and Red Kite (*Milvus milvus*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinu*s), Spotted Crake (*Porzana porzana*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

The invasive mammal species American Mink (*Neovison vison*) and Fallow Deer (*Dama dama*) have been recorded on the bog in the past.

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs. Although spatial overlap with the proposed rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are a number of European Sites in close proximity (i.e., within a 5km radius at minimum) to Derryarkin Bog.

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Derryarkin Bog. The nearest EU Designated sites to Derryarkin Bog are as follows:

- Raheenmore Bog SAC (Site Code: 000582) – 2.8 km southwest of Derryarkin.
- Split Hills and Long Hill Esker SAC (Site code: 001831) – 6.5 km west of Derryarkin.
- Lough Ennell SAC (Site code: 000685) – 8.8 km northwest of Derryarkin.
- Lough Ennell SPA (Site code: 004044) – 9.3 km northwest of Derryarkin.
- Mount Hevey Bog SAC (Site Code: 002342) – 13.6 km northeast of Derryarkin.

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within 10km of Derryarkin Bog including:

- Raheenmore Bog pNHA (Site code: 000582) – 2.8 km southwest of Derryarkin.
- Cloncrow Bog (New Forest) NHA – 4-2km west of Derryarkin.
- Grand Canal pNHA (Site code: 002104) – 5 km south of Derryarkin.
- Milltownpass Bog NHA (Site code: 002323) – 5.0km northeast of Derryarkin.
- Split Hills and Long Hill Esker NHA (Site code: 001831) – 6.5 km west of Derryarkin.

[4] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

[5] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

- Black Castle Bog NHA (Site code: 000570) - 7.2km southeast of Derryarkin.x
- Ardan Wood pNHA (Site code: 001711) - 7.3km west of Derryarkin.
- Rahugh Ridge (Kiltober Esker) (Site code: 000918) – 5km west of Derryarkin.
- Lough Ennell pNHA (000685) – 8.8m north-west of Derryarkin.
- Daingean Bog NHA (Site code: 002033) – 10km south of Derryarkin.
- Nure Bog NHA (Site code: 001725) – 9.9km north-west of Derryarkin

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites within close proximity to Derryarkin Bog. The nearest Ramsar sites are Raheenmore Bog and Lough Ennell located approximately 2.8 km south-west and 9.3km north-west respectively.

See drawing BNM-ECO-26-18-23: ***Proximity to Designated Sites*** in the accompanying map book.

3.5 Hydrology and Hydrogeology

Derryarkin Bog is located within the Boyne (Catchment ID: 07) catchment as defined by the EPA under the Water Framework Directive (WFD) and the Yellow [Castlejordan]_SC_010 sub-catchment.

There are two main watercourses which flow along the boundaries of Derryarkin Bog. The Mongagh River (Castlejordan_020) referred to on the EPA website as Kiltotan_and_Collinstown (EPA code: 07K04) flows in an easterly direction along the northern boundary of the central section of the bog and along the southern boundary of the northeastern lobe Yellow River (Yellow [Castlejordan], EPA code 07Y02) flows in close proximity to the boundary of the south eastern section of the site. Both rivers flow east providing connectivity with the River Boyne_30 (EPA code 07B04).

GSI data indicates that Derryarkin Bog is primarily underlain by Lucan Formation, dark limestone and shale, and is classified as a locally important aquifer – bedrock which is moderately productive only in local zones. Two sections underlain by Agglomerate and Basalt, one north and one in the southern section of the site are located within locally important aquifer - Bedrock which is generally moderately productive.

Derryarkin Bog also has significant sub-soil deposits of sand and gravel. These are currently being utilised for gravel extraction. The underlying gravel based sub-soils have a significant influence on the development of cutaway at this site as significant water level fluctuations have been noted in the past, indicating potential losses of water to depth, via the gravel sub-soil.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100400 m^3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Derryarkin bog is located in an area mapped by GSI as Low groundwater vulnerability (GSI Map viewer). Groundwater vulnerability for the area surrounding Derryarkin Bog is variable between areas of high, moderate and low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and

hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond or appropriate silt control measure that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt control measure treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Derryarkin Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BnM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up from silt control measures is excavated on a bi-annual basis by BnM to facilitate an efficient level of silt control. Silt control measures will continue to be maintained during the rehabilitation and decommissioning. Silt pond/silt control measure decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Details of structures and associated surface water emissions are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-ECO-26-18-02: ***Structures and Sampling***, along with Drawing number BNM-ECO-26-18-WQ01: ***Water Quality Map*** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Derryarkin Bog.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the Environmental Protection Agency.

Decommissioning and Rehabilitation Programme - Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected

to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Derryarkin has been completed. This discharge will have improved water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key watercourse receptors, the Mongagh River (Kiltotan_and_Collinstown River, EPA code: 07K04) and Yellow River (Yellow [Castlejordan], EPA code 07Y02) and the Yellow [Castlejordan]_SC_010 sub-catchment and Boyne_SC_10 sub-catchment and will support the future status of the watercourses achieving Good Status.

Water quality monitoring will be established. There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt pond or other silt control measure, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.

Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.

The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions

reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Derryarkin Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Parts of this bog are expected to develop as regenerating wet *Sphagnum*-rich vegetation on deep peat areas. Other areas of shallower residual peat will develop wetland mosaic habitats on shallow peat with open water, reed swamp and fen habitats with alkaline peatland emission factors. Birch woodland and Heather is expected to develop on the drier areas and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)[6]

Ecological value was assessed in accordance with the NRA (2009) Guidelines, taking account of habitat quality, naturalness, biodiversity, rarity, ecological function and the presence of species of conservation interest.

The majority of Derryarkin Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare ground in the quarry area and bare peat in the former production area of Derryarkin Bog are assessed as **local importance (lower value)**. Marginal habitats including wetland, Coillte forestry, woodland, scrub, pioneer cutaway habitats and bog remnant may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

The lake associated with the quarry has been rated as **B National Ecological Value** due to its usage by wintering Whooper Swans, Hen Harrier, Peregrine and wintering and breeding wetland birds, including Black-headed Gull.

[6] https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf

4. CONSULTATION

4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by BnM over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally-focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Derrygreenagh bog group, including Derryarkin Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan review days 2010-2018.2016-2021
- DAMX Ltd. (DA Motorcross)
- Derryarkin Sand and Gravel Ltd.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Derryarkin Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Derryarkin Bog.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Derryarkin Bog Rehabilitation Plan will contain a review of the consultation.

4.2 Issues raised by Consultees

N/A - consultation has not yet commenced.

4.3 BnM response to issues raised during consultation

N/A - consultation has not yet commenced.

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5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g., suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Integrating rehabilitation measures with existing land-use (e.g., gravel extraction and conifer forestry). It is not proposed to change or affect any industrial use, conifer or commercial forestry, or amenity use.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM.

The rehabilitation goals and outcomes take account of the following issues.

- Natural colonisation will form the basis for the environmental stabilisation of any bare peat areas. Re-wetting of the cutaway, where possible, has been the general rehabilitation strategy. Much of Derryarkin has already developed a mosaic of cutaway habitats across the former peat extraction area in addition to the other key land-uses (Conifer plantation and gravel extraction). The main target will be re-wet the residual peat, where possible via targeted drain-blocking. Re-wetting accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of a mosaic of wet cutaway habitats at Derryarkin Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Derryarkin Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). this will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years), although areas of the site with deeper residual peat have the potential to develop some *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.

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- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Derryarkin Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g., Cavemount and Esker Bog) in 2023-2024 and have previously carried out rehabilitation at Derryarkin Bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area entire area of Derryarkin Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Derryarkin Bog is part of the Derrygreenagh bog group.
- The local environmental conditions of Derryarkin Bog mean that wetland creation and dry cutaway measures has been most suitable rehabilitation approach for this site.
- BnM have defined the key goal and outcome of rehabilitation at Derryarkin Bog as **environmental stabilisation** and **optimising residual peat re-wetting** to enhance the development of compatible habitats.
- Rehabilitation has already been carried out at this site on a pilot and phased basis and the cutaway is already developing a mosaic of Birch scrub/woodland, wetland and cutaway peatland habitats. Much of the cutaway is stabilised already. A very small portion of the site has bare peat.
- Rehabilitation is proposed to enhance residual peat re-wetting across the site and to promote environmental stabilisation, while taking account of current land-uses (e.g., conifer plantation and gravel extraction).
- Rehabilitation of Derryarkin Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g., Kellysgrove) or more localised with targeted drain-blocking (e.g., Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- Derryarkin is a typical shallow cutaway bog and phased rehabilitation including drain-blocking and hydrological management has been successful in re-wetting, where possible across the site. The gravel sub-soils have a significant influence on environmental conditions at this site and significant water level fluctuations have been observed at Derryarkin that likely indicate losses to depth via the gravel sub-soil. Natural colonisation has progressed, and the site is largely vegetated and stabilised.
- **Land-use.** Part of the bog has been developed for forestry and is leased to Coillte. Part of the site is leased to Derryarkin Sand and Gravel Ltd. The drainage of these areas will have to be maintained. Part of the site was previously leased and is used for amenity.
- **Adjacent land-use.** There is an ongoing gravel extraction on lands adjacent to Derryarkin Bog. This has the potential to directly impact on the hydrology of the site.

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- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland (see Appendix X).
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remains intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Turf-cutting.** There is some active private sod-turf cutting on cutover bog located to the northwest of Derryarkin Bog.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to turf cutting are excluded.
- The area developed as grassland by BnM in the 1980's and now sold to local farmers.
- The longer-term development of stable naturally functioning habitats to fully develop at Derryarkin Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Derryarkin Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g., drain-blocking/re-wetting) slowing movement of water across the site and encouraging a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g., potential suspended solids run-off).

7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and increase in the area of potentially peat-forming habitats. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longford Pass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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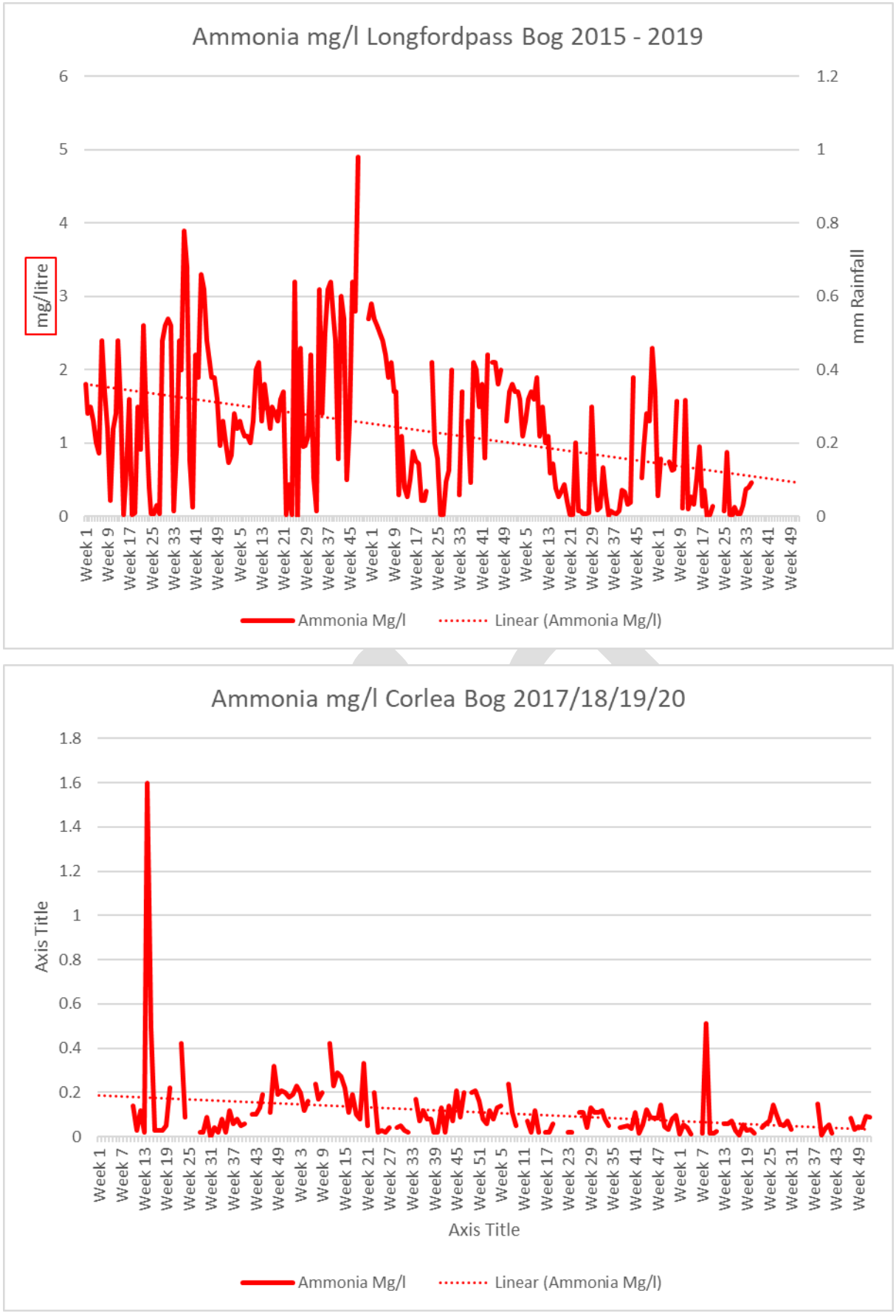


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7.1. Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2 years
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2 years
IPC validation	Reducing pressure from drainage on the local water body catchment (WFD)	Where this section of the water body (that this bog drains to) has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

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7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, a LiDAR Surface Map and Depression Analysis, these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-18-21 titled**: Aerial Imagery 2000**

BNM-ECO-26-18-22 titled: **Aerial Imagery 2020**

BNM-ECO-26-18-04 titled: **Peat Depths**

BNM-ECO-26-18-03 titled: **LiDAR Map**

BNM-ECO-26-18-09 titled: **Depression Analysis**

The restoration and rehabilitation measures are provisionally outlined in drawing **BNM-ECO-26-18-20** titled**: Rehabilitation Measures** in the accompanying Mapbook.

These rehabilitation measures for Derryarkin Bog will include (see Table 8.1):

- There have already been several phases of rehabilitation at Derryarkin. Much of the cutaway has already vegetated and stabilised.
- A targeted drain-blocking programme and hydrological management will be implemented across the cutaway, where required. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Hydrological measures may include modifying outfalls and managing water levels with overflow pipes.
- Silt control measures will need to be created during the rehabilitation phase. During the monitoring and verification phase the implemented silt control measures will be continually inspected and maintained, where appropriate. When it is deemed that the silt control measures are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt control measures will be reviewed. The silt control measure will either be de-watered (water levels lowered to a level where the silt control measure will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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Table 8.1: Types of and areas for rehabilitation measures at Derryarkin Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

Type	Code	Description	Area (Ha)
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	14.4
Marginal land	MLT1	No work required	36.9
Forestry	Forestry	Forestry	72.5
Measures Implemented	Implemented Rehab Measures	Pilot rehabilitation trials including drain blocking and modifications to the main outfalls and the application of fertiliser	238.5
Constraint	Constraint	Access, Bog remnants, Cutover Bog, Turf Cutting, Industrial, Agricultural Grassland, Watercourses, Amenity	37.9
Total Area			**400.2**

8.1 Implemented and Ongoing

- Some cutaway was developed in the past (1980's) as grassland. This land has now been sold.
- A significant portion of the site has already been developed as a conifer plantation by Coillte (12%). This forestry (conifer plantation) has established and is considered to be rehabilitated. Issues of forestry management will be addressed during forestry operations in the forested sections of the site by Coillte, and under the appropriate Felling Licence as granted by the Forest Service.
- Part of the site is used for gravel extraction and there has also been some rehabilitation of this area.
- There have been several phased pilot rehabilitation measures at Derryarkin.
- Wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.
- An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.
- Rehabilitation with drain-blocking and hydrological management (wetland creation) has already been carried out across the site. There has also been some phased rehabilitation with a fertiliser treatment targeting primarily bare peat areas in 2016.
- Natural re-colonisation of the cutaway so far has been quite effective across the site.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of the final rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Derryarkin Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.

- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g., breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

8.3 Short-term practical actions (0-2 years)

- Silt control measures created as part of the rehabilitation measures at Derryarkin.
- Carry out proposed measures as per the detailed site plan. This will include targeted drain blocking (if required) and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9.
- Silt control measures will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.

8.4 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 9 below).
- Decommissioning of the silt-ponds or other silt control measures will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

8.5 Timeframe (to be adjusted when the rehabilitation plan is finalised)

- **Year 1**: Short-term planning actions.
- **Year 1-2**: Short-term practical actions.
- **>Year 3**: Decommission silt control measures, if necessary.

8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see

the BnM Annual Report (BnM 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a ‘standard’ rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, silt control measures will be created and the condition of the these measures will be assessed and monitored throughout, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on the silt control measures will be carried out over a two-year cycle.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

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9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC License Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed;
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and

The site has been environmentally stabilised.

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APPENDIX I: BOG GROUP CONTEXT

The Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Cos. Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Derrygreenagh Group ceased in 2020. Decommissioning for the Derrygreenagh Group started in 2021 at a number of individual bogs and PCAS rehabilitation started in 2021.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The BnM Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carrenstown, Bracklin and Lisclogher East. Milled peat was supplied from Ballivor, Carrenstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford). Kinnegad Bog is an isolated bog unit with no industrial railway link to the other bogs. Kinnegad Bog is located to the south of Kinnegad in Co. Meath. This bog supplied mainly milled horticultural peat via road to various customers.

The Derrygreenagh Bogs sub-group is located to the south and east of Rochfortbridge (Co. Westmeath), along the borders of Co. Westmeath, Offaly and Meath. Four bogs (Ballybeg, Derryhinch, Drumman, Toar) supplied milled fuel peat via industrial railway to Edenderry Power.

Lisclogher East was never developed for milled peat production, but it was used for sod turf extraction until recently. A large section of Bracklin was formerly a sod peat production bog and was never converted to milled peat production. This area has developed as cutaway. Lisclogher West was drained in the 1980's but has never been put into industrial peat production. Bogs that have been in industrial peat production for decades (such as Ballybeg and Drumman) have become cutaway as peat was extracted from the sites and the active industrial peat production area shrunk. A large section of cutaway in Derryarkin and Drumman has been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd). A large section of Derryarkin was also rehabilitated in 2001-2002 with wetland development via outfall blocking.

There has already been significant rehabilitation work carried out within the Derrygreenagh Bog Group. BnM originally established a grassland research unit and farm at Derryarkin. This farm has now been closed for some time but grassland established from cutaway has been sold to local farmers. Older rehabilitation includes the establishment of confer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

During the 1980s/1990s about 176 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Drumman and Derryarkin in several different areas. There is ongoing management of these areas by Coillte.

One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Fertiliser and nursery crop trials were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

In Derryarkin, wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.

A small area of cutaway at Derryarkin has been leased to DAMX Ltd for the development of an off-road moto-cross track at Derryarkin.

An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.

Part of the cutaway at Ballybeg (76 ha) was planted with Alder (2008-2009) as a biomass trial (for fuel).

An area of marginal raised bog (19 ha) was restored at Bracklin Bog in 2016, as part of the BnM Raised Bog Restoration Programme. An extensive drain blocking programme was carried out to raise water levels and help re-wet the bog area, encouraging the development of Sphagnum-rich 'active' peat-forming raised bog. This area is of significant biodiversity and cultural interest to a local group called Meath-Westmeath Bog Group

Some rehabilitation was carried out in a small area of cutaway in Ballivor Bog (9 ha) in 2015. This involved drain-blocking to maintain and enhance re-wetting of an area of cutaway with *Sphagnum*-rich poor fen peat-forming vegetation.

Rehabilitation and re-wetting as part of the Peatland Climate Action Scheme (PCAS) has been completed at Carrenstown and Lischogher West.

BnM is currently developing a wind energy project called Ballivor Wind farm (BnM Wind Farm | Ballivor Wind Farm). This proposed project has been submitted to the planning authority. The proposed location extends across parts of Bracklin, Lisclogher East, Carranstown and Ballivor Bogs.

BnM has secured planning consent for the Derrygreenagh Power Project (Drumman Bog), a thermal power plant. Planning consent included the associated infrastructure required to connect the development to the national gas and electricity transmission networks, enabling integration with the wider energy system

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC License Ref. PO-501-01 is outlined in Table Ap-1.

Table Ap-1: Derrygreenagh Bog Group names, area and indicative status (Derrygreenagh Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Bracklin	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats	2020	Draft 2023 Bracklin West (sub-site) rehabilitation completed.

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Bare peat is prevalent in the western section, which was in milled peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.		
Carranstown	306	Industrial peat production commenced at Carrenstown in the 1980s. The majority of the site has relatively deep peat.	Carranstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat. There are cutaway habitats developing on the eastern side. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Finalised 2022 Planned Rehab completed
Lisclogher East	486	Industrial peat production commenced at Lisclogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lisclogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Lisclogher West	239	Lisclogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lisclogher West was drained but never fully developed for industrial peat extraction.	N/A	Finalised 2023. Rehab completed
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat.	2020	Draft 2017
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	N/A
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s. Most of the site is cutaway	Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.	2020	Draft 2026
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction in past.	Between 1988 and 1991	Draft 2026
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.	2017	Draft 2026

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Most of the site is bare peat with emerging cutaway habitats. Part of the site was used to trial herb production. This initiative has now ceased.		
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction. Part of the site was used to trial herb production. Part of the site is used for log storage (biomass).	2018	Draft 2026
Toar	445	Industrial peat production commenced at Toar in the 1950s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Most of the site is bare peat. Part of the site is used for log storage (biomass).	2018	Draft 2026

See Drawing number BNM-ECO-26-18-24 titled **Bog Group Map**, included in the accompanying Mapbook which illustrates the location of Derryarkin Bog and the Derrygreenagh Bog Group in context to the surrounding area.

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APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Bog Name:	Derryarkin	**Area (ha):**	710.0 ha (1754.5 acres)
Works Name:	Derrygreenagh	**County:**	Offaly/Westmeath
Recorder(s):	MMC & DF	**Survey Date(s):**	27th & 28th October 2009

Habitats present (in order of dominance)

The most common habitats present on the industrial cutaway include:

- Bare peat (BP), pioneer Poor Fen communities (pJeff, pEang, pTrig, pRos) and Birch-dominated scrub (eBir, oBir) in the naturally re-colonising areas. There are relatively small areas of other Poor fen communities (pRos, pTrig) and other communities such as dry grassland (gCal) and pioneer vegetation (DisCF) of glacial sub-soils. (Codes refer BnM classification of pioneer habitats of industrial cutaway. See Appendix II).
- There is a large wetland area with a significant area of shallow open water in the eastern section and smaller pools of open water scattered across the rest of the cutaway. Wetland complexes are developing around these open water areas and include emergent vegetation such as Tall Reeds (pPhrag, pTyph) and fringing Poor fen communities and scrub noted above.
- A quarry is located in the northern section of the site. A lake (FL8) has developed with a large area of open water. No significant amount of riparian vegetation has developed in this area yet. Large areas of gravel spoil (both piles of gravel and areas of levelled gravel) are located in the area surrounding the lake and are at various stages of re-colonisation (ED2, ED3). (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- Two blocks of conifer forestry (WD4) has been planted on the site. One in the north section and the other in the north east section.
- Some dry heath (dHeath) has developed on part of the mineral island in the north section and on a small knoll in the south-western cutaway in association with Dense Bracken.
- A railway crosses the site and this can also be classed as built land along with some works areas with associated infrastructure (BL3).
- There is a small amount of raised bog (PB1) high bog around the margins of the site.
- Other fringe habitats around the margins of the bog include Scrub (Birch-dominated and Gorse dominated), Birch woodland (WN7), a Quarry (ED4), Conifer plantation (WD4) and Cutover Bog (active and abandoned).

Description of site

This site is composed of four main sections of bog. The R400 Rochfortbridge to Rhode road runs in a north west direction and separates the bogs of Derryarkin and Drumman with the exception of the smallest section of Derryarkin bog being located on the east side of the road, adjacent to Drumman bog. The Offaly/Westmeath county boundary follows the path of the Mongagh River, which flows through the west side of the site. There is no industrial peat production at Derryarkin although a large area is zoned for sand and gravel extraction.

North East Section

This section of bog is isolated from the other three sections of the site and is located north of the Mongagh River in Co. Westmeath. This section is zoned as Forestry (largest area) and other (a mosaic of habitats including some sod-peat)) on the BnM land use maps. The majority of the site is planted with conifer trees – Sitka Spruce (*Picea sitchensis)* and Lodgepole Pine (*Pinus contorta*). The surrounding area is vegetated with areas of bare peat, pioneer vegetation, Gorse scrub, pioneer Calcareous Grassland (gCal), Acid Grassland and Dry Heath (dHeath). (Codes refer to BnM habitat classification. See Appendix II). The Mongagh River flows along the southern boundary of the site. The conifer plantation was established over twenty years ago and is in a poor condition with poor growth forms along with stunted trees and dead trees throughout the plantation. The peat in this section of the site is noted to be made up of *Phragmites* layered peat and is known as being a difficult medium in which to establish trees and other plants (Egan, T. pers.comm). One notable feature of this site is that there is still a substantial amount of unvegetated bare ground, even after very little activity in parts of this section in over 20 years. Blue Fleabane was noted in this area on some exposed glacial sub-soil.

Sod peat activities have been carried out on the site in past years on the eastern side of this section with some bags of turf remaining on the site from previous years; however there did not appear to have been any sod peat activity on the site from 2009.

North Section

This section of the site is bordered by the R400 Road to the east while BnM railway lines separate it from the two other sections of the bog. The Monagh River flows along its northern boundary. The majority of this section is zoned as sand and gravel quarry (Derryarkin Sand and Gravel Ltd) with a smaller area zoned as forestry. A private tarred road connects the quarry with the R400 road. The quarry was originally located in the north west of the site but

over the past number of years it has grown in size and now occupies almost half of the northern section of the site. Gravel extraction began in 2002. The most notable features of this section of the site are the gravel areas (gravel piles and levelled out areas of gravel) along with the large lake that has been created as a result of the quarries activities over a number of years.

A conifer plantation is also located in the north and north eastern part of this section of the site. This plantation comprises of Sitka Spruce (*Picea sitchensis*) and Lodgepole Pine (*Pinus contorta)* and is in an overall poor condition with areas ranging from moderate quality trees to dying and completely stunted areas of forestry.

The remaining eastern part of this section of the site is cutaway that has been allowed to revert back to a more vegetated state with pools of open water, bare peat, and pioneer Poor fen communities (pJeff, PEang and gCal). One notable feature in this section of the site is a mineral island along the railway line that is made up of dry heath and areas of bare gravel with some dry grassland (gCal). Some deep pits have been excavated in this area possibly a result of some quarry activity.

South West Section

This section is bound by intact raised bog (PB1), improved grassland (GA1), cutover bog (PB4) and conifer plantation (WD4), with the aforementioned sand and gravel quarry directly to the north east of this section. A BnM railway line runs in a NE-SW direction through the site. A mosaic of habitats have established themselves in this area with pioneer Poor fen communities being most prominent (pEang, pJeff, pRos), along with small scattered patches of open water and some Birch scrub forming many small wetland complexes. There is minor development of emergent Tall Reed communities around the many wetland complexes but both Common Reed and Reedmace are present. Bare peat still forms a significant portion of the ground cover. There are a regular series of much barer unvegetated higher fields through this area and there are also several fields with abandoned stock-piles that are also revegetating slowly. One notable feature in this area is the exposed gravel and glacial till that appears near the eastern side and is also a prominent feature along the railway embankments. This material is revegetating slowly. A small glacial mound vegetated with Dry heath (dHeath) and Bracken is located in the northern half of this area.

The site extends further south-east along an access route that links Derryarkin to adjacent bogs. This zone contains a railway and tracks used by BnM vehicles. The vegetation is dominated by dry calcareous grassland (GS1) and some wet grassland (GS4).

A small adjacent section (two agricultural fields) are located in the south-east corner of this section appear to have been areas of cutover bog that have been converted to agricultural grassland in the past. This appears to have had limited success and the area is dominated by Birch scrub (eBir and oBir) with acid grassland (gMol).

South East Section

This section is an area of cutaway that was deliberately re-wetted in 2001-2002 to create wetlands. No industrial peat harvesting operations have been carried out in this section of the site in recent years, as a result a mosaic of habitats have become established around a large and fragmented area of open water. This open water forms a wetland mosaic with large patches of Common Reed and some fringing pioneer Poor fen communities (pRos) that are diversified by higher fields with other vegetation such as Birch and Willow scrub that extends into the open water. The un-flooded sections on both sides of the wetland are dominated by mosaic of Birch scrub (eBir and oBir), pioneer Poor fen communities (pJeff, pEang) and pioneer grassland of drier areas (gCal, DisCF). Vegetation communities of drier areas (dHeath and gMol) appeared around the boundaries at the ends of the higher fields. There was also some exposed glacial sub-soil in this area that contained pioneer vegetation (DisCF).

Blue Fleabane was noted in this area on some exposed glacial sub-soil. To the north west of the site a poor fen habitat was noted with small amounts *Sphagnum*. In this section of the site boundary habitats include agricultural grasslands, raised bog, quarry and the R400 Road.

To the north east of this section, a mineral ridge runs towards the northern section of the site. This ridge contained Birch scrub, pioneer vegetation and some Poor fen vegetation (eBir, Discf and pJeff).

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

Adjacent habitats and land-use

Adjacent land uses include conifer plantation (WD3), Improved grassland (GA1), turf cutting, hedgerows (WL1), tree line (WL2), cutover bog (PB4), depositing/lowland river (FW2), raised bog (PB1), active quarry (ED4), drainage ditches (FW4), arable crops (BC1) and buildings and artificial surfaces (BL3) (Derrygreenagh works site).

Watercourses (major water features on/off site)

The Monagh river forms a boundary with the northern section while also forming a boundary to the south of the northeast section further downstream. A tributary of the Monagh River forms the boundary along the eastern edge of the northeast section of the site. The Yellow River forms a boundary with the lower end of the southeast section, while the Big River is located approximately 1.6km to the south of the site. These rivers are part of the Boyne catchment.

All of the aforementioned watercourses have been canalised and modified along their BnM boundaries.

Site topography

The site is generally low lying and flat as is usual on cutover bogs although a raised area of mineral island along with a mineral ridge are contained within the site along with various large mounds of gravel that are associated with the quarry activity.

Fauna biodiversity

- Several birds were noted around the site. Wren, Robin, Thrush and Blackbird in scrub areas around site, Meadow Pipit (>10) using a variety of habitats on site, Snipe (>15) in some of the wetter pioneer Poor fen vegetation and in the drains around the site. Grey Crow and Mallard were also noted on the site.
- Three Mallard were noted in a drain in the south-western cutaway area. Other species present included Blackbird (2), Robin, Wren, Reed Bunting (3), Goldfinch (10), Meadow Pipit (5) and Snipe (8).
- A number of bird species were noted In the large lake that has been created by quarry activity including Lesser Black-backed Gull (15), Black Headed Gull (25), Teal (10), Mute Swan (7), Lapwing (3) and Curlew (>15) flying over the site. A second flock of Curlew (35) was noted in the northeastern section of the site (Westmeath) where they were roosting on the bare peat before taking flight.
- A large flock (>100) of unidentified Finches were also observed amongst areas of Birch scrub in the south-eastern section of the site. Snipe (3), Heron (1) and Meadow Pipit (3) were also noted in this area. Several large nests were also noted in some of the scrub (SE corner).
- Signs of Rabbits are widespread and common around the site.
- Signs of Hares also noted. One Hare was observed in the SW cutaway area.
- Deer tracks were observed along the southern boundary of the southwestern section of the site.
- Pine Marten scats were observed.
- Signs of Badger activity in the bog included tracks and scrapes.
- Fox droppings recorded at several locations.
- Frogs recorded at several locations on the site.
- Stickleback (fish) observed in some of the smaller drains close to the quarry lake.

Fungal biodiversity

Geastrum triplex (Collared Earthstar), *Russula betularum* (Birch Brittlegill), *Aleuria aurantia* (Orange Peel), *Hygrocybe cantharellus* (Goblet Waxcap), *Lactarius vietus* (Grey Milkcap), *Lycoperdon lividum* (Common Puffball) and *Leccinum scabrum* (Brown Birch Bolete).

Blue Fleabane distribution

This rare species (whose status is listed as endangered) was recorded at several locations around the site. It has not been recorded at this site before. Blue Fleabane (*Erigeron acer*) is an annual species that is found in dry pastures and sandy or gravely places such as eskers and its distribution is mainly confined to the central and south-eastern parts of Ireland (Webb et al 1992). It has been recorded in several 10 km grid squares in Offaly in the past, including the grid square where the current sites are located.

Several populations were recorded on the site (see Habitat Map). The largest population was noted in the south-eastern cutaway area. Many plants (500-1000) were growing on exposed gravel and glacial till that made up the spoil heaps. Smaller populations were also noted along the railway embankment that bisects this cutaway and also on exposed glacial till towards the eastern side of the cutaway area. Populations were also noted on spoil heaps along the main entrance road to the Derryarkin quarry and on exposed glacial till within the area mapped as wetland (south-eastern section) and zoned for further quarry development.

This species is not likely to have been present on the site prior to the development of the cutaway. Subsequent development of the site including construction of railways on gravel embankments, construction of drains, and more recently the development of the quarry have created suitable exposed gravel banks made up of calcareous rich material that this species prefers. In the long-term, it could be expected that these spoil heaps and exposed gravel patches will re-vegetate with grassland and scrub, which may not favour this species.

HABITAT DESCRIPTIONS

(See Habitat Description Document for detailed description of each vegetation community not described in this section.)

Raised Bog (PB1)

This habitat is found along the western boundary of the south-western cutaway area within and adjacent to the BnM site boundary. Most of this high bog is begin cut for sod peat by private individuals on the outside of the bog. The largest area within the boundary is located towards the SW corner of the cutaway. This section has a small area with a notable transition from species-rich wet grassland dominated by *Molinia caerulea* to Birch Woodland along the edge of the high bog and then to high bog. The high bog is in reasonable condition and has not been burnt for some time. Typical ecotopes are present including Facebank, Marginal and Sub-marginal. The sub-marginal has a high cover of *Cladonia portentosa*. The vegetation is dominated by *Eriophorum vaginatum*, *Eriophorum angustifolium* and *Calluna vulgaris*. Other species present include *Trichophorum cespitosum*, *Carex panicea* and *Narthecium ossifragum*. *Sphagnum capillifolium* and S. *papillosum* are present (overall cover 10-20%) and *S. magellanicum* is present in one of the larger drains. There

is some development of hummocks but there are no pools present and only a few small damp hollows with *S. cuspidatum*. Some degraded hummocks of *Sphagnum* as present. *Pinus* saplings and young trees are rare on this section of high bog. Meadow Pipit was noted on the high bog.

BnM habitat classification scheme

	General	Vegetation community [1]	BnM habitat code	Equivalent Heritage Council codes [2]
Pioneer habitats of industrial cutaway	Peatland	Bare peat (0-50% cover)	BP	ED2
		Embryonic bog community (containing *Sphagnum* and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer *Campylopus*-dominated community	pCamp	PF2
		Pioneer *Juncus effusus*-dominated community (Soft Rush)	pJeff	PF2
		Pioneer *Eriophorum angustifolium*-dominated community (Bog Cotton)	pEang	PF2
		Pioneer *Juncus bulbosus*-dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer *Triglochin palustris*-dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with *Cladium* (rich fen)	pCladium	PF1
		pioneer *Schoenus nigricans* community (rich fen)	pSchon	PF1
		pioneer *Carex viridula*/brown moss community (rich fen)	pVir	PF1
	Emergent communities	Pioneer *Carex rostrata*-dominated community (Bottle Sedge)	pRos	PF2/FS1
		Pioneer *Phragmites australis*-dominated community (Common Reed)	pPhrag	FS1
		Pioneer *Typha latifolia*-dominated community (Reedmace)	pTyp	FS1
		Pioneer *Schoenoplectus lacustris*-dominated community (Bulrush)	pSch	FS1
	Open water	Charaphyte-dominated community	pChar	FL2
		Permanent pools and lakes	OW	FL2
		Temporary open water	tOW	
	Woodland and scrub	Emergent *Betula*/*Salix*-dominated community (A) (Birch/Willow)	eBir	WS1
		Open *Betula*/*Salix*-dominated community (B) (Birch/Willow)	oBir	WS1
		Closed *Betula*/*Salix*-scrub community (C) (Birch/Willow)	cBir	WS1
		Ulex europaeus-dominated community (Gorse)	eGor	WS1
		Betula/*Salix*-dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry *Calluna vulgaris*-dominated community (Heather)	dHeath	HH1
		Dense *Pteridium aquilinum* (Bracken)	dPter	HD1
	Grassland	Pioneer dry calcareous and neutral grasssland (Centaureo-Cynosuretum)	gCal	GS1
		Dactylis-Anthoxanthum-dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2

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	General	Vegetation community [1]	BnM habitat code	Equivalent Heritage Council codes [2]
		Anthoxanthum-Holcus-Equisetum community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		Molinia caerulea-dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (Filipendulion ulmariae)	Mar	GM1
	Disturbed	*Tussilago farfara*-dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		Epilobium-dominated community (vegetation > 50%) (Willowherb spp.)	DisWil	ED3
	General	Riparian areas (streams or drain with associated edge habitats (e.g. FW2/4 + WS1, GS2 etc)	Rip	FW2 +
		Silt Ponds (artificial ponds with associated bank habitats (e.g. FL8 + WS1, GS2, ED2, ED3)	Silt	FL8 +
		Access (tracks or railways with associated edge habitats (e.g. BL3 + gCal, gMol, eGor etc)	Acc	BL3 +
		Works areas (predominately built land but can include landscaped and brownfield habitats (e.g. GA2, WS3, WD4, ED2, ED3)	Works	BL3 +

[1] These are generally pioneer habitats of bare peat and the communities can contain a significant proportion of bare peat. Some habitats are more developed than others. They frequently occur in mosaic with each other.

[2] Not all these communities are equivalent to habitat classes used by The Heritage Council habitat classification scheme (Fossitt 2000) as some are quite rudimentary and undeveloped.

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Heritage Council habitat classification scheme (Fossitt 2000)

	General	Habitat	Heritage Council code
Semi-natural and modified habitats	Peatlands	Raised Bog	PB1
		Lowland Blanket bog	PB3
		Cutover Bog	PB4
		Rich fen and flush	PF1
		Poor fen and flush	PF2
		Transition mire and quaking bog	PF3
	Woodland and scrub	Oak-Birch-Holly woodland	WN1
		Oak-Ash-Hazel woodland	WN2
		Wet Pendunulate Oak-Ash woodland	WN4
		Riparian Woodland	WN5
		Wet Willow-Alder-Ash woodland	WN6
		Bog woodland	WN7
		Mixed broad-leaved woodland	WD1
		Mixed broad-leaved/conifer woodland	WD2
		Conifer plantation	WD4
		Scrub (Gorse)	WS1
		Emergent Betula-dominated community	WS1
		Closed Betula scrub community	WS1
		Recently-planted woodland	WS2
		Ornamental scrub	WS3
		Short-rotation coppice	WS4
		Recently-felled woodland	WS5
	Linear woodland	Hedgerow	WL1
		Treeline	WL2
	Grasslands and Marsh	Improved grassland	GA1
		Amenity grassland	GA2
		Dry calcareous and neutral grassland	GS1
		Dry meadows and grassy verges	GS2
		Dry-humid acid grassland	GS3
		Wet grassland	GS4
		Freshwater Marsh	GM1
	Heath and Bracken	Dry Heath	HH1
		Dry calcareous Heath	HH2
		Wet Heath	HH3
		Dense Bracken	HD1

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	Disturbed ground	Exposed sand, gravel or till	ED1
		Spoil and bare ground	ED2
		Recolonising bare ground	ED3
		Active quarry	ED4
	Freshwater	Acid Oligotrophic lakes	FL2
		Mesotrophic lakes	FW4
		Artificial ponds (slit ponds)	FL8
		Depositing rivers	FW2
		Canals	FW3
		Drains	FW4
	Cultivated and Built land	Stonewalls and other stonework	BL1
		Earth Banks	BL2
		Buildings and artificial surfaces	BL3
		Arable crops	BC1
		Horticulture	BC2
		Tilled land	BC3

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APPENDIX III. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt control measures will be created and they will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

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APPENDIX IV. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

[7] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security, In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh Bog group (Ref. P0-501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the

process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydro morphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 National Archaeology Code of Practice

BnM operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased between 1988 and 1991, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

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13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

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APPENDIX VI. DECOMMISSIONING

1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under section 95 of the EPA Acts. This is achieved by BnM identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Derryarkin Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Control measures	Cleaning silt control measures
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where required

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

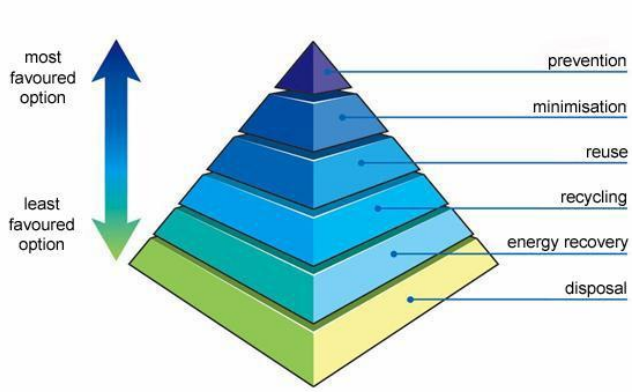
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, BnM will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary).

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration to defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004).

Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelem – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPC Licence's Ref P0501-01, Derrygreenagh Bog Group, Counties Offaly and Westmeath and Meath.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in Derrygreenagh serviced by a silt lagoons/ponds. During the excavation of these silt ponds, pre IPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or is levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Edenderry Power and Lough Ree Power Ltd screened the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0501-01 IPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
IPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.
Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment
4.1 Silt pond excavation material and cleanings.
The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.
The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

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5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	**C**lassification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Derrygreenagh IPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Derrygreenagh IPC Licence P0501-01.

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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX X. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.



Code of Practice

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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.
- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

APPENDIX XI: STOCKPILE DECOMMISSIONING PROCEDURE

Scope
All IPC licensed peatlands with residual peat stockpiles requiring decommissioning and rehabilitation, as required by Condition 10.

The aim of this Stockpile Decommissioning Procedure is to stabilise any remaining stockpiles by depositing the peat in the two drains located immediately adjacent to the stockpile field, enabling the re-shaping of the stockpile to facilitate stabilization and revegetation.

Condition 10:
10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Procedure:

1. Strip any remaining stockpile protection and remove using the poly wrapper for recycling.
2. Ensure the silt control measures servicing this pile field catchment has been cleaned within the last six months as per condition 6.8, and visually inspected as per condition 6.7, prior to any pile decommissioning.
3. Where stockpiles occur within areas planned for rehabilitation, such planned rehabilitation measures (regular drain blocking) will be implemented in advance of any stockpile decommissioning, with priority given to the required adjacent stockpile field drains.
4. Once the rehabilitation measure above has been completed, proceed to reprofile the stockpile as per below.
5. Using suitable available excavator/dozer to make a safe ramp up onto the end of the pile.
6. Track up onto the pile and establish a safe level base.
7. Using the machine to reduce and reprofile the pile height and deposit into the adjoining pile field drains. The residual height to be determined based on stockpile size and area required to reprofile.
8. Work along the pile using this method until reaching the pile end.
9. Using a suitable machine, track the peat into the pile field drain along both sides of the pile, ensuring the final level is below the existing drain blocks and any damage to existing drain blocks avoided.
10. If required, use a suitable machine to track along the top of the reprofiled stockpile to level and flatten the profile to reduce the runoff gradient.
11. Fertiliser application and any grass seed mix should be applied to each stockpile following completion of the above steps, to accelerate the stabilisation.

Draft

Derryarkin Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Derryarkin Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.2**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	12	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	03/07/2026	03/07/2026	03/07/2026
Rev. 0.2	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	CS	MMcC
Date:	24/09/2026	24/09/2026	24/09/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			

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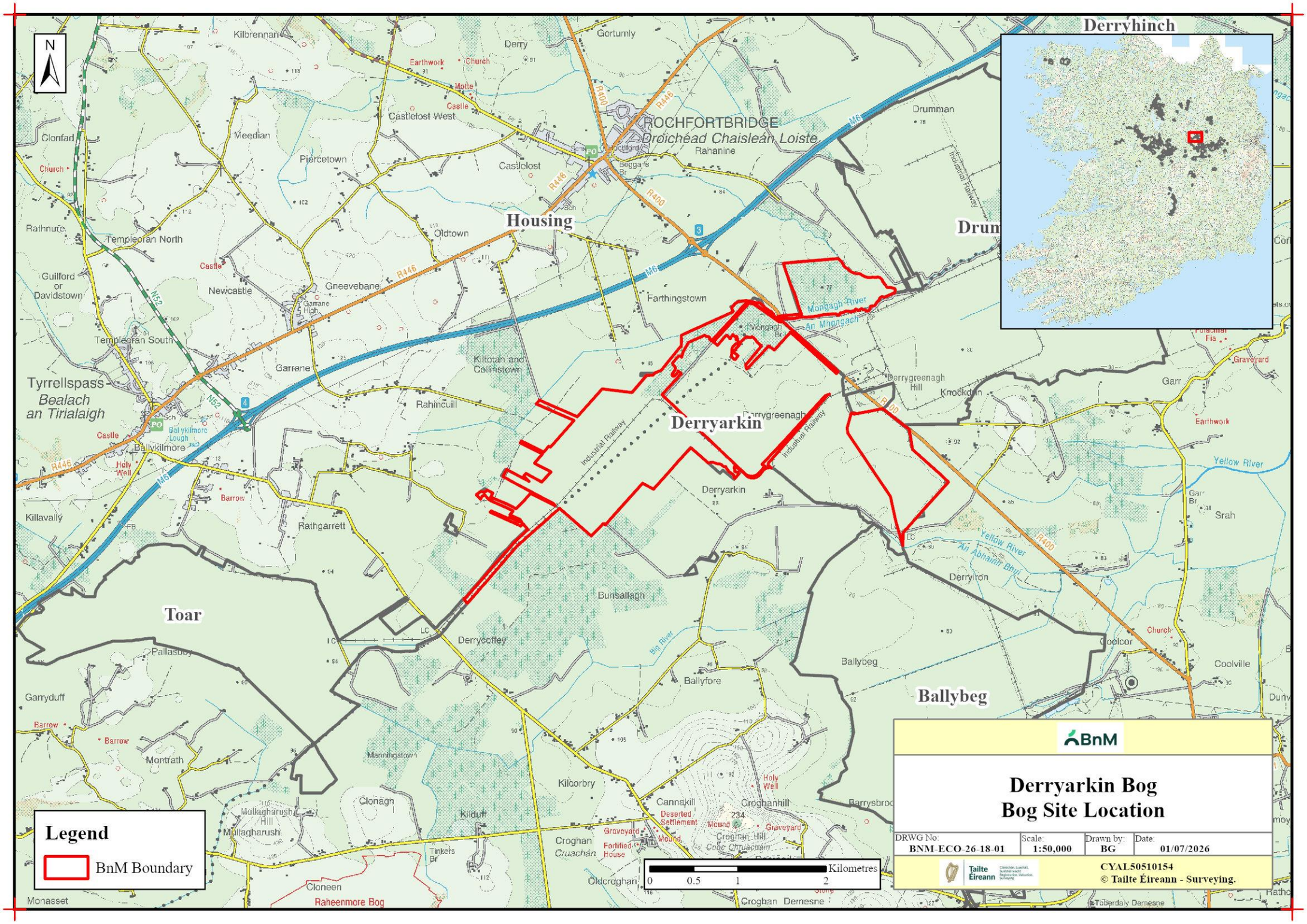
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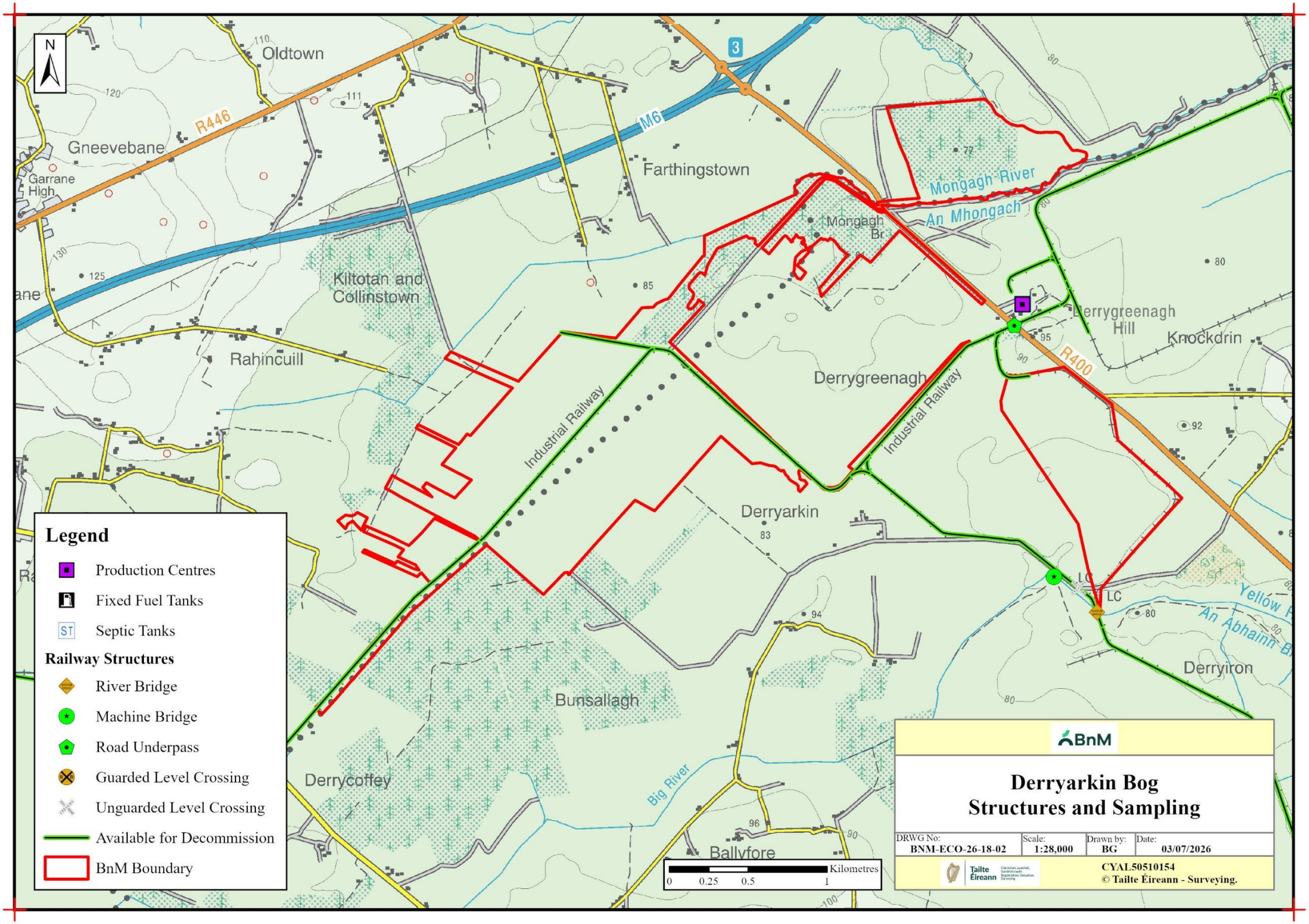
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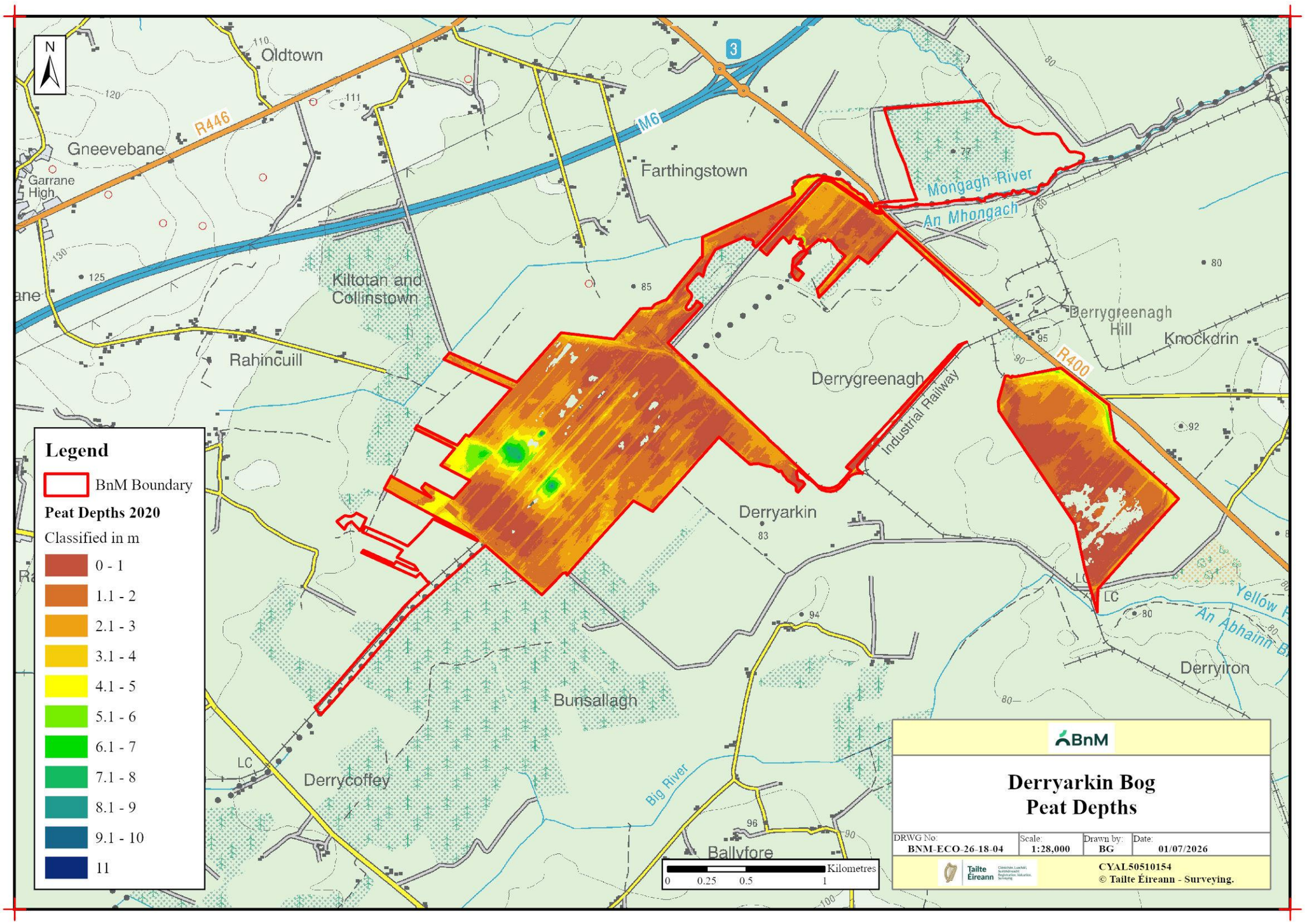
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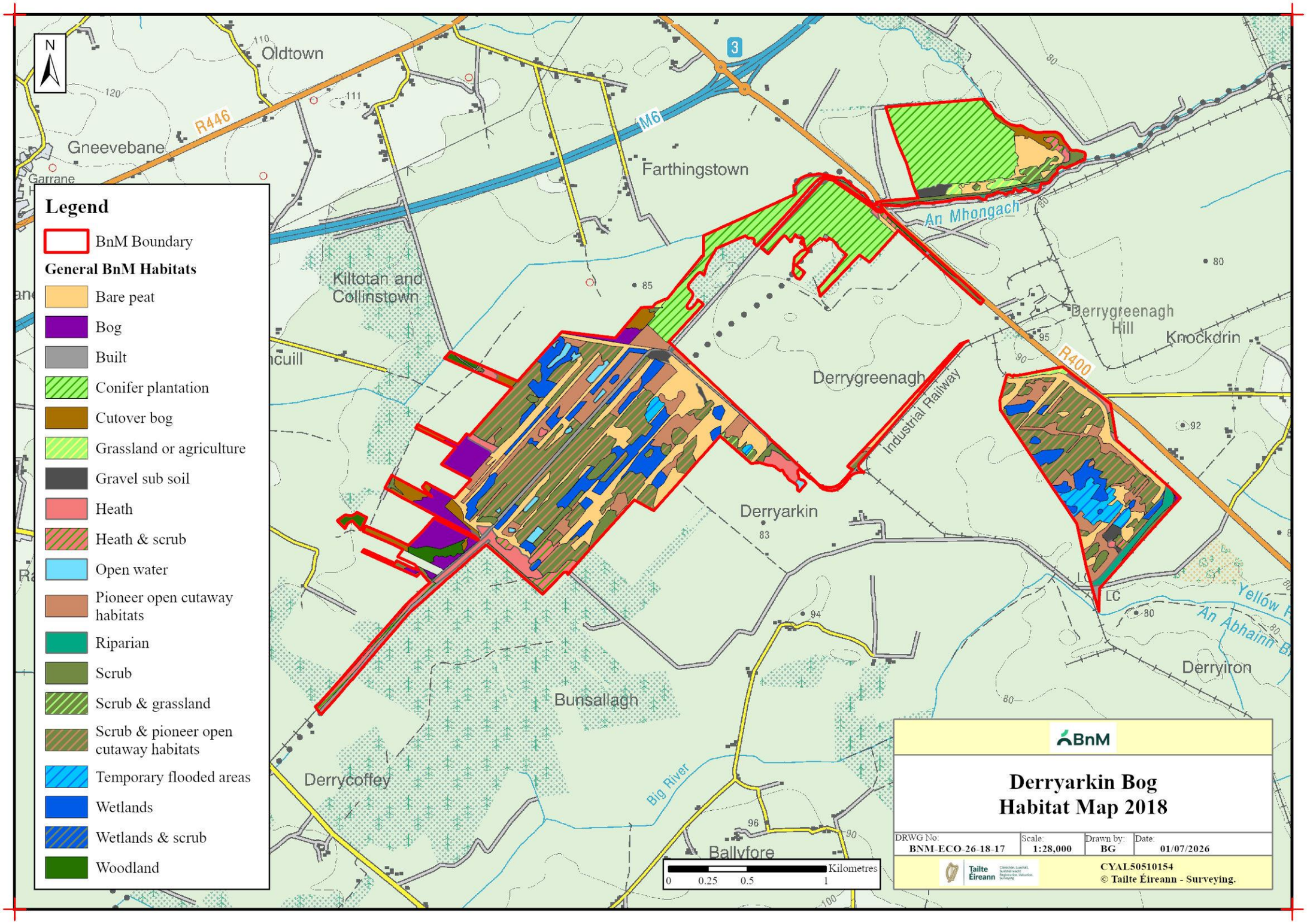



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Farthingstown
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Kiltotan and Collinstown
Rahincuill
Derrygreenagh Hill
Knockdrin
R400
Derrygreenagh
Industrial Railway
Derryarkin
Yellow R
An Abhainn B
Derryiron
Bunsallagh
Derrycoffey
Big River
Ballyfore
LC
Legend
Production Centres
Fixed Fuel Tanks
ST
Septic Tanks
Railway Structures
River Bridge
Machine Bridge
Road Underpass
Guarded Level Crossing
Unguarded Level Crossing
Available for Decommission
BnM Boundary
Kilometres
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BnM
Derryarkin Bog
Structures and Sampling
DRWG No: BNM-ECO-26-18-02
Scale: 1:28,000
Drawn by: BG
Date: 03/07/2026
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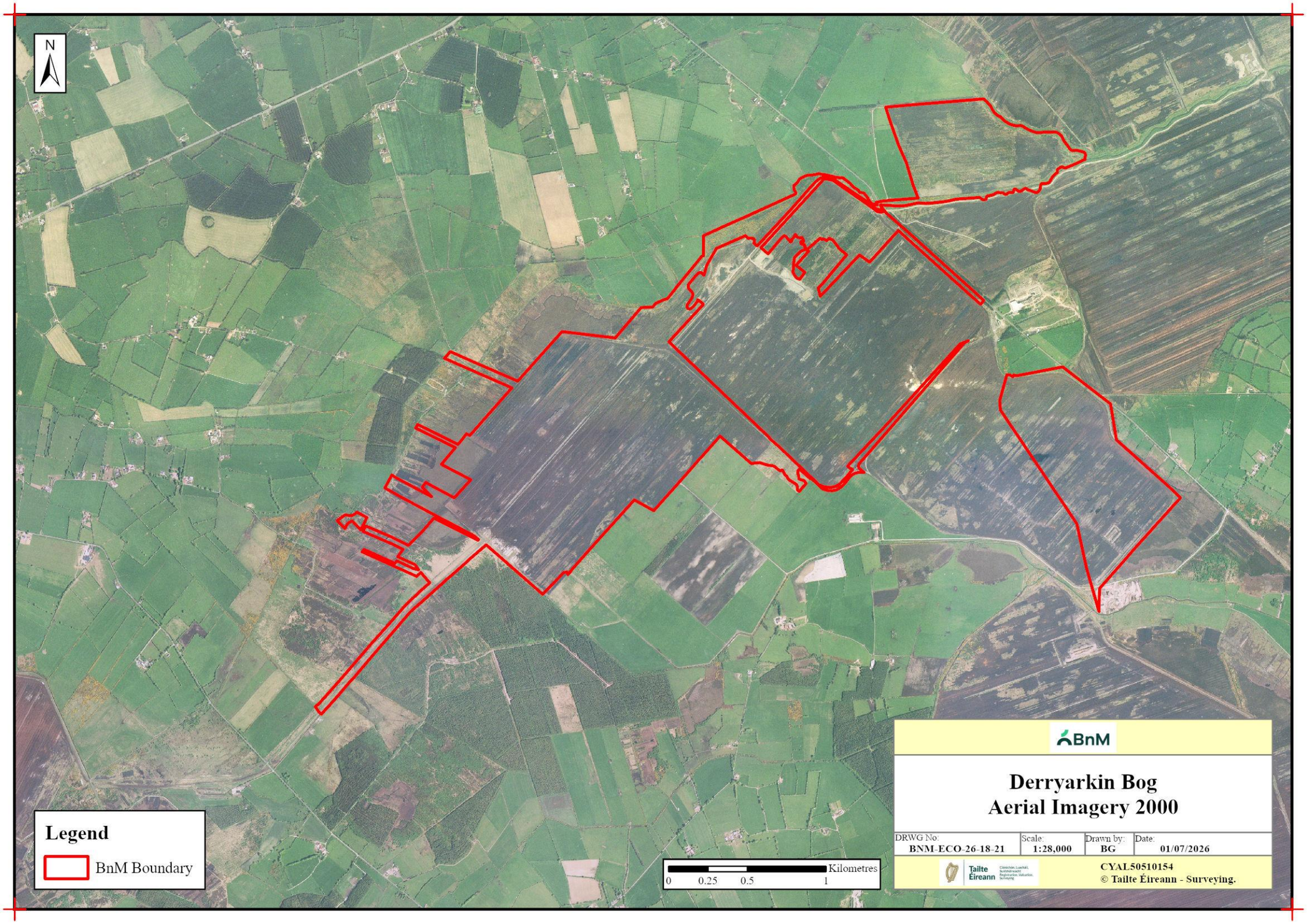
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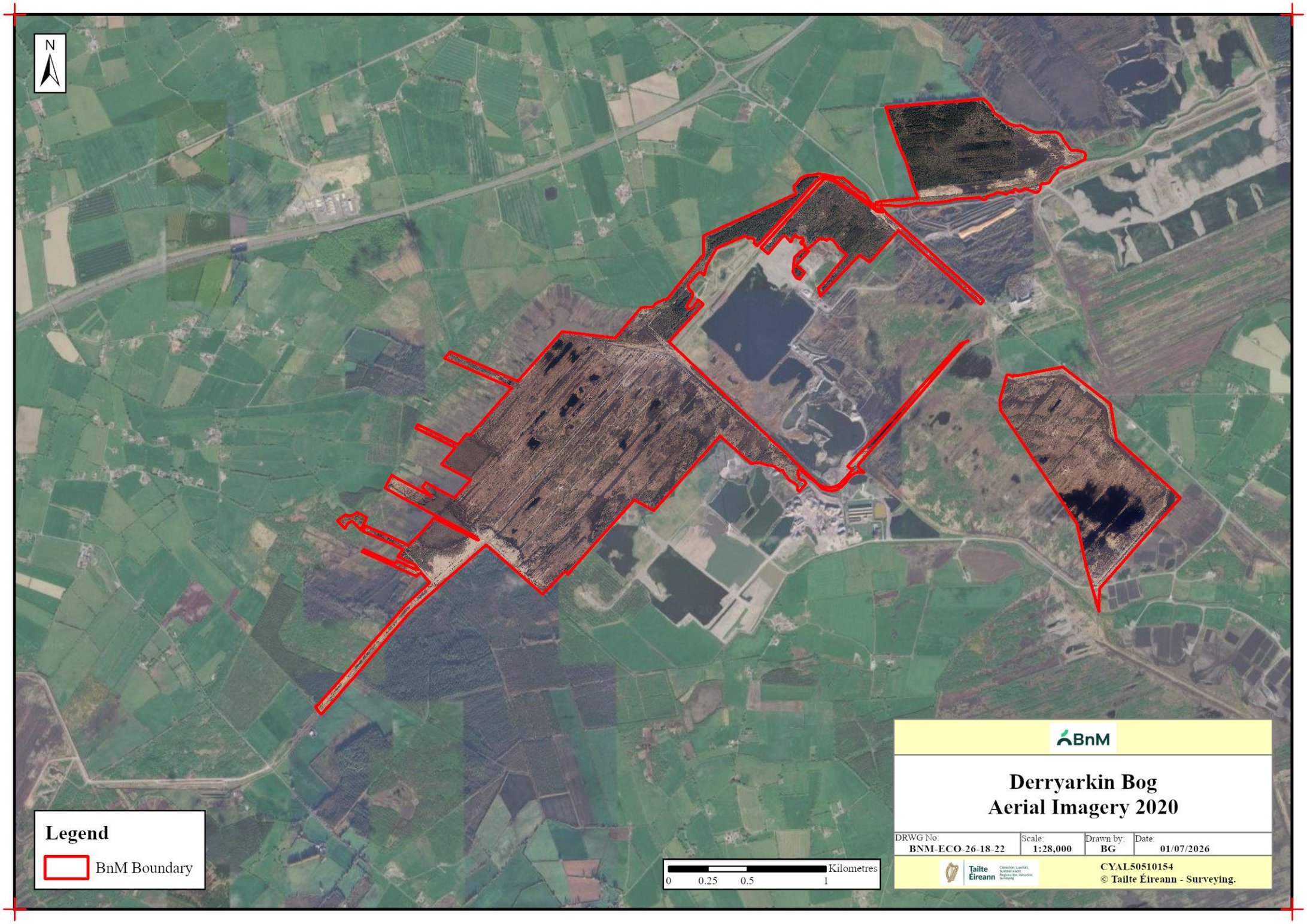
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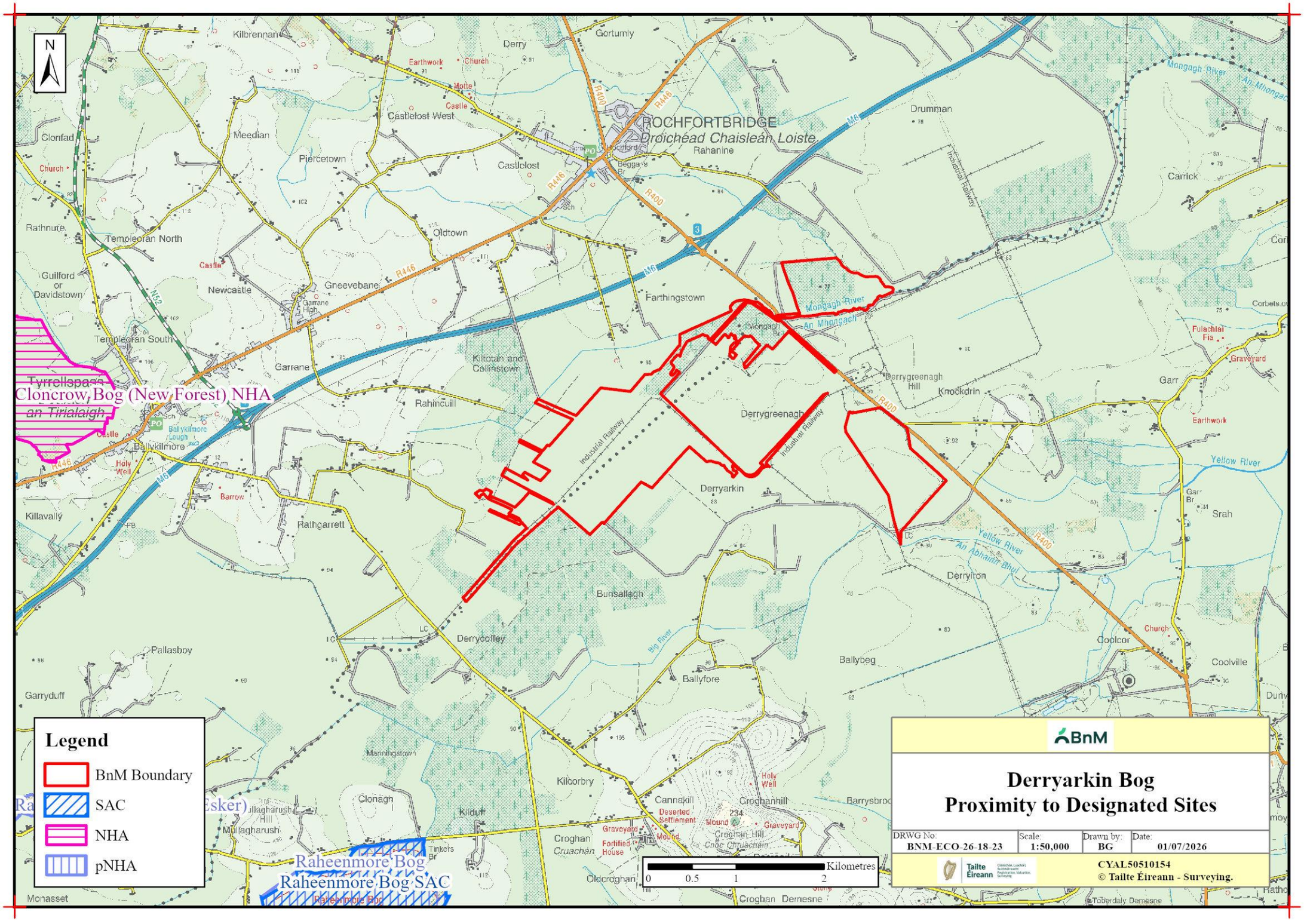
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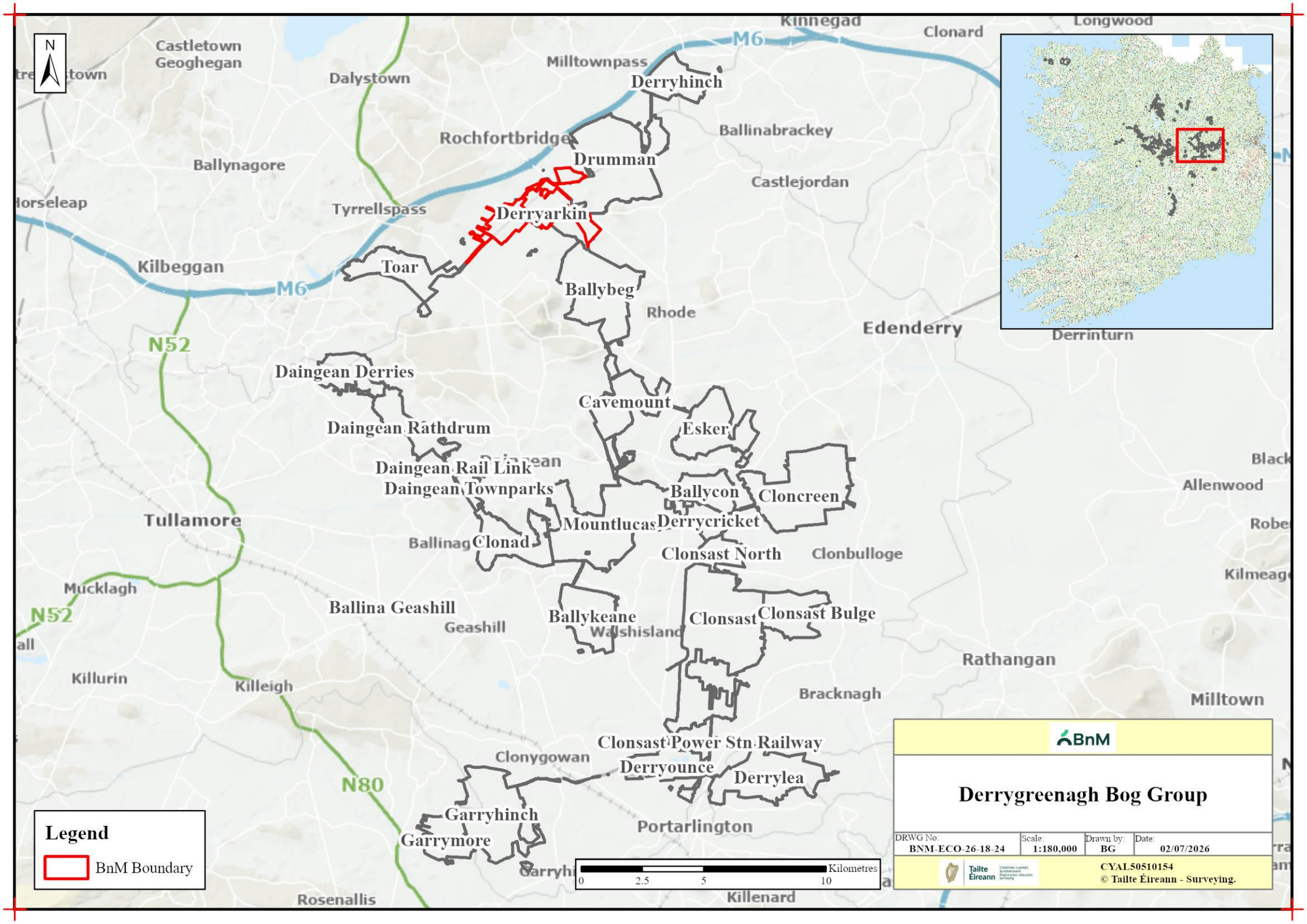
BNM-ECO-26-18-23: Proximity to Designated Sites

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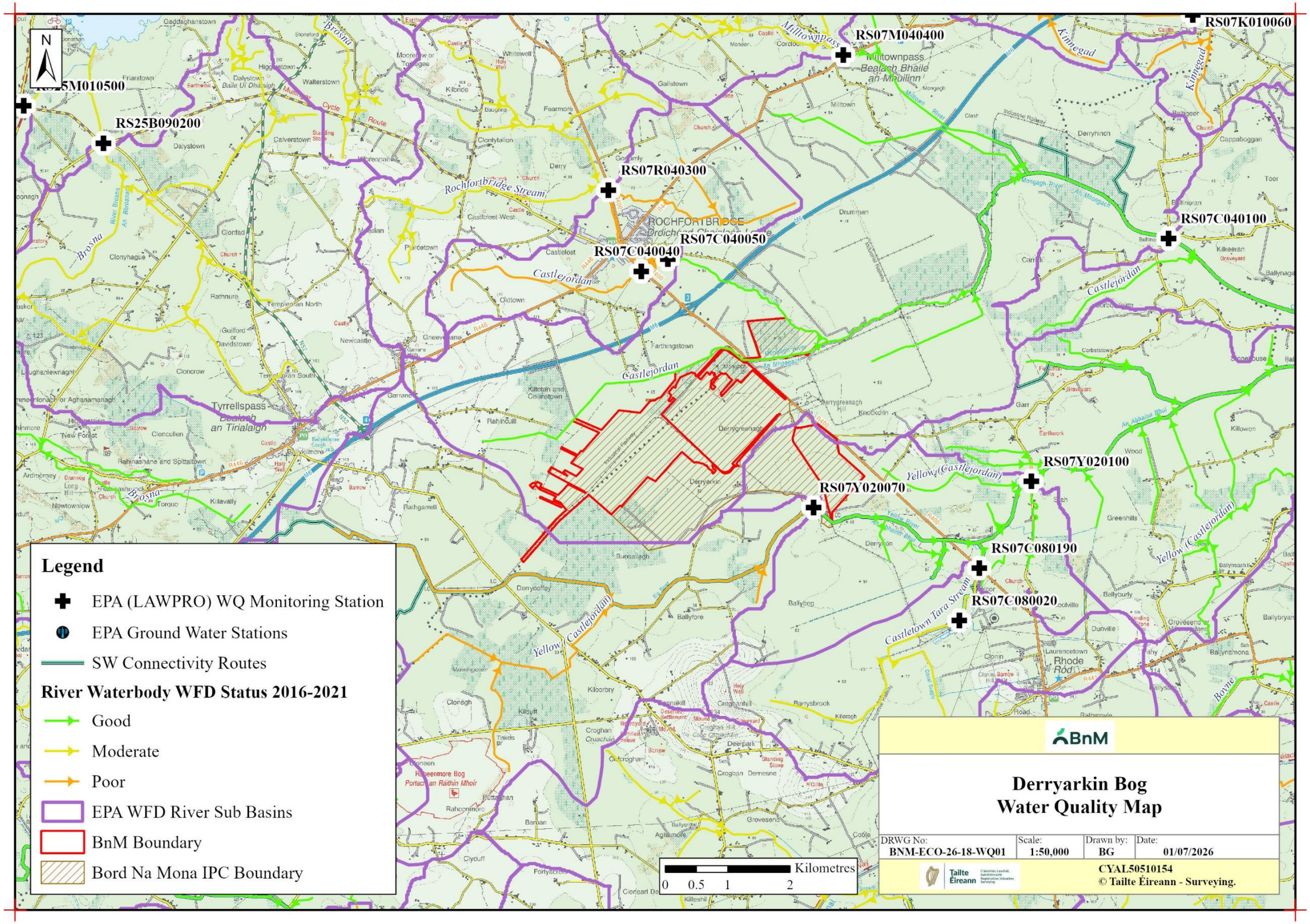
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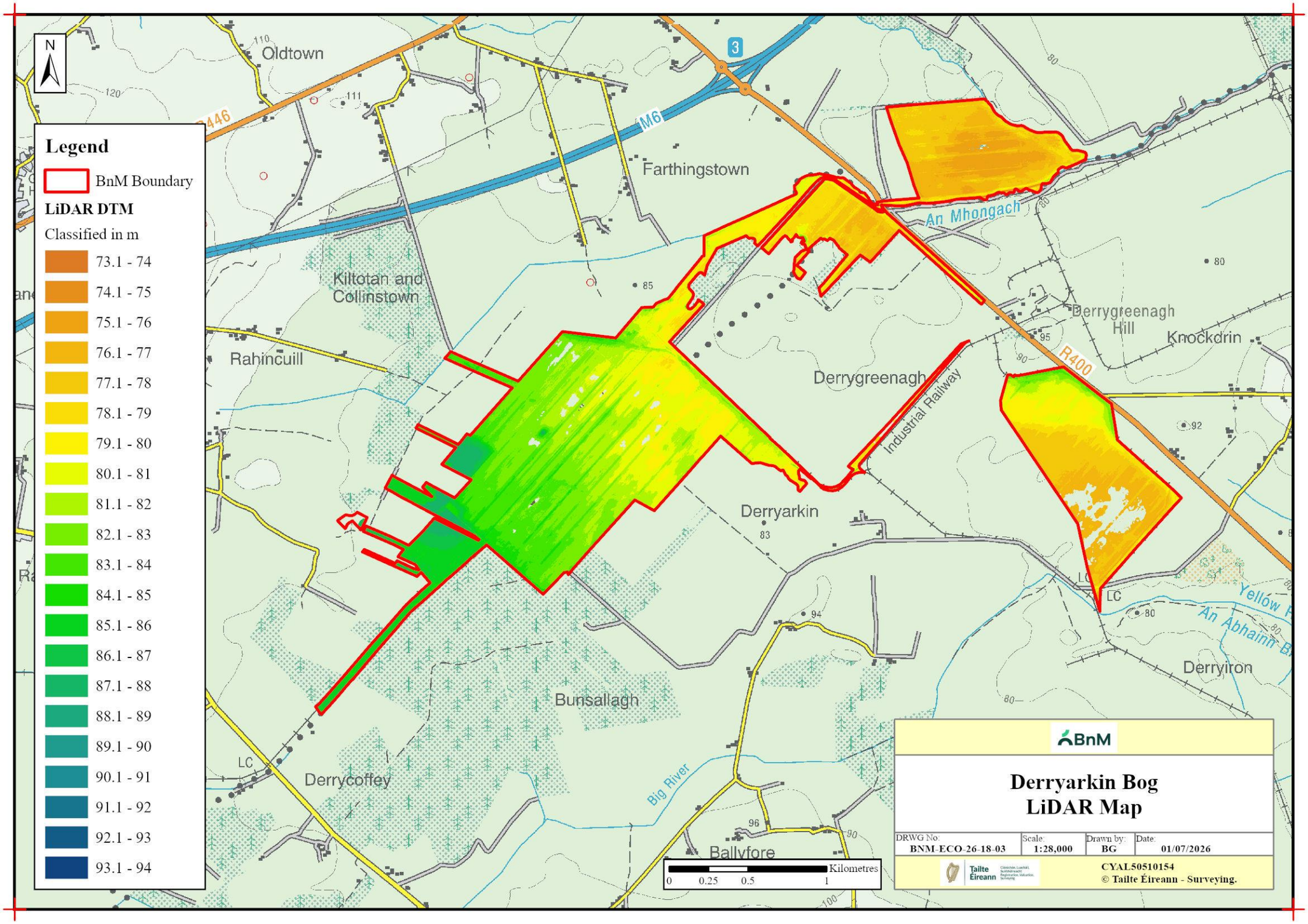
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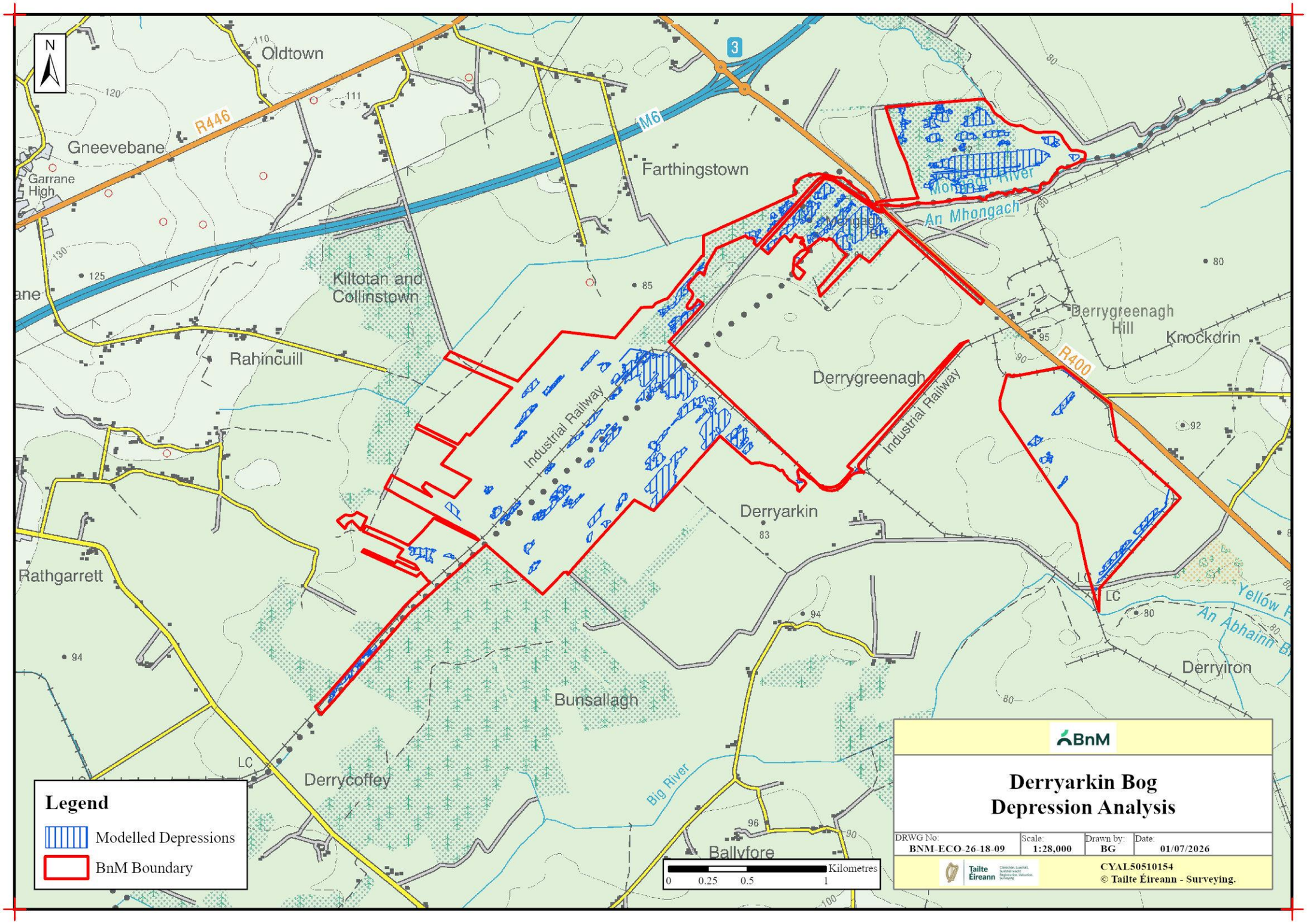
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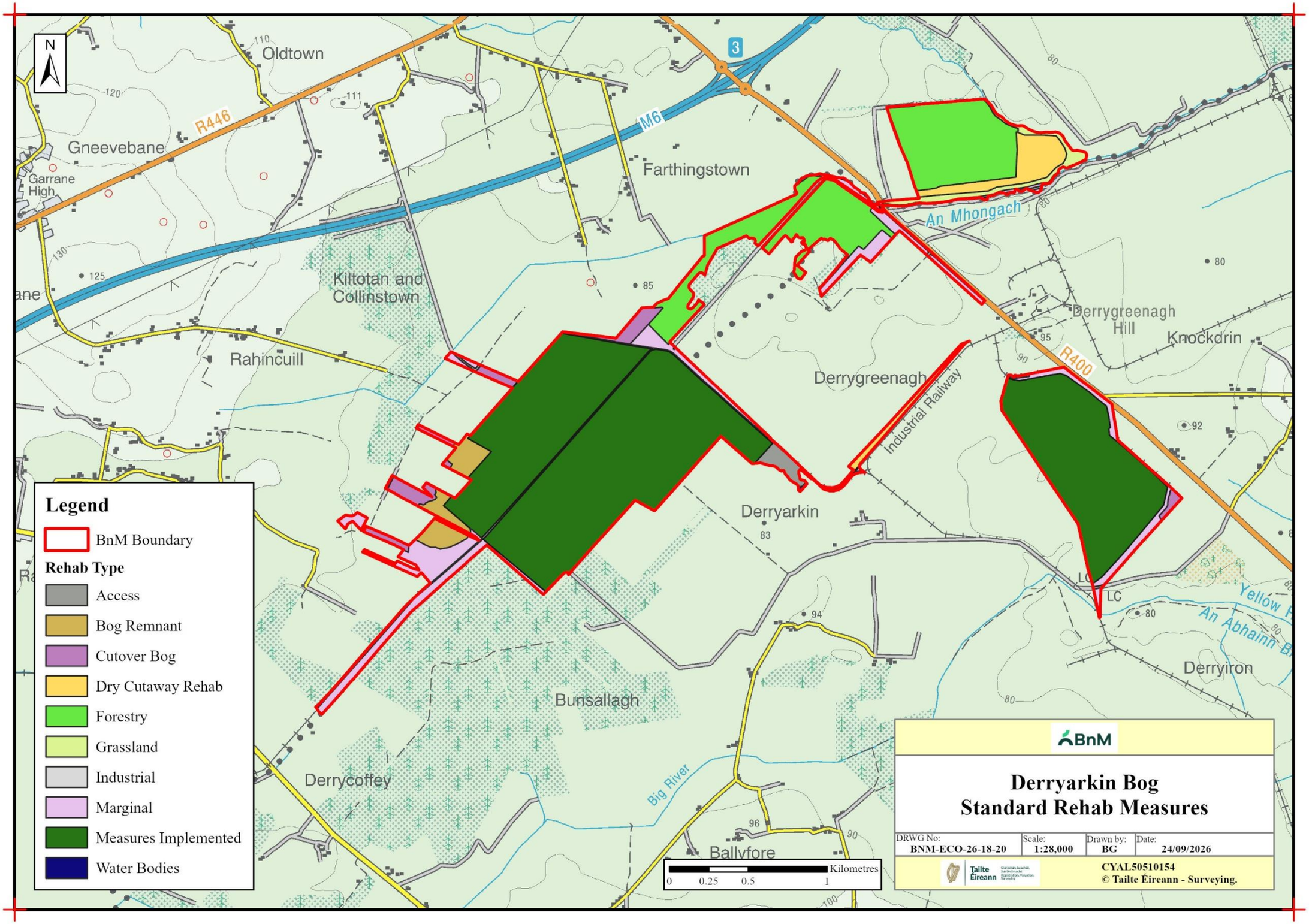



N
Oldtown
R446
M6
3
Gneevebane
Garrane High
Farthingstown
An Mhongach
Kiltotan and Collinstown
Rahincuill
Derrygreenagh
Derrygreenagh Hill
Knockdrin
R400
Industrial Railway
Derryarkin
Rathgarrett
Bunsallagh
Derrycoffey
Big River
Ballyfore
Derryiron
An Abhainn
LC
Legend
Modelled Depressions
BnM Boundary
Kilometres
0 0.25 0.5 1
BnM
Derryarkin Bog
Depression Analysis
DRWG No: BNM-ECO-26-18-09
Scale: 1:28,000
Drawn by: BG
Date: 01/07/2026
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Rehabilitation Maps

BNM-ECO-26-18-20: Standard Rehab Measures

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Derryhinch Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026

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This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e., stabilisation of Derryhinch Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Derryhinch Bog.

BnM have defined the key rehabilitation outcome at Derryhinch Bog as environmental stabilisation.

*This rehabilitation plan for Derryhinch Bog has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. BnM expect to finalise these rehabilitation plans in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Derryhinch Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Document Control Sheet	
Document Name:	Derryhinch Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Derrygreenagh ref. 501 (EPL)\Derryhinch
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	33	4	0	10

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	JOS	MMC	MMC
Date:	24/07/2023	31/07/2023	31/07/2023

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):	JOS	MMC	
Date:	29/09/2023	9/03/2026	
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	CS		
Date:	14/05/2026		

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Non-technical Summary

- BnM (formerly Bord na Móna) is updating the draft rehabilitation plan for Derryhinch Bog and is located in southeast Westmeath/southwest Meath and the southern access point is located on the Co. Westmeath/Offaly border, 5 km east of Rochfortbridge.
- Derryhinch is a gravity-drained bog.
- BnM Industrial peat production commenced at Derryhinch in the 1950s and completely ceased in 2017.
- The majority of the site is dominated by cutaway bare peat. Some areas have well-established cutaway habitats. Pioneer vegetation is developing across the bog.
- This draft rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies.
- It will take some time for vegetation and habitats to fully develop at Derryhinch, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape. Rehabilitation is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats will develop, like poor fen and regenerating wet deep peat vegetation (on deeper peat); and wetlands with reedbeds and birch woodland on shallower peat. In time, a naturalised peatland can be developed.
- The development of a range of habitats at Derryhinch Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. Rehabilitation will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland habitats.
- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM (formerly known as 'Bord na Móna' and used interchangeably in this report) operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh bog group (Ref. P0501-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

Derryhinch Bog is a part of the Derrygreenagh bog group (see Appendix I for details of the bog areas within this Group). Derryhinch Bog is located in counties Meath and Westmeath, with the county boundary passing through the central to eastern section of the bog. The southern access point is located on the Co. Westmeath/Offaly border, 5 km east of Rochfortbridge.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix V).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Derryhinch Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

BnM are carrying out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) on its peatlands (2021-2026). This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the scheme are being supported by the Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) are acting as the scheme regulator. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part the PCAS project are **NOT** proposed as part of this draft Derryhinch rehabilitation plan at this stage.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This document covers the area of **Derryhinch Bog.**

Derryhinch Bog is part of the Derrygreenagh Bog Group.

There is some private sod-peat production around the margins of the high bog to the east of the bog occurring inside and outside the ownership of BnM. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Derryhinch Bog. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to archaeology or other property issues.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA – '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2026 inclusive) and monitoring and desktop analysis, forms the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the references section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midlands peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Derrygreenagh bog group Integrated Pollution Control Licence;
- Derrygreenagh bog group Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);

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- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027
- BnM Annual Report 2025,
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Derryhinch Bog was surveyed in 2009. Habitat maps were updated in 2017. Additional ecological walkover surveys and visits have taken place between 2009-2026, in advance of the preparation of this rehabilitation plan. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while moss and liverwort nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

A detailed ecological survey report for Derryhinch Bog is contained in Appendix II.

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3. SITE DESCRIPTION

Derryhinch Bog is located on the Co. Meath/Westmeath border, with the southern access point located on the Co. Westmeath/Offaly border, 5km east of Rochfortbridge. The M6 motorway passes along the western edge of the bog. The boundary of the bog now extends to the base of the motorway embankment.

Derryhinch Bog is situated close to several other BnM Bogs in Derrygreenagh bog group including Derryarkin and Drumman bogs. A former industrial railway runs through the site that is part of the greater Derrygreenagh bog group industrial rail network.

BnM Industrial milled-peat production began in the 1950s and ceased in 2017. Derryhinch still a significant residual depth of peat remaining over most of the site. The majority of the site is dominated by cutaway bare peat with pioneer vegetation developing. Pioneer vegetation has developed in areas which came out of peat production earlier, in particular along the boundary with the motorway. There are several ridges and mounds with higher ground and some exposed gravel underlying some of this cutaway. Derryhinch is a gravity-drained bog. Derryhinch was used recently to develop a pilot herb production programme. This pilot project has now been completed.

See Drawing number BNM-ECO-26-18-01: ***Site Location Map***, included in the accompanying Mapbook[1], which illustrates the location of Derryhinch Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

The majority of the bog was in industrial milled peat production from the 1950s until 2017. Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Briquette Factory and Edenderry Power.

The central portion of the site was used to trial herb production. This initiative has now been completed.

Derryhinch also includes a small sod-peat production area in the southern section of the site. Most of the plots have been abandoned but there is still some active private turbary sod-peat cutting in several plots. It was naturally regenerating with a range of cutaway habitats including Birch woodland, scrub and some embryonic peatland habitats.

Some rehabilitation has been carried out at Derryhinch. Trees were planted along the western boundary of Derryhinch, in the zone along the motorway to help create a screen between motorway and the former production bog (Spring, 2014). Fertiliser was spread over this area to help tree growth and natural re-colonisation, to help create a buffer zone along the motorway.

3.1.2 Current land-use

All industrial peat production at Derryhinch Bog has now ceased since 2017. A works area with cabins, material storage and refuelling facilities is located along the northern boundary of the bog.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Derryhinch Bog Map Book

A BnM railway line runs along the southern boundary of the bog connecting with the wider Derrygreenagh Bog group network. This railway will be decommissioned shortly.

There is some private sod-peat production around the margins of the high bog in the east of Derryhinch, both inside and outside the ownership of BnM.

Habitats and land-use around the site include improved grassland (GA1) for grazing livestock and growing fodder, a remnant patch of raised bog (PB1), some Birch woodland (WN7), and a motorway (M6) on an embankment (BL3). A significant area of conifer plantation (WD4) has been planted on more mineral soil to the south of the site.

3.1.3. Socio-economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Derryhinch Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station (EPS).

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas. These job numbers have now declined with the cessation of peat extraction at this bog.

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3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The bedrock geology[2] at Derryhinch Bog comprises Lucan Formation (dark limestone and shale). Quaternary sediment maps indicate that Derryhinch is primarily underlain by peat, with till derived from limestones located in the wider area surrounding the bog. The site is entirely underlain with peat subsoils.

3.2.2 Peat type and depths

The majority of Derryhinch retains deep peat reserves, particularly in the northern half of the bog. The deepest peat is in the north-east with peat reserves of between 3 - 5+ m remaining. Shallower peat occurs along the margins of the former production area and in a central band running through the bog. Peat depths across the bog are between 0 - 5 m.

3.3 Key Biodiversity Features of Interest

The majority of Derryhinch is still dominated by bare peat across the former industrial production areas, with some areas that have begun developing pioneer vegetation, primarily made up of pioneer Poor fen communities with emergent Birch scrub. An iron flush was noted in the eastern half, towards the centre of the bog in a raised area with a mosaic of pioneer communities.

Some sections towards the north-east corner and in the eastern section are developing some drier communities with emergent Birch scrub (eBir), Gorse scrub (eGor), dry grassland (gCal), disturbed vegetation (DisCF) and some Poor fen (pJeff) all represented. Wetter patches containing poor fen (pEang, pJeff) and emergent Gorse scrub (eBir) are present along the southern section and along the western boundary.

The former sod-peat area, south of the railway, contains the most significant features of biodiversity interest. This area is old cutover bog with a mosaic of face-banks, fields and drains at different heights. The vegetation is quite well established in this area and a complex mosaic of habitats have developed, since the plots were abandoned, related to the underlying environmental conditions. The majority of this area is developing as mature Birch scrub and Birch woodland (WN7). The underlying conditions are quite variable, ranging from standing water with emergent Reedmace or Bottle Sedge to drier open sections dominated by Heather. In damper hollows there has been *Sphagnum* regeneration. Other indicators of a more acidic substrate in this area include *Eriophorum vaginatum*.

A small area of high bog is located in the north-west corner of this sod-peat area. This area is largely intact, although there were some signs of surface cutting in the past. The majority of this area would be classified as marginal ecotope as it is quite dry with signs of degradation. The damaged sections have mainly re-vegetated and there is some *Sphagnum* regeneration in these damaged areas with *Rhynchospora alba*.

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

3.3.1 Current habitats

The most common vegetation communities/ habitats[3] include:

- Bare Peat (BP)
- Pioneer poor fen communities mostly dominated by Soft Rush (pJeff), Bottle Sedge (pRos), Bog cotton (pEang) and Reedmace Typha community (pTyp) (PF1).
- Wet and drier *Betula pubescens*-dominated scrub (eBir, oBir)
- Pioneer dry calcareous grassland (gCal)
- *Ulex*-dominated community (eGor)
- Reedbed *Phragmites australis* community (pPhrag)
- Dry heather dominated community (dHeath)

The most common habitats found around the margins of the site include:

- Fringe habitats found on the edges around the site include dry calcareous grassland (gCal), Birch scrub (eBir, oBir) and Gorse scrub (WS1), scrub railway lines (BL3), Buildings and artificial surfaces (BL3) and drainage ditches (FW4).
- There are several silt pond areas. These areas contain steep banks vegetated with dry grassland (gCal), Bracken (dPter), disturbed vegetation and developing scrub (WS1). The ponds contain open water with poor development of aquatic or emergent wetland vegetation.

See Appendix II for more detail on site, habitats and local features. See Drawing number BNM-ECO-26-18-17 titled**: *Habitat Map 2018***, included in the accompanying Mapbook, which illustrates the habitats at Derryhinch Bog.

3.3.2 Species of Conservation Interest

A number of species of conservation concern have been recorded at Derryhinch Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre. Evidence of multiple mammal species has been recorded on or within 1km of Derryhinch bog including: Badger (*Meles meles*), Hedgehog (*Erinaceus europaeus*), Irish Hare (*Lepus timidus subsp. hibernicus*), Irish Stoat (*Mustela erminea subsp. hibernica*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Rabbit (*Oryctolagus cuniculus*), Red Fox (*Vulpes vulpes*) and Wood Mouse (*Apodemus sylvaticus*).

Frogs (*Rana temporaria*) have also been recorded on the bog.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km square (N54) which Derryhinch Bog intersects include; Barn Owl (*Tyto alba*), Curlew (*Numenius arquata*), Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Redwing

[3] Codes refer BnM classification of pioneer habitats of production bog

[4] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

(*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola*) and Yellowhammer (*Emberiza citrinella*). Red-listed[5] listed bird species that are also Annex I listed species included on the NBDC database include: Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*) and Red Kite (*Milvus milvus*).

Annex I listed bird species recorded include Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

BnM and NBDC holds records for the invasive mammal species' American Mink (*Mustela vison*) and Fallow Deer (*Dama dama*) at Derryhinch.

A broad range of common garden escapes are occasionally present around the margins of BnM bogs. Although spatial overlap with the proposed rehabilitation work is expected to be limited, any invasive species or garden escapes, will be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Derryhinch Bog. The nearest European Designated sites to Derryhinch Bog are as follows:

- Mount Hevey Bog SAC (Site Code: 002342) – 6.7 km north-east of Derryhinch,
- River Boyne And River Blackwater SAC (Site Code: 002299) – 9.4 km north-east of Derryhinch (at the closest point),
- River Boyne and River Blackwater SPA (Site Code: 004232) – 9.4 km north-east of Derryhinch (at the closest point),
- Wooddown Bog SAC (Site Code: 002205) – 10.2 km north-west of Derryhinch,
- Lough Ennell SAC (Site Code: 000685) – 10.7 km north-west of Derryhinch,
- Lough Ennell SPA (Site code: 004044) – 11.1 km northwest of Derryhinch,
- Raheenmore Bog SAC (Site Code: 000582) – 11.5 km southwest of Derryhinch.

One NHA (Natural Heritage Area) and one pNHA (Proposed Natural Heritage Area) occur within 5km of Derryhinch Bog including:

- Milltownpass Bog NHA (Site code: 002323) – 1.6km north-east of Derryhinch,
- Royal Canal pNHA (Site code: 002103) – 5km north of Derryhinch.

A number of non-statutory designated sites also occur in the wider area around Derryhinch Bog, including:

- Mount Hevey Bog pNHA (Site code: 001584) – 6.7 km north-east of Derryhinch,
- Black Castle Bog NHA (Site code: 000570) – 7.5km south-east of Derryhinch,
- Wooddown Bog NHA (Site code: 000694) - 10.2 km north-west of Derryhinch,
- Lough Ennell pNHA (Site code: 000685) –10.7km north-west of Derryhinch.

[5] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites within close proximity to Derryhinch Bog. The nearest Ramsar sites are Raheenmore Bog and Lough Ennell located approximately 11.5 km south-west and 11.1 km north-west respectively.

See drawing BNM-ECO-26-18-23: ***Proximity to Designated Sites*** in the accompanying map book.

3.5 Hydrology and Hydrogeology

Derryhinch Bog is located within the Boyne (Catchment ID: 07) catchment as defined by the EPA under the Water Framework Directive (WFD). The majority of the bog lies in the Yellow [Castlejordan]_SC_010 sub-catchment, with a small portion of the north-western part of the bog lying in the Boyne_SC_030 sub-catchment.

There are several watercourses which flow close to the boundaries of Derryhinch Bog. The CLONFAD 07 (EPA code: 07C13) stream flows westerly along the northern boundary. This watercourse drains towards the Kinnegad 07 River (EPA code: 07K01) and is part of the Boyne_SC_030 sub-catchment. The Clonfad stream is not listed as being under pressure from peat extraction however it is listed as being under pressure from agriculture. This stream was listed as being At risk in the second cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

The Mongagh River (Castlejordan_020) referred to on the EPA website as CASTLEJORDAN 07 (EPA code: 07C04) flows in an easterly direction along the southern boundary of Derryhinch and the northern boundary of Drumman bog.

The Milltownpass River (EPA code: 07M04) flows in an easterly direction outside the southern boundary of the main area of bog at Derryhinch, however it flows through the access track to the south of the bog. The TEMP_07D93 stream also flows through the access track to the south of the main lobe of the bog in an easterly direction. These watercourses flow into the Castlejordan 07 (EPA code: 07C04). This river flows east providing connectivity with the Yellow [Castlejordan] (EPA code: 07Y02), a tributary of the River Boyne_30 (EPA code 07B04).

These three watercourses are not listed as being under pressure from any specific source however they were listed as being At risk in the second cycle of the River Basin Management Plan for Ireland and are indicated as being under Review in the third cycle.

Derryhinch Bog has a gravity drainage regime. Hydrological modelling (BNM-ECO-26-18-09: ***Depression analysis***) indicates that large parts of the bog are in natural basins and have significant potential for re-wetting, with the assumption that all drains would be blocked. It is likely that a portion of the basins in target areas will re-wet with deeper water, creating a mosaic of wetland habitats, when drains are blocked.

GSI data indicates that Derryhinch Bog is primarily underlain by Lucan Formation, dark limestone and shale, and is classified as a locally important aquifer – bedrock which is moderately productive only in local zones.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally

important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Derryhinch bog is primarily located in an area mapped by GSI as Low groundwater vulnerability (GSI Map viewer) with a small section of the eastern boundary and the southern access track located in an area mapped as Moderate groundwater vulnerability. Groundwater vulnerability for the area surrounding Derryhinch Bog is variable between areas of high, moderate and low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

3.6 Emissions to Surface-Water and Watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Derryhinch Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BnM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a bi-annual basis by BnM to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Derryhinch Bog has three surface water outlets from previously active peat extraction catchments. Details of the three silt ponds and associated surface water emission are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-ECO-26-18-02: ***Structures and Sampling***, along with Drawing number BNM-ECO-26-18-WQ01: ***Water Quality Map*** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Derryhinch Bog.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the Environmental Protection Agency.

Decommissioning and Rehabilitation Programme - Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also aids the primary

objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Derryhinch has been completed. This discharge will have improved water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key watercourse receptors, and the Yellow [Castlejordan]_SC_010 sub-catchment and Boyne_SC_030 sub-catchment and will support the future status of the watercourses achieving Good Status.

Water quality monitoring will be established. There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually.

Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.

The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour and COD.

3.7 Fugitive Emissions to Air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon Emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter

and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Derryhinch Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Parts of this bog are expected to develop as regenerating wet *Sphagnum*-rich vegetation on deep peat areas. Other areas of shallower residual peat will develop wetland mosaic habitats on shallow peat with open water, reed swamp and fen habitats with alkaline peatland emission factors. Birch woodland and Heather is expected to develop on the drier areas and along peripheral headlands.

3.9 Current Ecological Rating

(Following NRA (2009) Evaluation Criteria)[6]

Ecological value was assessed in accordance with the NRA (2009) Guidelines, taking account of habitat quality, naturalness, biodiversity, rarity, ecological function and the presence of species of conservation interest.

The majority of Derryhinch Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat in the former production area of Derryhinch Bog has been assessed as **local importance (lower value)**.

In contrast, marginal habitats including scrub, pioneer cutaway habitats and bog remnant may act as a refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

[6] https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf

4. CONSULTATION

4.1 Consultation to Date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by BnM over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Derrygreenagh bog group, including Derryhinch Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan review days 2010-2018.2016-2021 Review – held in Lullymore in 2018.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Derryhinch Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Derryhinch Bog.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Derryhinch Bog Rehabilitation Plan will contain a review of the consultation.

4.2 Issues raised by Consultees

N/A - consultation has not yet commenced.

4.3 BnM response to issues raised during consultation

N/A - consultation has not yet commenced.

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5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g., suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM.

The rehabilitation goals and outcomes take account of the following issues.

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies where possible. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Derryhinch Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Derryhinch Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years), although areas of the site with deeper residual peat have the potential to develop some *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private

peat extraction and BnM). Reducing pressures due to former peat extraction activities at Derryhinch Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).

- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g., Esker Bog, Cavemount Bog). There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Derryhinch Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Derryhinch Bog is part of the Derrygreenagh bog group.
- The local environmental conditions of Derryhinch Bog mean that deep peat measures are the most suitable rehabilitation approach for this site along with some dry cutaway and wetland measures. Derryhinch Bog has significant areas of residual deep peat along with areas of shallow cutaway that are expected to develop as wetland habitats in topographical depressions and Heather and Birch scrub in drier areas.
- BnM have defined the key goal and outcome of rehabilitation at Derryhinch Bog as **environmental stabilisation** and **optimising residual peat re-wetting** to enhance the development of compatible habitats.
- A majority of this site is bare peat. Rehabilitation is proposed to enhance residual peat re-wetting across the site and promoting environmental stabilisation.
- Rehabilitation of Derryhinch Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key Constraints

- **Bog conditions.** Rehabilitation outcomes of bogs are constrained by their environmental characteristics. Drain blocking can be widespread in scale with each field drain being blocked (e.g., Kellysgrove) or more localised with targeted drain-blocking (e.g., Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- Derryhinch has deeper residual peat present. This would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised. There is some potential to develop some wetland habitats across the site adjusting main outfalls and raising the water-level somewhat. More elevated areas on shallow peat will develop as drier habitats – Birch scrub and Heather dominated vegetation.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.

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- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland (see Appendix X).
- **Turf-cutting.** There is some active private sod-turf cutting on cutover bog located along the western margins of Derryhinch Bog.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to turf cutting are excluded.
- The small area cut off from the original bog unit due to the construction of the N6 motorway.
- The longer-term development of stable naturally functioning habitats to fully develop at Derryhinch Bog. The plan covers the short-term rehabilitation actions and an additional monitoring and after-care programme to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Derryhinch Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g., drain-blocking/re-wetting) slowing movement of water across the site and encouraging a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g., potential suspended solids run-off).

7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation and increase in the area of potentially peat-forming habitats. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures, and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longford Pass bog in Littleton over 3 years post cessation of peat extraction with ongoing rehabilitation, were considered. These indicate a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over past 3 years post cessation of peat extraction with ongoing rehabilitation, indicates downward trends.

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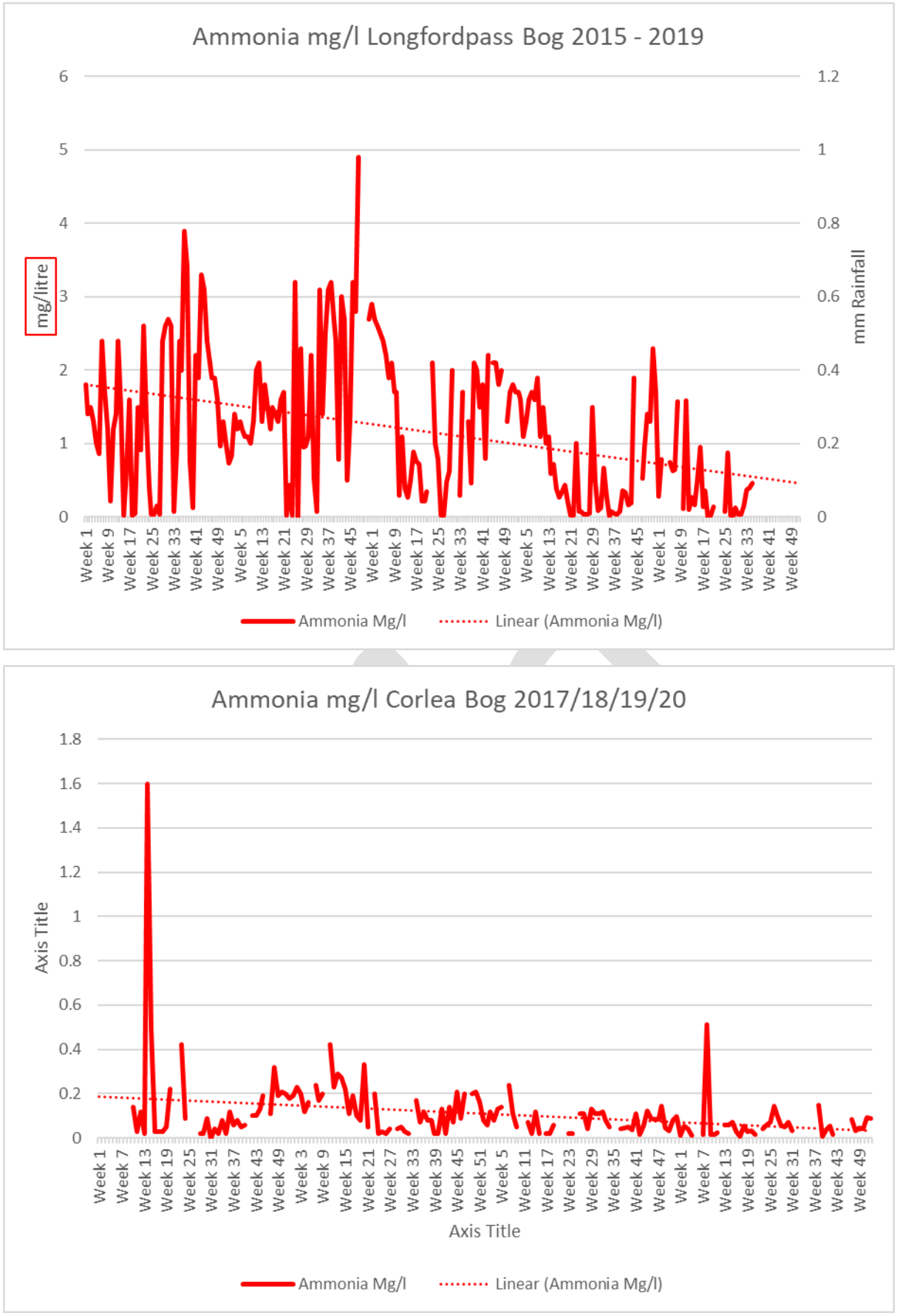


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7-1 Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	3 years
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2 years
IPC validation	Reducing pressure from drainage on the local water body catchment (WFD)	Where this section of the water body (that this bog drains to) has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

7.2 Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM).** BnM maintains a provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM

is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths and LiDAR Surface Maps, these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-18-21 titled: ***Aerial Imagery 2000***

BNM-ECO-26-18-22 titled: ***Aerial Imagery 2020***

BNM-ECO-26-18-04 titled: ***Peat Depths***

BNM-ECO-26-18-03 titled: ***LiDAR Map***

BNM-ECO-26-18-09 titled: ***Depression Analysis***

The restoration and rehabilitation measures are provisionally outlined in drawing BNM-ECO-26-18-20 titled: ***Standard Rehabilitation Measures*** in the accompanying Mapbook.

These rehabilitation measures for Derryhinch Bog will include (see Table 8.1):

- A widespread drain-blocking programme will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes.
- Wetland measures including drain blocking, modifying outfalls and managing water levels with overflow pipes.
- The existing silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that the silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. The silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

Table 8-1 Types of and areas for rehabilitation measures at Derryhinch Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	117.3
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	112.8

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Type	Code	Description	Area (Ha)
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	64.2
Marginal land	MLT1	No work required.	6.7
Silt Pond	Silt Ponds	Silt Pond	3.6
Constraint	Constraints	Access, turbary/turf cutting, archaeology, forestry and watercourses.	30.2
Total Area			**334.7**

*Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

8.1 Short-term planning actions (0-1 years)

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Derryhinch Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g., breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

8.2 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9.

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- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.

8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (see section 9 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

8.4 Timeframe (to be adjusted when the rehabilitation plan is finalised)

- **Year 1**: Short-term planning actions.
- **Year 1**: Short-term practical actions
- **> Year 3**: Decommission silt-ponds, if necessary

8.5 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

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9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC License Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed;
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

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APPENDIX I. BOG GROUP CONTEXT

The Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Cos. Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Derrygreenagh Group ceased in 2020. Decommissioning for the Derrygreenagh Group started in 2021 at a number of individual bogs and PCAS rehabilitation started in 2021.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The BnM Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carrenstown, Bracklin and Lisclogher East. Milled peat was supplied from Ballivor, Carrenstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford). Kinnegad Bog is an isolated bog unit with no industrial railway link to the other bogs. Kinnegad Bog is located to the south of Kinnegad in Co. Meath. This bog supplied mainly milled horticultural peat via road to various customers.

The Derrygreenagh Bogs sub-group is located to the south and east of Rochfortbridge (Co. Westmeath), along the borders of Co. Westmeath, Offaly and Meath. Four bogs (Ballybeg, Derryhinch, Drumman, Toar) supplied milled fuel peat via industrial railway to Edenderry Power.

Lisclogher East was never developed for milled peat production, but it was used for sod turf extraction until recently. A large section of Bracklin was formerly a sod peat production bog and was never converted to milled peat production. This area has developed as cutaway. Lisclogher West was drained in the 1980's but has never been put into industrial peat production. Bogs that have been in industrial peat production for decades (such as Ballybeg and Drumman) have become cutaway as peat was extracted from the sites and the active industrial peat production area shrunk. A large section of cutaway in Derryarkin and Drumman has been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd). A large section of Derryarkin was also rehabilitated in 2001-2002 with wetland development via outfall blocking.

There has already been significant rehabilitation work carried out within the Derrygreenagh Bog Group. BnM originally established a grassland research unit and farm at Derryarkin. This farm has now been closed for some time but grassland established from cutaway has been sold to local farmers. Older rehabilitation includes the establishment of confer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

During the 1980s/1990s about 176 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Drumman and Derryarkin in several different areas. There is ongoing management of these areas by Coillte.

One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Fertiliser and nursery crop trials were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

In Derryarkin, wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.

A small area of cutaway at Derryarkin has been leased to DAMX Ltd for the development of an off-road moto-cross track at Derryarkin.

An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.

Part of the cutaway at Ballybeg (76 ha) was planted with Alder (2008-2009) as a biomass trial (for fuel).

An area of marginal raised bog (19 ha) was restored at Bracklin Bog in 2016, as part of the BnM Raised Bog Restoration Programme. An extensive drain blocking programme was carried out to raise water levels and help re-wet the bog area, encouraging the development of Sphagnum-rich 'active' peat-forming raised bog. This area is of significant biodiversity and cultural interest to a local group called Meath-Westmeath Bog Group

Some rehabilitation was carried out in a small area of cutaway in Balivor Bog (9 ha) in 2015. This involved drain-blocking to maintain and enhance re-wetting of an area of cutaway with *Sphagnum*-rich poor fen peat-forming vegetation.

Rehabilitation and re-wetting as part of the Peatland Climate Action Scheme (PCAS) has been completed at Carrenstown and Lischogher West.

BnM is currently developing a wind energy project called Ballivor Wind farm (BnM Wind Farm | Ballivor Wind Farm). This proposed project has been submitted to the planning authority. The proposed location extends across parts of Bracklin, Lisclogher East, Carranstown and Ballivor Bogs.

BnM has secured planning consent for the Derrygreenagh Power Project (Drumman Bog), a thermal power plant. Planning consent included the associated infrastructure required to connect the development to the national gas and electricity transmission networks, enabling integration with the wider energy system

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC License Ref. PO-501-01-01 is outlined in Table Ap-1.

Table Ap-1: Derrygreenagh Bog Group names, area and indicative status (Derrygreenagh Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Bracklin	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats	2020	Draft 2023 Bracklin West (sub-site) rehabilitation completed.

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Bare peat is prevalent in the western section, which was in milled peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.		
Carranstown	306	Industrial peat production commenced at Carrenstown in the 1980s. The majority of the site has relatively deep peat.	Carranstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat. There are cutaway habitats developing on the eastern side. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Finalised 2022 Planned Rehab completed
Lisclogher East	486	Industrial peat production commenced at Lisclogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lisclogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Lisclogher West	239	Lisclogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lisclogher West was drained but never fully developed for industrial peat extraction.	N/A	Finalised 2023. Rehab completed
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat.	2020	Draft 2017
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	N/A
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s. Most of the site is cutaway	Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.	2020	Draft 2026
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction in past.	Between 1988 and 1991	Draft 2026
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.	2017	Draft 2026

Draft

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Most of the site is bare peat with emerging cutaway habitats. Part of the site was used to trial herb production. This initiative has now ceased.		
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction. Part of the site was used to trial herb production. Part of the site is used for log storage (biomass).	2018	Draft 2026
Toar	445	Industrial peat production commenced at Toar in the 1950s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Most of the site is bare peat. Part of the site is used for log storage (biomass).	2018	Draft 2026

See Drawing number BNM-ECO-26-18-24 titled ***Bog Group Map***, included in the accompanying Mapbook which illustrates the location of Derryhinch Bog and the Derrygreenagh Bog Group in context to the surrounding area.

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APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Bog Name:	**Derryhinch**	**Area (ha):**	337ha
Works Name:	Derrygreenagh	**County:**	Westmeath and Meath
Recorder(s):	MMC & DF	**Survey Date(s):**	21-10-2009

Habitats present (in order of dominance)

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of former production bog)
- Minor re-colonisation of Poor fen vegetation (pJeff, pEang).
- There are several areas where there is more substantial development of pioneer communities including: Bare peat (BP), pioneer Poor Fen communities (pJeff, PEang) and *Betula pubescens*-dominated scrub (eBir).
- A small area of cutaway in the north-east section contains a mosaic of pioneer dry grassland (gCal) and Gorse scrub (eGor).
- A small mineral island located in the mid-west section contains Birch scrub and is surrounded by dry grassland (gCal).
- A wetland mosaic has developed in association with the scrub in the southern section within the old cutover area (Sod-peat). Wet and drier Birch scrub (eBir, oBir) is most common and other habitats such as Poor fen communities (pRos, PEang), Tall Reedbed (pThy) and Dry heath (dHeath) are present. There is also some active cutover bog with bare peat where sod-turf is being actively removed.
- Fringe habitats found on the edges around the site include dry grassland (gCal), Birch scrub and Gorse scrub (WS1), scrub railway lines (BL3) and drainage ditches (FW4).
- There are several silt pond areas. These areas contain steep banks vegetated with dry grassland (gCal), Bracken (), disturbed vegetation and developing scrub. The ponds contain open water with poor development of aquatic or emergent wetland vegetation.

Description of site

Derryhinch Bog is located to the north east of Derrygreenagh works near Rochfortbridge. The M6 motorway passes directly to the western edge of the site. Construction of the motorway 'cut off' some of the original bog area along the western boundary. The boundary of the bog now extends to the base of the motorway embankment.

The majority of the site is composed of areas of bare peat with only small sections developing pioneer vegetation, primarily made up of pioneer Poor fen communities with emergent Birch scrub. Some sections towards the north-east corner and in the eastern section are developing some drier communities with emergent Birch scrub (eBir), Gorse scrub (eGor), dry grassland (gCal), disturbed vegetation (DisCF) and some Poor fen (pJeff) all represented. Wetter patches containing poor fen (pEang, pJeff) and emergent Gorse scrub (eBir) are present along the southern section of the former production cutaway and along the western boundary.

A small section of the site south of the railway is used as a sod-peat area. This section contained the most significant features of biodiversity interest. The majority of the site is old cutover bog with a mosaic of face-banks, fields and drains at different heights. Most of the plots have been abandoned. This area was quite treacherous and dangerous to survey, particularly the denser scrub, due the variety of drains and face-banks. The vegetation is quite well established in this area and a complex mosaic of habitats has developed that is related to the underlying environmental conditions that the cutover plots were left in and the time elapsed since the plots were abandoned. The majority of this area is developing mature Birch scrub with some small patches doing to Birch woodland (WN7). The underlying conditions are quite variable, ranging from standing water with emergent Reedmace or Bottle Sedge to dry sections, and this adds to the diversity of the area. Some sections are still open and may have wetter or drier communities depending on level of the cutover. The drier open sections are dominated by Heather while there are damper hollows with some excellent *Sphagnum* regeneration that is associated with cutover bog vegetation dominated by Bog Cottons. Other indicators of a more acidic substrate (compared to industrial cutaway) were present such as *Eriophorum vaginatum*.

A small area of high bog is located in the north-west corner of this sod-peat area. This area is largely intact, although there were some signs of surface cutting in the past. The majority of this area would be classified as marginal ecotope as it is quite dry with signs of degradation. The damaged sections have mainly re-vegetated and there is some *Sphagnum* regeneration in these damaged areas with *Rhynchospora alba'*.

A Works area with cabins, material storage and refuelling facilities is located along the northern boundary of the site.

An iron flush was noted in the eastern half, towards the centre of the bog in a raised area with a mosaic of pioneer communities.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

Adjacent habitats and land-use

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Habitats and land-use around the site include improved grassland (GA1) for grazing livestock and growing fodder, a remnant patch of raised bog (PB1), some Birch woodland (WN7), and a motorway (M6) on an embankment (BL3). A significant area of conifer plantation (WD4) has been planted on more mineral soil to the south of the site.

Watercourses (major water features on/off site)

Drainage ditches (FW4) are located along the site's southern and northern boundaries and there are also several silt pond areas present on the site. Two water courses are located to the south of the site – the Miltown River and the Mongagh River are situated approximately 200m and 400m respectively from the southern boundary of the site. Both rivers drain east towards the Boyne catchment. A third stream/drain also flows along part of the northern boundary. This stream drains towards the Kinnegad River and is part of the Boyne River catchment.

Fauna biodiversity

- Several birds were noted around the site. Snipe were widespread around the site roosting in the poor fen vegetation, drainage ditches and scrub (13 sightings around site). Meadow Pipit also widespread around site using cutaway areas and areas with established vegetation cover (4 occurrences). Reed Bunting, Blackbird, Wren, Robin and Blue Tit were noted in the Birch scrub in the southern section of the site and in other areas. Several Long-tailed Tits were noted using the silt-pond area in the south-east corner of the site. A pair of Mallard was roosting in a drain in the eastern section.
- Signs of Rabbits are common around the site and on the mineral island. Signs of Hares widespread around site, especially on younger cutaway with establishing vegetation and some bare peat.
- Signs of Deer activity (droppings) in southern part of the site along the boundary with the conifer plantation.
- Pine Marten tracks noted in the southern section.
- Signs of Badger activity in the middle section among pJeff sections.
- Fox droppings recorded in the south western section.
- Frog recorded in the northern section.
- Sticklebacks (fish) noted in drains in the north and north west.

Fungal biodiversity

Common puffball (*Lycoperdon perlatum*), Vermillion Waxcap (*Hygrocybe miniata*), Bleached Brittle gill *(Russula exalbicans*), *Lactarius uvidus, Armillaria sp.,* Brown Birch Bolete *(Leccinum scabrum)* and *Lepiota hystrix*.

HABITAT DESCRIPTIONS

(See Habitat Descriptions Document for detailed description of each vegetation community not described in this section.)

Sod-peat area (open Birch scrub mosaic)

This area contains a range of habitats that have developed into a mosaic due to the history of the site as a domestic cutover area. A mosaic of fields, drains and face-banks of different highest and sizes has been abandoned and left to naturally re-colonise for some time. This area now contains mainly open Birch scrub although there are pockets of more mature trees that could be classified as Birch woodland (WN7) as well as more open areas with energizing Birch scrub, patches of poor fen communities with no scrub and drier fields with Dry Heath dominated by *Calluna vulgaris*. Several access strips divide this area into several sections and these strips are drier or are dominated by *Calluna vulgaris.*

The *Betula pubescens* scrub contains frequent *Salix cinerea* and *Salix aurita*. Other species present include *Rubus fruticosus*, *Chamaerion angustifolium*, *Ulex europaeus*, *Pinus contorta* saplings and young trees, *Molinia caerulea*, *Calluna vulgaris*, *Potentilla anserina, Potentilla erecta, Plantago lanceolata, Crataegus monogyna, Urtica dioica, Succisa pratensis, Lonicera periclymenum, Agrostis stolonifera, Anthoxanthum odoratum, Myrica gale, Dryopteris dilatata, Deschampsia caespitosia, Deschampsia flexuosa, Juncus effusus* and *Polystichum setiferum.* Moss species included *Polytrichum spp., Hypnum spp* and *Pseudoscleropodium purum. Typha latifolia* was noted in some of the old drains.

Denser patches of *Betula pubescens* (Birch woodland) contain *Rubus fruticosus*, *Hedera helix*, *Molinia caerulea*, *Luzula sylvatica*, *Vaccinium myrtillus, Blechnum spicant, Dryopteris felix-mas* and *Pteridium aquilinum* in the ground layer. Mosses present include *Polytrichum formosum*, *Thuidium tamariscinum*, *Dicranum scoparium*, *Pseudoscleropodium purum* and *Sphagnum* spp.

The more open sections could be classified as a mosaic of dHeath, eBir, gMol and pEang. The eastern section is quite dry and is dominated by *Calluna vulgaris* with *Erica tetralix*, *Myrica gale*, *Vaccinium myrtillus* and *Molinia caerulea*. Several hollows contain large hummocks of *Sphagnum capillifolium* and *S. palustre* as well as *S. subnitens* and *S. cuspidatum*. *Sphagnum* cover in some sections is up to 80% while *Aulacomnium palustre* was also present. Other species associated with these damper hollows include *Molinia caerulea*, *Juncus effusus*, *Carex flacca*, *Carex demissa*, *Eriophorum angustifolium* and *Eriophorum vaginatum.*

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Raised bog (PB1)

A small area of this habitat is located in the northwest corner of the sod-peat area, north of the silt ponds. This area is largely intact high bog, although there has been some surface cutting in the past, and the damaged areas have now revegetated. Most of the bog is dominated by *Calluna vulgaris* with *Eriophorum vaginatum*, *Molinia caerulea*, *Eriophorum angustifolium*, *Carex panicea*, *Trichophorum cespitosum*, *Narthecium ossifragum* and some *Myrica gale*. *Sphagnum capillifolium, S. papillosum* and *S. subnitens* are all present. *Rhynchospora alba* is prominent in some of the damaged sections in association with some lawns of *S. papillosum and some S. magellanicum.* Some of these damaged sections correspond with the EU Annex I habitat 'Depressions on the peat substrates of the *Rhynchosporion* (7150), although they are small in extent.

Dry calcareous grassland community (gCal) and *Ulex europaeus*-dominated community (eGor) mosaic

This vegetation mosaic is found at the north-eastern corner of the site. The vegetation is characterised by a pioneer dry grassland community developing in conjunction with frequent *Ulex europaeus* bushes along the edges of the fields. Some *Betula pubescens* saplings and young trees are also present along with small *Salix aurita* bushes. The pioneer grassland is characterised by species such as *Carex flacca*, *Carex demissa*, *Centaurea nigra*, *Molinia caerulea*, *Filipendula ulmaria*, *Potentilla anglica, Succisa pratensis, Plantago lanceolata, Vicia cracca, Agrostis stolonifera, Calluna vulgaris, Achillea millefolium, Juncus effusus, Potentilla anserina, Equisetum sp., Tussilago farfara, Cerastium fontanum, Trifolium repens, Rumex acetosella, Rubus fruticosus, Polygala serpyllifolia, Triglochin palustre, Polytrichum* spp*., Dactylorhiza* sp*., Hypochaeris radicata, Lotus corniculatus, Phragmites australis* and *Pteridium aquilinum.*

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APPENDIX III. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and, in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

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APPENDIX IV. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Any records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing any known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

[7] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security, In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh Bog group (Ref. P0-501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the

process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydro morphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

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11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 Archaeology Code of Practice

BnM operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht (National Monuments Service) and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2017, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna

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Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

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APPENDIX VI. DECOMMISSIONING

1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under section 95 of the EPA Acts. This is achieved by BnM identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stockpile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Derryhinch Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

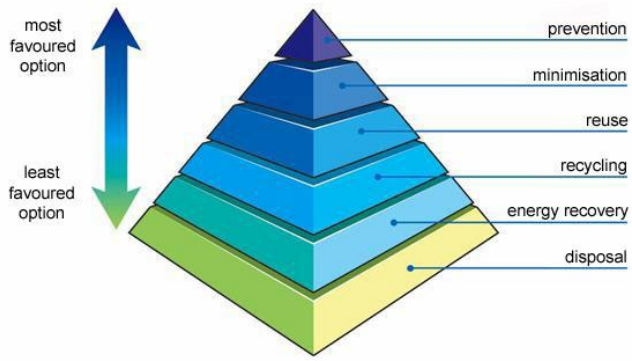
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, BnM will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutover bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary).

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration to defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004).

Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPC Licence's Ref P0501-01, Derrygreenagh Bog Group, Counties, Offaly, Meath and Westmeath.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in Derrygreenagh serviced by a silt lagoons/ponds. During the excavation of these silt ponds, pre IPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or is levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Edenderry Power and Lough Ree Power Ltd screened the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0501-01 IPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed, or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
IPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog and are required to be removed prior to processing.

3.3 Bog Timbers.
Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment
4.1 Silt pond excavation material and cleanings.
The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.
The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.
6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a) (i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a) (ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a) (iii)
Under Condition 10 of the IPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a) (iv)
The peat bogs do not contain any topsoil, so this is not required.

5 (2a) (v)
Peat mineral resources do not undergo any treatment.

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5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c) (i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.

The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.

Therefore, the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	Classification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.

- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Derrygreenagh IPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Derrygreenagh IPC Licence P0501-01.

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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX X. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.



Code of Practice

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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

---

2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

---

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

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Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Derryhinch Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Derryhinch Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.2**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	12	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	02/07/2026	02/07/2026	02/07/2026
Rev. 0.2	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	CS	MMcC
Date:	24/09/2026	24/09/2026	24/09/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			

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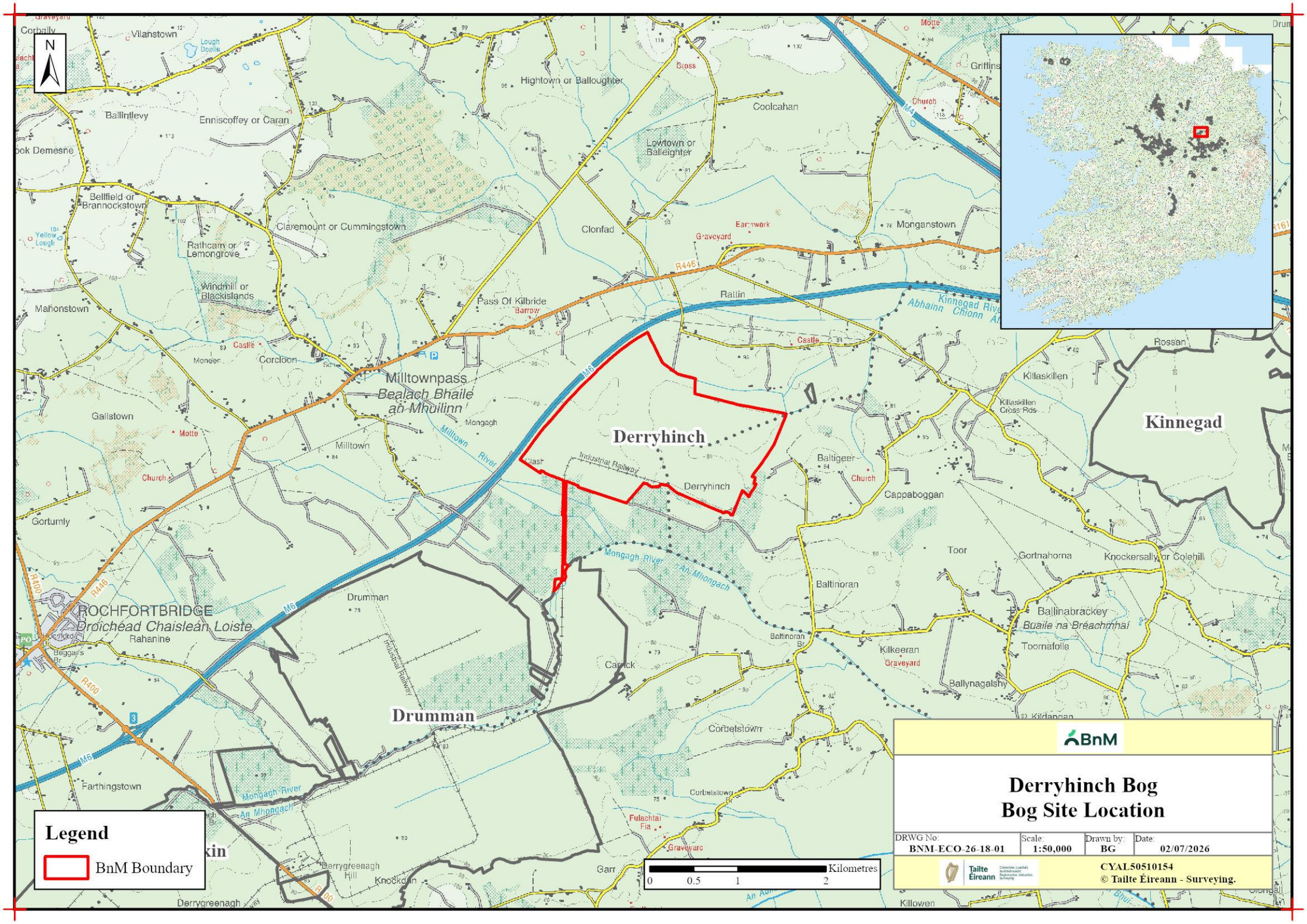
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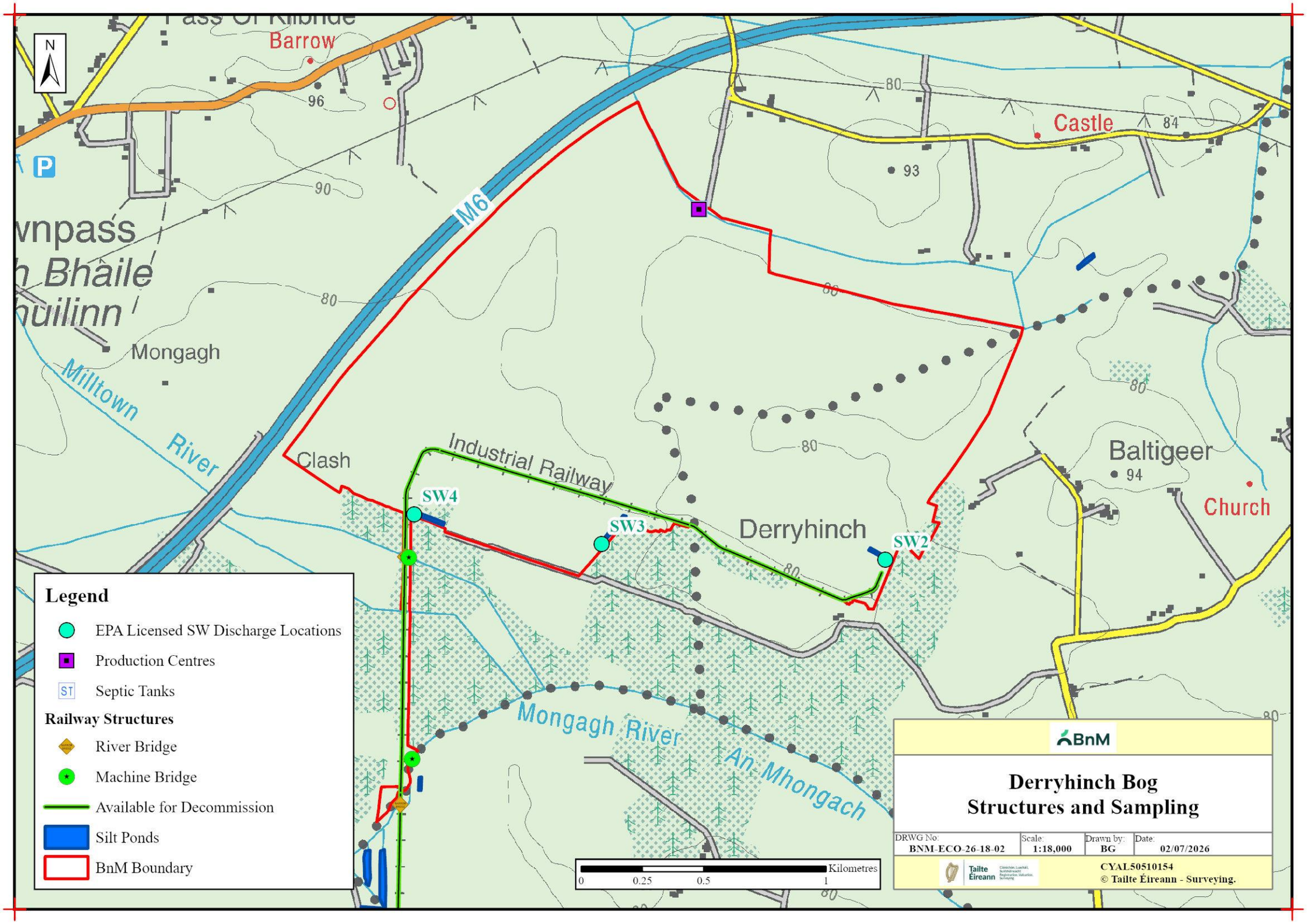
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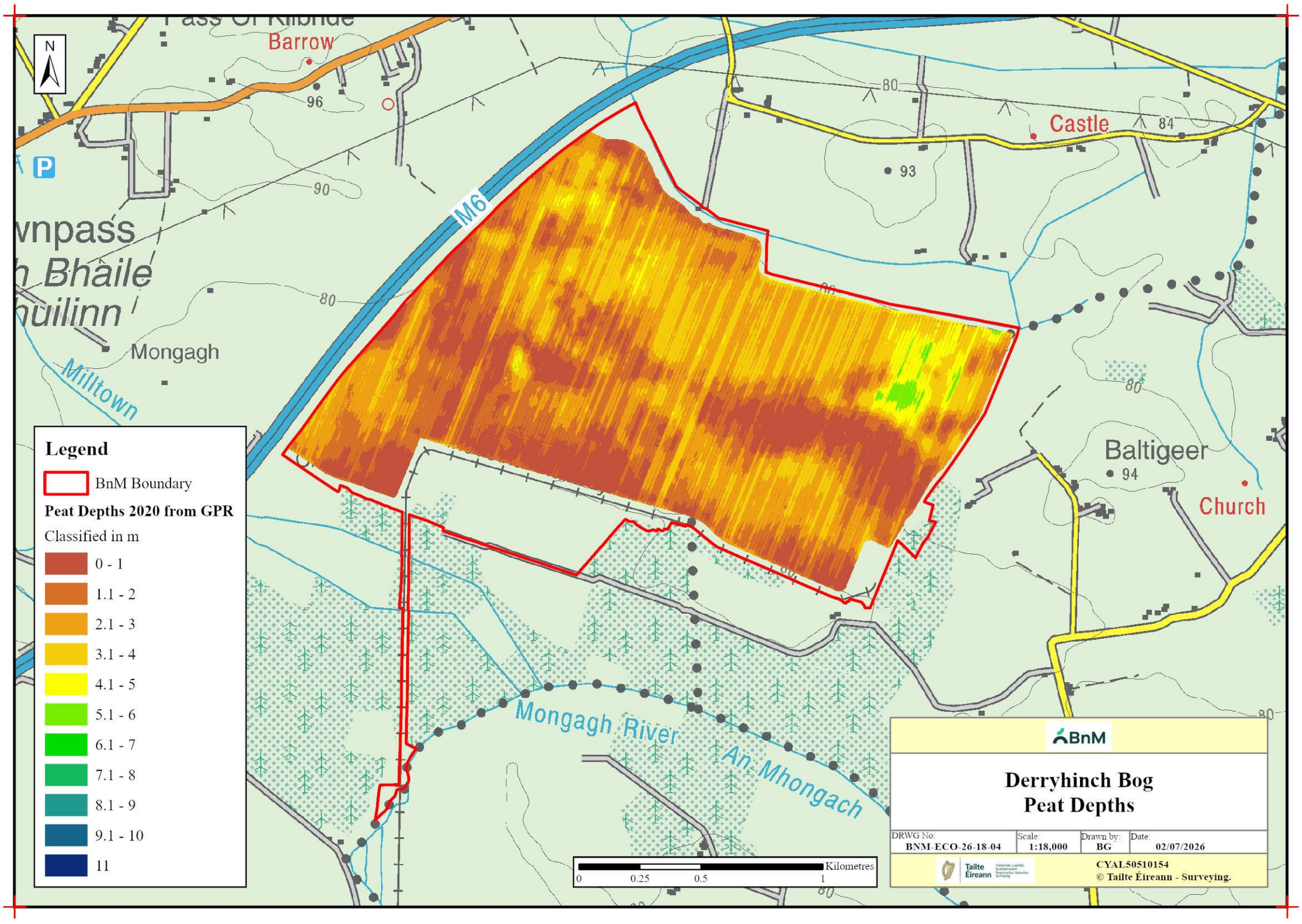
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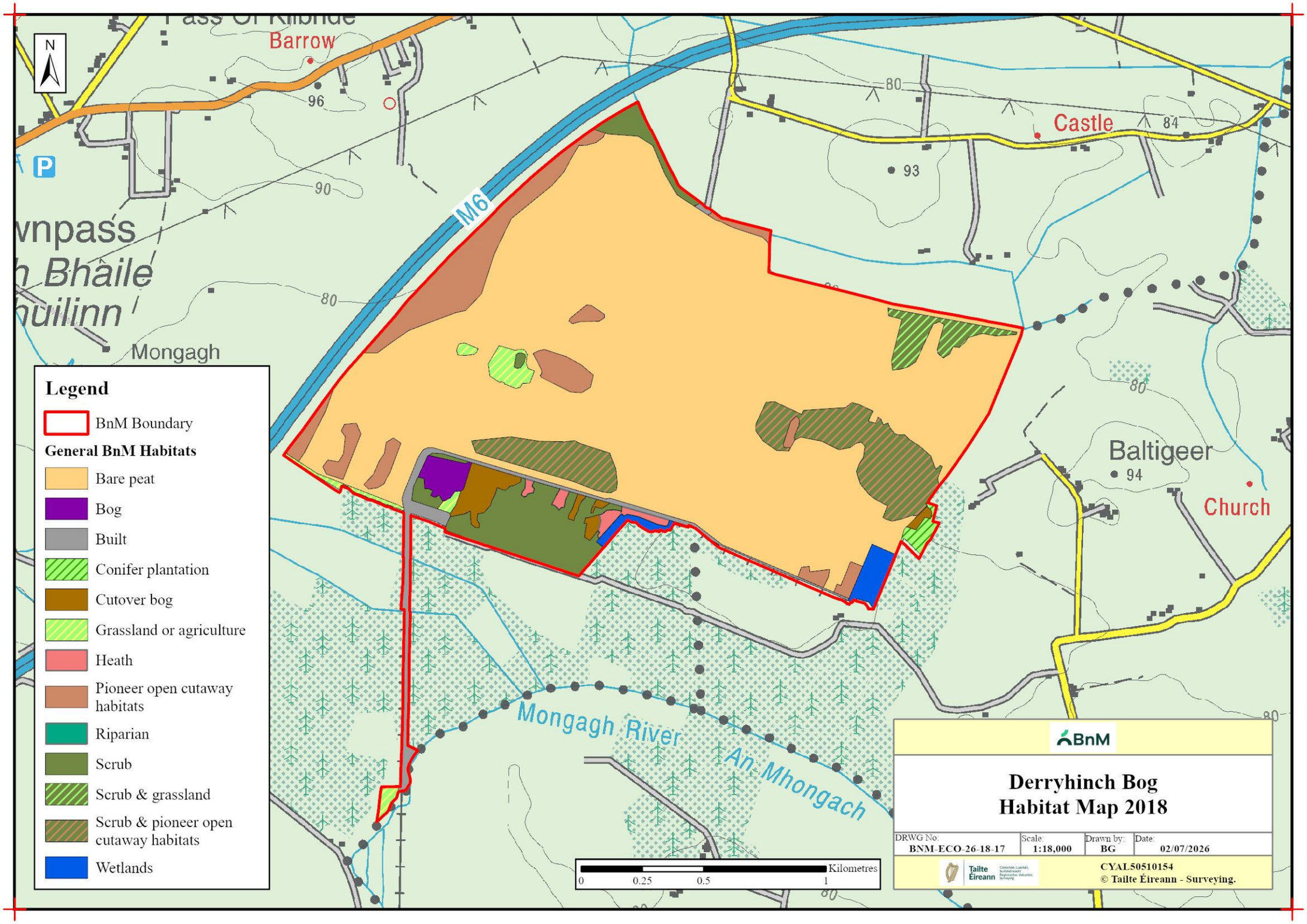



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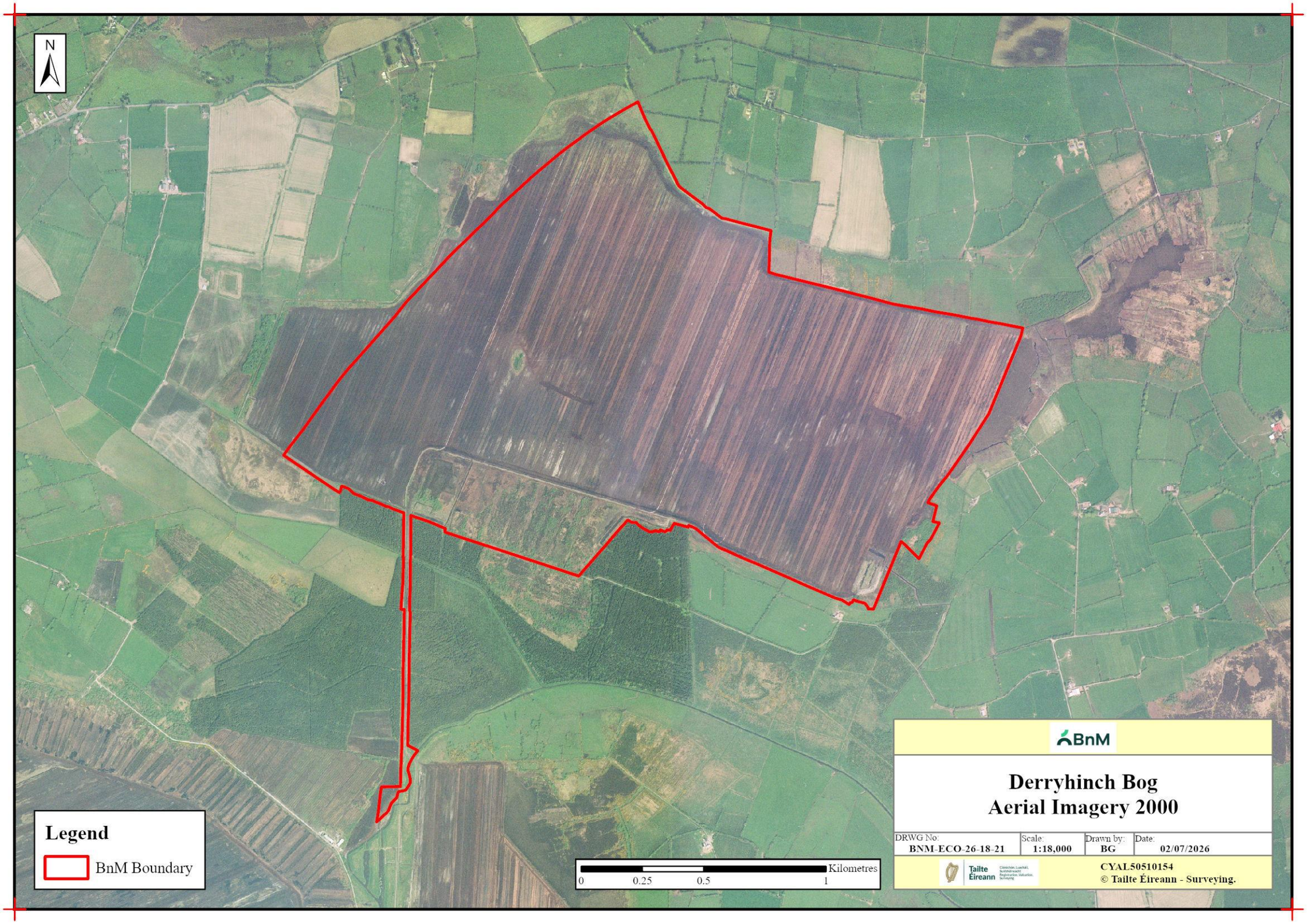
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Mongagh River An Mhongach
Legend
BnM Boundary
General BnM Habitats
Bare peat
Bog
Built
Conifer plantation
Cutover bog
Grassland or agriculture
Heath
Pioneer open cutaway habitats
Riparian
Scrub
Scrub & grassland
Scrub & pioneer open cutaway habitats
Wetlands
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BnM
Derryhinch Bog
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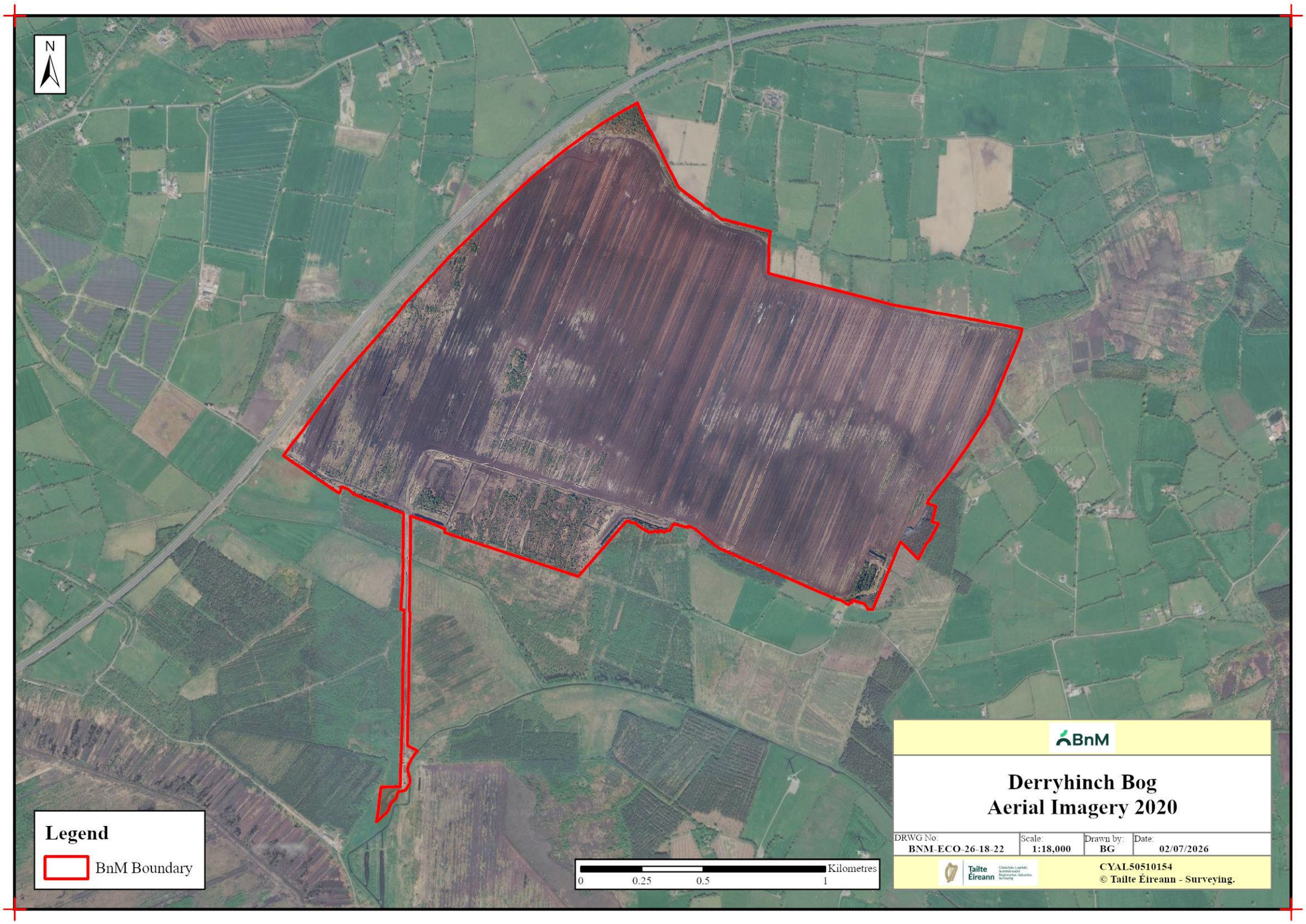
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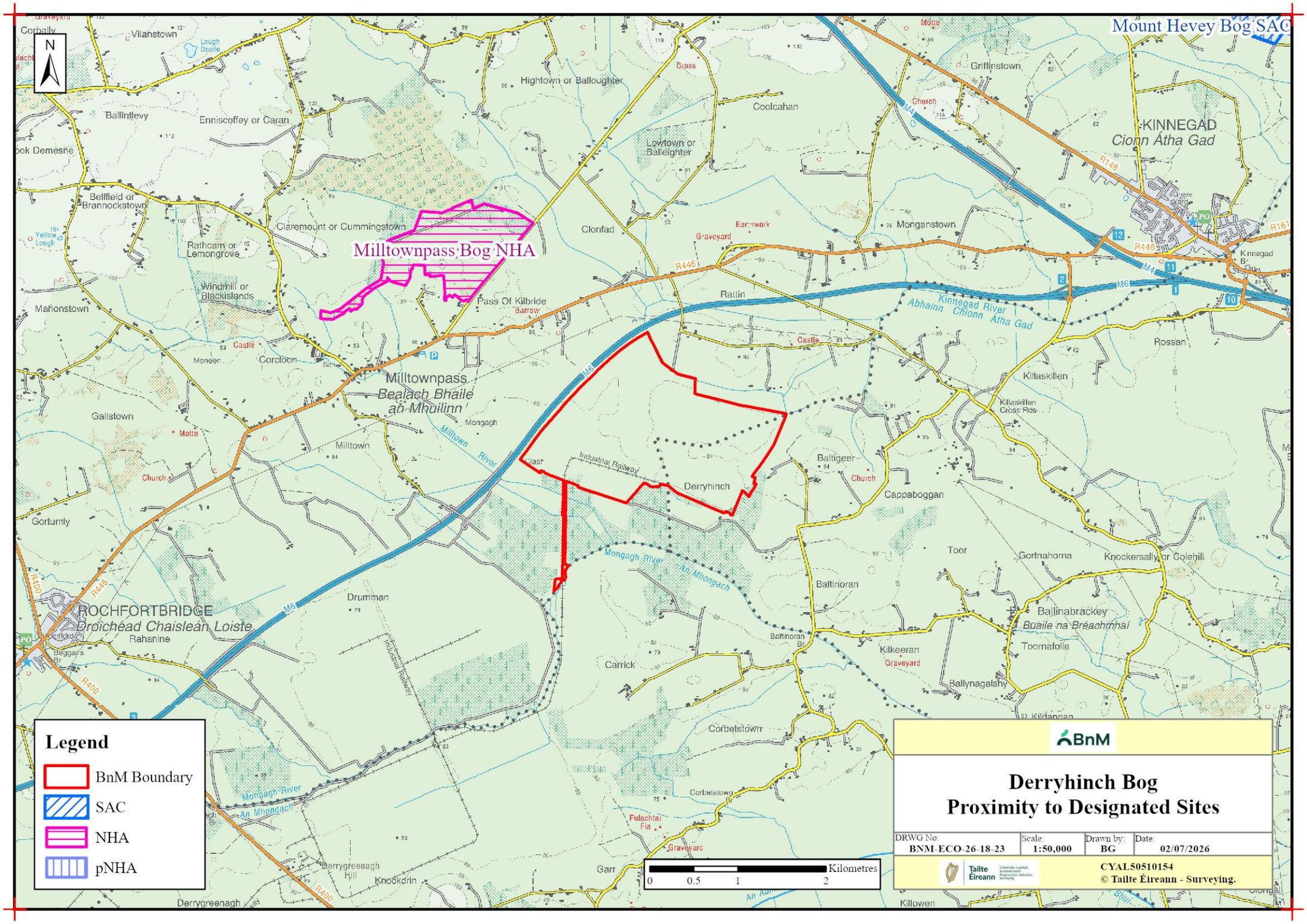
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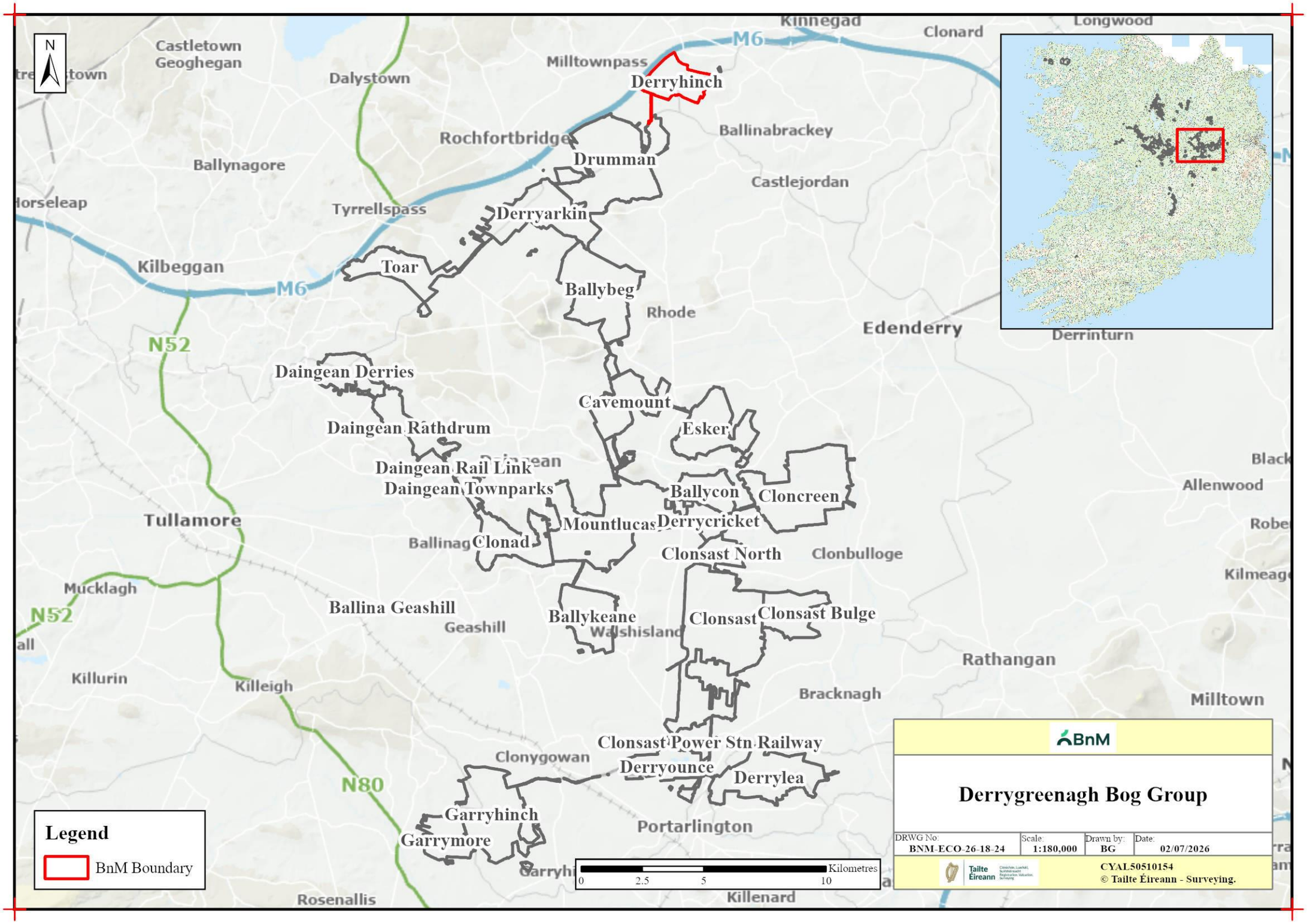
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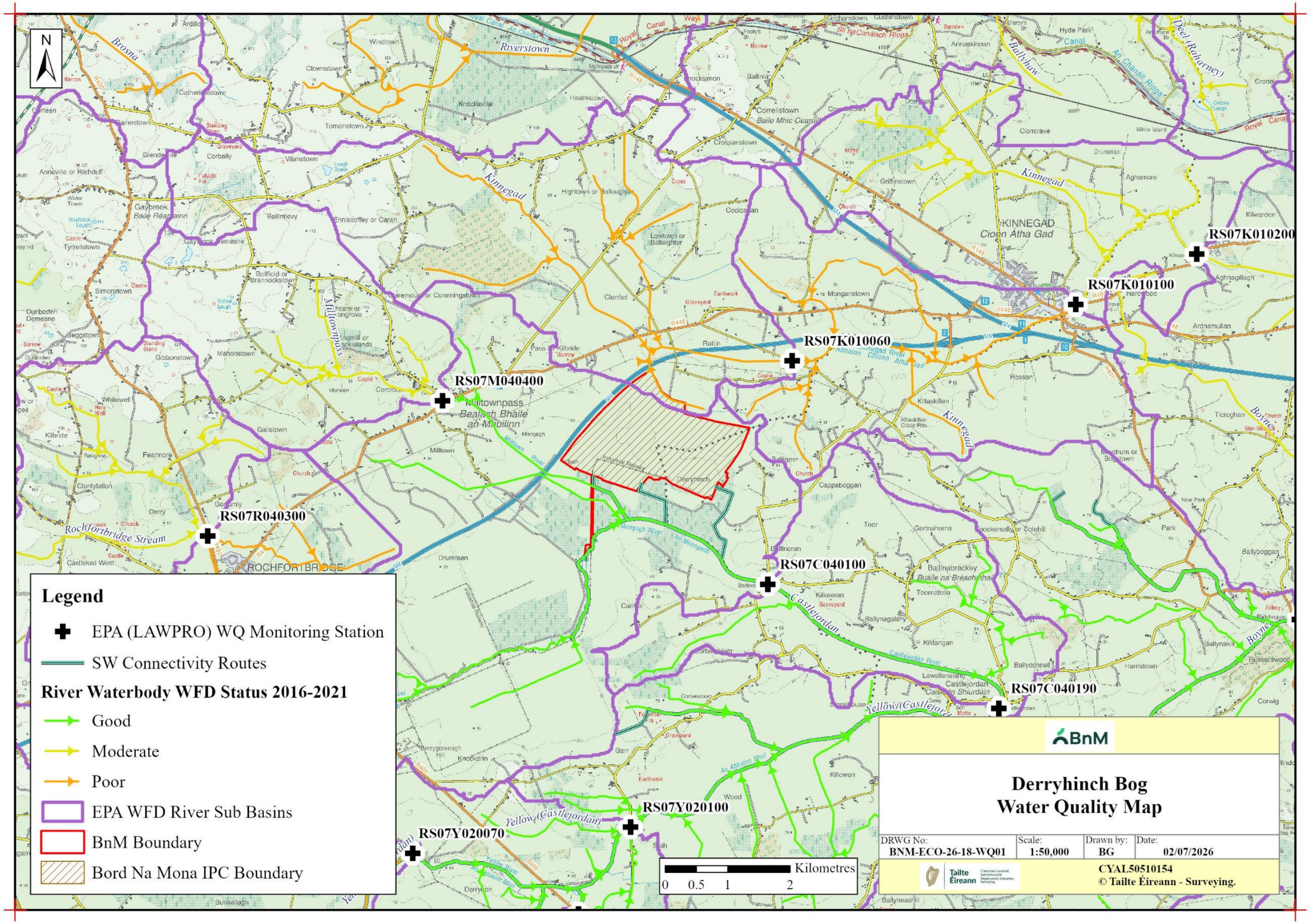
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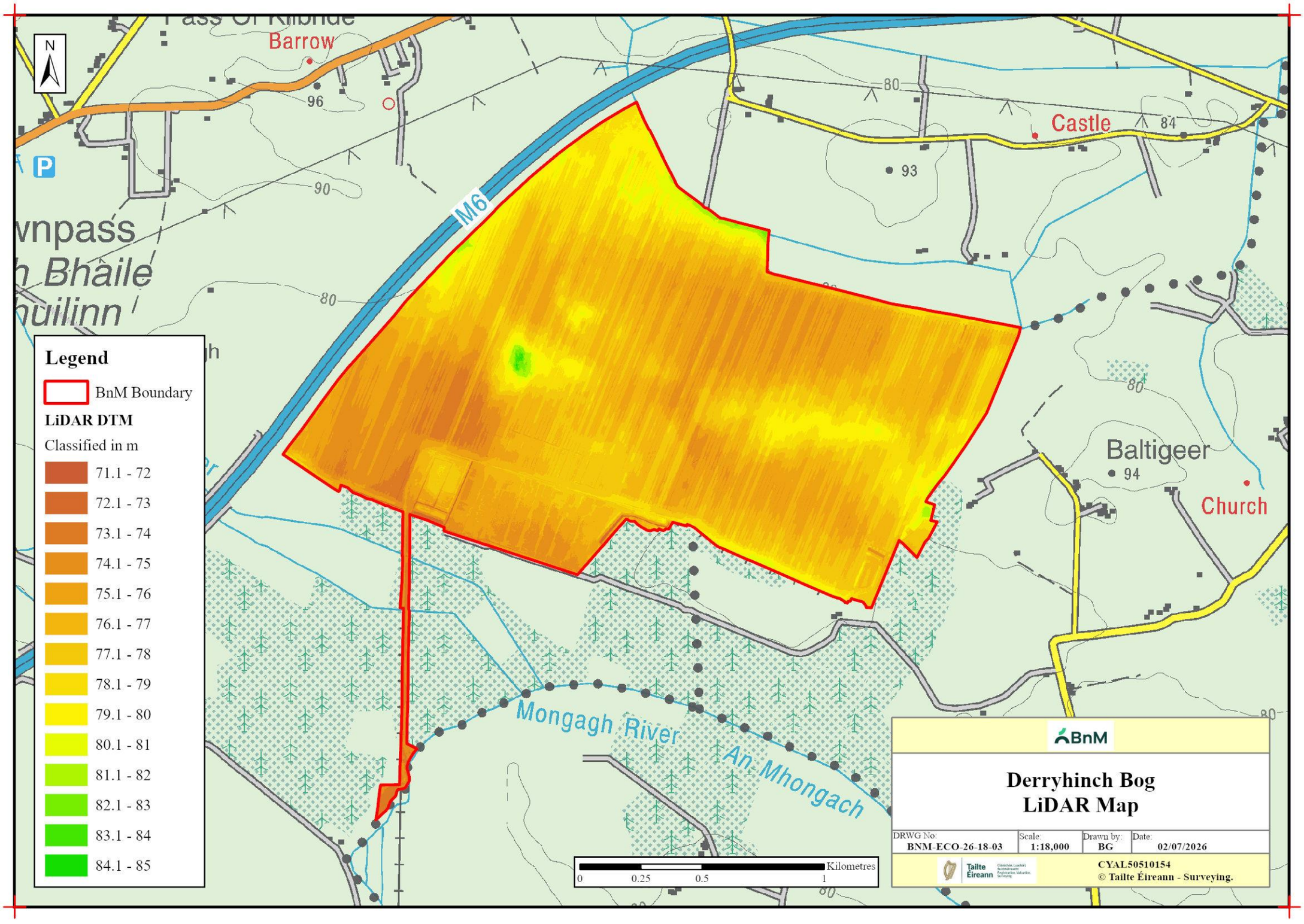
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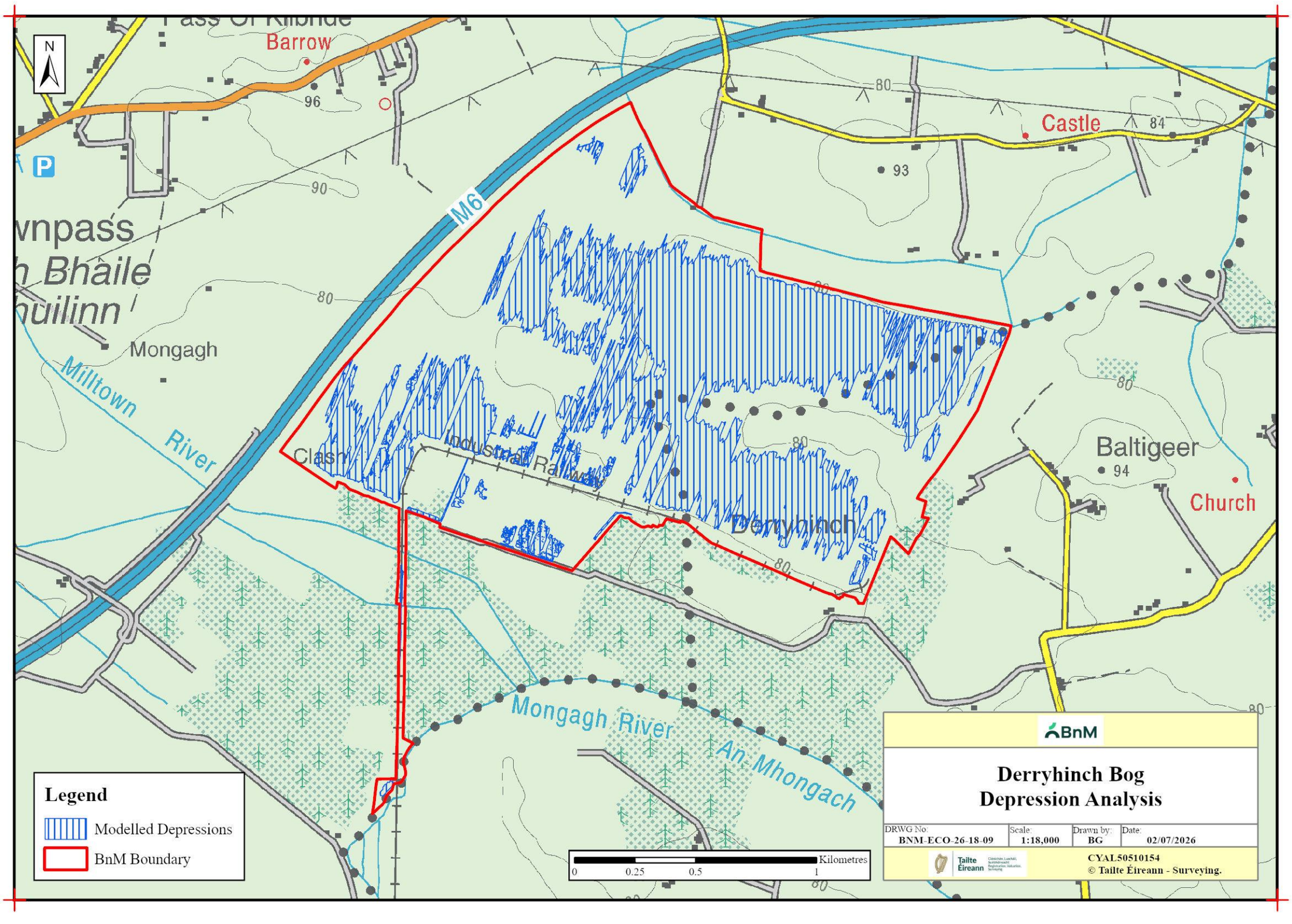
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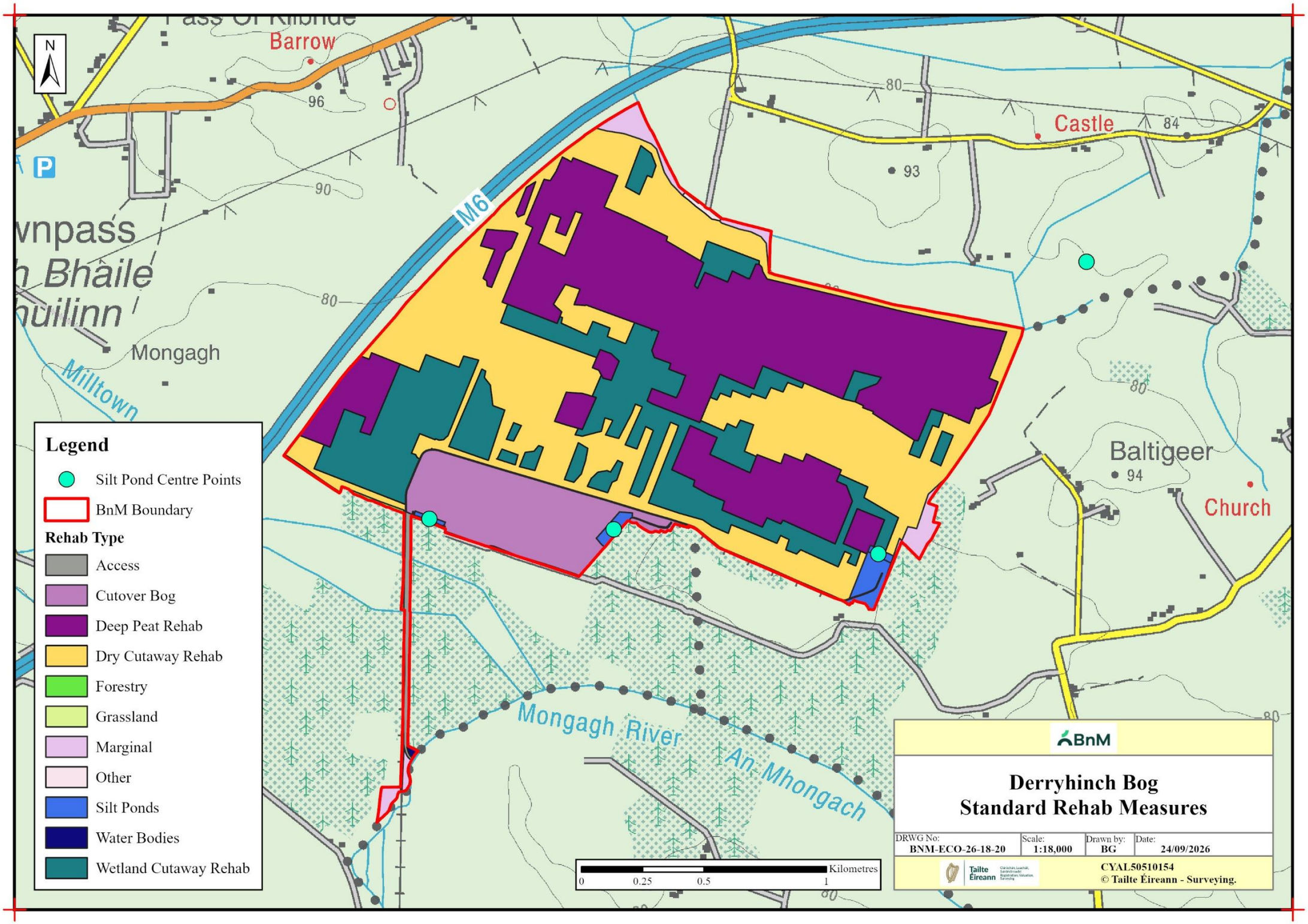
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Rehabilitation Maps


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Drumman Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2026

Draft

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Drumman Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Drumman Bog.

BnM have defined the key rehabilitation outcome at Drumman Bog as environmental stabilisation.

*This rehabilitation plan for Drumman Bog has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. BnM expect to finalise these rehabilitation plans in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Drumman Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Document Control Sheet	
Document Name:	Drumman Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Derrygreenagh ref.501 (EPL)\Drumman\
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	30	4	0	10

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	PE	MMC	MMC
Date:	28/06/2023	31/07/2023	31/07/2023

Rev. 1	Author(s):	Checked By:	Approved By:
Name(s):	JOS	MMC	
Date:	28/09/2023	9/03/2026	
Rev. 1.1	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	CS		
Date:	15/05/2026		

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Non-technical summary

- BnM (formerly Bord na Móna) is updating the rehabilitation plan for Drumman Bog, located approximately 2km east of the village of Rochfortbridge and 10km to the north-west of Edenderry, adjacent to the R400 Rochfortbridge to Rhode Road, and along the Westmeath – Offaly County boundary.
- The BnM works offices at Derrygreenagh (referred to as 'Derrygreenagh Works') are located at Drumman Bog and is close to several other bogs in the Derrygreenagh Bog Group, including Derryarkin and Ballybeg bogs.
- The Offaly/Westmeath County boundary follows the path of the Mongagh River, which flows eastwards and centrally crosses Drumman Bog.
- BnM Industrial peat extraction commenced in Drumman Bog in the 1950s and supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Briquette Factory. Industrial peat production formally ceased on the site in 2018.
- The majority of the site is now developing pioneer and maturing habitats.
- A significant part of Drumman Bog has already been rehabilitated via re-wetting and the development of conifer forestry. There have been several phased pilot rehabilitation measures at Drumman Bog. Part of the bog is also used for gravel extraction.
- A small part of the site is used as a timber storage depot for the supply of biomass to Edenderry Power.
- This rehabilitation plan has been prepared as BnM as part of obligations to carry out peatland rehabilitation via an IPC Licence issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies.
- It will take some time for vegetation and habitats to fully develop at Drumman, and a peatland ecosystem to be restored. However, it is expected that any bare peat will be developing pioneer habitats after 5-10 years.
- Rehab measures will include drain-blocking and other measures to raise water levels to the surface of the bog, thus encouraging the development of naturally functioning cutaway peatland habitats.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- Peatland rehabilitation of this bog will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.
- Many BnM bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats can be developed, like poor fen and wetlands with reedbeds and Birch woodland on shallower peat.
- The development of a range of habitats at Drumman Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new peatland and wetland habitats.

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- This peatland rehabilitation plan does not outline future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the bog.

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1. INTRODUCTION

BnM (formerly known as 'Bord na Móna' and used interchangeably in this report) operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh bog group (Ref. P0501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

Drumman is a part of the Derrygreenagh bog group (see Appendix I for details of the bog areas within this Group). Drumman Bog is located in Counties Offaly and Westmeath, with the administrative boundary for both counties defined by the Mongagh River, which flows eastwards across Drumman Bog.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix V).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance, and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Drumman Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

BnM are carrying out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) on its peatlands (2021-2026). This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the scheme are being supported by the Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) are acting as the scheme regulator. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part the PCAS project are **NOT** proposed as part of this draft Drumman rehabilitation plan at this stage.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC Licence Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This document covers the area of **Drumman Bog.**

Parts of the margins of Drumman Bog, are currently being used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Drumman Bog. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

There are known rights of way around the margins of Drumman Bog. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as archaeology/monuments.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered recently published guidance issued by the EPA – '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and general bog information collected during the BnM ecological baseline surveys, additional site visits (covering the period 2011 to 2023 inclusive) and monitoring and desktop analysis, forms the basis for the development of this rehabilitation plan for the bog along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and peat depth data;
- Hydrological modelling.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best practice guidance (full citations are in the References section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Feehan, J. (2004). A long-lived wilderness. The future of the north midland's peatland network. Department of Environmental Resource Management, UCD.
- Foss, P.J., Crushell, P. & Gallagher, M.C. (2017) Title: Counties Longford &Roscommon Wetland Study. Report prepared for Longford and Roscommon County Councils.

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- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: A Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. Al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND – Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas – The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Derrygreenagh bog group Integrated Pollution Control Licence;
- Derrygreenagh bog Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland – National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/;
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);

- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Report 2025;
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Drumman Bog was surveyed in 2011. Habitat maps were updated in 2017. Additional ecological walkover surveys and visits have taken place in between 2017 and 2023, in advance of the preparation of this rehabilitation plan. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best practice guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2019), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4).

A detailed ecological survey report for Drumman Bog is contained in Appendix II.

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3. SITE DESCRIPTION

Drumman Bog is located in located approximately 2km east of the village of Rochfortbridge and 10km to the north-west of Edenderry, adjacent to the R400 Rochfortbridge to Rhode road, and along the Westmeath - Offaly county boundary. The Mongagh River flows eastwards across the site, defining the county boundary and dividing the site into two large sections. See Drawing number BNM-ECO-26-18-01: ***Site Location Map***, included in the accompanying Mapbook[1], which illustrates the location of Drumman Bog in context to the surrounding area.

Industrial peat extraction commenced in Drumman Bog in the 1958 and supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Briquette Factory. Industrial peat production formally ceased on the site in 2018. One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Rehabilitation trials using fertiliser and nursery crop were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha, which were successful in re-vegetating and stabilising these areas. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. Subsequent crop trials in Drumman took place in 2014 (grass-seed).

A large section of cutaway has also been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd).

The south-eastern part of the northern section of Drumman Bog comprises conifer plantation forestry and was developed by Coillte.

In addition to the above, parts of the remaining site have naturally re-vegetated with typical cutaway habitats. There are also several sections of remnant high bog (PB1) around the margins of the site. These have generally been cut for sod peat. Ownership of these areas is currently being reviewed.

3.1 Status and Situation

3.1.1 Site history

Drumman Bog was developed as an industrial peat production bog that formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Briquette Factory and Edenderry Power Station.

Active rehabilitation took place within a large section of the site with the blocking of a main outfall in 2005 raising water-levels, re-wetting cutaway and creating a large wetland area. Wetland habitats such as Reedbeds are continuing to develop in this area.

A small part of the site (< 5ha) was used to establish a herb production trial. This pilot project has now ceased.

At the time of cessation of industrial peat production in 2020, the majority of the remainder of the site comprised bare peat. Cutaway habitats have been developing across the site since this time.

[1] Cutaway Bog Decommissioning and Rehabilitation Plan – Drumman Bog Map Book

3.1.2 Current land-use

All industrial peat production at Drumman Bog (including some licenced turf-cutting) has now ceased as of 2018. It is noted that there is some private sod-peat production around the margins of the high bog, both inside and outside the ownership of BnM.

BnM, in partnership with Roadstone have over the years developed part of the site for sand and gravel extraction (Derryarkin Sand and Gravel Ltd). Sand and gravel extraction was initially permitted in Derryarkin Bog, to the west of Drumman Bog, under Planning Reg. Ref. 01/365. An EIS was prepared for this development. Subsequently, a planning application seeking permission to expand footprint of sand and gravel extraction in Derryarkin Bog into Drumman Bog was lodged to Offaly County Council in 2019 (Offaly Reg. Ref. 19/25) which was granted permission for a period of 18 years. This planning application was accompanied by an Environmental Impact Assessment Report. This permission remains active until January 2037. A remediation plan was prepared for the footprint of the gravel extraction as part of this consent and this incorporates and enhances wildlife habitats that have already been developed along with regrading of some areas and the provision of public amenity with walking trails. The feasibility of expanding gravel extraction at Drumman is currently being explored.

A significant portion of the cutaway at Drumman is leased to Coillte for the development of conifer forestry; during the 1980's/1990's about 80ha of the cutaway bog and marginal bog was developed for forestry by Coillte in several different areas. There is ongoing management of these areas by Coillte.

Part of the site was also used to trial fertiliser and lime treatments and nursery crops on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

A small part of Drumman Bog is used for timber storage, which is used as biomass fuel at Edenderry Power. This timber storage depot received planning consent.

A BnM industrial railway network runs through the site and is an active link to Edenderry Power Station; this is part of the greater Derrygreenagh bog group industrial rail network. It is anticipated that this railway will be decommissioned when peat stocks are finally removed from neighbouring bogs.

There are several small sections of remnant raised bog along the margins of Drumman bog. The majority are degraded and have been cut privately for sod peat over the years, but they all still retain some typical raised bog characteristics.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities in these areas at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were

located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

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In respect of Drumman Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station.

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas. These job numbers have now declined with the cessation of peat extraction at this bog.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying bedrock geology[2] at Drumman Bog comprises Dinantian Limestones (undifferentiated). Quaternary sediment maps indicate that Drumman is primarily underlain by peat, with till derived chiefly from Limestone. The site is underlain with a mix of limestone till and marl/lacustrine clay sub-soils. The limestone till sub-soil is exploited for sand and gravel extraction across part of the site.

3.2.2 *Peat type and depths*

Much of Drumman Bog is now cutaway, and the majority of the original raised bog has now been removed. Drumman is considered to be a shallow peat cutover bog, and it is estimated that between 0.5m - 1.5m of residual fen or minerotrophic peat remains within the majority of the site.

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

The different cutaway habitats developing across the site reflects the underlying and varying environmental conditions. Environmental factors such as hydrology, residual peat depths and topography all have a significant influence on the future development of cutaway habitats and proposed rehabilitation. Hydrology tends to have the most significant influence on the development of future cutaway habitats. All sites have hydrological

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

gradients from wet to dry habitats. Shallow residual peat usually means there are stronger fen influences on the pioneer cutaway development as fen peat is the residual peat type and groundwater has a stronger influence.

The majority of Drumman Bog comprises a mosaic of bare peat along with cutaway habitats. Some of these areas contain developing wetlands.

The main notable areas within the site are described below. The northern cutaway area has not been used for peat extraction for some time, has been re-wetted in part and has established a mosaic of cutaway wetlands and dry Birch scrub and woodland. The open water forms a mosaic with emergent reedbeds (mainly Common Reed with some Reedmace) and large areas of fringing Poor fen communities with Bog Cotton-dominated (pEang), Soft Rush-dominated (pJeff) and some Bottle sedge-dominated (pRos) vegetation (codes refer to BnM habitat classification). There are several small areas of bare peat. This area was used in part for several pilot rehabilitation projects using fertiliser lime and nursery crops. This area is also used for gravel extraction and for conifer forestry. The cutaway area south of the Monagh River is used for gravel extraction and was used in the past for the Herb Project. The former production area is a mosaic of bare peat and pioneer vegetation. There are small wetland features establishing as the drainage breaks down and there are patches of Birch scrub and woodland establishing. There are some dry areas that are somewhat elevated and underlain by limestone based till. These areas are developing pioneer dry grassland (gCal) disturbed vegetation (DisCF) and Soft Rush-dominated Poor fen vegetation (pJeff) forming mosaics with bare peat. Some marginal areas also have developed tussocky grassland (GS2) and patches of Bracken (HD1) along the railway and track along the river. This type of grassland is also prominent on the banks around the silt-ponds.

A key feature in Drumman Bog is the development of an artificial lake (FL8) that is used by breeding and wintering water birds such as Mute Swan and Great Crested Grebe.

See Drawing number BNM-ECO-26-18-17 titled**: *Habitat Map 2018***, included in the accompanying Mapbook, which illustrates the habitats at Drumman Bog. See also Appendix II for more detail on site, habitats and local features.

3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Drumman Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC).

The rare plant Blue Fleabane (*Erigeron acer*) has been recorded at several locations around the site. This species is a Red List (Wyse *et al*., 2016) plant species whose status is “Least Concern”. The plant is an annual species that is found in dry pastures and sandy or gravely places such as eskers and its distribution is mainly confined to the central and south-eastern parts of Ireland (Webb et al 1992). It has been recorded in several 10 km grid squares in Offaly in the past, including the grid squares (N43 and N53) where the current sites are located. It was also recorded in the northern half of the site (N54) which lies within County Westmeath, the only hectad in the county where the plant has been recorded. The presence this species enhances the rare flora resource of Co. Westmeath.

Evidence of widespread mammal species has been recorded on or in close proximity to the bog. Signs of Deer (most likely Fallow Deer) were noted at several locations around the site. Rabbit (*Oryctolagus cuniculus*) were also quite common on some of the drier sections of the site and several hares were also noted. Grazing by rabbits/hares was widespread throughout the site. Signs of Badger (*Meles meles*) were noted in the northern section of the Northern cutaway area and Pine Marten presence (*Martes martes*) scat observed in the section of

Birch woodland (WN7) along the southern boundary of the site. Fox (*Vulpes vulpes*) scats were observed in the southern section of the site. American Mink (*Mustela vison*) were also recorded in the eastern of the southern half of the site and west of the northern section boundary.

Several bird species have been noted during BnM ecological surveys at Drumman including Cormorant (*Phalacrocorax carbo*), Curlew (*Numenius arquata*), Kingfisher (*Alcedo atthis*), Lapwing (*Vanellus vanellus*), Mallard (*Anas platyrhynchos*), Mute Swan (*Cygnus olor*), Snipe (*Gallinago gallinago*), Black-headed Gull (*Larus ridibundus*), Lesser Black-backed Gull (*Larus fuscus*), passerines such as Meadow Pipit (*Anthus pratensis*), Reed Bunting (*Emberiza schoeniclus*), Stonechat (*Saxicola rubicola*), Blackbird (*Turdus merula*), Goldfinch (*Carduelis carduelis*), Lesser Redpoll (*Carduelis flammea cabaret*), Linnet (*Carduelis cannabina*), Robin (*Erithacus rubecula*), Wren (*Troglodytes troglodytes*) have also been recorded on the site, as well as Magpie (*Pica pica*), Rook (*Corvus frugilegus*) and Hooded Crow (*Corvus cornix*). Annex I listed bird species Hen Harrier (*Circus cyaneus*) has also been recorded roosting west of the northern half of Drumman Bog.

In addition, numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Heron (*Ardea cinerea*), Mallard (*Anas plathrhynchos*), Kestrel (*Falco tinnunculus*) and Pied Wagtail (*Motacilla alba yarrellii*) have all been recorded during BnM ecology surveys of other bogs in the locality.

NBDC records for red-listed[3] bird species of conservation concern recorded in the 10km squares (N43, N44, N53 and N54) within which Drumman Bog is located; Barn Owl (*Tyto alba*), Common Quail (*Coturnix coturnix*), Common Scoter (*Melanitta nigra*), Curlew (*Numenius arquata*), Dunlin (*Calidris alpina*), Goldeneye (B*ucephala clangula*), Grey Partridge (*Perdix perdix*), Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Lapwing (*Vanellus vanellus*), Meadow Pipit (*Anthus pratensis*), Pochard (*Aythya ferina*), Red Grouse (*Lagopus lagopus*), Redshank (*Tringa totanus*), Scaup (*Aythya marila*), Shoveler (*Anas clypeata*), Snipe (Gallinago gallinago), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola*) and Yellowhammer (*Emberiza citrinella*).

Red-listed[4] listed bird species that are also Annex I listed species included on the NBDC database include: Bewick's Swan (*Cygnus columbianus bewickii*), Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*), Nightjar (*Caprimulgus europaeus*), Red Kite (*Milvus milvus*), Slavonian Grebe (*Podiceps auritus*) and White-tailed Eagle (*Haliaeetus albicilla*).

Annex I listed bird species recorded include Common Tern (*Sterna hirundo*), Great Northern Diver (*Gavia immer*), Hen Harrier (*Circus cyaneus*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*), Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*), Spotted Crake (*Porzana porzana*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

BnM and NBDC holds records for the invasive mammal species' American Mink (*Mustela vison*) and Fallow Deer (*Dama dama*) at Drumman bog.

[3] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

[4] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

A broad range of common garden escapes are also occasionally present around the margins of BnM bogs, and although spatial overlap with the proposed rehabilitation work is expected to be limited, these are, where necessary, to be treated in line with best practice during rehabilitation.

3.4 Statutory Nature Conservation Designations

There are a no European Sites in close proximity (i.e., within a 5km radius at minimum) to Drumman Bog. The nearest European Designated sites to Drumman Bog are as follows:

- Raheenmore Bog SAC (Site code: 000582) – 7.2 km to the south-west of Drumman,
- Mount Hevey Bog SAC (Site Code: 002342) - 9.5 km north-east of Drumman,
- Wooddown Bog SAC (Site Code: 002205) – 11.9 km north of Drumman,
- Lough Ennell SAC (Site Code: 000685) – 8.6 km north-west of Drumman,
- Lough Ennell SPA (Site code: 004044) – 9.2 km northwest of Drumman,
- Split Hills and Long Hill Esker SAC (Site code: 001831) – 10.6 km west of Drumman,
- River Boyne And River Blackwater SAC (Site Code: 002299) – 12.1 km north-east of Drumman (at the closest point),
- River Boyne and River Blackwater SPA (Site Code: 004232) – 12.1 km north-east of Drumman (at the closest point).

With regard to nationally designated sites for nature conservation in the vicinity of Drumman Bog, one NHA (Natural Heritage Area) occurs in close proximity of Drumman bog:

- Milltownpass Bog NHA (Site code 002323) lies approximately 2.8 km to the north.

A number of non-statutory designated sites NHAs/ pNHAs (proposed Natural Heritage Area) also occur in the wider area (approx. 10km) around Drumman bog, including:

- Black Castle Bog NHA (Site code: 000570) – 5.4km south-east of Drumman,
- Raheenmore Bog pNHA (Site code: 000582) – 7.2 km to the south-west of Drumman,
- Cloncrow Bog (New Forest) NHA (Site code: 000677) – 7.5km west of Drumman,
- Royal Canal pNHA (Site code: 002103) – 7.7km north of Drumman (at the closest point),
- Mount Hevey Bog pNHA (Site code: 001584) – 9.5 km north-east of Drumman,
- Lough Ennell pNHA (Site code: 000685) – 8.6km north-west of Drumman,
- Split Hills and Long Hill Esker pNHA (Site code: 001831) – 10.6 km west of Drumman,
- Wooddown Bog NHA (Site code: 000694) – 11.9 km north of Drumman.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites within close proximity of Drumman bog (the nearest, Raheenmore Bog (designated as a SAC and pNHA), is located approximately 7.2km to the south-east).

See drawing BNM-ECO-26-18-23: ***Proximity to Designated Sites*** in the accompanying map book.

3.5 Hydrology and Hydrogeology

Drumman Bog is located within the Boyne (Catchment ID: 07) catchment and the Yellow [Castlejordan]_SC_010 sub-catchment as defined by the EPA under the Water Framework Directive (WFD).

The Mongagh River (Castlejordan_020) referred to on the EPA website as CASTLEJORDAN 07 (EPA code: 07C04) is the main water feature associated with Drumman Bog, and bisects the site as it flows west to east through the middle of the bog. A flowing stream TEMP (EPA code: 07E41) mapped by the EPA flows parallel to the Mongagh River approximately 400 m to the south, and subsequently enters the river. Subsequently, the river flows north along the western boundary of the north-eastern section of the bog/along the southern boundary of Derryhinch bog access track. The TEMP stream (EPA code: 07A66) rises less than 250m east of the southeastern site boundary and flows east into the Yellow river, which flows south, southeast and northeast into the River Boyne. Significant riparian works have been carried out in the past along the Mongagh River to increase the height of the banks, create berms to protect against flooding and increase the size of the main channel.

Both the Mongagh River and the Temp stream which flow within Drumman bog are not listed as being under pressure from any specific source however they were listed as being At risk in the second cycle of the River Basin Management Plan for Ireland and are indicated as being under Review in the third cycle.

GSI data indicates that Drumman Bog is primarily underlain by Lucan Formation, Dinantian dark limestone and shale, the majority of which is classified as a locally important aquifer, with some areas classified as regionally important. A small section of both the north-eastern section of Drumman and the southeastern section are underlain by Volcanics, Mafic & felsic volcanic tuff, which is classified as a locally important aquifer - bedrock which is generally moderately productive.

An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying regionally important abstractions (e.g. large public water supplies), or 'excellent' yields (>400 m^3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Drumman bog is located in an area mapped by GSI as of Low groundwater vulnerability (GSI Map viewer). Groundwater vulnerability for the area surrounding Drumman Bog is variable between areas of high, moderate and low vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. These data indicate there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In

accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production permanently ceased at Drumman Bog as of 2018.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BnM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a bi-annual basis by BnM to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Drumman Bog has five surface water outlets to the River Boyne (07) catchment and the Yellow (Castlejordan) sub-catchment. Water discharges to the Mongagh River (CasleJordan_07)) and from this river to the River Boyne from four of the surface water outlets. Water discharges from the southeastern corner of the site to an unmapped historical watercourse which flows east, north of plantation forestry before merging with the TEMP stream (EPA code: 07A66). The Temp stream flows southeast into the Yellow [Castlejordan] river (EPA code: 07Y02), which also flows east to the River Boyne.

Details of silt ponds and associated surface water emission are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-ECO-26-18-02: ***Structures and Sampling***, along with Drawing number BNM-ECO-26-18-WQ01: ***Water Quality Map*** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Drumman Bog.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the Environmental Protection Agency.

Decommissioning and Rehabilitation Programme - Water Quality Monitoring

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. This site is already largely vegetated. Re-wetted peat also aids the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH 2024) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Drumman has been completed. This discharge will have improved water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of the key waterbody receptors i.e. the

Mongagh river, Yellow [Castlejordan] river and the Boyne river within the Boyne catchment and the Yellow [Castlejordan]_SC_010 sub-catchment and will support the future status of the waterbodies achieving Good Status.

Water quality monitoring will be established. There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation.

Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.

The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour and COD.

3.7 Fugitive Emissions to air

There will be no fugitive emissions to air associated with the proposed rehabilitation of Drumman Bog.

Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible. Collectively, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson *et al.* 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans *et al*. 2017). Renou-Wilson *et al.* (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther *et al*. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger *et al.* (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the long-term warming effect of continued CO_2 emissions (Gunther *et al*. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson *et al.* (2022) confirmed the benefit of rapid rewetting to achieve strong carbon reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Drumman Bog will become a reduced carbon source following rehabilitation. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. The majority of this bog is expected to

develop as regenerating shallow cutaway peat vegetation on in shallow peat areas. These areas will develop wetland mosaic habitats on shallow peat with open water, reed swamp and fen habitats with alkaline peatland emission factors. Birch woodland is expected to develop on the drier mounds and along peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)[5]

Ecological value was assessed in accordance with the NRA (2009) Guidelines, taking account of habitat quality, naturalness, biodiversity, rarity, ecological function and the presence of species of conservation interest.

The majority of Drumman Bog can be rated as **Local Importance; lower value to Local Importance; higher value.** Bare peat areas in the former production areas of Drumman Bog are assessed as **local importance (lower value)**.

Marginal habitats including wetland, woodland, scrub, pioneer cutaway habitats and bog remnant may act as a habitat/refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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[5] https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf

4. CONSULTATION

4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by BnM over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Derrygreenagh bog group, including Drumman Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018.
- Bord na Móna Biodiversity Action Plan review days 2010-2018.2016-2021.
- Derryarkin Sand and Gravel Ltd.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Drumman Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Drumman Bog or the programme in general.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Drumman Bog Rehabilitation Plan will contain a review of the consultation.

4.2 Issues raised by Consultees

N/A - consultation has not yet commenced.

4.3 BnM response to issues raised during consultation

N/A - consultation has not yet commenced.

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5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- Integrating rehabilitation measures with existing land-use (e.g., industrial use, gravel extraction and conifer forestry). It is not proposed to change or affect any industrial use, conifer or commercial forestry.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g., suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation and restoration) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM.

The rehabilitation goals and outcomes take account of the following issues.

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Much of the cutaway has already revegetated via natural colonisation. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies, where possible. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation. There is some potential for the creation of wet cutaway habitats at Drumman Bog due to the local topography (localised basins).
- It will take some time for stable naturally functioning habitats to fully develop at Drumman Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan. The site has already developed pioneer and maturing cutaway habitats and much of the site is stabilised.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, the majority of the bog is shallow peat and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Drumman Bog

will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving waterbody will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).

- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g., Esker and Cavemount Bog) in 2022-2023 and have previously carried out re-wetting and rehabilitation at Derryarkin Bog and Drumman Bog. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area entire area of Drumman Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Drumman bog is part of the Derrygreenagh bog group.
- The local environmental conditions of Drumman Bog mean that wetland creation along with some deep peat measures is the most suitable rehabilitation approach for this site. Drumman Bog has a partially pumped drainage regime and has significant areas of residual deep peat along with areas of shallow cutaway and shallow cutaway areas that are already developing as wetland, heath and birch scrub.
- BnM have defined the key goal and outcome of rehabilitation at Drumman Bog as **environmental stabilisation**, and **optimising residual peat re-wetting,** to enhance the development of compatible habitats.
- Rehabilitation has already been carried out at this site on a pilot and phased basis. A portion of the cutaway is stabilised already.
- The cutaway is already developing a mosaic of Birch scrub/woodland, grassland, wetland, dry Heather-dominated vegetation and cutaway peatland habitats. A significant portion of this cutaway is largely stabilised already. A portion of the site has bare peat. Rehabilitation is proposed to enhance residual peat re-wetting across the site, while taking account of current land-uses.
- Current land-use includes industrial use, gravel extraction, conifer forestry, where drainage will be maintained. These areas will be treated as constraints.
- Rehabilitation of Drumman Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. Drain blocking can be widespread in scale with each field drain being blocked (e.g. Kellysgrove) or more localised with targeted drain-blocking (e.g. Mountlucas Wind Farm) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to manage water levels or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.
- The majority of Drumman Bog is cutaway and a mosaic of habitats are present, including bare peat and including more established habitats such as Birch scrub and wetlands. Drumman is a typical shallow cutaway bog and some phased rehabilitation including drain-blocking and hydrological management has already been successful in re-wetting parts of the site. The gravel sub-soils have a significant influence on environmental conditions at this site and significant water level fluctuations have been observed at Drumman that likely indicate losses to depth via the gravel sub-soil. Natural colonisation has progressed

and parts of the site are largely vegetated and stabilised. Rehabilitation will focus on re-wetting and stabilising remaining bare peat, where possible, via a drain-blocking programme. There is likely to be greater development of drier cutaway habitats are this site due to the influence of the underlying sub-soil gravels.

- **Land-use**. Part of the bog has been developed for forestry and is leased to Coillte. Part of the bog is leased to Derryarkin Sand and Gravel and is used for gravel extraction. Another section of the cutaway is used for biomass storage. The drainage of these areas will have to be maintained.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care must be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Turf-cutting.** The area of remnant of intact raised bog at the north-eastern corner of the site will not be subject to rehabilitation measures. This is largely due to turf cutting, and the small area that this parcel of land covers and the limited effectiveness of rehabilitation measures in this area. This area is ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Areas subject to private turf cutting are excluded.
- The Works area and the BnM Derrygreenagh Offices are excluded.
- The footprint of the proposed thermal gas power plant at Derrygreenagh is excluded from this plan.
- The longer-term development of stable naturally functioning habitats at Drumman Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Drumman Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g., drain-blocking/re-wetting) slowing movement of water across the site and encouraging a naturally functioning raised bog ecosystem; and
- mitigation of key emissions (e.g., potential suspended solids run-off).

7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage and accelerate development of vegetation cover via natural colonisation and increase in the area of potentially peat forming habitats. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures, and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the *At Risk* classification will see improvements in the associated pressures from this peatland or if remaining *At Risk*, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longford Pass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the 3 years post cessation of peat extraction with ongoing rehabilitation indicates downward trends.

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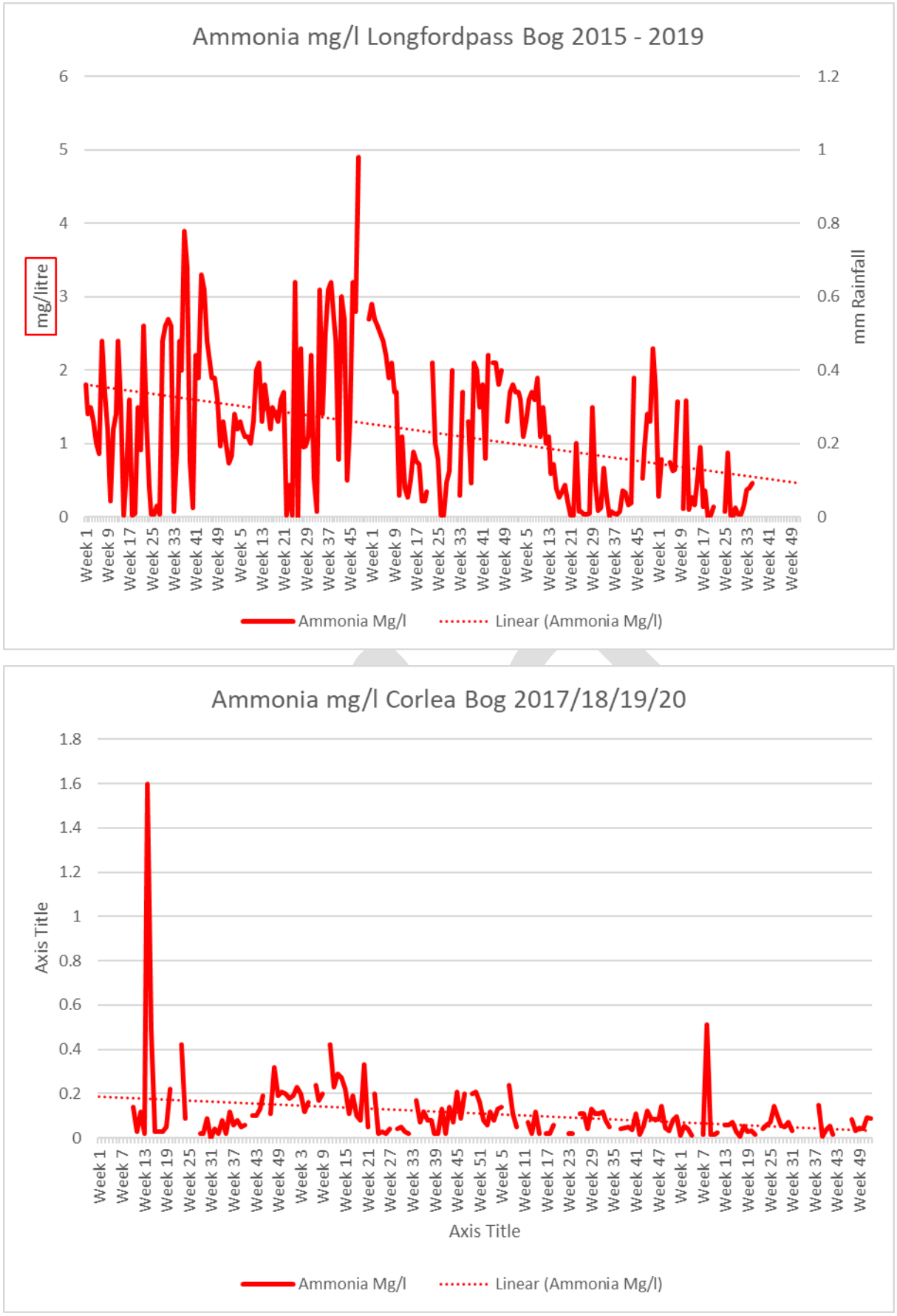


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

Table 7.1. Summary of Success criteria, targets, how various success criteria will be measured and expected timeframes.

Criteria type	Criteria	Target	Measured by	Expected Timeframe
IPC validation	Rewetting in the former area of industrial drainage.	Delivery of rehabilitation measures Restoration of hydrological regime.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2years
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2 years
IPC validation	Reducing pressure from drainage on the local water body catchment (WFD)	Where this section of the water body (that this bog drains to) has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

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7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM).** BnM maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on cutaway peatland takes time. Pioneer vegetation can develop relatively quickly (3-10 years) and wetland habitats can develop relatively quickly. Birch woodland make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation and restoration has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies based on environmental characteristic. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography. This planning is essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths, a LiDAR Surface Map and Depression Analysis, these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-18-22 titled: ***Aerial Imagery 2020***

BNM-ECO-26-18-22 titled: ***Aerial Imagery 2020***

BNM-ECO-26-18-04 titled: ***Peat Depths***

BNM-ECO-26-18-03 titled: ***LiDAR Map***

BNM-ECO-26-18-09 titled: ***Depression Analysis***

The restoration and rehabilitation measures are provisionally outlined in drawing BNM-ECO-26-18-05 titled: ***Rehabilitation Measures*** in the accompanying Mapbook.

These rehabilitation measures for Drumman Bog will include (see Table 8.1):

- Much of the cutaway has already vegetated and stabilised. A targeted drain-blocking programme and hydrological management will be implemented in bare peat areas across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat.
- Areas of deeper bare peat within the central area of the site will be targeted for more intensive drain-blocking.
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Hydrological measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes;
- The existing silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that the silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. The silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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Table 8.1: Types of and areas for rehabilitation measures at Drumman Bog. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the rehabilitation measures.

Type	Code	Description	Area (Ha)
Dry cutaway measures	DCT1	Modifying outfalls and managing water levels with overflow pipes	150.4
Wetland cutaway measures	WLT1	Modifying outfalls and managing water levels with overflow pipes within low lying areas and depressions on shallow peat.	207.4
Marginal land	MLT1	No work required	60.3
Silt ponds	Silt pond	Silt ponds	1.3
Measures Implemented	Implemented Rehab Measures	Pilot rehabilitation trials including the application of fertiliser and nurse crops.	298.0
Forestry	Forestry		82.5
Constraint	Constraint	Access, Bog Remnant, turbary/ turf cutting, grassland, Industrial, Water Bodies	32.5
Total Area			**832.4**

8.1 Implemented and Ongoing

- A significant portion of the site has already been developed as a conifer plantation by Coillte (11%).
- Rehabilitation has already been carried out in an additional 10% of the cutaway in Dumman North, with the development of a large wetland mosaic.
- Rehabilitation trials have been carried out on 19 ha of bare peat cutaway in the north of the site, re-vegetating and stabilising these areas (2010).
- Additional bare peat cutaway in the north of the site (30 ha) was treated with a fertiliser application (2012). This area has subsequently become well vegetated.
- A second trial was developed in 2014 to test the ability of two different grass seed mixtures to establish on bare peat cutaway. This trial covered 2 ha.
- Part of the site was used to establish a herb production trial. This pilot project has now concluded, and the herb production has helped to establish vegetation as a nursery crop.
- The majority of the site are already re-vegetating, with establishing cover of pioneer vegetation developing a mosaic of typical cutaway peatland and wetland habitats. Natural re-colonisation of the cutaway so far has been quite effective. Bare peat areas within the cutaway parts of the site are shrinking as vegetation develops and consolidates.

8.2 Short-term planning actions (0-1 years)

- Seek formal approval of the rehabilitation plan from the EPA.
- Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Drumman Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies).

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- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out.
- A review of remaining milled peat stocks is to be carried out.
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g., breeding waders) will be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

8.3 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include intensive drain blocking and targeted hydrological management prescriptions in the cutaway. All rehabilitation will be carried out with regard to best practice environmental control measures (Appendix III).
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.
- Carry out the proposed monitoring, as outlined in Section 9.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.

8.4 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 9 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC Licence is surrendered.

8.5 Timeframe (to be adjusted when the rehabilitation plan is finalised)

- **Year 1**: Short-term planning actions.
- **Year 1**: Short-term practical actions.
- **Year 1-3:** Long term practical actions. Evaluate success of short-term rehabilitation. measures outlined above and remediate where necessary.
- **> Year 3**: Decommission silt-ponds, if necessary

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8.6 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of standard rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the BnM Annual Report (BnM 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to LAWPRO and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be available in April each year as a requirement of the Annual Environmental Report at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

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9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC Licence Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC Licence is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed;
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and

The site has been environmentally stabilised.

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APPENDIX I: BOG GROUP CONTEXT

The Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Cos. Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Derrygreenagh Group ceased in 2020. Decommissioning for the Derrygreenagh Group started in 2021 at a number of individual bogs and PCAS rehabilitation started in 2021.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The Bord na Móna Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carrenstown, Bracklin and Lisclogher East. Milled peat was supplied from Ballivor, Carrenstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford). Kinnegad Bog is an isolated bog unit with no industrial railway link to the other bogs. Kinnegad Bog is located to the south of Kinnegad in Co. Meath. This bog supplied mainly milled horticultural peat via road to various customers.

The Derrygreenagh Bogs sub-group is located to the south and east of Rochfortbridge (Co. Westmeath), along the borders of Co. Westmeath, Offaly and Meath. Four bogs (Ballybeg, Derryhinch, Drumman, Toar) supplied milled fuel peat via industrial railway to Edenderry Power.

Lisclogher East was never developed for milled peat production but it was used for sod turf extraction until recently. A large section of Bracklin was formerly a sod peat production bog and was never converted to milled peat production. This area has developed as cutaway. Lisclogher West was drained in the 1980's but has never been put into industrial peat production. Bogs that have been in industrial peat production for decades (such as Ballybeg and Drumman) have become cutaway as peat was extracted from the sites and the active industrial peat production area shrunk. A large section of cutaway in Derryarkin and Drumman has been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd). A large section of Derryarkin was also rehabilitated in 2001-2002 with wetland development via outfall blocking.

There has already been significant rehabilitation work carried out within the Derrygreenagh Bog Group. BnM originally established a grassland research unit and farm at Derryarkin. This farm has now been closed for some time but grassland established from cutaway has been sold to local farmers. Older rehabilitation includes the establishment of confer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

During the 1980s/1990s about 176 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Drumman and Derryarkin in several different areas. There is ongoing management of these areas by Coillte.

One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Fertiliser and nursery crop trials were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

In Derryarkin, wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.

A small area of cutaway at Derryarkin has been leased to DAMX Ltd for the development of an off-road moto-cross track at Derryarkin.

An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.

Part of the cutaway at Ballybeg (76 ha) was planted with Alder (2008-2009) as a biomass trial (for fuel).

An area of marginal raised bog (19 ha) was restored at Bracklin Bog in 2016, as part of the BnM Raised Bog Restoration Programme. An extensive drain blocking programme was carried out to raise water levels and help re-wet the bog area, encouraging the development of Sphagnum-rich 'active' peat-forming raised bog. This area is of significant biodiversity and cultural interest to a local group called Meath-Westmeath Bog Group

Some rehabilitation was carried out in a small area of cutaway in Balivor Bog (9 ha) in 2015. This involved drain-blocking to maintain and enhance re-wetting of an area of cutaway with *Sphagnum*-rich poor fen peat-forming vegetation.

Rehabilitation and re-wetting as part of the Peatland Climate Action Scheme has been completed at Carrenstown and Lischogher West.

BnM is currently developing a wind energy project called Ballivor Windfarm (BnM Wind Farm | Ballivor Wind Farm). This proposed project has been submitted to the planning authority. The proposed location extends across parts of Bracklin, Lisclogher East, Carranstown and Ballivor Bogs.

BnM has secured planning consent for the Derrygreenagh Power Project (Drumman Bog), a thermal power plant. Planning consent included the associated infrastructure required to connect the development to the national gas and electricity transmission networks, enabling integration with the wider energy system

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC License Ref. PO-501-01 is outlined in Table Ap-1.

Table Ap-1: Derrygreenagh Bog Group names, area and indicative status (Derrygreenagh Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Bracklin	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats	2020	Draft 2023 Bracklin West (sub-site) rehabilitation completed.

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Bare peat is prevalent in the western section, which was in milled peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.		
Carranstown	306	Industrial peat production commenced at Carrenstown in the 1980s. The majority of the site has relatively deep peat.	Carranstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat. There are cutaway habitats developing on the eastern side. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Finalised 2022 Planned Rehab completed
Lisclogher East	486	Industrial peat production commenced at Lisclogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lisclogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Lisclogher West	239	Lisclogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lisclogher West was drained but never fully developed for industrial peat extraction.	N/A	Finalised 2023. Rehab completed
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat.	2020	Draft 2017
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	N/A
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s. Most of the site is cutaway	Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.	2020	Draft 2026
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction in past.	Between 1988 and 1991	Draft 2026
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power.	2017	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Most of the site is bare peat with emerging cutaway habitats. Part of the site was used to trial herb production. This initiative has now ceased.		
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction. Part of the site was used to trial herb production. Part of the site is used for log storage (biomass).	2018	Draft 2026
Toar	445	Industrial peat production commenced at Toar in the 1950s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Most of the site is bare peat. Part of the site is used for log storage (biomass).	2018	Draft 2026

See Drawing number BNM-ECO-26-18-24 titled: ***Bog Group Map***, included in the accompanying Mapbook which illustrates the location of Drumman Bog and the Derrygreenagh Bog Group in context to the surrounding area.

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APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.

Bog Name:	**Drumman**	**Area (ha):**	1122ha
Works Name:	Derrygreenagh	**County:**	Offaly & Westmeath
Recorder(s):	MMC & DF	**Survey Date(s):**	16th & 17th October 2009

Habitats present (in order of dominance)

The most common habitats present on the Drumman site include:

- Bare peat (BP), pioneer Poor Fen communities (pJeff, pEang, pRos) and Birch-dominated scrub (eBir, oBir) dominate in the wetter naturally re-colonising areas, particularly in the northern section. (Codes refer BnM classification of pioneer habitats of industrial cutaway. See Appendix II).
- A large part of this area has been re-wetted and is a wetland mosaic of open shallow water and Poor fen (pEang), with smaller amounts of Birch-scrub (eBir). There is some development of Tall Reeds (pPhrag, pTyph) throughout the wetland but development of fringing wetland communities is poor at present.
- Parts of the southern section and northern section are somewhat drier and mosaics with Birch-dominated scrub (eBir, oBir), dry grassland (gCal), pioneer vegetation (DisCF) and Poor fen (pJeff) have developed.
- There are relatively small areas of other Poor fen communities (pRos, pTrig) and other communities such as dry grassland (gCal) and pioneer vegetation (DisCF) of glacial sub-soils. Exposed and bare glacial sub-soils are also present and there are also some iron-flushes present on bare peat.
- One block of conifer forestry (WD4) has been planted on the site.
- A quarry is located in the northern section of the site. A lake (FL8) has developed with a large area of open water. No significant amount of riparian vegetation has developed in this area yet. Large areas of gravel spoil (both piles of gravel and areas of levelled gravel) are located in the area surrounding the lake and are at various stages of re-colonisation (ED2, ED3). (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.)
- A railway crosses the site and this can also be classed as built land along with some works areas with associated infrastructure (BL3).
- There is a small amount of raised bog (PB1) high bog around the margins of the site.
- Other fringe habitats around the margins of the bog include Scrub (Birch-dominated and Gorse dominated), Birch woodland (WN7), Conifer plantation (WD4) and Cutover Bog (PB4) (active and abandoned).

Description of site

Drumman is located along the Offaly-Westmeath border, 3 km from Rochfortbridge and on the east side of the R400 Rochfortbridge-Rhode regional road. The Derrygreenagh Works form part of the site. The new Dublin-Galway motorway has been constructed adjacent the northern boundary. The majority of the site comprises cutaway bog; in addition to this a large area was planted for conifer forestry and a large section recently developed as a gravel quarry.

It is a relatively large site that can be split into several sections for ease of description according to natural divisions, infrastructure on the site and the county boundary. The Mongagh River flows across the site, forming the county boundary and dividing the site into two large sections. A third section (NE) is located in the north-eastern part of the site and is

somewhat separated from the main section by the river and by the topography of the site. A railway generally follows along the river and links Drumman to an adjacent bog, Derryhinch, to the north. The western boundary of the site is marked by the regional road and separates the site from an adjacent bog to the west, Derryarkin.

Northern Cutaway (Biodiversity Area and Conifer plantation)

This large area is located on the Westmeath side of the site. The majority of the area has been cutaway for some time and is divided into 2 main sections by a wide high field (originated north-south) through the centre that is relatively unvegetated and bare. A large block in the south-eastern corner has been planted for conifer forestry. An adjacent block in the south-western section contains a large quarry.

The cutaway area has been modified by the creation of a large wetland area after an outfall was blocked around 2005. This has created a large mosaic of wetland habitats including a significant area of open water in the south-eastern section. The open water forms a mosaic with emergent Reedbeds (mainly Common Reed with some Reedmace) and large areas of fringing Poor fen communities with Bog Cotton-dominated (pEang), Soft Rush-dominated (pJeff) and some Bottle sedge-dominated (pRos) vegetation (codes refer to BnM habitat classification). There are some small patches of Birch scrub on drier ground through-out this area and several high fields have not been re-wetted. Lines of Reedmace extending through the open water, which originally developed along the drains, are a notable feature and indicate that much of the open water is quite shallow. There is no fringing wetland vegetation around some of the wetland, which indicates it has developed relatively recently.

The north-eastern area is mainly dominated by developing Birch scrub. Much of this area is drier and associated habitats with the Birch scrub include pioneer dry grassland (gCal) disturbed vegetation (DisCF) and Soft Rush-dominated Poor fen vegetation (pJeff) forming mosaics with bare peat. Conifer (Pine and Spruce) saplings and young trees are rare-occasional. There are some wetter sections in lower fields where Bog Cotton-dominated vegetation is more prominent and there is some standing water. Some Heather (dHeath) appears along the higher ground adjacent to the central high field.

The western half of the cutaway is a more completed mosaic of wet and dry pioneer habitats with a significant portion of bare peat. There are several relatively small pools of open water with associated fringing poor fen vegetation (pEang). Drier sections are vegetated by emerging Birch scrub with associated pioneer dry grassland (gCal), disturbed vegetation (DisCF), some *Campylopus*-dominated vegetation (pCamp) and some Soft Rush-dominated vegetation in the damper areas. Some small areas have denser development of Birch scrub. Reedmace is frequently present along the drains but does not form large areas of Tall Reed habitat in this area. There are some small patches of Common Reed but again they only cover a very minor area in comparison with the other habitats. There is some exposed glacial sub-soil that only covers a minor area.

North-eastern cutaway area

This area is largely divided from the rest of the site by the Monagh River, and comprises bare peat and recently establishing vegetation (mainly Poor fen communities such as Soft Rush-dominated by Bog Cotton-dominated). There is a strip of vegetated ground along the western side adjacent to the river that contains the railway, access tracks and a silt-pond complex. This zone is vegetated by tussocky grassland (GS2) and patches of Bracken (HD1) along the railway and track along the river. Habitat codes refer to classification scheme used by Fossitt (2000). This type of grassland is also prominent on the banks around the silt-ponds. Some sections contain other grassland communities including dry calcareous grassland (gCal) and some Purple Moor-grass-dominated grassland (wet grassland, gMol). Some are also small patches of Birch and Gorse scrub in this area. Some diverse wet grassland (GS4) is also found on some marginal land along the northern boundary and adjacent to the river.

Gravel-Pit area

The main ecological feature of the quarry area north of the river is a large shallow open body of water (artificial lake FL8) created by gravel extraction. Surrounding this lake are series of large mounds of sorted aggregate (ED4) and also spoil mounds that are slowly revegetating (ED2). The Monagh River riparian zone flows close to the edge of the active quarry in one section and there is no significant buffer zone.

Southern production area

This area is located south of the river in Offaly. This large area can be further sub-divided into several smaller sections by access roads and railway embankments. The area is divided into two main sections by a railway (north-south) through the centre of the area). There is a further division of a small area in the north-west corner close to the Derrygreenagh Works by railway.

The eastern half is largely active production with bare peat towards the southern side, while the northern section is much more vegetated. The northern part is a complex mosaic of pioneer vegetation communities, the most prominent of which are Birch scrub, dry grassland (gCal) and poor fen communities (pJeff, PEang) and there is still a significant portion of the ground cover bare peat. The density of Birch scrub varies through this area and some denser patches are present. The majority of the area north of a large drain is relatively dry with tendency towards wetter vegetation moving to the north-east side. There is small open water area in this section, although Poor fen communities do predominate (pEang). A similar trend was noted for the vegetated section south of the main drain, with wetter habitats appearing further east. About midway along the eastern boundary there is a ridge of vegetated ground that extends into this section. There is only minor development of Tall Reed habitat (Common Reed) associated with the open water. Some Purple Moor-grass-dominated grassland appears around the margins, particularly along the northern railway embankment and adjacent cutover. One notable feature of this area was the presence of some Broom-dominated scrub on cutaway.

The western half also contains a complex mosaic of wet and dry vegetation communities, mainly in the northern half. The variable topography of some parts of this area means that there is intermixing of wet and dry areas. There is similar development of habitats to other parts of the site with only small scattered open patches of water through this area. Wetter Poor fen communities (mainly pEang and pJeff) are associated with these open water areas, along with some emerging Birch scrub creating wetland complexes. There is only minor development of Bottle Sedge-dominated Poor fen vegetation (pRos) associated with the wetland complexes and very little Tall reed habitat. The drier sections are being vegetated by Birch scrub (eBir, oBir), dry grassland (gCal), disturbed/pioneer vegetation (DisCF) and some Soft Rush-dominated Poor fen vegetation (pJeff). This area is also notable for the appearance of iron flushes in the bare peat. There is also some exposed glacial sub-soil in places that only covers a minor area.

Within the southern section (of the western half) of cutaway a mosaic of habitats has become established including pJeff, pEang, eBir and oBir along with areas of open water, while an old railway line close to the southern boundary has developed into a Scot's Pine woodland.

The north-western section is similar to other portions of the site and contains a range of different communities, of which denser Birch scrub (cBir) is prominent, forming some patches of developing Birch woodland. There are also several pools and wetland complexes. A new access road along the northern side to access the quarry has created two rows of exposed glacial till. These exposed gravel substrates are vegetated by a range of pioneer and colonising species (DisCF, DissWill) including the Blue Fleabane. A relatively large shallow pool to the north of the access road contains some Charophytes.

Forestry and potential forestry on site

A conifer plantation is located in the south east of the northern section of the site. This area is even aged and consists of Lodgepole Pine (*Pinus contorta*), Sitka Spruce (*Picea sitchensis*), Scots Pine (*Pinus sylvestris)*, Norway Spruce (*Picea abies*) and Japanese Larch (*Larix kaempferi*). Sections of this forest became wet leading to complete failure of large areas of trees while large sections of the forest appeared to be in check as a result of poor nutrient status of the soil. It is also worth noting

that a number of iron upwellings were located within the forest. Overall this forest is in poor condition with little hope of achieving a reasonable timber crop.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

Adjacent habitats and land-use

There are several main land-uses on adjacent habitats around the site. The northern section of site is mainly surrounded by cutover bog (PB4) some of which is being actively cut for sod-peat. There are also a few remnant fragments of high raised bog (PB1). The new motorway marks the northern boundary of this area and there is a wide unplanted margin adjacent to the motorway with typical pioneer cutaway vegetation communities. There is some improved grassland along the eastern and southern margins of the site that is mainly grazed by livestock. Other habitats found around the margins of the site include scrub (WS1) and Wet grassland in small area that are not managed.

Watercourses (major water features on/off site)

- The Monagh River is the main water feature at this site. This river is part of the Boyne catchment. Significant riparian works have been carried out in the past along the river to increase the height of the banks, create berms to protect against flooding and increase the size of the main channel. The channel is in poor condition and shows signs of significant disturbance, such as siltation and eutrophication. The riparian zone is poorly developed along the river at present.
- The berms are mainly vegetated by dry tussocky grassland (GS2), disturbed vegetation (ED3) dominated by Rose-bay Willowherb and some Bramble encroachment (WS1). There are also patches of Bracken (HD1). Scrub such as Gorse is likely to become more prominent in the future.
- There are several large silt-pond systems on the site, as well as some large drains. Some of these form important habitats for species such as Kingfisher and Mallard, and Blue Fleabane (a rare species) has been recorded on the glacial till dug from these drains. Some of the drains and silt-ponds in the northern cutaway section are developing more diverse aquatic vegetation as they mature and are left undisturbed.

Peat type and sub-soils

Phragmites-type peat.

Fauna biodiversity

Several bird species were noted on the site during the survey.

- A Kingfisher was recorded using a silt-pond in the eastern half of the southern section.
- Group of five Whooper Swans at the centre of the southern production area.
- Jay remains in the commercial plantation east of the quarry (Mammal kill).
- Two Pheasants observed in the south western edge of the site.
- Grey Heron (1) in the eastern section of the site.

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- Three Mute Swan and 1 Whooper Swan were recorded using the wetland area in the northern cutaway. One Moorhen was also noted.
- Five Mute Swans were noted using the new lake in the quarry. Two family groups were present with cygnets. Two Mute Swans were also noted using the silt pond in the north-east production area. One Cormorant was also noted flying over.
- Mallard (9) along the disused railway line to the south of the site while six Mallard were roosting in the silt ponds in the south east of the site.
- A group of Curlew were recorded flying around the site on several occasions. The size of the group was about 40-50. A similar-sized group of Lapwing were also noted around the site on several occasions.
- Snipe (36) were frequently flushed when walking around the bog in both cutaway and in active production areas. This species was noted as roosting in several different habitats.
- Meadow Pipit were also generally quite common around the site as were Robin and Wren. These species most frequently used the scrub habitats. Other species recorded on the site included Reed Bunting, Blackbird, Magpie, Pheasant, Rook and Hooded Crow. Several groups of finches were observed on the site feeding on the scrub and other vegetation along the river (Goldfinch, Redpoll, Linnet) and numbering up to 50. A single Stonechat was noted on the cutaway. A group of Lesser Black-backed Gulls and Black-headed gulls were roosting along the new motorway at the north end of the site and some were roosting on the cutaway. A 'hawk' (Kestrel or Merlin) was recorded hunting over the site. Collections of snail shells were notable on some of the gravely areas that were probably made by feeding thrushes.
- Signs of Deer (most likely Fallow Deer) were noted at several locations around the site. Rabbit were also quite common on some of the drier sections of the site and several hares were also noted. Grazing by rabbits/Hares was widespread throughout the site. Signs of Badger were noted in the northern section of the Northern cutaway area and fox scats were observed in the southern section.
- Pine Marten presence (scat) observed in the section of Birch woodland (WN7) along the southern boundary of the site.

Site Visit 10/06/2010

- Bird species noted on the site (crop trails) included Cuckoo, Redpoll, Whitethroat, Skylark, Meadow Pipit, Grey Crow and Willow Warbler.
- Small blue butterfly and Large White Butterfly also noted.

Fungal biodiversity

Boletus subtomentosus (Suede Bolete), *Hygrocybe cantharellus* (Goblet Waxcap), *Leccinum scabrum* (Brown Birch Bolete), *Laccaria proxima* (Scurfy Deceiver), *Clavaria argillacea* (Moor Club) *Pleurotus sp*., *Lichenomphalia umbellifera* (Heath Navel), *Lichenomphalia alpine, Coprinus comatus* (Shaggy Inkcap), *Phallus impudicus* (Stinkhorn) and *Mycena sp*.

Blue Fleabane distribution

This rare species (whose status is listed as endangered) has been recorded at several locations around the site. Blue Fleabane (*Erigeron acer*) is an annual species that is found in dry pastures and sandy or gravely places such as eskers and its distribution is mainly confined to the central and south-eastern parts of Ireland (Webb et al 1992). It has been recorded in several 10 km grid squares in Offaly in the past, including the grid square where the current sites are located.

Several populations were recorded on the site (see Habitat Map) The main population was noted along the main access road into the quarry on soil either side of the road. Plants were also noted on exposed gravel around the large pool to the

north of the access road. This exposed glacial till is a perfect habitat for this species. The number of plants probably reaches 500-1000. A smaller population was noted on glacial till alongside a drain in the southern production area (< 50 plants). A third population was noted in the Northern cutaway on spoil heaps adjacent to an abandoned silt pond (300-500 plants).

This species was probably unlikely to have been present on the site prior to the development of the cutaway. Subsequent development of the site including construction of railways on gravel embankments, construction of drains and silt ponds and more recently the development of the quarry have created suitable exposed gravel banks made up of calcareous rich material that this species prefers. In the long-term, it could be expected that these spoil heaps and exposed gravel patches will re-vegetate with grassland and scrub, which will not favour this species.

HABITAT DESCRIPTIONS

(See Habitats Description Document for detailed description of each vegetation community not described in this section.)

HABITAT DESCRIPTIONS

DisCF and gCal

This habitat occurs quite frequently around the site on the gravel and glacial sub-soil that has been exposed by peat production or as spoil heaps taken from silt ponds, drains and other excavations. This habitat is notable for containing Blue Fleabane a notable and rare plant species.

The DisCF is characterised by a diverse range of pioneer plants that are colonising various mixtures of bare gravel and marl (ED2). The ground cover is generally dominated by bare substrate but some sections are much more vegetated and ground cover is dominated by vegetation (gCal). However, there is a similar species assemblage. The Blue Fleabane was found on gravel and finer material with very little peat in general. Other species found with Blue Fleabane include *Sagina nodosa*, *Hieracium pilosella*, *Carlina acaulis*, *Sisymbrium officinale*, *Diplotaxis muralis*, Epilobium sp., *Chamaerion angustifolium*, *Tussilago farfara*, *Equisetum* sp.

The more vegetated areas with more peat mixed with the sub-soil contain frequent *Hypochaeris radicata* and *Agrostis stolonifera*. Other species present include *Juncus effusus*, *Betula pubescens*, *Chamaerion angustifolium*, *Rubus fruticosus*, *Campylopus introflexus*, *Holcus lanatus*, *Cirsium vulgare*, *Rumex crispus*, *Cirsium palustre*, *Carex flacca*, *Centaurea nigra*, *Agrostis stolonifera*, *Leucanthemum vulgare, Calluna vulgaris, Dactylorhiza* sp.*, Tussilago farfara, Molinia caerulea, Cladonia* spp.*, Prunella vulgaris, Festuca arundinacea, Polytrichum alpestre, Rumex acetosella, Rosa* sp.*, Eupatorium cannabinum, Epilobium sp., Equisetum* sp.*, Cerastium fontanum, Lotus corniculatus, Anthoxanthum odoratum, Plantago lanceolata, Polygala serpyllifolia, Pteridium aquilinum, Potentilla erecta, P. anserina, P. anglica* and *Daucus carota.* Blue Fleabane was also found amongst this vegetation on an old path near to the access road to the quarry and also on spoil adjacent to a drain and levelled but much less frequently compared to the barer gravel.

Dry grassland (Co-An) (GS2)

This grassland is found on verges along the river. This zone has been modified in the recent past by arterial drainage works. The grassland is dominated by tall tussocks of *Dactylis glomerata* and *Festuca arundinacea* with *Centaurea nigra*, *Plantago lanceolata*, *Urtica dioica*, *Agrostis stolonifera*, *Deschampsia caespitosia*, *Phalaris arundinacea*, *Molinia caerulea*, *Chamaerion angustifolium*, *Filipendula ulmaria*, *Taraxacum* sp., *Cirsium arvense*, *Daucus carota*, *Rubus fruticosus*, *Festuca rubra* and *Pteridium aquilinum*.

Scots Pine-dominated woodland (WN7)

This long linear habitat is located close to the southern boundary of the site. Habitats such as gMol and dHeath are dominant towards the south western end of the railway but moving eastwards the railway line develops into a Scots Pine woodland

that is approaching maturity. Species located within this habitat include *Pinus sylvestris*, *Rubus fruticosus*, *Calluna vulgaris*, *Centaurea nigra*, *Hedera helix*, *Agrostis sp., Potentilla anglica, Succisa pratensis, Potentilla erecta, Molinia caerulea, Angelica sylvestris, Betula pubescens* and *Daucus carota.* The Scots Pine woodland has the potential to link up with the Birch Woodland along the southern boundary of the site.

Draft

BnM habitat classification scheme

	General	Habitat [1]	BnM habitat code	Equivalent Heritage Council codes [2]
Pioneer habitats of industrial cutaway	Peatland	Bare peat (0-50% cover)	BP	ED2
		Embryonic bog community (containing *Sphagnum* and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer *Campylopus*-dominated community	pCamp	PF2
		Pioneer *Juncus effusus*-dominated community (Soft Rush)	pJeff	PF2
		Pioneer *Eriophorum angustifolium*-dominated community (Bog Cotton)	pEang	PF2
		Pioneer *Juncus bulbosus*-dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer *Triglochin palustris*-dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with *Cladium* (rich fen)	pCladium	PF1
	Emergent communities	Pioneer *Carex rostrata*-dominated community (Bottle Sedge)	pRos	FS1
		Pioneer *Phragmites australis*-dominated community (Common Reed)	pPhrag	FS1
		Pioneer *Typha latifolia*-dominated community (Reedmace)	pTyp	FS1
		Pioneer *Schoenoplectus lacustris*-dominated community (Bulrush)	pSch	FS1
	Open water	Charaphyte-dominated community	pChar	FL2
		Permanent pools and lakes	OW	FL2
		Temporary open water	tOW	
	Woodland and scrub	Emergent *Betula*/*Salix*-dominated community (A) (Birch/Willow)	eBir	WS1
		Open *Betula*/*Salix*-dominated community (B) (Birch/Willow)	oBir	WS1
		Closed *Betula*/*Salix* scrub community (C) (Birch/Willow)	cBir	WS1
		Ulex europaeus-dominated community (Gorse)	eGor	WS1
		Betula/*Salix*-dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry *Calluna vulgaris*-dominated community (Heather)	dHeath	HH1
		Dense *Pteridium aquilinum* (Bracken)	dPter	HD1
	Grassland	Pioneer dry calcareous and neutral grasssland (Centaureo-Cynosuretum)	gCal	GS1

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	General	Habitat [1]	BnM habitat code	Equivalent Heritage Council codes [2]
		Dactylis-Anthoxanthum-dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2
		Anthoxanthum-Holcus-Equisetum community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		Molinia caerulea-dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (Filipendulion ulmariae)	Mar	GM1
	Disturbed	*Tussilago farfara*-dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		Epilobium-dominated community (vegetation > 50%) (Willowherb spp.)	DisWil	ED3
	General	Riparian areas (streams or drain with associated edge habitats (e.g. FW2/4 + WS1, GS2 etc)	Rip	FW2 +
		Silt Ponds (artificial ponds with associated bank habitats (e.g. FL8 + WS1, GS2, ED2, ED3)	Silt	FL8 +
		Access (tracks or railways with associated edge habitats (e.g. BL3 + gCal, gMol, eGor etc)	Acc	BL3 +
		Works areas (predominately built land but can include landscaped and brownfield habitats (e.g. GA2, WS3, WD4, ED2, ED3)	Works	BL3 +

[1] These are generally pioneer habitats of bare peat and the communities can contain a significant proportion of bare peat. Some habitats are more developed than others. They frequently occur in mosaic with each other.

[2] Not all these communities are equivalent to habitat classes used by The Heritage Council habitat classification scheme (Fossitt 2000) as some are quite rudimentary and undeveloped.

Draft

Heritage Council habitat classification scheme (Fossitt 2000)

	General	Habitat	Heritage Council code
Semi-natural and modified habitats	Peatlands	Raised Bog	PB1
		Lowland Blanket bog	PB3
		Cutover Bog	PB4
		Rich fen and flush	PF1
		Poor fen and flush	PF2
		Transition mire and quaking bog	PF3
	Woodland and scrub	Oak-Birch-Holly woodland	WN1
		Oak-Ash-Hazel woodland	WN2
		Wet Pendunulate Oak-Ash woodland	WN4
		Riparian Woodland	WN5
		Wet Willow-Alder-Ash woodland	WN6
		Bog woodland	WN7
		Mixed broad-leaved woodland	WD1
		Mixed broad-leaved/conifer woodland	WD2
		Conifer plantation	WD4
		Scrub (Gorse)	WS1
		Emergent Betula-dominated community	WS1
		Closed Betula scrub community	WS1
		Recently-planted woodland	WS2
		Ornamental scrub	WS3
		Short-rotation coppice	WS4
		Recently-felled woodland	WS5
	Linear woodland	Hedgerow	WL1
		Treeline	WL2
	Grasslands and Marsh	Improved grassland	GA1
		Amenity grassland	GA2
		Dry calcareous and neutral grsld	GS1
		Dry meadows and grassy verges	GS2
		Dry-humid acid grassland	GS3
		Wet grassland	GS4
		Freshwater Marsh	GM1
	Heath and Bracken	Dry Heath	HH1
		Dry calcareous Heath	HH2
		Wet Heath	HH3
		Dense Bracken	HD1

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	General	Habitat	Heritage Council code
	Disturbed ground	Exposed sand,gravel or till	ED1
		Spoil and bare ground	ED2
		Recolonising bare ground	ED3
		Active quarry	ED4
	Freshwater	Acid Oligotrophic lakes	FL2
		Mesotrophic lakes	FW4
		Artificial ponds (slit ponds)	FL8
		Depositing rivers	FW2
		Canals	FW3
		Drains	FW4
	Cultivated and Built land	Stonewalls and other stonework	BL1
		Earth Banks	BL2
		Buildings and artificial surfaces	BL3
		Arable crops	BC1
		Horticulture	BC2
		Tilled land	BC3

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APPENDIX III. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and, in all circumstances,, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

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APPENDIX IV. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the spread and establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013) , accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practice measures around the prevention and spread of Crayfish plague[6] will be adhered with throughout all rehabilitation measures and activities.

[6] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security, In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh Bog group (Ref. P0-501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 The Peatlands Climate Action Scheme (PCAS)

BnM understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the

process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydro morphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 Archaeology Code of Practice

BnM operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht (National Monuments Service) and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2018, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna

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Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

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APPENDIX VI. DECOMMISSIONING

1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the licence under section 95 of the EPA Acts. This is achieved by BnM identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Drumman Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Where relevant
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Not relevant
7	Decommissioning or Removal of Septic Tanks	Where required

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

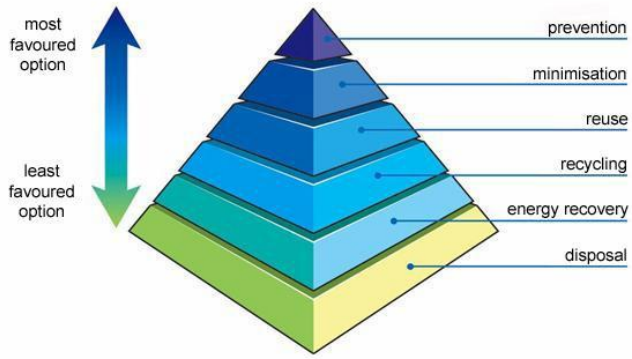
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, BnM will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary).

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration to defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004).

Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

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APPENDIX VIII. EXTRACTIVE WASTE MANAGEMENT PLAN

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPC Licence's Ref P0501-01, Derrygreenagh Bog Group, Counties Offaly, Meath and Westmeath.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in Derrygreenagh bog group are serviced by silt lagoons/ponds. During the excavation of these silt ponds, pre IPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or is levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Peat from the bogs is screened prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0503-01 IPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December 2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
IPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.

These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.
Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment
4.1 Silt pond excavation material and cleanings.
The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.
The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

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5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	**C**lassification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Derrygreenagh IPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the National River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the IPC Licence ref. P0501-01.

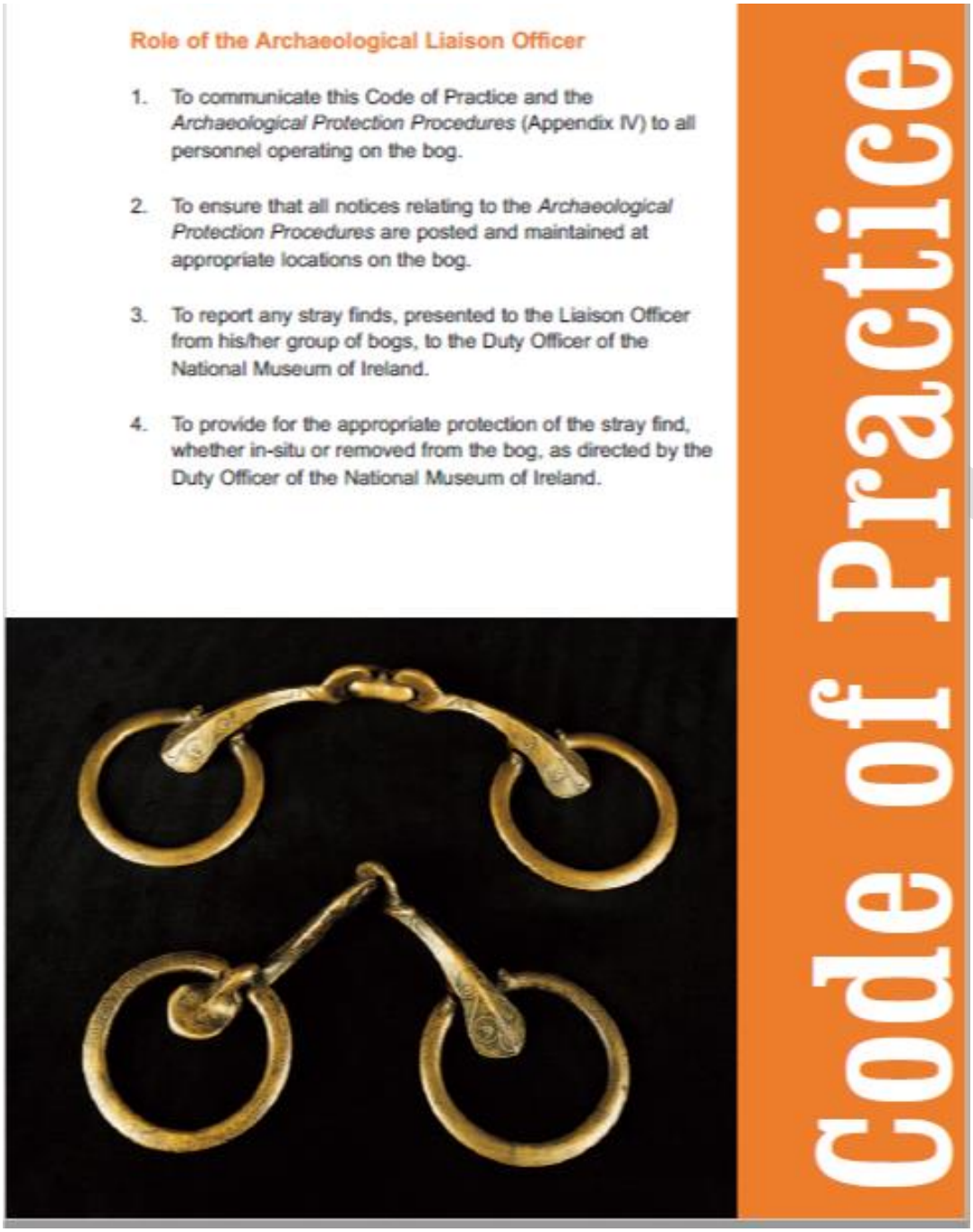
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- No fertiliser will be spread on land within 2 metres of a surface watercourse.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application. Reproduced as follows:

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX X. ARCHAEOLOGY



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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.

- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Drumman Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Drumman Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.2**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	12	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	02/07/2026	02/07/2026	02/07/2026
Rev. 0.2	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	CS	MMcC
Date:	24/09/2026	24/09/2026	24/09/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			

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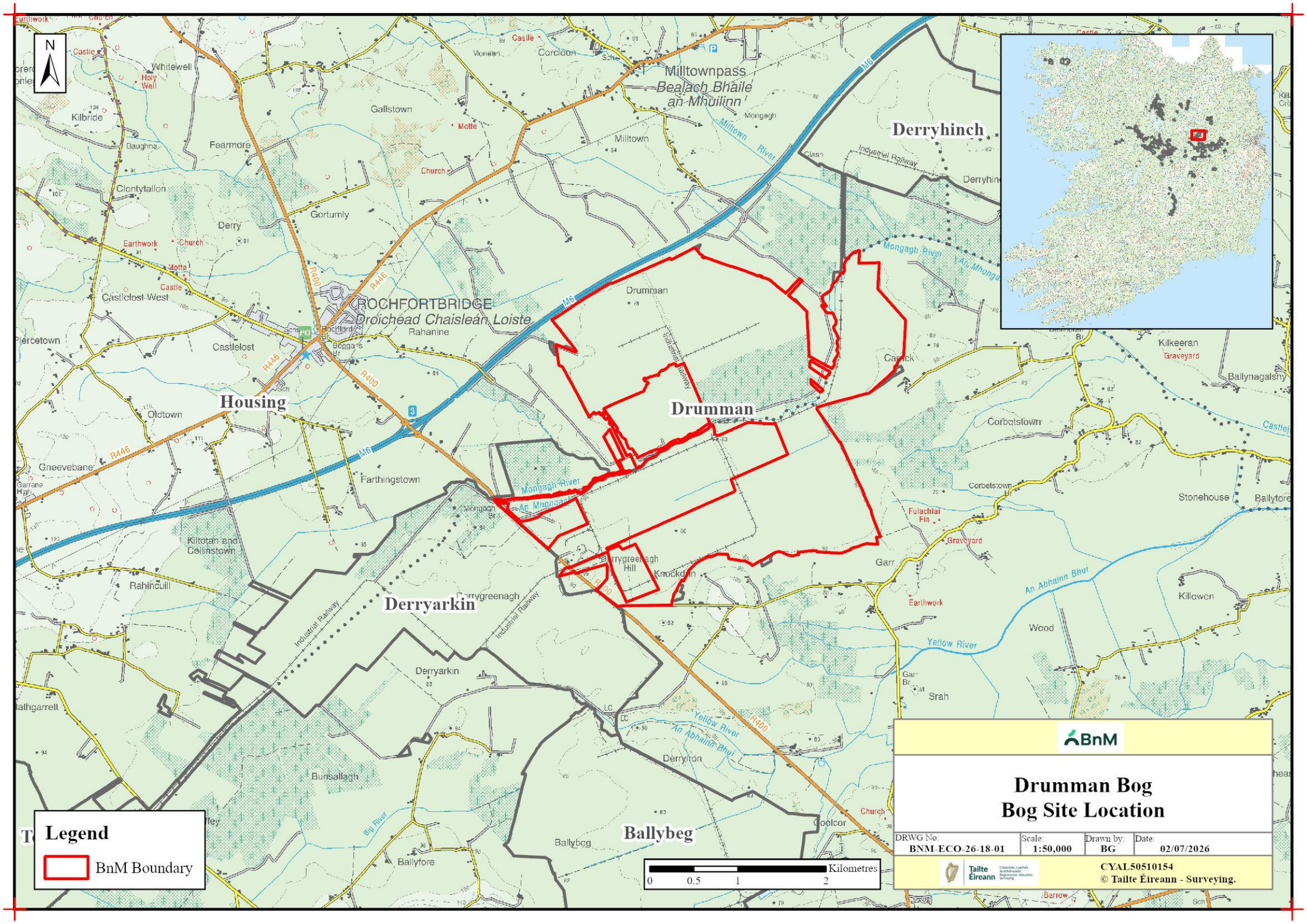
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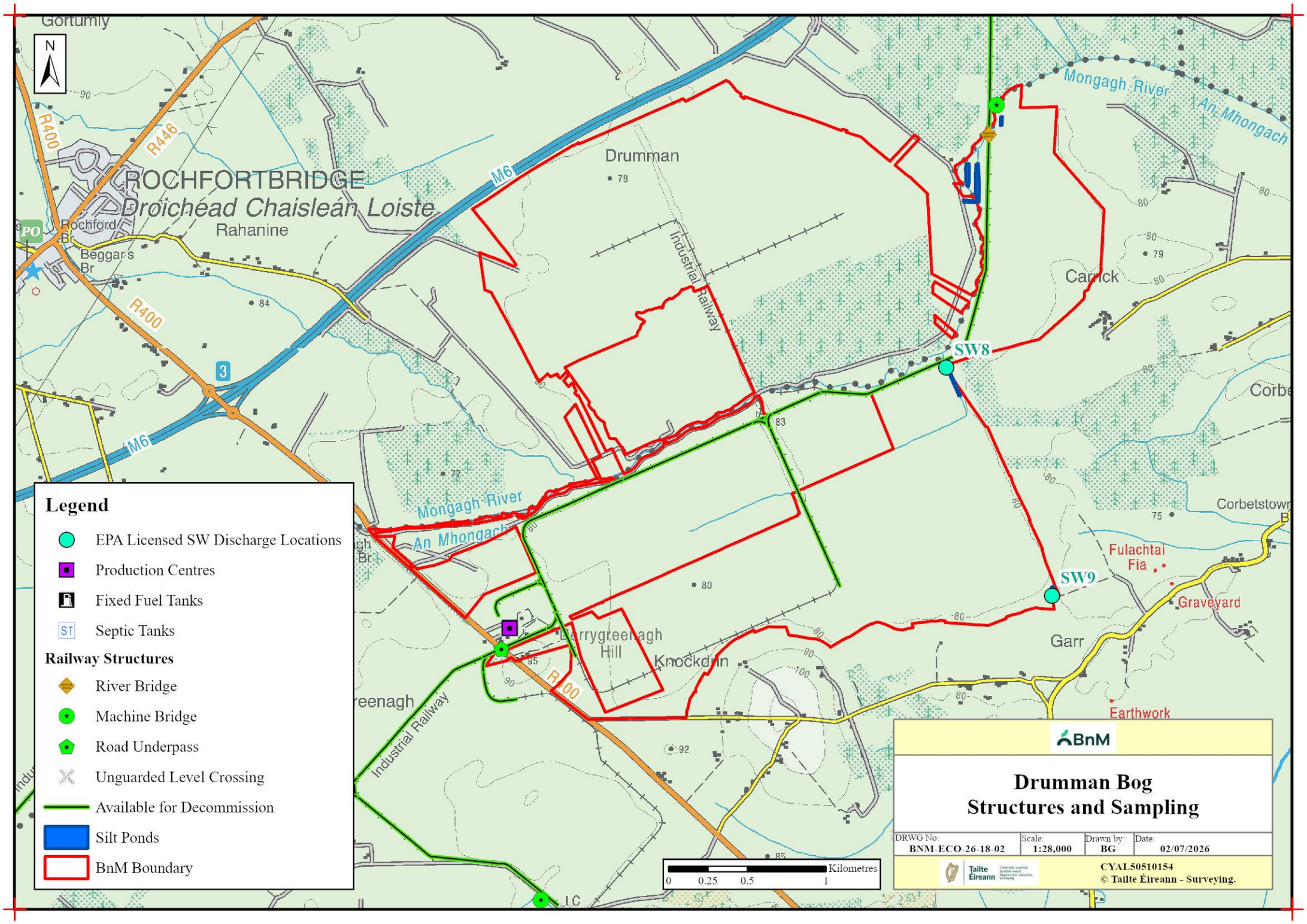
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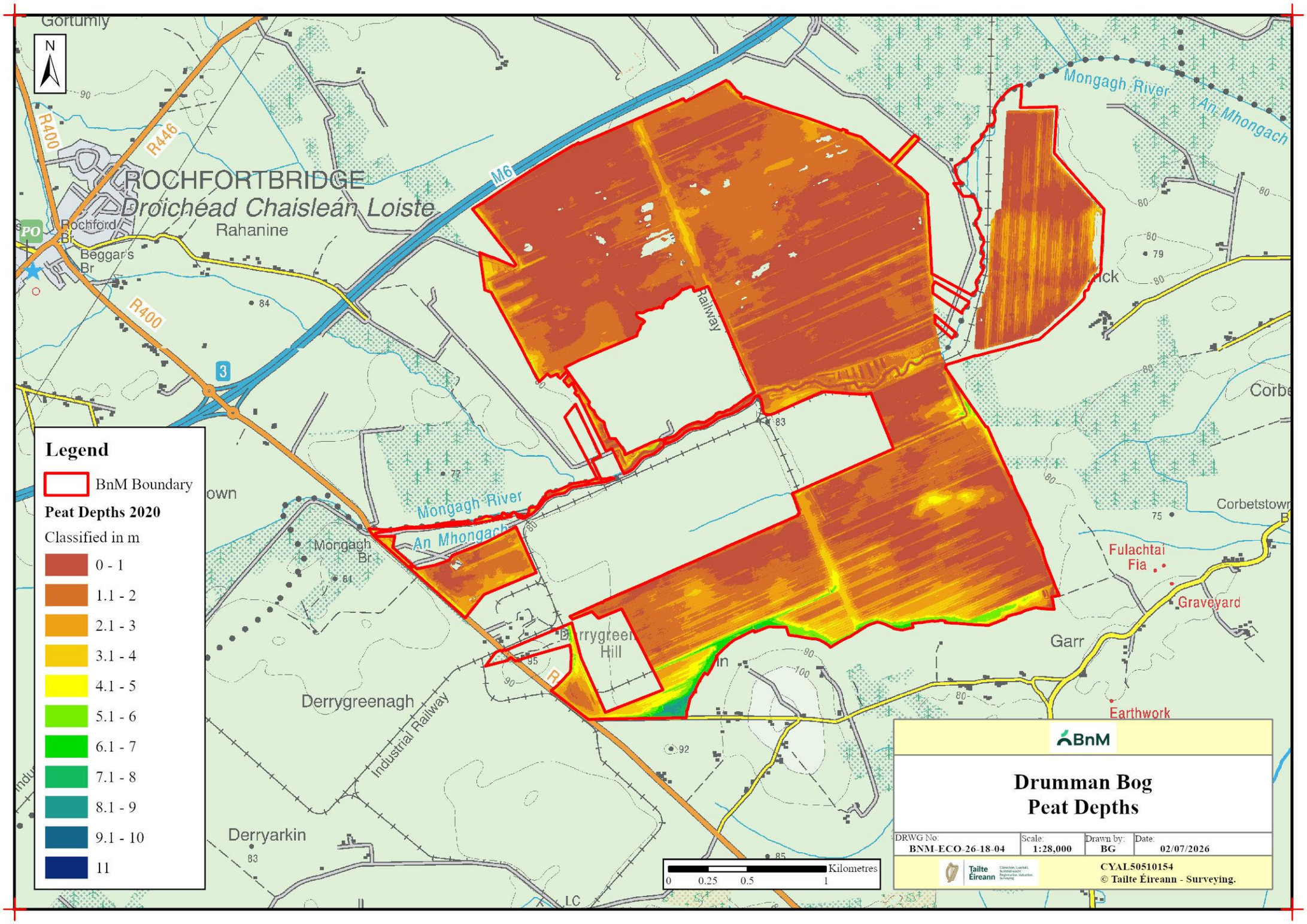
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Droichead Chaisleán Loiste
Rahanine
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Drumman
Industrial Railway
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SW8
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Earthwork
Garr
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Derrygreenagh Hill
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LC
Legend
EPA Licensed SW Discharge Locations
Production Centres
Fixed Fuel Tanks
Septic Tanks
Railway Structures
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Machine Bridge
Road Underpass
Unguarded Level Crossing
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Silt Ponds
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Kilometres
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BnM
Drumman Bog
Structures and Sampling
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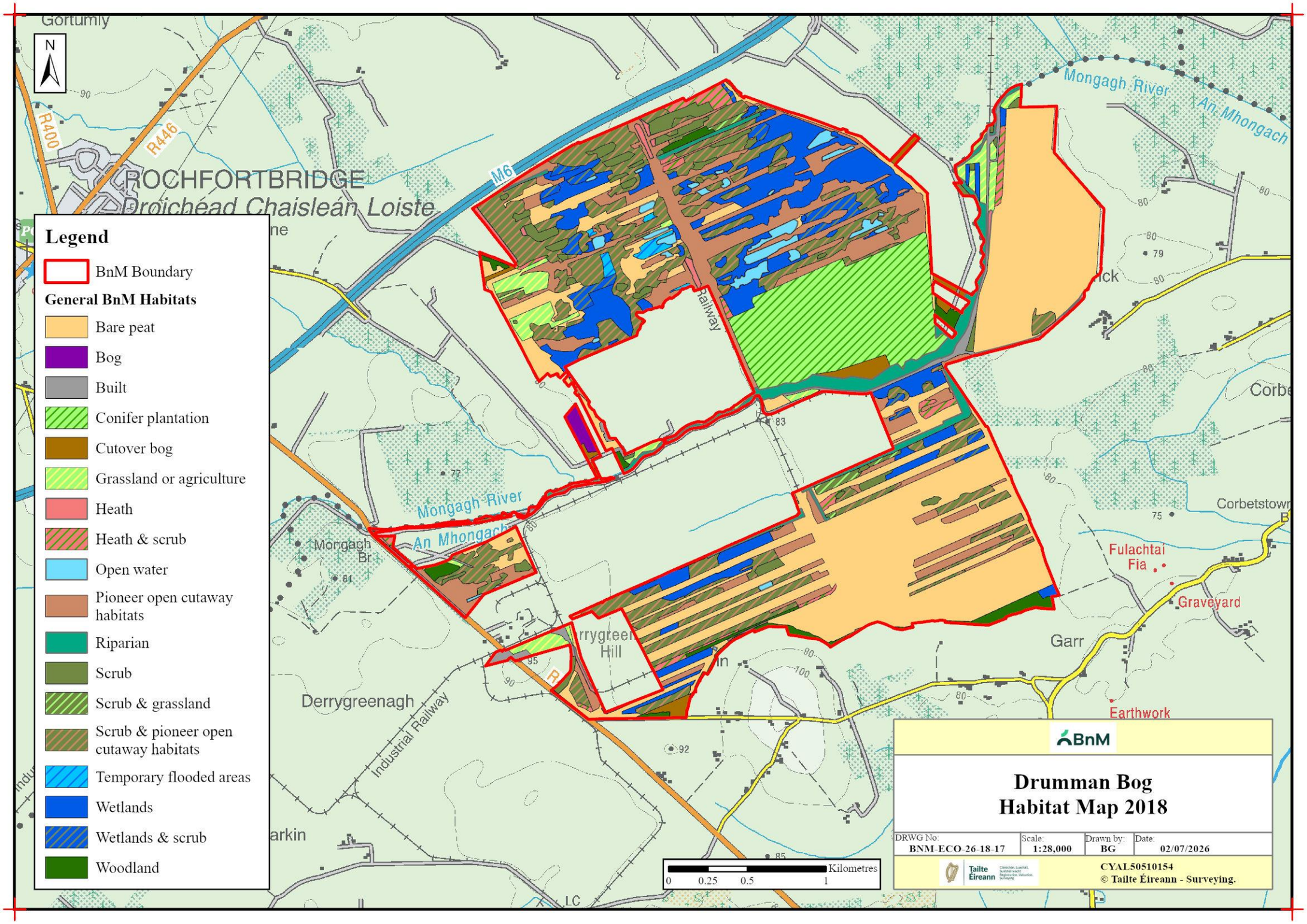
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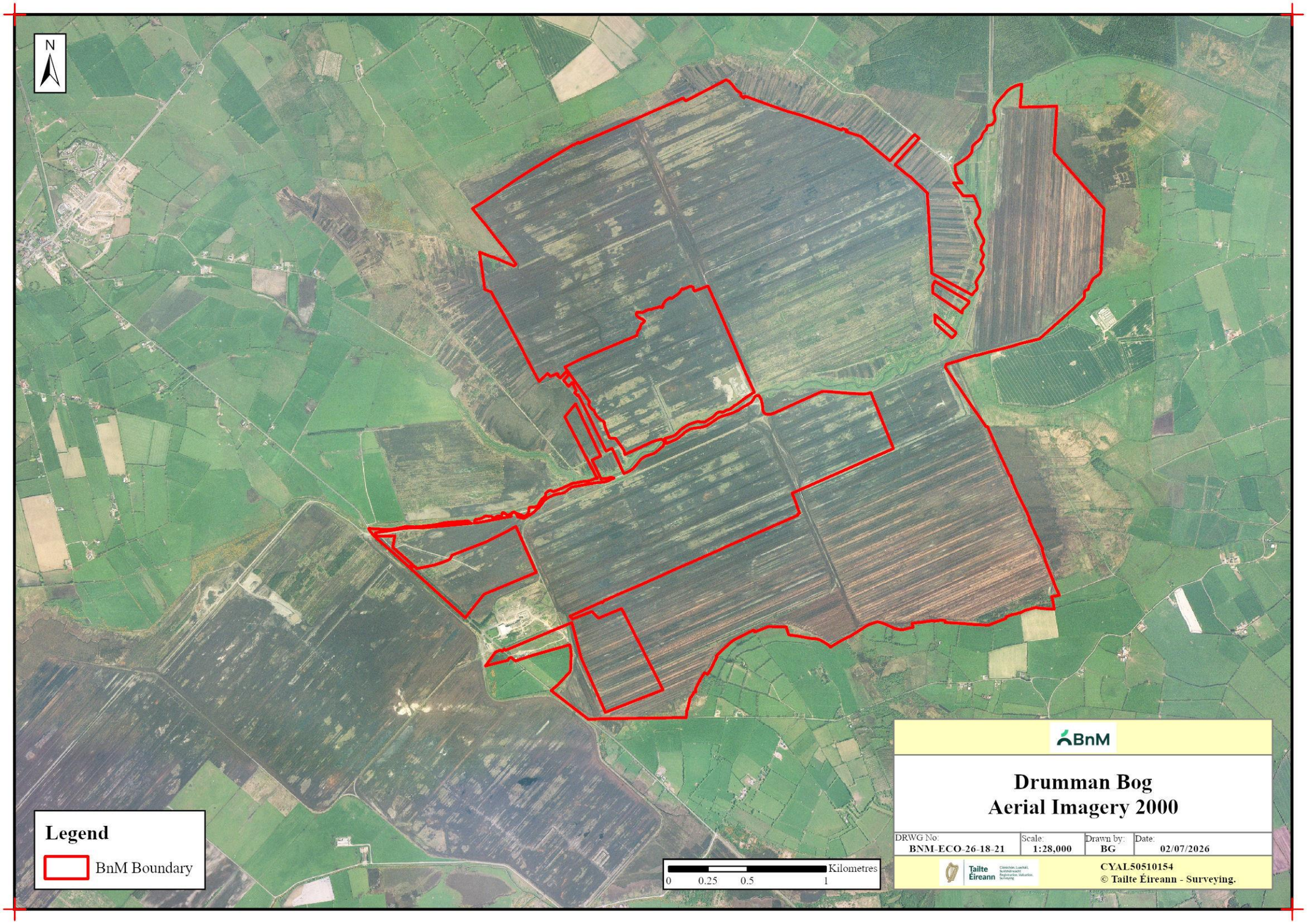
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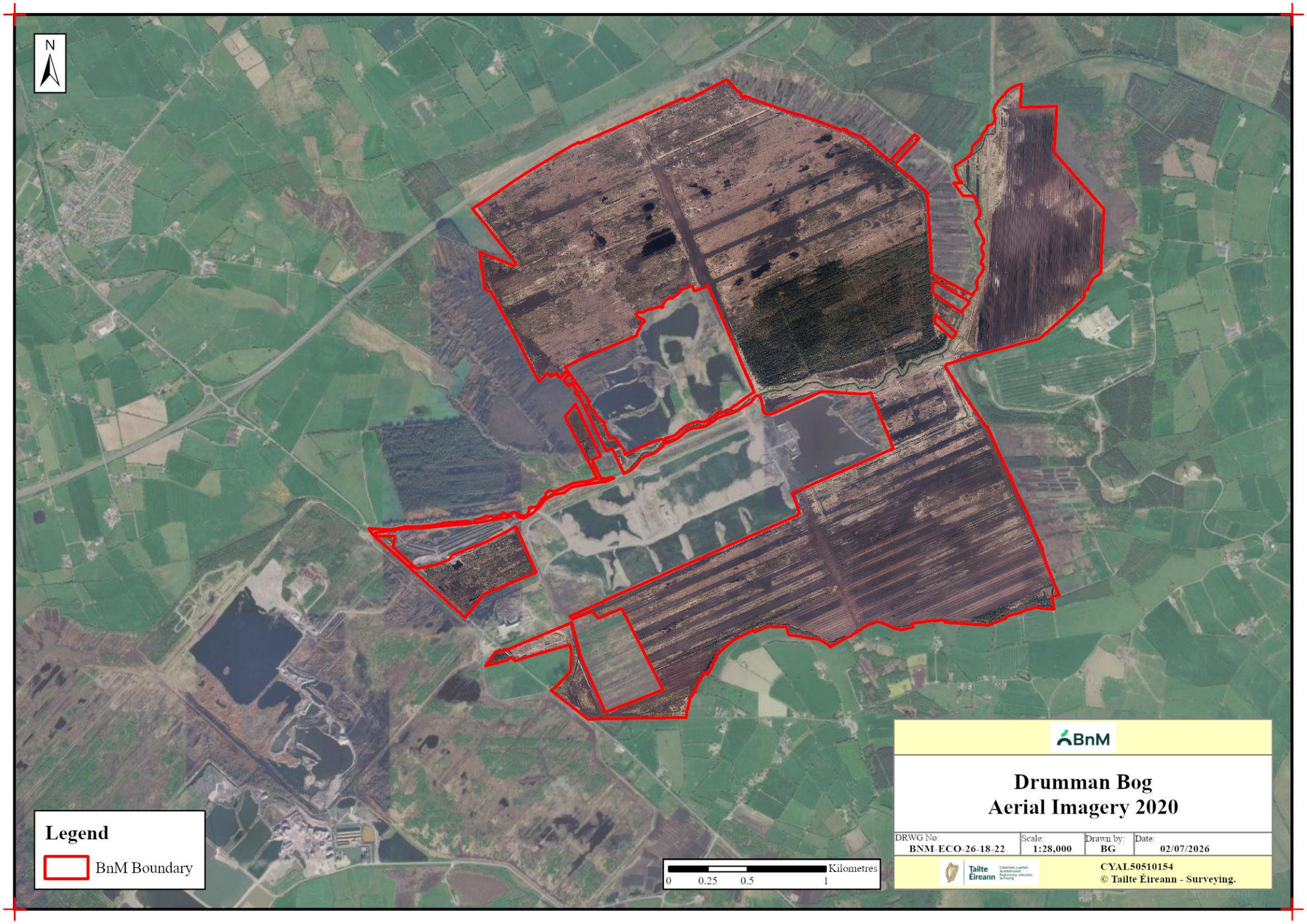
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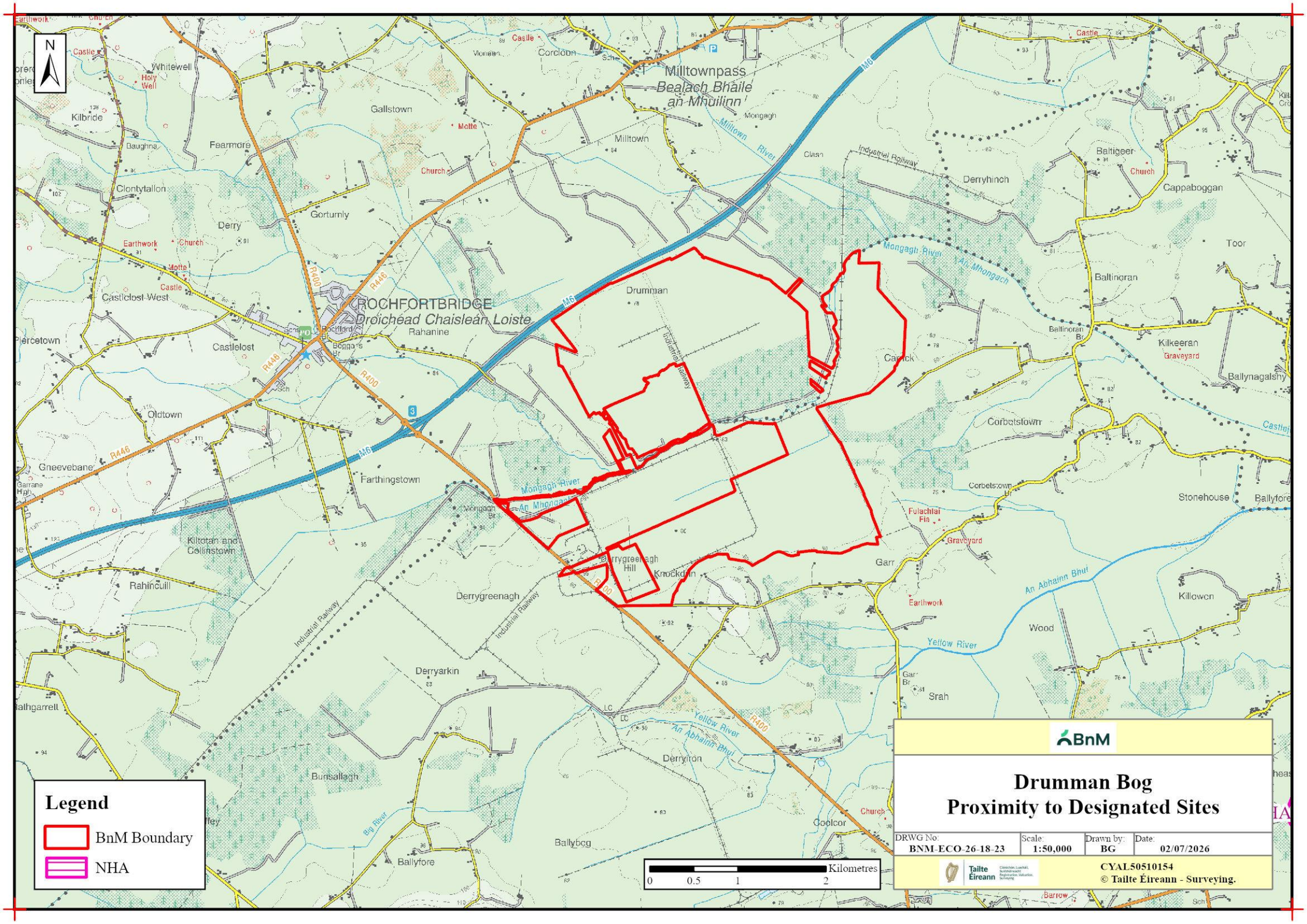
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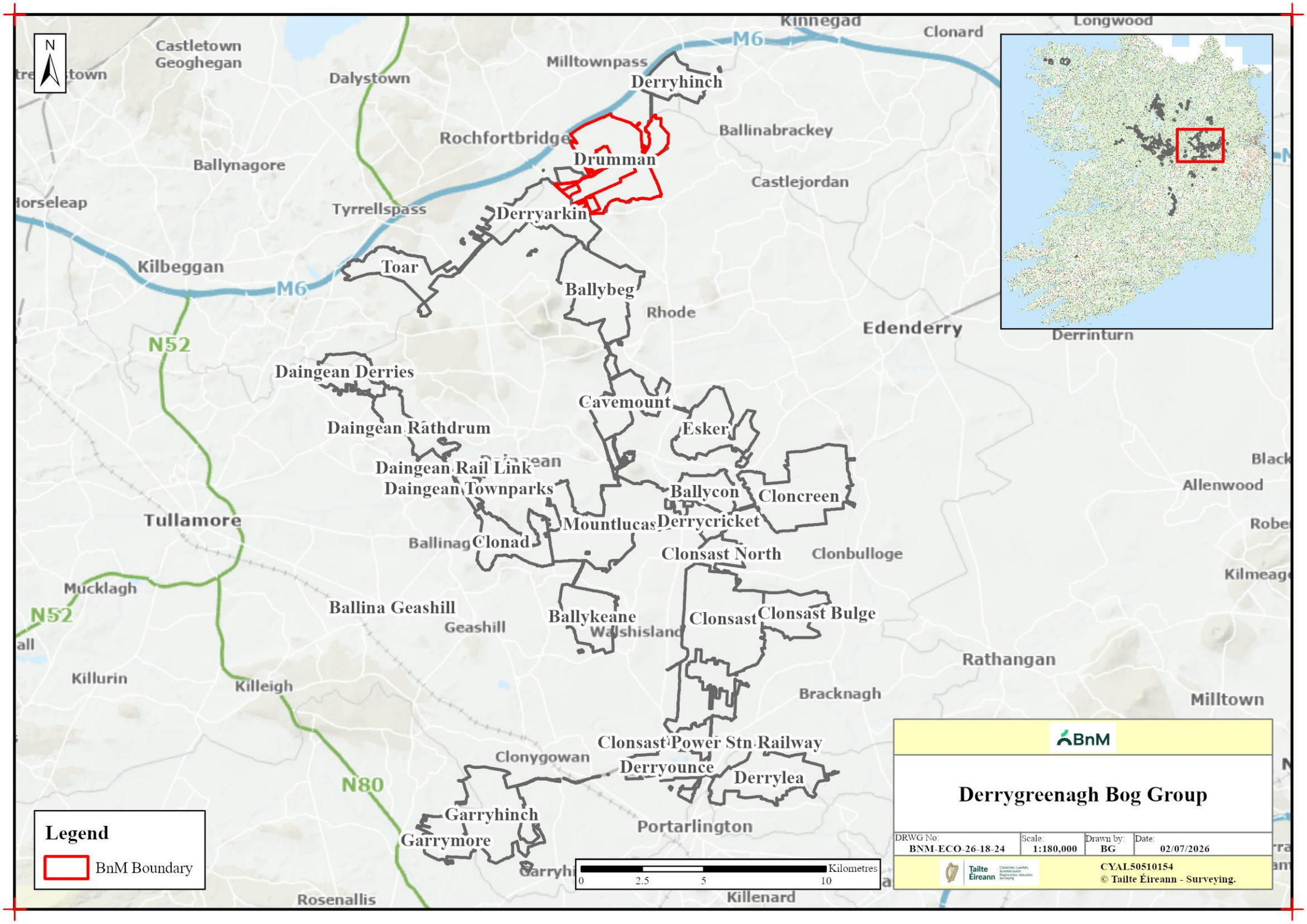
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BNM-ECO-26-18-24: Bog Group Map

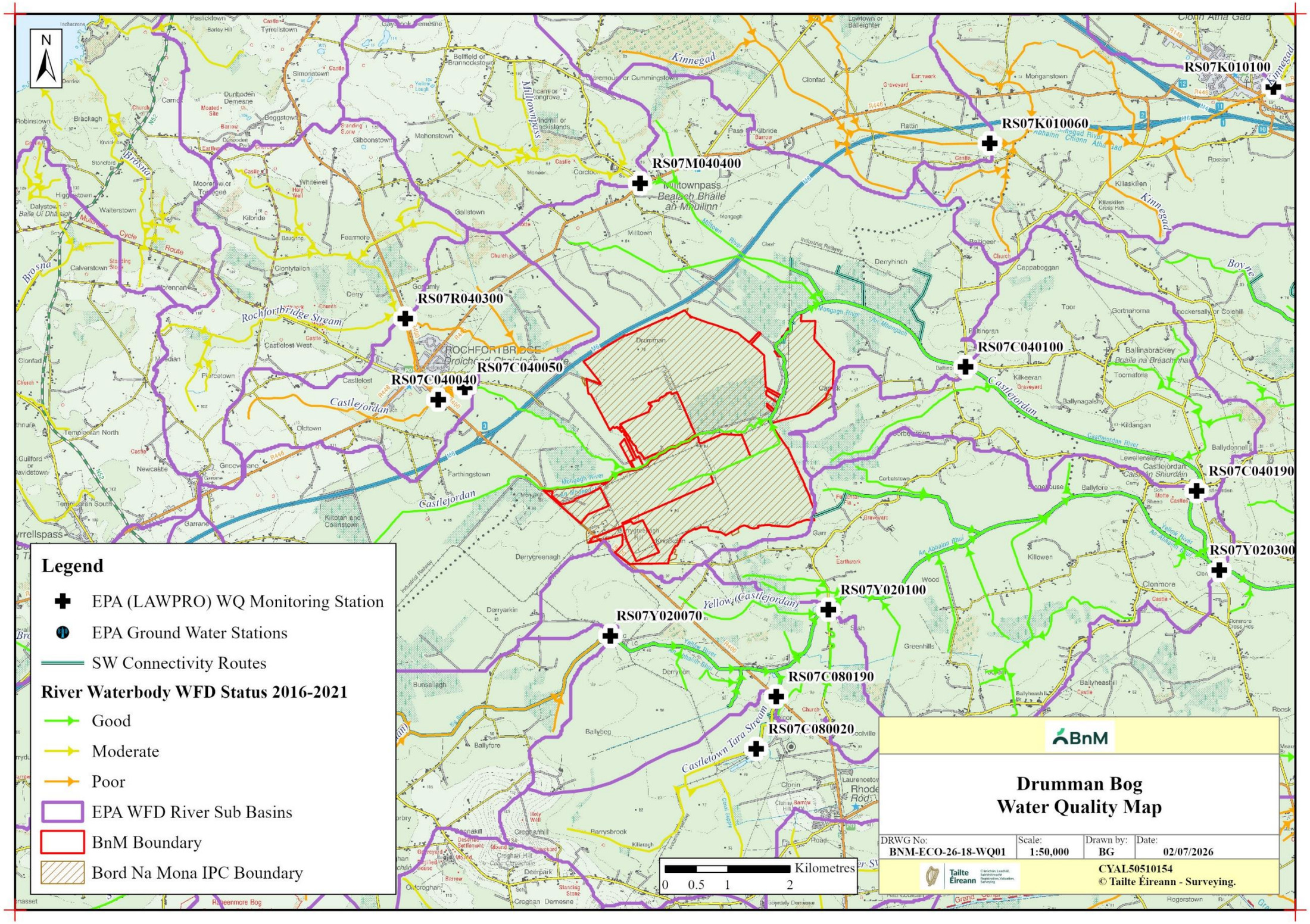
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Hydrology / Topography Maps

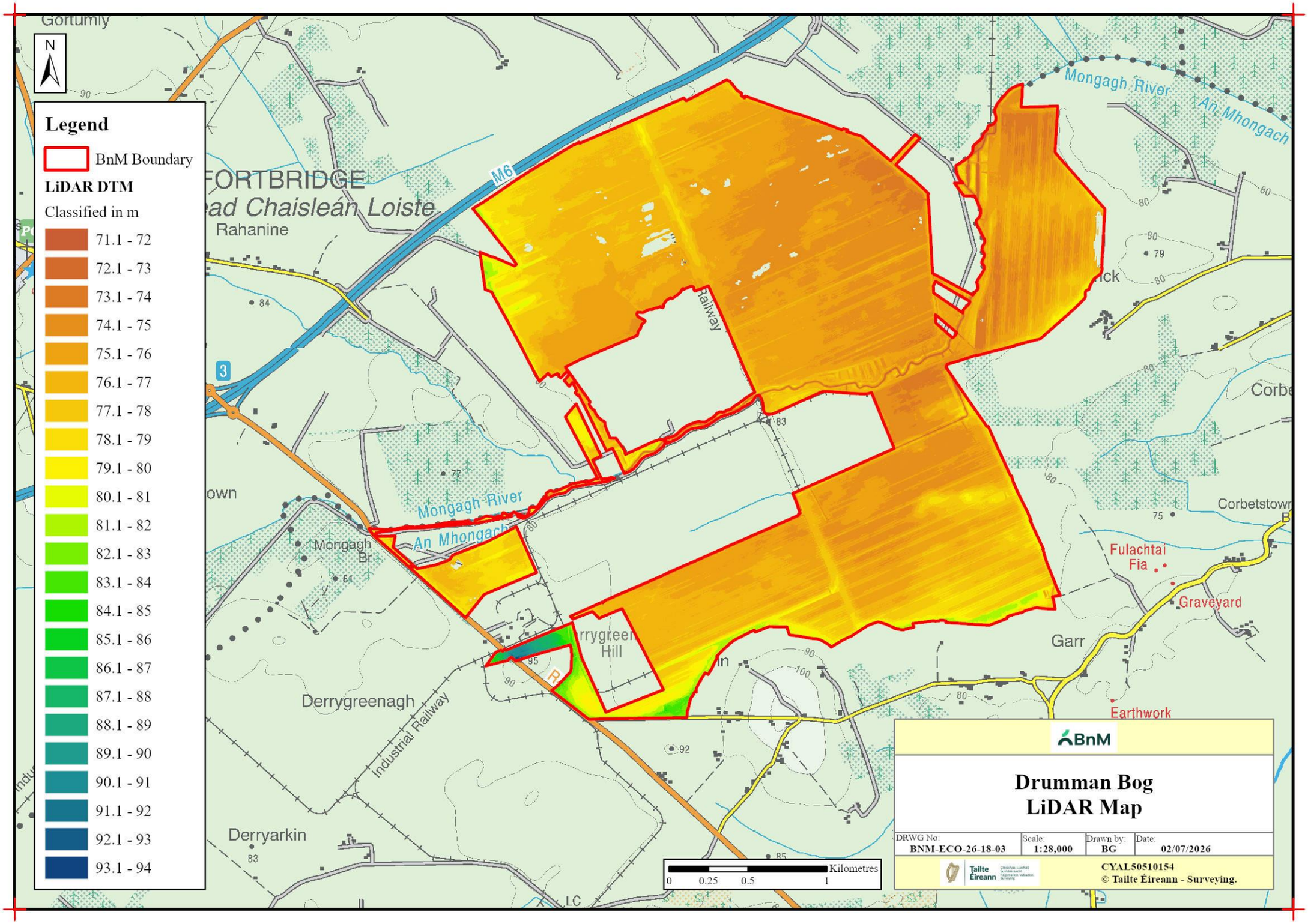
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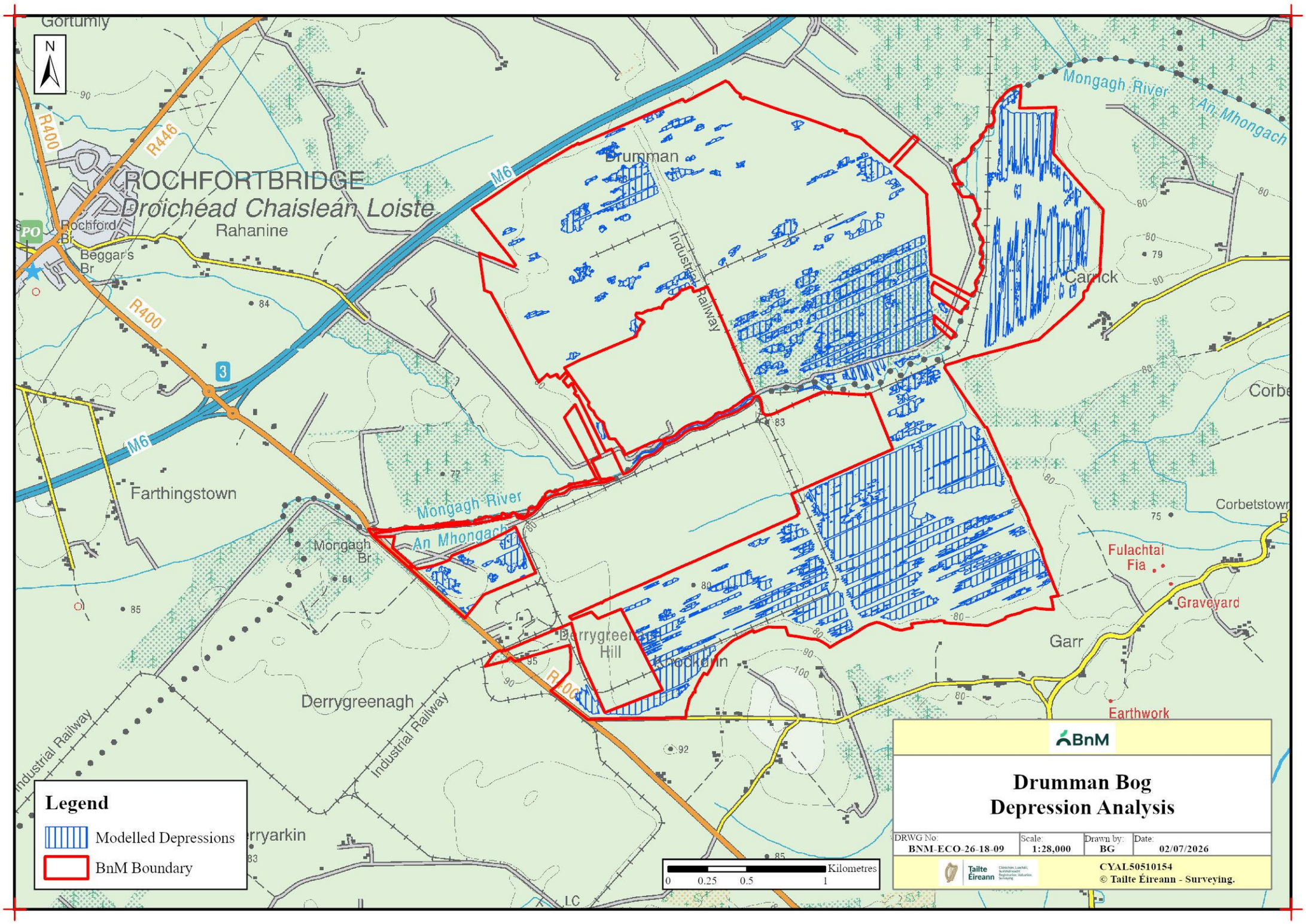
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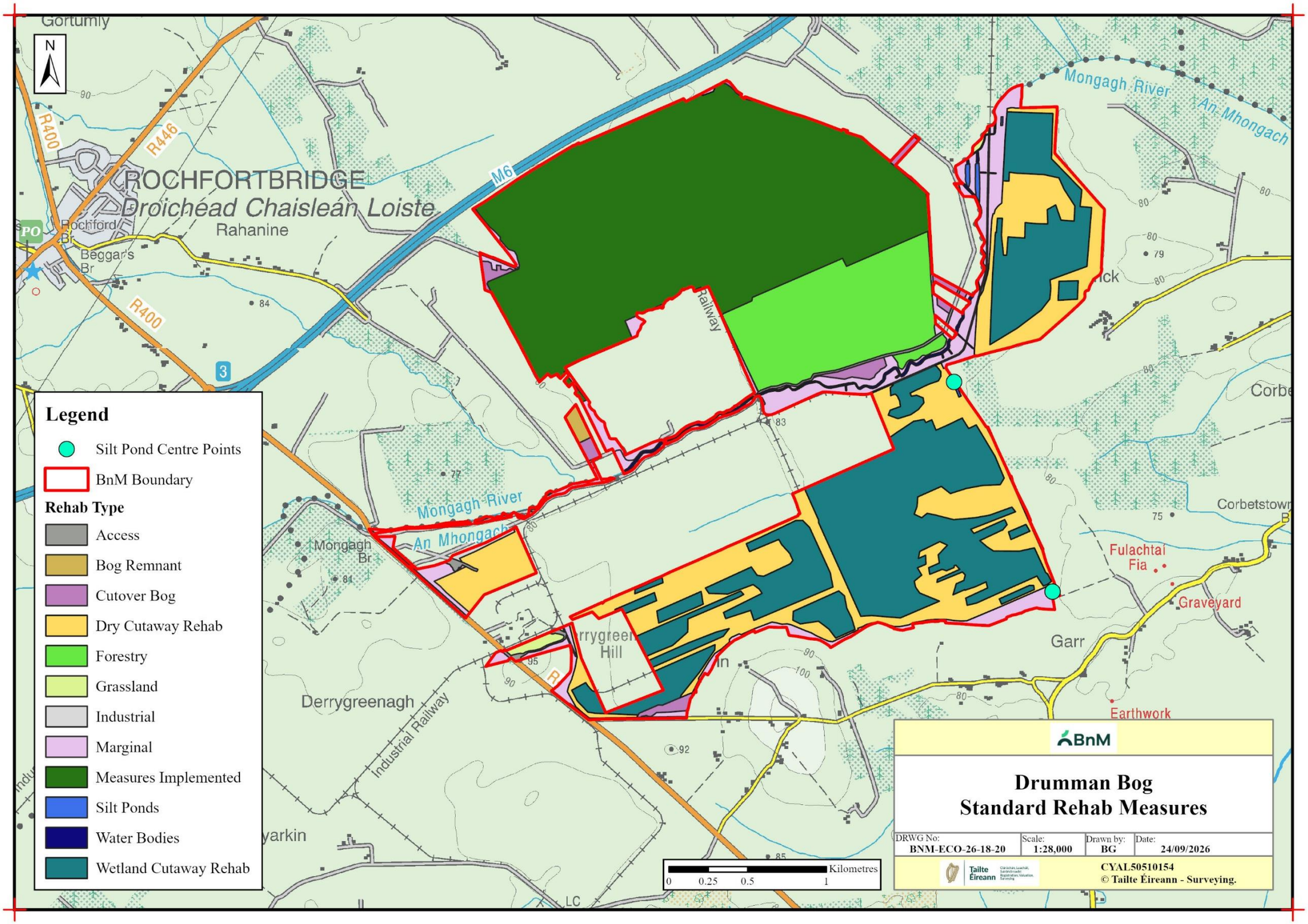
BNM-ECO-26-18-03: LiDAR Map

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Gortumly
N
R400
R446
ROCHFORTBRIDGE
Droichead Chaisleán Loiste
Rahanine
Rochford Br
Beggar's Br
PO
M6
Brummon
Industrial Railway
Mongagh River
An Mhongach
Carrick
Corbe
Farthingstown
Mongagh Br
Corbetstown
Fulachtai Fia
Graveyard
Garr
Derrygreenagh Hill
Knockdrin
Derrygreenagh
Earthwork
Legend
Modelled Depressions
BnM Boundary
0 0.25 0.5 1 Kilometres
BnM
Drumman Bog
Depression Analysis
DRWG No: BNM-ECO-26-18-09
Scale: 1:28,000
Drawn by: BG
Date: 02/07/2026
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Rehabilitation Maps


Gortumly
N
R400
R446
ROCHFORTBRIDGE
Droichead Chaisleán Loiste
Rahanine
Rochford Br
Beggar's Br
PO
M6
R400
3
Mongagh River
An Mhongach
Railway
Mongagh Br
Derrygreenagh
Industrial Railway
Derrygreen Hill
Garr
Fulachtai Fia
Graveyard
Earthwork
Corbetstown
Kilometres
0 0.25 0.5 1
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
Access
Bog Remnant
Cutover Bog
Dry Cutaway Rehab
Forestry
Grassland
Industrial
Marginal
Measures Implemented
Silt Ponds
Water Bodies
Wetland Cutaway Rehab
BnM
Drumman Bog
Standard Rehab Measures
DRWG No: BNM-ECO-26-18-20
Scale: 1:28,000
Drawn by: BG
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BnM

Toar Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2026

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

This licence condition requires BnM agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Toar Bog upon cessation of peat production and compliments the licence requirement to decommission the site.

***Rehabilitation** generally comprises site stabilisation with natural colonisation with or without targeted management.*

Industrial peat production has now fully ceased at Toar Bog.

*This rehabilitation plan for Toar Bog has been updated but not fully finalised. As such it remains a **draft** rehabilitation plan until it is fully finalised. BnM expect to finalise these rehabilitation plans in the future as part of its overall peatland rehabilitation programme.*

Any consideration of any other future after-uses for Toar Bog will be conducted in adherence to the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

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Document Control Sheet	
Document Name:	Toar Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2026
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Derrygreenagh ref. 501 (EPL)\Toar
Document Status:	Draft

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	2	31	4	0	10

Rev.	0.1	Author(s):	Checked By:	Approved By:
Name(s):		JOS	MMC	MMC
Date:		20/09/2021	22/09/2021	22/09/2021
Rev.	**1**	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):		DMN	MMC	MMC
Date:		08/12/2022	21/12/2022	21/12/2022
Rev.	**1.1**	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):		CS		
Date:		18/05/2026		

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NON-TECHNICAL SUMMARY

- BnM (formerly Bord na Móna) is planning to rehabilitate Toar Bog, approximately 1.5km south of Tyrrellspass, in Co. Westmeath.
- This draft rehabilitation plan has been prepared by BnM as part of obligations to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat (putting a "skin" back onto the peat), and minimising effects to downstream waterbodies. Toar was drained in the past to allow peat extraction. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- Toar Bog was utilised for industrial peat production by BnM from 1958. BnM Industrial peat extraction is now finished at Toar Bog since 2018.
- In general soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and Reeds will thrive.
- Much of the Toar Bog has deeper residual peat. Sections with deeper residual peat have the capacity to regrow *Sphagnum* moss again, where there are suitable hydrological conditions. *Sphagnum* is a key species for restoring naturally functioning peatland conditions.
- Areas where most peat has been removed and the environmental conditions have been modified cannot be restored back to raised bog immediately. However other natural habitats will develop like shallow wetlands with Reedbeds and Birch woodland.
- The development of a range of habitats in Toar Bog will support biodiversity including plants, insects, birds and mammals. This includes some species that are rare and protected in the wider landscape. It will increase the national area of native woodland and create new wetland habitats. Many wetland habitats in the wider landscape have been reclaimed for agriculture and other uses and peatland rehabilitation is an opportunity to create new wetland and peatland habitats.
- Toar Bog was utilised for industrial peat production from 1958 until 2020 and much of the former production area currently comprises of bare peat. Within the former production area there are some already established pioneer peatland habitats.
- Measures proposed for Toar Bog include drain blocking, creation of cells, and other measures required to raise water levels to the surface of the peat (changing levels of pipes for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of BnM rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the bog via the existing outlets.
- It will take some time for vegetation and habitats to fully develop at Toar, and for a peatland ecosystem to be restored. However, it is expected that most of the bog will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. BnM continually reviews its land-bank to consider future commercial or industrial developments. BnM are reviewing the potential to develop a potential gravel extraction project at Toar Bog
- Peatland rehabilitation of these bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies

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in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

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1. INTRODUCTION

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh bog group (Ref. P0501-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area.

Toar bog is part of the Derrygreenagh bog group (see Appendix II for details of the bog areas within the Derrygreenagh Bog Group). Toar Bog is located in Co. Westmeath (Grid reference: N 41946 35557) with the south/southeastern boundary along the Co. Offaly boundary.

This plan is a specific rehabilitation plan for the bog and outlines:

- Description of site management and status.
- Main issues and approaches to rehabilitation.
- Consultation to date with interested parties.
- Interaction with other policy and legislative frameworks (Appendix VI).
- The planned rehabilitation goals and outcomes.
- The scope of the rehabilitation plan.
- Criteria which define the successful rehabilitation and key targets to validate rehabilitation.
- Proposed rehabilitation actions.
- Proposed timeframe to implement these measures.
- Budget and Costings.
- Associated aftercare, maintenance and monitoring.

Note: This plan should be read in conjunction with the accompanying Map book.

BnM announced the complete cessation of industrial peat production across its estate in January 2021.

This draft rehabilitation plan outlines the proposed approach to be taken for IPC compliance in respect of Toar Bog, and how the site will be rehabilitated. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

BnM are carrying out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS) on its peatlands (2021-2026). This scheme is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). The additional costs of the scheme are being supported by the Government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) are acting as the scheme regulator. Over 24,000 ha of cutaway peatlands have been rehabilitated as part of this scheme to date across multiple BnM peatlands. Enhanced rehabilitation measures that have been proposed as part the PCAS project are **NOT** proposed as part of this draft Toar rehabilitation plan at this stage.

1.1 Constraints and Limitations

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0501-01:

> "*The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area.*"

It also seeks to outline measures to optimise climate action and other ecosystem services benefits, mainly through hydrological management.

This document covers the area of **Toar Bog**.

Toar Bog is part of the Derrygreenagh Bog Group. BnM Industrial peat extraction at Toar Bog permanently ceased in 2018 (having commenced in 1958).

Parts of Toar Bog in the south-eastern section of the site (within the areas owned and under the control of BnM) are currently being used by domestic turf cutters who have turbary rights to harvest peat. These areas are ecologically and hydrologically linked to the area owned by BnM where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting or turbary issues on Toar Bog. Nevertheless, BnM are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

A small part of the site is used for biomass storage by BnM and it is anticipated to be used until 2030. Logs are stored on site before being transported to Edenderry Power for use as biomass fuel. Logs are stored along accessible areas on the eastern travel pass and in the former gravel extraction area.

The site is in close proximity to Coillte plantation forestry. Killavally (Forest code: WH04, which is located adjacent to the site boundary in the western section of the site. Further plots of Coillte forestry plantation, Derrycoffey (Forest code: OY02) occur to the south-east of Toar Bog, set back a minimum distance of 65m from the site boundary.

Part of the site along the access road in the eastern section of the site is currently under use as a BnM biomass storage area.

Rehabilitation in other areas of the bog may also be constrained due to archaeology or other property issues.

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2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders. The development of this rehabilitation plan considered **recently published** guidance issued by the EPA – '*Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan*' (EPA, 2020).

The ecological information and site information collected during the BnM ecological baseline survey, additional confirmatory site visits (covering the period 2012 to 2026 inclusive) and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- Best practise for peatland restoration being developed in Ireland including the Methodology Paper for the Enhanced Decommissioning, Rehabilitation and Restoration on Bord na Móna Peatlands – Preliminary Study Nov 2022:
- Consultation and engagement with internal and external stakeholders;
- GIS Mapping;
- BnM drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site;
- Hydrological modelling.

2.1 Desk Study

The desk study involved collecting all relevant environmental and ecological data for the study area. The development of the rehabilitation plan also takes account of research, experience and engagement with other peatland restoration and rehabilitation projects and peatland research including Irish, UK, European and International best-practise guidance (full citations are in the References Section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.

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- Joosten & Clarke (2002). Wise Use of mires and peatlands – Background and Principles including a framework for Decision-making.
- Lindsay (2010). Peatbogs and Carbon: a Critical Synthesis to Inform Policy Development in Oceanic Peat Bog Conservation and Restoration in the Context of Climate Change.
- Mackin *et al*. (2017). Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service,
- McBride *et al*. (2011). The Fen Management Handbook (2011), Scottish Natural Heritage.
- McDonagh (1996). Drain blocking by machines on Raised Bogs. Unpublished report for National Parks and Wildlife Service.
- NPWS (2017a). National Raised Bog Special Areas of Conservation management plan. Department of Arts, Heritage and the Gaeltacht.
- Pschenyckyj et al., 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
- Quinty & Rochefort (2003). Peatland Restoration Guide, second edition. Canadian *Sphagnum* Peat Moss Association and New Brunswick Department of Natural Resources and Energy.
- Regan*, et. al.* (2020). Ecohydrology, Greenhouse Gas Dynamics and Restoration Guidelines for Degraded Raised Bogs. EPA Research Report. Prepared for the Environmental Protection Agency by Trinity College Dublin.
- Renou-Wilson *et al*. (2011). BOGLAND - Sustainable Management of Peatlands in Ireland. STRIVE Report No 75 prepared for the Environmental Protection Agency.
- Schouten (2002). Conservation and Restoration of Raised Bogs: Geological, Hydrological and Ecological Studies. Dúchas - The Heritage Service of the Department of the Environment and Local Government, Ireland;
- Thom, *et al*. (2019). Conserving Bogs – The Management Handbook, second edition.
- Wheeler & Shaw (1995). Restoration of Damaged Peatlands – with Particular Reference to Lowland Raised Bogs Affected by Peat Extraction.
- Wittram *et al*. (2015). A Practitioners Guide to Sphagnum Reintroduction. Moors for the Future Partnership.

Additional on-line resources were also incorporated into the desk study, including:

- Derrygreenagh Integrated Pollution Control Licence;
- Derrygreenagh Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);

- River Basin Management Plan for Ireland 2022-2027;
- BnM Annual Report 2025.
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.

2.2 Consultation

A number of stakeholders have been identified during the course of BnM's rehabilitation and Biodiversity Action Plan activities and are contacted during the rehabilitation planning process for their views. See Section 4.

2.3 Field Surveys

BnM carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Toar Bog was surveyed in February of 2012. Additional ecological walk-over surveys and visits have taken place at Toar Bog between 2012-2021, with a confirmatory survey carried out in September of 2021. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet. A site visit was used to categorise any changes in habitat extent at Toar in September 2021.

A detailed ecological survey report for Toar Bog is contained in Appendix II.

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3. SITE DESCRIPTION

Toar Bog is located approximately 1.5km south of Tyrrellspass, Co. Westmeath. Offaly County boundary borders the southeastern boundary.

The surrounding landscape is a mosaic primarily consist of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by BnM for industrial peat production with some areas utilised for domestic turf-cutting. The M6 motorway passes adjacent to the north-western boundary of the site.

A rail line connects Toar bog with Derryarkin Bog to the east, and this is the main access to the site. There is also a small tea centre and machinery access path on the northern edge of the bog.

See Drawing number BNM-ECO-26-18-01 titled**: *Site Location Map***, included in the accompanying Mapbook[1] , which illustrates the location of Toar Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Toar bog was developed relatively recently for industrial peat production and was in peat production by BnM from 1958 until 2018. The peat harvested from this site was used for horticultural peat supply and energy peat for Edenderry Power.

3.1.2 Current land-use

BnM Industrial peat production has now permanently ceased at Toar Bog.

Raised bog remnants occurs along the margins of the bog along with cutover bog. These bog remnants have been subject to drainage, associated with domestic turf cutting, which is ongoing.

The entire bog is not within the ownership of BnM and some domestic turf cutting is having an impact on the margins of the bog, both within and outside the BnM boundary.

A small part of the site was used for gravel extraction by BnM in the past. This activity is now ceased.

A small part of the site is used for biomass storage by BnM. Logs are stored on site before being transported to Edenderry Power for use as biomass fuel. Logs are stored along accessible areas on the eastern travel pass and in the former gravel extraction area.

3.1.3. Socio-Economic conditions

BnM has historically been a vital employer for the rural community of the Midlands of Ireland. BnM compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of BnM's Third Development Programme, a total of twenty-three work locations had been established around the country. The company had an average employment of approximately 4,688 in the mid 1980's, with a peak employment of 6,100 during the production season, which placed it among the country's largest commercial

[1] Cutaway Bog Decommissioning and Rehabilitation Plan - Toar Bog Map Book

employers. The importance of such levels of employment were largely due to its regional concentration in the Midlands and the lack of alternative employment opportunities at the time.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

According to the Energy Crop Socio-Economic Study undertaken by Fitzpatrick Associates in 2011, there were an estimated 1,443 jobs supported by the peat-to-power industry in Ireland at the time, some 81% of which were located in the catchment areas of the three peat-fired generating stations (Lough Ree, West Offaly, and Edenderry Power Stations). These constituted jobs in the plants and in peat extraction, jobs indirectly supported in upstream supply industries and jobs induced through the trickle-down effects of the wages and salaries of those supported directly or indirectly.

In respect of Toar Bog, jobs would have included those to facilitate fuel peat production.

As the primary employer in many Midland counties, BnM played a central role in building communities through several initiatives, including education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas. These job numbers have now declined with the cessation of peat extraction at this bog.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The underlying geology at Toar Bog consists of Waulsortian Limestone (Massive unbedded lime-mudstone) in the western half of the site, with a Visean Limestones extrusion (undifferentiated limestone) through the central part of the site. The southeastern section of the site consists of Lucan Formation (dark limestone and shale)[2]. The site is entirely underlain with peat subsoils.

The underlying geology and subsoil of Toar bog is limestone - calcareous.

3.2.2 *Peat type and depths*

Industrial peat extraction has only been undertaken at Toar Bog relatively recently (within the past 30 years). As a result, there are substantial residual peat depths of over 4 m in some parts of the site. Peat depths range from less than half a meter to greater than 5m across most of the former industrial production area. The peat harvested on site is mostly “red” or “*Sphagnum* peat” and was used in the supply of horticultural peat products as well as some milled peat used for fuel in EPL.

[2] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

3.3 Key Biodiversity Features of Interest

3.3.1 Current habitats

The majority of Toar Bog within the BnM boundary is bare peat as this site was in production until 2018. Due to the recent cessation of industrial peat production, there has been little opportunity for post-production habitats to develop, and biodiversity interest is therefore limited in general to the margins of the site. The former industrial production area is relatively dry overall as drainage is still active.

Some pioneer cutover vegetation communities are beginning to establish within the bare peat, including, pioneering birch scrub, dry *Calluna vulgaris* (Heather) dominated community and pioneer *Juncus effusus* (soft rush) dominated community. However, these are small in area.

Habitats along the margins of the site include poor fen (soft rush dominated) and dry Heather. The western edge contains a mix of Birch woodland (WN7), cutover bog (PB4) and small sections of remnant raised bog (PB1). The cutover is old and turf-cutting appears to have been carried out long before industrial peat production began on the site. The areas of cutover have re-vegetated with Heather. The woodland was dominated with Birch and Willow.

There is a small compound located to the north of Toar bog. This is being used for the temporary storage of timber for use as biomass. An old inactive gravel pit is located to the east of Toar bog. This area has been constrained out of the proposed rehabilitation footprint along with a buffer zone as it is currently being considered for a larger gravel extraction development.

See Drawing number BNM-ECO-26-18-17 titled**: *Habitat Map 2018***, included in the accompanying Mapbook, which illustrates the habitats at Toar Bog.



Drone image of Toar bog showing the extent of bare peat across the site (September 2021).

	
Degraded remnant raised bog habitat in the western section of Toar Bog (September 2021)	*Example of some colonisation of Bog Cotton (Eriophorum vaginatum) (September 2021).*

Table 1: Photos of Habitats at Toar Bog

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3.3.2 Species of conservation interest

A number of species of conservation concern have been recorded at Toar bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Data Centre (NBDC). Evidence of multiple mammal species has been recorded on or in close proximity to the bog including Badger (*Meles meles*), Hedgehog (*Erinaceus europaeus*), Leisler's Bat (*Nyctalus leisleri*), Otter (*Lutra lutra*) and Pine Marten (*Martes martes*). Frogs (*Rana temporaria*) have also been recorded at the site.

Bird species recorded utilising or associating with the habitats onsite during the most recent visit to Toar in September of 2021, included Meadow Pipit (*Anthus pratensis*) (Red-listed[3]), Kestrel (*Falco tinnunculus*) (Red-listed) and Swallow (*Hirundo rustica*).

Butterflies species including Small Tortoiseshell, Ringlet (*Aphantopus hyperantus*) and Large White (*Pieris brassicae*) have been recorded along the bog margins. Marsh Fritillary (*Euphydryas aurinia*) larval webs were recorded at Toar Bog in September of 2021, within the grassland verges along the site access road along the northern boundary. Dragonfly species recorded included Common hawker (*Aeshna juncea*) and Common darter (*Sympetrum striolatum*).

Snipe (*Gallinago gallinago*) has previously been recorded at Toar Bog, and several Badger setts were recorded along the north-west boundary of the site.

NBDC records for red-listed[4] bird species of conservation concern recorded in the 10km square (N43) in the past, which Toar Bog intersects include; Barn Owl (*Tyto alba*), Curlew (*Numenius a*rquata), Grey Partridge (*Perdix p*erdix), Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Lapwing (Vanellus vanellus), Meadow Pipit (*Anthus pratensis*), Pochard (*Aythya ferina*), Red Grouse (*Lagopus lagopus*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), Whinchat (*Saxicola rubetra*), Woodcock (*Scolopax rusticola*) and Yellowhammer (*Emberiza citrinella*). Red-listed[5] listed bird species that are also Annex I listed species included on the NBDC database include: Corncrake (*Crex crex*), Golden Plover (*Pluvialis apricaria*) and Nightjar (*Caprimulgus europaeus*).

Annex I listed bird species recorded include Merlin (*Falco columbarius*), Peregrine (*Falco peregrinus*) and Whooper Swan (*Cygnus cygnus*).

3.3.3 Invasive species

BnM and NBDC holds records for the invasive mammal species American Mink (*Mustela vison*) at Toar bog.

A broad range of common garden escapes are occasionally present around the margins of BnM bogs. Although spatial overlap with the proposed rehabilitation work is expected to be limited, any invasive species or garden escapes, will be treated in line with best practice during rehabilitation.

[3] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

[4] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

[5] Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523—544

3.4 Statutory Nature Conservation Designations

There are no European Sites, Special Areas of Conservation (SAC) or Special Protection Areas (SPA), located within or adjacent to Toar Bog.

There are a number of European Sites in close proximity (i.e., within a 5km radius at minimum) to Toar Bog. The nearest European Designated sites to Toar Bog are as follows:

- Raheenmore Bog SAC (Site Code: 000582) – 1.3km south of Toar.
- Split Hills and Long Hill Esker SAC (Site code: 001831) – 1.4km west of Toar.
- Lough Ennell SAC (Site code: 000685) – 6.7km north Toar.
- Lough Ennell SPA (Site code: 004044) – 7.8 km north of Toar.
- Clara Bog SAC (Site code: 000572) – 13.1km west of Toar.
- Charleville Wood SAC (Site Code: 000571) – 14.2km southwest of Toar.

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within 10km of Toar Bog including:

- Raheenmore Bog pNHA (Site code: 000582) – 1.3km south of Toar.
- Cloncrow Bog (New Forest) NHA – 1.3km north of Toar.
- Split Hills and Long Hill Esker NHA (Site code: 001831) – 1.4km west of Toar.
- Rahugh Ridge (Kiltober Esker) (Site code: 000918) – 1.5km south of Toar (at the closest point).
- Ardan Wood pNHA (Site code: 001711) – 2.4km west of Toar.
- Grand Canal pNHA (Site code: 002104) – 4.2 km west of Toar (at the closest point).
- Lough Ennell pNHA (000685) – 6.7km north of Toar.
- Daingean Bog NHA (Site code: 002033) – 7km south of Toar.
- Nure Bog NHA (Site code: 001725) – 8km north of Toar.
- Milltownpass Bog NHA (Site code: 002323) – 10km northeast of Toar.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha.

There are no Ramsar sites within close proximity to Toar Bog. The nearest Ramsar sites are Raheenmore Bog, Lough Ennell and Clara Bog located approximately 1.3 km south, 7.8 km north and 13.1km west respectively.

3.5 Hydrology and Hydrogeology

The majority of Toar Bog is located in the Yellow[Castlejordan]_SC_010 (WFD SubCatchment ID: 07_11) within the Boyne catchment (WFD Catchment ID: 07).

The western portion lies within the Lower Shannon (WFD Catchment ID: 25A). The majority of this western portion lies within the Silver[Tullamore]_SC_010 sub-catchment (WFD SubCatchment ID: 25A_3), with less than 1 hectare overlapping with the BROSNA_SC_020 sub-catchment (WFD SubCatchment ID: 25A_7).

The Tyrrellspass Stream (EPA code: 25T74) flows approximately 0.5km west of Toar Bog within the Brosna_SC_020 sub-catchment. Drains from the bog flow, into a network of field drains outside of the site boundary and discharge into the Tyrrellspass Stream (EPA code: 25T74), which itself flows in a north-westerly direction flowing into the River Brosna (EPA code: 25B09). The River Brosna flows southwest, flowing through the

Split Hills and Long Hill Esker SAC approximately 6.8km downstream. The River Brosna flows southeast before it merges with the River Shannon [Lower] (EPA Code: 25S01), which flows in a southerly direction through the River Shannon Callows SAC/ Middle Shannon Callows SPA approximately 60.9km downstream and at the confluence of the River Suck and the River Shannon, meets the River Suck Callows SPA within the River Shannon main channel after approximately 78.9km, before discharging into Lough Derg, which is designated as part of Lough Derg, North-east Shore SAC and Lough Derg (Shannon) SPA after approximately 87.5km. The River Shannon [Lower] continues to flow in a southerly direction, discharging into the Lower River Shannon SAC after approximately 128km, and River Shannon and River Fergus Estuaries SPA after approximately 157.8km.

To the north and north-east the bog drains to the Rathgarrett Stream (EPA code: 07R05), which flows in an easterly direction adjacent and within the northern site boundary and discharges to the Yellow River (EPA code: 07Y02). The Cloneen 07 Stream (EPA code: 07C12) occurs along the south-eastern boundary of the site, flowing in a north-easterly direction, before flowing east into the Bunsallagh Stream (EPA code: 07B05) which flows northeast into the Rathgarrett river (EPA code: 07R05), which in turn discharges to the Yellow River.

Two silt ponds are present at the eastern corner of the site which discharge into the Rathgarret Stream. Two silt ponds are located at the north-western corner of the site that discharges through a network of field drains into the Tyrrellspass Stream. A further silt pond is located on the south-western side of the bog which discharges to a boundary field drain flowing in an easterly direction. This drainage network drains into the Rathgarrett Stream (EPA code: 07R05) to the north-east of the site.

The bog is located in an area with a locally important bedrock aquifer (LI) with Bedrock that is moderately productive only in local zones (EPA map-viewer). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

Toar Bog is primarily located in an area mapped by GSI as of low groundwater vulnerability (GSI Mapviewer). Two small portions of the northern boundary and one section along the west of the main bog unit are mapped by GSI as being of Moderate groundwater Vulnerability. Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. This data indicates there is generally low risk of any groundwater contamination occurring at this site. Groundwater Vulnerability is typically used to indicate the susceptibility to groundwater pollution, it can provide a useful proxy indication of likely groundwater flow rates in the surrounding area.

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt (present on an adjacent cutaway site). The bog water table across the site is expected to be high when bog drains are locked, and perched above the underlying regional groundwater table. The ability of the shallow peat water to interact with the underlying regional groundwater

flows is limited by the permeability of the underlying glacial deposits. As such the potential for bog restoration to interact or impact on underlying groundwater is very low.

3.6 Emissions to surface-water and watercourses

Drainage is an important feature of industrial peat production and there were extensive field drains maintained throughout bog areas to facilitate industrial peat production annually, each of which eventually drains into a terminal silt pond that allows for settlement of suspended solids before entering the main river systems. In accordance with the existing Integrated Pollution Control licence, all drainage water from boglands in a licensed area is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence. Industrial peat production has now permanently ceased at Toar Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BnM have a number of procedures for how it manages and maintains its silt pond network. The silt that builds up in silt ponds is excavated on a bi-annual basis by BnM to facilitate an efficient level of silt control. Silt ponds will continue to be maintained during the rehabilitation and decommissioning. Silt pond decommissioning will be considered when sites are deemed to be on a trajectory of environmental stability and peatland rehabilitation has been completed.

Toar has four surface water outlets to both the Rathgarrett Stream (WFD Risk Reporting Name: Yellow (Castlejordan)_010) and field drains which discharge to the Tyrrellspass Stream (EPA code: 25T74) which itself flows in a north-westerly direction discharging to the River Brosna (WFD Risk Reporting Name: Brosna_060).

Agriculture was identified as a river pressure in respect of the Yellow (Castlejordan)_010) which includes both the Rathgarrett Stream which flows along the northern site boundary and the Cloneen 07 Stream which flows along the south-eastern boundary of the site.

The Yellow (Castlejordan)_010 has an EPA river waterbodies risk projection of ‘at risk’ in the Water Framework Directive risk 3rd cycle, whilst the Brosna_060 has a risk projection of ‘not at risk’. The Silver (Tullamore)_010 which occurs south of Toar bog has been under review since the 2nd cycle and continues this projection into the 3rd cycle.

Details of the 6 silt ponds and associated surface water emission points at Toar are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-ECO-26-18-02 titled**: *Structures and Sampling***, along with Drawing number BNM-ECO-26-18-WQ01 titled**: *Water Quality Map*** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Toar.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the Environmental Protection Agency.

Decommissioning and Rehabilitation Programme Water Quality Monitoring.

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat will also aid the primary objective of stabilizing peat, as when peat is re-wetted it is not vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 2017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2022-2027 (DHLGH, 2024) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as the BnM peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Toar has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of key water body receptors, the Yellow River and the River Brosna, and is expected to support the future status of the waterbody as being of Good Status.

Water quality monitoring will be established. There will be initial quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, assess the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually.

Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.

The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour and COD.

3.7 Fugitive Emissions to air

Rehabilitation of the drained peatland will seek to re-wet the dry peat where possible. Collectively re-wetting and re-vegetating will minimise any risk of emission to air from dust.

3.8 Carbon emissions

Irish peatlands are a huge carbon store, containing more than 75% of the national soil organic carbon (Renou-Wilson et al. 2012). Peatland drainage and extraction transforms a natural peatland which acts as a modest carbon sink (taking in 0.1 to 1.1 t of carbon as CO_2-C /ha/yr) into a cutaway ecosystem which is a large source of carbon dioxide (releasing 1.3 to 2.2 t of carbon as CO_2-C /ha/yr) based on Tier 1 Emission factors (Evans et al. 2017). Renou-Wilson et al. (2018) reported losses of between 0.81 – 1.51 CO_2-C /ha/yr from drained peatlands located in Ireland.

Re-wetting of dry peatlands will increase methane emissions (Gunther et al. 2020) as a consequence of the anoxic conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Tanneberger et al. (2021) describes how peatland management has to choose between CO_2 emissions from drained peatlands or increased methane (CH_4) emissions from rewetted industrial peatlands. However, when radiative effects and atmospheric lifetimes of both GHG gases are considered and modelled, postponing rewetting increases the longterm warming effect of continued CO_2 emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO_2 emissions reductions. Further, Wilson et al. (2022) confirmed the benefit of rapid rewetting to achieve strong carbon

reductions and potentially altering the warming dynamics from warming to cooling depending upon the climate scenario.

It is expected that Toar Bog will become a reduced carbon source following rehabilitation. In time, parts of the site can develop as a carbon sink. The potential of any cutaway site to develop as a carbon sink in the longer-term depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich or other peat-forming habitats, the balance of carbon fluxes from different cutaway habitats and future climatic conditions. Much of this bog is expected to develop embryonic bog on deep peat areas, and wetland habitats on shallow peat with open water, reed swamp and fen habitats with alkaline emission factors. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)[6]

Ecological value was assessed in accordance with the NRA (2009) Guidelines, taking account of habitat quality, naturalness, biodiversity, rarity, ecological function and the presence of species of conservation interest.

The **Current ecological rating of Toar** ranges from **Local Importance; lower value** to **Local Importance; higher value.**

The majority of Toar Bog predominantly consists of modified production peatland with limited habitat diversity and reduced ecological functionality and is therefore considered to be of **Local Importance (lower value).**

In contrast, some marginal habitats such as raised bog (PB1), birch woodland (WN7) and scrub (WS1) around the margins of the site exhibit greater structural diversity and naturalness and provide important habitat and refuge for wildlife, including species of conservation interest such as Marsh Fritillary. These habitats also contribute to ecological connectivity across the site and are therefore considered to be of **Local Importance (higher value)**.

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[6] https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf

4. CONSULTATION

4.1 Consultation to date

Consultation seeks to engage an audience of relevant stakeholders at both a national and local level. National stakeholders have been identified from varied bog restoration and rehabilitation efforts undertaken by BnM over the past 40 years, with particular emphasis on engagement with stakeholders during their Biodiversity Action Plan programme, since 2010. National Stakeholders includes relevant government departments and agencies, relevant semi-state bodies, NGOs and other environmentally-focused groups with a national remit.

There has been ongoing consultation about rehabilitation, biodiversity and other general issues over the years about Derrygreenagh bog group, including Toar Bog, with various stakeholders in relation to:

- General consultation with range of stakeholders at annual Bord na Móna Biodiversity Action Plan review days 2010-2018. Review – held in Lullymore in 2018.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Toar Bog and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation at Toar Bog.

All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed here, and the final draft of the Toar Bog Rehabilitation Plan will contain a review of the consultation. Consultation in relation to other land-sues (e.g. the use of the site for biomass storage and potential future gravel extraction) is not listed here.

4.2 Issues raised by Consultees

N/A Yet as consultation has not commenced.

4.3 BnM response to issues raised during consultation

N/A Yet as consultation has not commenced.

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5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what BnM want to achieve by implementing the rehabilitation. These include:

- Meeting conditions of IPC Licence.
- Environmental stabilisation of the former peat production areas and mitigation of potential silt run-off.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving waterbodies that have been classified as At Risk from peatlands and from peat extraction, via stabilization or improving water-quality from this bog, and therefore, reducing pressures.
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities on deep peat, or reed swamp and fen on shallow more alkaline peat and other subsoils, where present.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.
- Supporting expected future land-uses, where needed.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to BnM.

The rehabilitation goals and outcomes take account of the following issues.

- Natural colonisation will form the basis for the environmental stabilisation of the bare peat areas. Re-wetting of the cutaway, where possible, is a general rehabilitation strategy. The main target will be to maintain water-levels close to the peat surface, and to avoid the creation of large-water bodies where possible. Re-wetting and water levels close to the peat surface accelerates the re-vegetation processes, the development of vegetation cover and therefore environmental stabilisation at Toar bog.
- It will take some time for stable naturally functioning habitats to fully develop at Toar Bog. This will happen over a longer timeframe than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchments (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

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- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and BnM). Reducing pressures due to former peat extraction activities at Toar Bog will contribute to stabilising or improving water quality status of receiving water bodies in general. Ultimately, improving the WFD status of the receiving water body will depend on reducing pressure from a range of different sources, including peatlands in general (private and BnM).
- BnM are also carrying out rehabilitation measures in some nearby bogs (e.g., Esker Bog, Cavemount Bog). There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the local Yellow River and downstream River Boyne from rehabilitating more than one bog in the same catchment, from rehabilitating more than one bog in the same catchment.
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.

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6. SCOPE OF REHABILITATION

The principal scope of this rehabilitation plan is the environmental stabilisation of the bog. This is defined by:

- The area of Toar Bog.
- EPA IPC Licence - Ref. P0501-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Toar bog is part of the Derrygreenagh Bog group.
- The local environmental conditions of Toar Bog mean that deep peat measures along with wetland creation is the most suitable rehabilitation approach for this site. Toar Bog has residual deep peat along with shallower areas.
- BnM have defined the key goal and outcome of rehabilitation at Toar Bog as **environmental stabilisation** of the site. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of peat-forming communities on residual deep peat, where possible, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Rehabilitation of Toar Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out rehabilitation on all marginal or peripheral cutover bog zones.

6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland).
- Remaining peat depths are between 1.7m and 6m deep for the most part apart from an area in the eastern section of the site where depths are less than 0.5m. The deeper residual peat present at Toar has the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.
- Current land-use. The areas being used for biomass log storage are not considered for rehabilitation and are constrained.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the BnM sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland. It is anticipated that the work proposed here (blocking drains and re-wetting cutaway peatlands) will not have any flooding impacts on adjacent land. There is also some conifer forestry adjacent to the bog.
- **Archaeology**. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it will be avoided and reported to the BnM Archaeological Liaison Officer and the National Museum of Ireland (see Appendix X).

- **Public Rights of Way**. Where a public right of way or similar burden exists on BnM property, consideration will be given to ensuring that this remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here.
- **Turf-cutting.** There is some active private sod-turf cutting on cutover bog located along the south-eastern margins of Toar bog.

6.2 Key Assumptions

- It is assumed that BnM will have all resources required to deliver this project.
- It is expected that weather conditions will be within normal limits over the rehabilitation plan timeframe. Long periods of wet weather have the capacity to significantly affect ground conditions and constrain drain blocking and other ground activities.

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- Two small, isolated areas to the south-east of the main production bog. These areas are excluded as they were never developed by BnM and are still being used for turf-cutting (turbary).
- The longer-term development of stable naturally functioning habitats to fully develop at Toar Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Toar Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

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7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what critical success factors are needed to achieve successful rehabilitation. All criteria used to indicate successful rehabilitation will be measured to validate the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this rehabilitation plan is **environmental stabilisation** and the stabilisation of any emissions from the site that related to the former industrial peat extraction activities.

Rehabilitation is generally defined by BnM as:

- stabilisation of bare peat areas via targeted active management (e.g. drain-blocking/re-wetting) slowing movement of water across the site and encouraging natural colonisation; and
- mitigation of key emissions (e.g. potential suspended solids run-off).

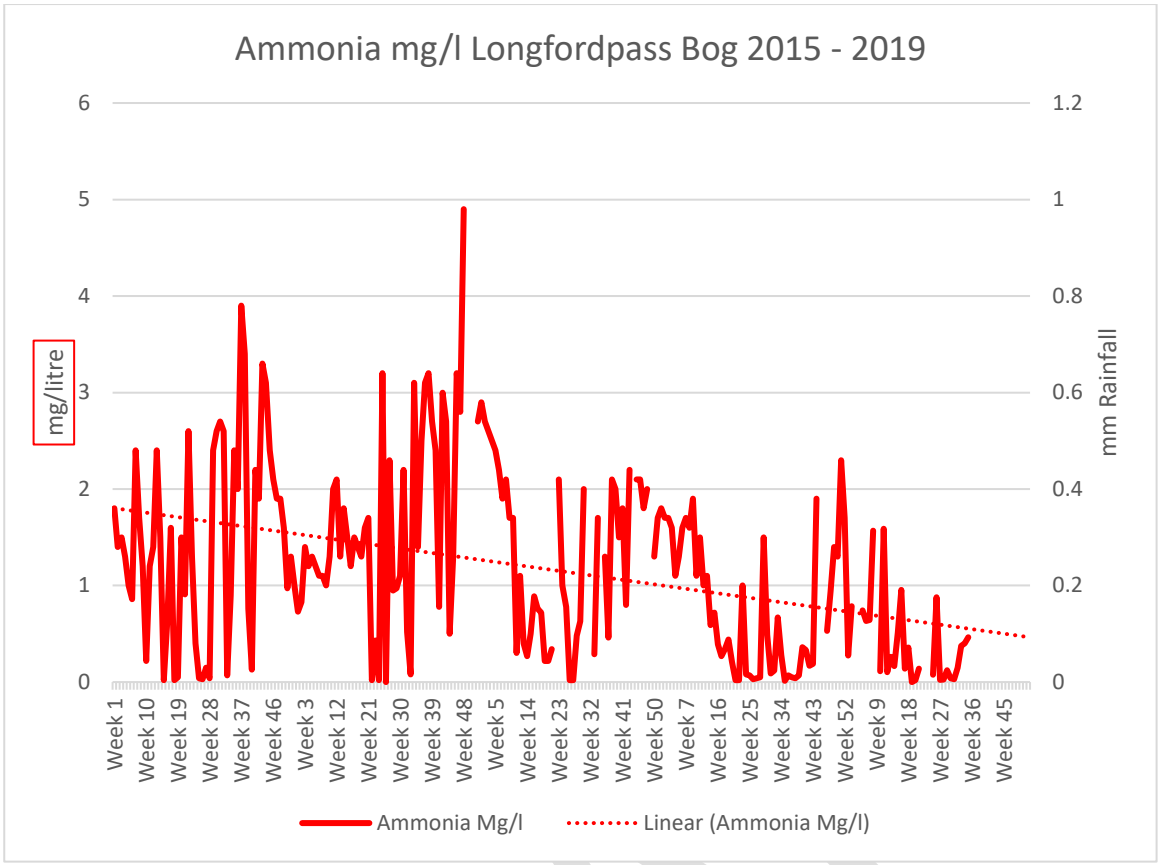
7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage and accelerate development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from BnM sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface. This will be demonstrated by developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia) towards what would be typical of a re-wetted cutaway bog. This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

With regard to predicting and estimating likely trends that might materialize or could be considered as a target, monitoring of surface water ammonia emissions from Longford Pass bog in Littleton over 3 years, post cessation of peat extraction with ongoing rehabilitation, were considered. These are indicating a downward trend in Ammonia concentrations (Figure 7.1).

Similarly monitoring of surface water ammonia emissions from a Corlea bog in Mountdillon over the 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

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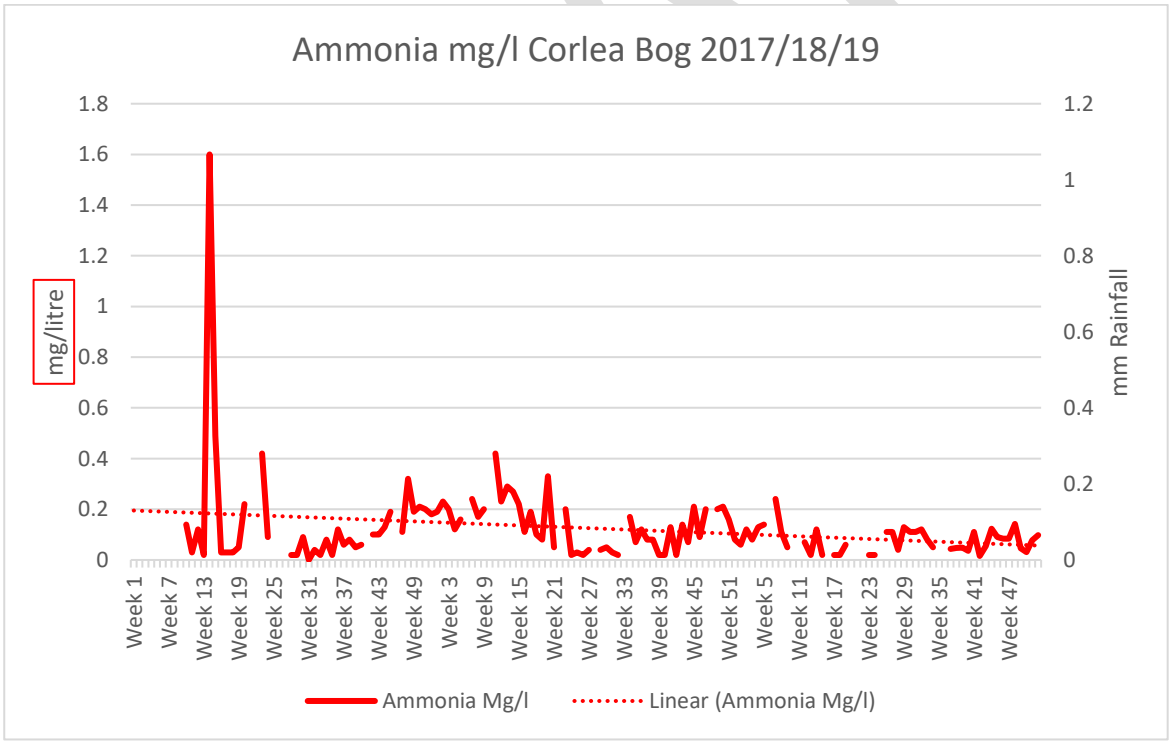


Figure 7.1. Ammonia levels over the period 2015-2019 at Longford Pass and Corlea.

Table 7.1. Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.

Criteria type	Criteria		Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former area of industrial peat production		Delivery of rehabilitation measures Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	3 years
IPC validation	Key water quality parameters Ammonia, Phosphorous, Suspended solids, pH and conductivity		Reduction or stabilisation of key water quality parameters associated with this bog	Water quality monitoring for a period after rehabilitation has been completed	2 years
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)		Where this section of the water body, that this bog drains to, has not been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body, confirms that its classification remains at not being at risk from peat extraction associated with activities at this bog.	EPA WFD monitoring programme	WFD schedule

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7.2. Critical success factors needed to achieve successful rehabilitation as outlined in the plan

The achievement of successful rehabilitation as outlined in the plan requires:

- **Funding to pay for resources required to deliver the planned rehabilitation (BnM and external).** BnM maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **BnM to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **BnM to have sufficient resources (suitable machinery) and staff to maintain this machinery.**
- **Weather conditions to be within normal limits over the rehabilitation plan timeframe.** Long periods of wet weather have the capacity to significantly affect ground conditions and constrain the delivery of rehabilitation. The potential impact of wet weather on ground conditions can be reduced by appropriate planning and management. BnM have significant experience of managing these issues through 70 years of working in these peatland environments.
- **Rehabilitation measures to be effective.** The rehabilitation measures proposed in this plan are based on 40 years of BnM experience of peatland management and best practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective at other sites. BnM will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan**.** If measures are not initially effective, BnM will review any requirement for additional practical rehabilitation.
- **Natural colonisation of vegetation to develop semi-natural habitats at a rate within the normal limits.** The development of naturally functioning semi-natural habitats on degraded bog takes time. It may take 30-50 years for active raised bog vegetation to re-develop on suitable cutaway that was previously bare peat. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. BnM experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

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8. REHABILITATION ACTIONS AND TIME FRAME

Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

A number of illustrative figures have been produced to inform Rehab Planning and Design, including Aerial Photography, Peat Depths andLiDAR Surface Maps; these are included in the accompanying Mapbook as the drawings referenced below:

BNM-ECO-26-18-21 titled**:** ***Aerial Imagery 2000***

BNM-ECO-26-18-22 titled**:** ***Aerial Imagery 2020***

BNM-ECO-26-18-04 titled**:** ***Peat Depths***

BNM-ECO-26-18-03 titled**:** ***LiDAR Map***

BNM-ECO-26-18-09 titled: ***Depression Analysis***

The restoration and rehabilitation measures are provisionally outlined in drawing BNM-ECO-26-18-20 titled**:** ***Standard Rehabilitation Measures*** in the accompanying Mapbook

These rehabilitation measures for Toar bog will include (see Table 8.1):

- Initial hydrological modelling indicates that part of the site has the potential to develop a mosaic of re-wetted peatland habitats (sub-basins etc) and other sections will be naturally drier (due to topography and slopes) and will require more intensive measures to re-wet these areas.
- A widespread drain-blocking programme and hydrological management will be implemented across the cutaway, where possible. In general, field drains will be blocked where possible to re-wet cutaway and re-wet to the optimum water-level. More intensive measures will be targeted towards the bare peat and deeper residual peat and management of overflows (analogous to best practise raised bog restoration for high bog), and/or blocking of internal outfalls,
- Less intensive measures (targeted drain-blocking) will be used in areas where habitats have already established.
- Measures will include drain blocking (3/100 m), modifying outfalls and managing water levels with overflow pipes.
- The existing silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase the silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that the silt ponds are not required, as the bog has been successfully stabilised and there is no silt run-off, the condition of the silt ponds will be reviewed. The silt ponds will either be de-watered (water levels lowered to a level where the silt pond will naturally develop as a small wetland feature), left in situ, or infilled (where discharges do not require silt control).

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Table 8.1: Types of and areas for rehabilitation measures at Toar Bog.

Type	Code	Rehabilitation Measure	Extent (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	79.3
Bog Restoration	DPT2	More intensive drain blocking (7/100m) + blocking outfalls and managing overflows (analogous to best practise raised bog restoration for high bog)	68.2
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	28.0
Marginal land	MLT1	No work required	17.8
Silt ponds	Silt pond	Silt ponds	2.3
Constraint	Other	Constraints including Bog remnant and cutover bog) (Turbary), Access, archaeology and other	201.7
Total			**397.3**

8.1 Short-term planning actions (0-1 years)

- Seek formal approval of the plan from the EPA.
- Develop a detailed site plan with engineering drawings outlining how the various rehabilitation methodologies will be applied to Toar Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See map for an indicative view of the application of different rehabilitation methodologies).
- A drainage management assessment of the proposed rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out
- An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders), Marsh fritillary butterfly and badger is to be carried out. The scheduling of rehabilitation operations will be adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- Appropriate Assessment (AA) of the Rehabilitation Plan will be carried out. Any required mitigation measures from the AA (if needed) will be incorporated into the plan for the delivery of rehabilitation and decommissioning across the site.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

8.2 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, and fertiliser applications targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will

be carried out with regard to best practice environmental control measures (Appendix IV). Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions.

- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*.
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential suspended solids run-off from the site during the rehabilitation phase.

8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below).
- Decommissioning of silt-ponds will be assessed and carried out, where required.
- Reporting to the EPA will continue until the IPC License is surrendered.

8.4 Timeframe

- **Year 1:** Short-term planning actions.
- **Year 1:** Short-term practical actions.
- **Year 1-3:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **> Year 3:** Decommission silt-ponds, if necessary.

8.5 Budget and costing

BnM maintains a provision on its balance sheet to pay for the future costs of **standard** rehabilitation and decommissioning when industrial peat extraction ceases. This is updated every year - for more information see the BnM Annual Report (BnM, 2025). BnM is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

At this time, a 'standard' rehabilitation provision (sufficient to discharge the requirement of Condition 10 in the licence) has been allocated to the site based on the area of different cutaway types across the site.

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9. AFTERCARE AND MAINTENANCE

9.1 Programme for monitoring, aftercare and maintenance

This programme for monitoring, aftercare and maintenance has been designed to meet the Conditions of the IPC Licence. This is defined as:

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed. It is proposed that sites can be monitored against this baseline in the future.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include quarterly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD and DOC.
- This quarterly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.
- If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.
- If, after two years, key criteria for successful rehabilitation have **not** been achieved and key targets have **not** been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures, but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined.
- Where other uses are proposed for the site that are compatible the provision of biodiversity and ecosystem services, these will be assessed by BnM in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the required assessment process and planning procedures.

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9.2 Rehabilitation plan validation and licence surrender – report as required under condition 10.4

IPC License Condition 10.4. *A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

Reporting to the EPA will continue until the IPC License is surrendered. The bog will be included in the full licence surrender process as per the Guidance to Licensees on Surrender, Cessation and Closure of Licensed Sites EPA, 2012, when:

- The planned rehabilitation has been completed;
- The key criteria for successful rehabilitation has been achieved and key targets have been met;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

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APPENDIX I: BOG GROUP CONTEXT

The Derrygreenagh Bog Group comprises 11 discrete and defined bog units within Cos. Offaly, Westmeath and Meath (and one site used for transport – Hill of Down Railway). There are two main sub-groups; Ballivor (7 sites) and Derrygreenagh (5 sites). Nearly all of the Derrygreenagh sub-group and all of the Ballivor sub-group is located within the River Boyne catchment. A small portion of the western side of Toar Bog is located in the River Shannon catchment. Each bog area further comprises a range of habitats from bare milled former peat extraction areas to re-colonising cutaway to workshops areas and transport infrastructure.

Industrial peat extraction in the Derrygreenagh Group ceased in 2020. Decommissioning for the Derrygreenagh Group started in 2021 at a number of individual bogs and the Peatland Climate Action Scheme (PCAS) rehabilitation started in 2021.

The Ballivor Bogs sub-group is located close to Ballivor Town in Co. Meath and most of the bogs extend across the Meath and Westmeath border. The BnM Ballivor Peat Moss factory is located 4 km from Ballivor Village on the margin of Ballivor Bog. An industrial railway links Ballivor to Carrenstown, Bracklin and Lisclogher East. Milled peat was supplied from Ballivor, Carrenstown, and part of Bracklin to Ballivor peat moss factory for horticultural products, with milled fuel peat being transported via road to Lough Ree Power (Lanesborough Co. Longford). Kinnegad Bog is an isolated bog unit with no industrial railway link to the other bogs. Kinnegad Bog is located to the south of Kinnegad in Co. Meath. This bog supplied mainly milled horticultural peat via road to various customers.

The Derrygreenagh Bogs sub-group is located to the south and east of Rochfortbridge (Co. Westmeath), along the borders of Co. Westmeath, Offaly and Meath. Four bogs (Ballybeg, Derryhinch, Drumman, Toar) supplied milled fuel peat via industrial railway to Edenderry Power.

Lisclogher East was never developed for milled peat production, but it was used for sod turf extraction until recently. A large section of Bracklin was formerly a sod peat production bog and was never converted to milled peat production. This area has developed as cutaway. Lisclogher West was drained in the 1980's but has never been put into industrial peat production. Bogs that have been in industrial peat production for decades (such as Ballybeg and Drumman) have become cutaway as peat was extracted from the sites and the active industrial peat production area shrunk. A large section of cutaway in Derryarkin and Drumman has been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and BnM (Derryarkin Sand & Gravel Ltd). A large section of Derryarkin was also rehabilitated in 2001-2002 with wetland development via outfall blocking.

There has already been significant rehabilitation work carried out within the Derrygreenagh Bog Group. BnM originally established a grassland research unit and farm at Derryarkin. This farm has now been closed for some time but grassland established from cutaway has been sold to local farmers. Older rehabilitation includes the establishment of confer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

During the 1980s/1990s about 176 ha of cutaway and marginal bog was developed for conifer forestry by Coillte at Drumman and Derryarkin in several different areas. There is ongoing management of these areas by Coillte.

One of the main outfalls of a large section of cutaway in Drumman (north) was blocked in 2005 creating a large wetland (~75 ha). Fertiliser and nursery crop trials were carried out on bare peat cutaway in Drumman (north) in 2010 over an area of 19 ha. Further applications of fertiliser were applied to an additional 22.6 ha of mostly bare peat cutaway in Drumman (north) in 2012. There have been further crop trials in Drumman in 2014 (grass-seed).

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In Derryarkin, wetlands (143 ha) were created in 2001-2002 when main outfalls were blocked and cutaway was deliberately re-wetted.

A small area of cutaway at Derryarkin has been leased to DAMX Ltd for the development of an off-road moto-cross track at Derryarkin.

An area of cutaway (13 ha) with significant bare peat cover adjacent to the road in Derryarkin was treated with fertiliser to encourage natural colonisation in 2016.

Part of the cutaway at Ballybeg (76 ha) was planted with Alder (2008-2009) as a biomass trial (for fuel).

An area of marginal raised bog (19 ha) was restored at Bracklin Bog in 2016, as part of the BnM Raised Bog Restoration Programme. An extensive drain blocking programme was carried out to raise water levels and help re-wet the bog area, encouraging the development of Sphagnum-rich 'active' peat-forming raised bog. This area is of significant biodiversity and cultural interest to a local group called Meath-Westmeath Bog Group

Some rehabilitation was carried out in a small area of cutaway in Balivor Bog (9 ha) in 2015. This involved drain-blocking to maintain and enhance re-wetting of an area of cutaway with *Sphagnum*-rich poor fen peat-forming vegetation.

Rehabilitation and re-wetting as part of the PCAS has been completed at Carrenstown and Lischogher West.

BnM is currently developing a wind energy project called Ballivor Wind farm (BnM Wind Farm | Ballivor Wind Farm). This proposed project has been submitted to the planning authority. The proposed location extends across parts of Bracklin, Lisclogher East, Carranstown and Ballivor Bogs.

BnM has secured planning consent for the Derrygreenagh Power Project (Drumman Bog), a thermal power plant. Planning consent included the associated infrastructure required to connect the development to the national gas and electricity transmission networks, enabling integration with the wider energy system

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC License Ref. PO-501-01 is outlined in Table Ap-1.

Table Ap-1: Derrygreenagh Bog Group names, area and indicative status (Derrygreenagh Energy Peat sub-group)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballivor	654	Industrial peat production commenced at Ballivor in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Ballivor Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power. Some sections were never re-developed to milled peat and have revegetated as cutaway. Some areas of cutaway are developing pioneer cutaway vegetation communities. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Bracklin	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	Bracklin Bog formerly supplied a range of commercial functions including the supply of horticultural peat, sod peat and latterly; fuel peat for Lough Ree Power.	2020	Draft 2023 Bracklin West (sub-site)

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats Bare peat is prevalent in the western section, which was in milled peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.		rehabilitation completed.
Carranstown	306	Industrial peat production commenced at Carrenstown in the 1980s. The majority of the site has relatively deep peat.	Carranstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat. There are cutaway habitats developing on the eastern side. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Finalised 2022 Planned Rehab completed
Lisclogher East	486	Industrial peat production commenced at Lisclogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lisclogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat. The majority of the bog is developing cutaway habitats and there is a mosaic of bare peat areas where there has been recent sod peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	2020	Draft 2023
Lisclogher West	239	Lisclogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lisclogher West was drained but never fully developed for industrial peat extraction.	N/A	Finalised 2023. Rehab completed
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power. The majority of the site is bare peat.	2020	Draft 2017
Hill of Down Railway	22		Rail link – not used for peat extraction	N/A	N/A
Ballybeg	847	Industrial peat production commenced at Ballybeg in the 1950s. Most of the site is cutaway	Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.	2020	Draft 2026
Derryarkin	710	Industrial peat production commenced at Derryarkin in the 1950s. Most of the site is cutaway	Derryarkin Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction in past.	Between 1988 and 1991	Draft 2026

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Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Derryhinch	337	Industrial peat production commenced at Derryhinch in the 1950s. There is a mosaic of residual peat depths left	Derryhinch Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is bare peat with emerging cutaway habitats. Part of the site was used to trial herb production. This initiative has now ceased.	2017	Draft 2026
Drumman	1,122	Industrial peat production commenced at Drumman in the 1950s. Most of the site is cutaway	Drumman Bog formerly supplied a range of commercial functions including the supply of fuel peat for Rhode Power Station, Croghan Brickette Factory and Edenderry Power. Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past. Part used for gravel extraction. Part of the site was used to trial herb production. Part of the site is used for log storage (biomass).	2018	Draft 2026
Toar	445	Industrial peat production commenced at Toar in the 1950s. Most of the site has deep residual peat.	Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power. Most of the site is bare peat. Part of the site is used for log storage (biomass).	2018	Draft 2026

See Drawing number BNM-ECO-26-18-24 titled ***Bog Group Map***, included in the accompanying Mapbook which illustrates the location of Toar Bog and the Derrygreenagh Bog Group in context to the surrounding area.

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APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report

Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value. The report outlines potential options for biodiversity management after industrial peat production has ceased, (if this is the proposed main land-use for the site).

Bog Name:	**Toar**	**Area (ha):**	445 ha
Works Name:	Derrygreenagh	**County:**	Westmeath
Recorder(s):	MMC & DF	**Survey Date(s):**	24/02/2012

Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix I).
- Pioneer poor fen communities dominated by Soft Rush and Bog Cotton (pJeff, pEang)
- Pioneer dry heath communities (dHeath)
- Silt Ponds (Silt) with associated habitats such as scrub, Bracken, rank grassland (GS2), dry calcareous grassland (gCal) and typical pioneer communities of disturbed areas (disTuss).

The most common habitats present around the margins at this site include:

- Birch woodland (WN7) (non-Annex) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix I.)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog (PB1) (several fragments)
- Cutover bog (PB4) (several small fragments)
- Wet grassland (GS4) along the edges of the site.

Description of site

Toar Bog is located approximately 4.3 km south of Tyrrelspass in County Westmeath. The M6 motorway passes by the western boundary of the site while the eastern edge of the site is connected to Derryarkin Bog via a short rail link. The Westmeath/Offaly county border runs along the south east corner of Toar.

Toar is a relatively young bog in terms of peat production and much of the site consists of red of Sphagnum peat. The peat from Toar is currently harvested for use as horticultural peat.

The majority of Toar Bog consists of bare peat as it was in full peat production. There are no areas that are zoned as cutaway. Habitats along the margins of the site include poor fen (Soft Rush dominated) and dry Heath. The western edge contains a mix of Birch woodland (WN7), cutover bog (PB4) and small sections of remnant raised bog (PB1). The cutover is old and appears to have been carried out long before industrial peat production began on the site. The areas of cutover had re-vegetated with Heather. The woodland was dominated with Birch and Willow.

The south eastern corner of the site also contains a large area of Birch woodland (WN7), cutover bog (PB4) and raised bog (PB1). Domestic turf cutting is active in this area and the area contained areas of bare peat along with dry heath and remnant sections of raised bog. The woodland was dominated by Birch and Willow and some small areas had been cleared recently. Some game bird feeding hoppers were also located within these areas.

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BnM are constructing a new section of road and a new silt pond close to the eastern edge of the site. Two gravel extraction pits are also located on the site.

Along the eastern boundary of the site a relatively large area of wet grassland (GS4) and scrub (WS1) exists. This area is grazed by cattle and horses and does not appear to have ever been in peat production. A new silt pond was being constructed to the south of this area at the time of the ecological survey.

A small, isolated section of the site is located adjacent to the south east corner of Toar. This area consists of a small area of remnant raised bog that is in active turf production, cutaway bog, Birch woodland and wet grassland. BnM do not carry out any active management within this area.

Several small, dry sections of remnant raised bogs are located along the margins of Toar. These sections are dry and degraded with a dominance of heather.

A series of Badger setts are located along the north western boundary of the site.

Designated areas on site (cSAC, NHA, pNHA, SPA other)

None

Adjacent habitats and land-use

Adjacent habitats include wet grassland (GS4), Birch woodland (WN7), improved agricultural grassland (GA1) and commercial forestry (WD3). The M6 motorway passes along the western edge of the site.

Peat type and sub-soils

Some marginal areas of the site appear to be fen peat, however the majority of the site consists of red or *Sphagnum* peat. Gravel appears to be present under the peat.

Fauna biodiversity

Birds

Several bird species were noted on the site during the survey.

- Snipe (>10) along the margins of the site.
- Other species observed include Wren, Rook, Kestrel, Blackbird and Long Tailed Tit.

Mammals

Signs of several mammal species were noted on the site during the survey.

- Several Badger setts along the north western boundary of the site.
- Fox

Other species

Frogs spawning at several locations around the site.

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APPENDIX III. ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off, activities will be halted.
- Measures will be carried out using a suitably sized machine and in all circumstances, excavation depths and volumes will be minimised where possible.
- All machines will be regularly checked and maintained prior to arrival at the site to prevent hydrocarbon leakage.
- Hoses and valves will be checked regularly for signs of wear and will be closed and securely locked when not in use.
- Fuelling and lubrication of equipment shall only be carried out in designated areas away from surface water drainage features and ecologically sensitive areas.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- Vehicles will never be left unattended during refuelling.
- No direct discharges to waters will be made. No washings from vehicles, plant or equipment will be carried out on site.
- All plant refuelling will take place using mobile fuel bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant BnM staff and updated as required.

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APPENDIX IV. BIOSECURITY

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under BnM ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Any areas of high bog will be subject to a confirmatory survey to establish presence or absence, where relevant, of Sarracenia within close proximity to activity locations.
- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[7] will be adhered with throughout all rehabilitation measures and activities.

[7] https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/

APPENDIX V. POLICY AND REGULATORY FRAMEWORK

Bord na Móna Plc (BnM) is a publicly owned company, originally established in 1934 to develop some of Ireland's extensive peat resources for the purposes of economic development and to support energy security, In the decades since its establishment the company has employed tens of thousands of people in its fuel, energy, and horticultural growing media businesses. For much of its history the company's support of important national policy aims has been enabled and encouraged in a variety of ways by Government.

Today, BnM is undertaking a number of highly significant actions in support of climate policy. These actions involve a radical transformation and decarbonisation of nearly the entire BnM business. This transformation will be driven by unlocking the full potential of our land and creating significant value for Ireland and the Midlands in particular.

BnM is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by BnM. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this BnM peatland rehabilitation plan. BnM have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

BnM operates under IPC Licence issued and administered by the EPA to extract peat within the Derrygreenagh Bog group (Ref. P0-501-01). As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

The Peatlands Climate Action Scheme (PCAS)

BnM understand that it is the Minister's (DECC) intention to impose an obligation on BnM to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that BnM carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha. This scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the additional costs associated with the additional and enhanced

rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the 'standard' rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs by the Scheme regulator and funded by the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on BnM not materialise, BnM will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. BnM will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

3 National Climate Policy

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

BnM is following a decarbonisation programme aimed at reducing the carbon emissions from its activities. Industrial peat production has now ceased, and several other decarbonisation measures are being implemented. The company aims to further develop renewable energy and resource recovery markets with a key objective of reducing the carbon intensity of all products. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

4 National Peatlands Strategy

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland's peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits

can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as BnM.

In line with a National Peatlands Strategy recommendation, a Peatlands Strategy Implementation Group (PSIG), was established, assisted in the finalisation of the Strategy, is overseeing subsequent implementation and will report to Government on an annual basis on the implementation of the actions and principles contained within the Strategy.

BnM is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some BnM sites to be restored and to contribute to the national SAC and NHA network of protected raised bog sites. The strategy (agreed in 2015) also recognises the various different values of cutaway bog and developed six key principles (with BnM) for the after-use of cutaway bog.

- BnM will continue to assess and evaluate the potential of the company's land bank, using a land use review system. The assessment will help prepare a set of evidence-based management plans for the various areas of peatland. These plans will also inform its cutaway bog rehabilitation.
- The policy of BnM is not to open up any undrained new bogs for peat production.
- Lands identified by BnM as having high biodiversity value and/or priority habitats will be reserved for these purposes as the principal future land use.
- Generally, BnM cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain drainage.
- In deciding on the most appropriate after use of cutaway peatlands, consideration shall be given to encouraging, where possible, the return to a natural functioning peatland ecosystem.
- This will require re-wetting of the cutaway peatlands which may lead in time to the restoration of the peatland ecosystem.
- Environmentally, socially and economically viable options should be analysed to plan the future use of industrial cutaway peatlands, in conjunction with limiting factors as outlined in BnM's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for BnM cutaway sites and implementing this peatland rehabilitation. Some of these principles have now been superseded by the company's decision to cease industrial peat extraction. The National Peatlands Strategy is currently being reviewed by Government.

5 National River Basin Management Plan 2022-2027 (Water Framework Directive)

The River Basin Management Plan for Ireland 2022-2027 (Department of Housing, Local Government and Heritage, 2022) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). In broad terms, the objectives of the WFD are (1) to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status and (2) to achieve compliance with the requirements for designated protected areas.

The NRBMP 2022-2027 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of BnM cutaway (in addition to other measures) was part of the WFD (2022-2027) programme of measures. The NRBMP 2022-2027 takes account of the fact that BnM was in the

process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (in 2018) and will look to implement best-available mitigation measures to further reduce water quality impacts caused by peat extraction while the phasing-out process is taking place. This NRBMP 2022-2027 rehabilitation target was superseded by the acceleration of the BnM de-carbonisation programme and the Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by BnM was expected to have a positive impact on water quality and will help the NRBMP 2022-2027 deliver its objectives in relation to the Water Framework Directive and is one of the five key principal actions.

The NRBMP 2022-2027 describes how the number of waterbodies impacted by peat, industry and forestry have decreased by 10, 10 and 5 waterbodies, respectively since the second cycle. Impacts on water quality and river habitat arising from peat and peat extraction and associated drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats. Drainage of peatlands also results in changes to the hydro morphological condition of rivers.

The NRBMP 2022-2027 outlines how maintaining and restoring Irish bogs will lead to a decrease in waterborne carbon leaching to levels comparable with intact bogs as well as reducing losses of peat silt and ammonia. Vegetation on the surface of the peat can also slow the flow of water over the land surface. Based on the EPA's most recent reports, peat extraction and drainage is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by BnM in 2021 was expected to have a significant positive impact on water quality of receiving water courses by reducing the impact of peat extraction as a key pressure on particular water courses. This is now being supported by the results and conclusions of the draft NRBMP 2022-2027.

6 4th National Biodiversity Action Plan 2023-2030

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. The 4th NBAP has been developed with the support, advice and input of the interdepartmental Biodiversity Working Group and the independent Biodiversity Forum. Ireland's 2nd National Biodiversity Conference was held to gather insights and recommendations for the development of the NBAP and a public consultation process was held to provide further opportunities to engage with the Plan.

The 4th NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to "act for nature".

The delivery of rehabilitation at this bog is expected to significantly contribute in the future to actions and targets of the 4th National Biodiversity Action Plan 2023-2030, particularly in relation to peatland restoration, nature restoration and creation of new habitats such as wetlands and woodlands.

7 EU Nature Restoration Law

The EU Nature Restoration Law is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The regulation combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

This regulation has now been adapted and it is expected that all Member States will be required to produce a National Restoration Plan within two years of adoption. This will be led by the National Parks and Wildlife Service and will comprise a broad and deep public participation process, informed by robust ecological and socio-economic impact assessments. BnM are working with NPWS to identify bog restoration and other re-wetted cutaway sites that can contribute towards Irelands targets for the Nature Restoration Law.

8 National Conservation Designations

BnM operates in a wider landscape that also includes a network of European and National nature conservation sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Heritage Areas (NHAs, pNHAs) and National Nature Reserves). BnM will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

9 National Raised Bog Special Area of Conservation Management Plan 2017-2022

The National Raised Bog Special Area of Conservation Management Plan 2017-2022 sets out a roadmap for the long-term management, restoration and conservation of protected raised bogs in Ireland. The Plan strikes an appropriate balance between the need to conserve and restore Ireland's raised bog network as part of Ireland's commitments towards the EU Habitats Directive, and the needs of stakeholders and gives recognition to the important role that communities have to play in the conservation and restoration of raised bogs. The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 is part of the measures being implemented in response to the on-going infringement action against Ireland in relation to the implementation of the EU Habitats Directive, with regard to the regulation of turf cutting on the Special Areas of Conservation (SACs). The then Minister for Arts, Heritage and the Gaeltacht, also published a **Review of Raised Bog Natural Heritage Area Network** in 2014.

BnM has also responded to the needs of the NRBMP and provided several sites to the government for the relocation of turf-cutters from SACs. This is part of a suite of ongoing bog conservation measures in the NRBMP to manage turf-cutting in protected sites. BnM and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

10 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan 2021-2025 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. A BnM specific action in this plan includes the adoption of pollinator-friendly management within the BnM network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

11 Land-use planning policies

As BnM operates in many counties across Ireland, it is important to note the respective development plans in these counties. Many of the existing development plans recognise the potential that exists in the after-use of cutover/cutaway peatlands. BnM seeks to work with all of the relevant local authorities to ensure that the most appropriate after-uses are reflected in local planning policy. The following areas of consistent importance are of both direct and indirect relevance to BnM: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

12 Archaeology Code of Practice

BnM operates under an agreed Code of Practice regarding archaeology with the Department of Arts, Heritage and the Gaeltacht (National Monuments Service) and the National Museum of Ireland which provides a framework to enable the Company to progress peat extraction whilst carrying out archaeological mitigation. (https://www.archaeology.ie/sites/default/files/media/publications/cop-bord-na-mona-en.pdf

Under the Code, BnM, the Minister and Director work together to ensure that appropriate archaeological survey and mitigation is carried out in advance of peat extraction.

As peat extraction ceased in 2018, the remaining elements of the COP that are still applicable include:

- BnM must ensure that any newly discovered monuments on BnM lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BnM must ensure that any archaeological objects discovered on BnM lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- BnM will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

Under the Peatlands Climate Action Scheme, an Archaeological Impact Assessment is prepared for each bog in advance, from a review of historical data and desk-based searches of:

- The IAWU Peatland Survey
- BnM Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments
- Field survey

The Draft AIA determines and advises on any known archaeology and its required protection and determines what is required to be undertaken if archaeology is found during the rehabilitation.

13 Bord na Móna Biodiversity Action Plan 2016-2021

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on BnM lands. The Bord na Móna

Biodiversity Action Plan also outlines key International and European policy in relation to biodiversity. This includes the **United Nations Convention on Biodiversity 2011-2020 (CBD)** and **European Biodiversity Strategy to 2020**. Further details of these policies and BnM's responses can be found in the Bord na Móna Biodiversity Action Plan (Bord na Móna, 2016). Both policy documents highlight targets such as reducing pressure on biodiversity, promoting sustainability, habitat restoration and benefits of ecosystem services.

One example of a key CBD target is:

- *"Restore at least 15% of degraded areas through conservation and restoration activities."*

The EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

14 BnM commitments

BnM made the commitment in 2009 not to develop any new peatland sites for industrial peat production. The company has continued to work with different stakeholders.

In line with BnM's accelerated decarbonisation programme, the company made a further commitment to a significantly larger rehabilitation target. This was reflected in our plans to rehabilitate a further 20,000 hectares of cutaway and cutover bog to wetland and woodland mosaics by 2025. In addition, we planned to restore a further 1,000 hectares of raised bog habitat by 2025. These initial targets have been achieved.

The company announced the cessation of industrial peat production in 2021 and that it would rehabilitate a target of 33,000 ha between 2021-2026. Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, The Nature Restoration Law, the Climate Action Plan, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. BnM has now transitioned to a Climate Solutions company with a key commercial and development focus being the delivery of renewable energy to support Ireland's Climate Action Plan. In general, BnM will seek to balance and optimise commercial, social, and environmental value of its bogs, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

These commitments outline the importance of peatland rehabilitation to BnM. The company will continue to demonstrate environmental responsibility and continue to deliver on these commitments in relation to peatland rehabilitation and in relation to the future management of these lands to maximise their benefits, particularly their ecosystem service benefits, along with the sustainable development of a portion of the land bank for other uses, such as renewable energy.

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APPENDIX VI. DECOMMISSIONING

1. Condition 10 Decommissioning

This is a requirement of the applicable Integrated Pollution Control Licence issued by the Environmental Protection Agency. This condition 10.1 requires the following:

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

The main success criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the licence under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

Item	Description	Toar Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Where relevant
4	Decommissioning or Removal of Buildings and Compounds	Where relevant
5	Decommissioning Fuel Tanks and associated facilities	Where relevant
6	Decommissioning and Removal of Bog Pump Sites	Where relevant
7	Decommissioning or Removal of Septic Tanks	Where relevant

In addition, condition 7 of the licence requires these now defined waste items to be disposed of or recovered as follows:

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the

waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

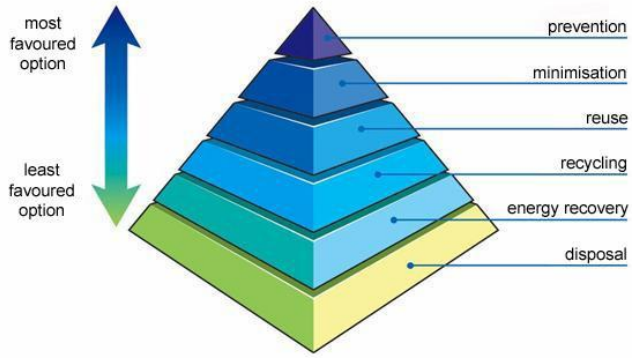
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

As required by the licence, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under 7.2, with waste records maintained as required under 7.3.

Where possible, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.



The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A BnM site generally becomes cutaway when it is economically unviable to continue industrial peat extraction or when the majority of peat has been removed.

Deep peat cutover bog. Deep peat cutover bog is defined as former raised bogs that have been in industrial peat production, where production has ceased but the residual peat depth is typically in excess of 2m. *Sphagnum* mosses are key species of raised bogs and the majority of the peat mass is formed from these mosses. *Sphagnum* species and other raised bog species are a key part of raised bog habitat function and prefer more acidic, nutrient poor, water-logged conditions. Typical raised bog *Sphagnum* mosses and other bog species do not thrive with the more typical alkaline water chemistry of cutaway bog but do grow well in these more acidic conditions where peat has been re-wetted. There is potential to re-develop embryonic *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing embryonic *Sphagnum*-rich vegetation communities that are considered Carbon sinks or peat-forming habitats and restoring the carbon sequestration function of these sites.

Dry cutaway bog: Cutaway bog is categorised as dry cutaway where it is not practical or feasible to re-wet these areas completely. It is inevitable that some areas of cutaway will remain relatively dry due to the heterogenous topography of the cutaway, as well as requirements for continued drainage on site for identified after-uses, or off site in relation to neighbouring lands or other infrastructure. Ridges and mounds of glacial deposits can become exposed during peat extraction and form a heterogenous topographical mosaic separated by basins. Dry cutaway may have very thin or no residual peat where ridges and mounds have been exposed. The exposed sub-soils are a mix of glacial gravels, muds and tills that can be quite free-draining. Dry cutaway may also have deeper residual peat but in a location (i.e. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

Environmental stabilisation: The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, slowing water movement across the bog, minimising effects to downstream waterbodies and meeting the conditions of the IPC Licence. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Habitats will develop that reflect the underlying environmental conditions. Other after-use development may also serve to act as environmental stabilisation.

Marginal land. Marginal land is defined as land around the margin of the industrial peat production area. This margin generally contains a range of habitats including scrub, Birch woodland, cutover bog and raised bog remnants. It has a variety of land-uses including turf-cutting (private turbary).

Rehabilitation: Rehabilitation is defined in general by BnM as environmental stabilisation of the former cutaway. This is generally achieved via re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention. It is not possible to restore raised bog habitats on BnM cutaway in general in the short-term. In general, most of the peat mass has been removed from many BnM cutaway sites and the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status. This means there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). Other after-use development may also serve to act as rehabilitation.

Restoration: Ecological restoration to defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement**

of ecological conditions in damaged wildlands through the **reinstatement of ecological processes**. In general, BnM cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelm – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of BnM sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

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APPENDIX VII. EXTRACTIVE WASTE MANAGEMENT PLAN

(Minimisation, treatment, recovery and disposal)

Objective:
The objective of this generic plan is to comply with the requirements of regulation 5 of the Waste Management (Management of Waste from Extractive Industries) Regulations, and to prevent or reduce waste production and its harmfulness.

Scope:
This plan covers IPC Licence's Ref P0501-01, Derrygreenagh Bog Group, County Westmeath, Offaly and Meath.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in Derrygreenagh serviced by a silt lagoons/ponds. During the excavation of these silt ponds, pre IPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or is levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Edenderry Power and Lough Ree Power Ltd screened the peat from the bogs prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the IPC licence permits disposal of these peat screenings back to the bog, where it is levelled and graded into the surrounding peat landscape. These locations have been agreed with the Agency as per condition 7.4 of the IPC Licence, and as per the attached locations.

1.3 Bog Timbers:
During peat extraction operations, bog timbers often arise in the bog surface and are required to be cleared. These timbers consist of bog pine, oak and some yew. Some of these timbers, such as the oak and yew are removed for use in the wood craft industry, with the remaining bog pine stockpiled in locations at the opposite end of each bog, where it generally becomes a habitat for flora and fauna. These piles of timber are generally no higher than 1-2 metres.

2.0 P0501-01 IPC Licence Extractive Waste Conditions

2.1 Condition 7.5 Extractive Waste Management
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 31' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
IPC Licence conditions require all production areas to be serviced by an appropriately designed silt pond based on storage volume and retention time. Condition 6.6 requires all ponds to be cleaned bi-annually and more often if inspections dictate, so the only opportunity for minimisation of same is through Standard Operating Procedures. These are required under condition 2.2.2 (i) regarding minimisation of suspended solids, and are in-place to minimise the generation of silt, which in-turn will minimise the generation of silt pond waste.

3.2 Power Station Screenings.
These screenings cannot be minimised as they are a consequence of peat production, stones, timbers and oversize peat materials are naturally occurring on the bog, and are required to be removed prior to processing.

3.3 Bog Timbers.
Bog timbers are also naturally occurring materials within a bog and are required to be removed prior for production. The volume of these bog timbers varies from bog to bog and as such their minimisation is not controllable or quantifiable.

4.0 Treatment
4.1 Silt pond excavation material and cleanings.
The silt pond excavation material and silt cleanings do not require any treatment for its end use which will be either backfilling these silt pond voids as per condition 7.7.1 above as part of the Bog Rehabilitation Plan, or reincorporated into the surrounding peatlands.

4.2 Power Station Screenings.
The factory screenings are permitted to be returned to the bog as they were naturally occurring materials from the bog, and as such do not require any treatment to serve this purpose.

4.3 Bog Timbers
As per 1.3 above, these timbers are stockpiled at two locations in each bog, as per the attached list of sites and become habitats for various flora and fauna.

5.0 Recovery
5.1 Silt pond excavation material and cleanings.
Condition 2.2.2 (vi) requires the reuse of silt pond waste to be examined. This was undertaken in 2006, the outcome of which was that this waste peat silt material, as a fuel, was contaminated with sub-soils, rendering it unsuitable for combustion. In addition, volumes are small compared to overall peat production volumes.

5.2 Power Station Screenings.
Given the nature of these screenings as outlined in 1.2 above, there is no further use identified and they are permitted to be disposed of back to the bog.

5.3 Bog Timbers
Investigations into processing these materials into smaller fractions for potential heating purposes did not yield any viable results. In addition, these older stockpiles are now classified as habitats and as such would not be considered for reuse as a fuel.

6.0 Disposal
6.1 Silt pond excavation material and cleanings.
Schedule 3 (ii) permits the disposal of silt pond cleanings (Lagoon Sediments) to the bog and these locations, adjacent to the silt pond site, are presented in the attached spreadsheet, with associated grid coordinates.

6.2 Power Station Screenings.
Schedule 3 (ii) permits the disposal of screenings (Peat Screenings) to the bog at designated locations agreed under Condition 7.4, and these locations, are presented in the attached spreadsheet, with associated grid coordinates.

6.3 Bog Timbers
These naturally occurring bog timbers are stockpiled at locations in each bog, grid coordinates attached.

7.0 Extractive Waste Management Plan

5 (2a)(i)
The vast majority of peat extraction bogs were all designed and drained for production prior to the 1960's and as such the production fields layout cannot' be altered. Under our Cleaner Reduction Procedures, various design changes have been implemented to the production machines and process to reduce lost peat which eventually is captured in the silt ponds and requires removal as waste peat silt. This along with training and ongoing research and development will continuously reduce waste peat and subsequently waste silt pond cleanings. Bog timbers are present naturally in various volumes and quantities in different bogs and as peat production involves stripping peat in layers, the exposure, generation and removal of these timbers is unavoidable. Work has been undertaken recently into project looking at grinding of these bog timbers in situ using a timber miller, and if this project becomes viable it will contribute to the reduction of bog timbers.

5 (2a)(ii)
Given the nature and expanse of peat bogs, the stockpiling and storage of these waste materials do not present a visual, storage or stability problem. As required under Condition 10 of the IPC Licence, the silt pond excavations and screenings will be utilised to backfill the silt pond voids once the bogs have finished and stabilised in accordance with out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the IPC Licence, all silt ponds will be decommissioned once the bog surface has stabilised, in agreement with the Agency. This will involve the removal of weirs and flow controls, returning the silt pond back to its original drain or removing the silt pond from the drainage system. Both of these activities will involve placing the silt pond extraction and cleaning material back into the excavation void.

5 (2a)(iv)
The peat bogs do not contain any topsoil, so this is not required.

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5 (2a)(v)
Peat mineral resources do not undergo any treatment.

5 (2b)
These three extractive waste are all being reused and recovered back to their original extraction points and have not undergone any physical, chemical, or biological change.

5 (2c)(i, ii & iii)
These three extractive wastes, stored on the bog for reuse or recovery during the bog rehabilitation phase, do not require any management or monitoring during the operation of these bogs. Silt pond excavations and cleanings are stored adjacent to the silt pond and quickly revegetated and stabilise, the screenings are graded back into the bog at the agreed locations upon disposal and the bog timbers do not prevent any water or airborne danger to the environment.

5 (3)
The three extractive wastes arising from peat extraction operations at this site are classified wastes from mineral non-metalliferous excavation, with an EWC code of 0101 02. The materials are not classified as hazardous under Directive 91/689/EEC20, and do not contain substances or preparations classified as dangerous under Directives 67/548/EEC5 or 1999/45/EC6 above a certain threshold.
The peat excavations and cleanings are stored in locations and in a manner that they could not collapse, and are remote in their nature. The stockpiles are located adjacent to silt ponds that are cleaned regularly and as such these stockpiles are managed and levelled to facilitate further cleanings.
Therefore the material stored at these waste facilities would not be considered to be a Category A waste facility.

Classification in accordance Annex II.

Waste Material	Description	**C**lassification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under IPC Licence. Bog timbers arise from preparation of the bogs surface for peat production. Estimated quantities of materials are below:

Closure plan. (Bog Rehabilitation Plan).
Condition 10.1 – 10.3 of the IPC Licence requires the following:

- 10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:
- 10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.
- 10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

- 10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.
- 10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

- 10.3.1 A scope statement for the plan; to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).
- 10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.
- 10.3.3 A programme to achieve the stated criteria.
- 10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.
- 10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment. This plan including maps and ecological classifications are available on file at the Derrygreenagh IPC Licence Coordinators office.
The location in relation to the silt pond excavations and cleanings are adjacent to the silt ponds, which are considered under the Shannon River Basin Management Plan in accordance with the requirements of Directive 2000/60/EC.
Screenings and bog timbers are all naturally occurring elements of peatland and there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Derrygreenagh IPC Licence P0501-01.

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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- Any fertiliser used will be Rock Phosphate and will not be applied in the following conditions:
    1. The land is waterlogged;
    2. The land is flooded, or it is likely to flood;
    3. The land is frozen, or covered with snow;
    4. Heavy rain is forecast within 48 hours (forecasts will be checked from Met Éireann).
    5. The ground slopes steeply and there is a risk of water pollution, when factors such as surface run-off pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover are taken into account.
- Buffer zones in respect of waterbodies, as specified on https://www.epa.ie/about/faq/name,57156,en.html, will be adhered with at all times with regard to fertiliser application.
- No fertiliser will be spread within or in proximity to European Sites. Fertiliser will not be spread within 25m of a hydraulic break (where slope indicates runoff potential); 25m of an area subject to annual winter inundation, 25m of a natural watercourse, or 25m of any drains where conveyance is to be retained through the proposed rehabilitation extent.
- Fertiliser will be applied to headlands and bare fields where the surface slope indicates runoff is directed away from the above areas, and to within 2m of internal drainage channels within the cutover high field areas. These drainage channels will be blocked in advance of fertiliser application, restricting potential run-off to downstream drainage channels

Water body / Feature	Buffer zone
Any water supply source providing 100m^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX X. ARCHAEOLOGY

Role of the Archaeological Liaison Officer

1. To communicate this Code of Practice and the *Archaeological Protection Procedures* (Appendix IV) to all personnel operating on the bog.
2. To ensure that all notices relating to the *Archaeological Protection Procedures* are posted and maintained at appropriate locations on the bog.
3. To report any stray finds, presented to the Liaison Officer from his/her group of bogs, to the Duty Officer of the National Museum of Ireland.
4. To provide for the appropriate protection of the stray find, whether in-situ or removed from the bog, as directed by the Duty Officer of the National Museum of Ireland.



Code of Practice

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Code of Practice

5. To arrange for the delivery or collection of the stray find, as directed by the Duty Officer of the National Museum of Ireland.

6. To complete the Report of Discovery of Archaeological Object(s) in Bogs (Appendix V), as directed by the Duty Officer of the National Museum of Ireland.

7. To maintain a file of all stray finds and associated documentation and provide copies to the Project Archaeologist.

8. To provide assistance, where required, to the Department during archaeological surveys.

9. To provide assistance, where required, to Bord na Móna's Consultant Archaeologists, during investigation and mitigation of monuments.

10. To report to the Bord na Móna members on the Archaeology Management Liaison Committee any planned developments or new activities on cutaway peatland areas within his/her group of bogs.



1. Purpose

The purpose of this procedure is to describe the arrangements within Bord na Móna (BnM) for the identification, protection and reporting of archaeological material, including stray finds and known archaeological features.

All objects, sites or monuments, no matter how fragmentary, are important elements of our national heritage. The protection of archaeological resources is a legal requirement and forms part of Bord na Móna's environmental and cultural heritage responsibilities.

This procedure also sets out operational controls to ensure that archaeological features and their associated buffer zones are protected during rehabilitation activities.

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2. Procedure

2.1 Archaeological Awareness

1. Verify whether any known archaeological monuments or constraints exist within the proposed work area prior to commencing works. These can be identified using the BnM GIS system, including the relevant PCAS layers and associated field maps.
2. All archaeological locations and their associated buffer zones shall be clearly marked on the bog in advance of any rehabilitation activities, irrespective of whether works are planned within those areas. The Survey Team will endeavour to mark all zones prior to commencement of rehabilitation works on a given bog; however, this is subject to the availability of survey resources. Where features are located in areas that are unsafe to access (e.g. water-covered areas), physical marking is not required.
3. These markings must be installed prior to machinery entering the field where all rehabilitation measures are taking place.
4. Archaeological features located within fields will be marked by the Survey Team using a visible red "X" to clearly alert operators to the presence of an archaeological constraint. These features are typically accompanied by a 20 m buffer zone, which may restrict access to up to three adjacent fields.
5. Operators must not drive over or across these markers, including when moving between work areas. Operators must navigate around the marked locations and their associated buffer zones.
6. If operators are observed driving over archaeological markers in order to move to the next work area, this must be reported to the Site Supervisor or **Archaeological Liaison Officer** immediately so corrective action can be taken.
7. Archaeological areas and their associated buffer zones must not be used for machine travel, idle travel, turning, or equipment positioning.

2.2 Stray Finds Procedure

1 Be vigilant at all times. Objects or traces of structures may be found:

- on field surfaces
- in drain faces
- on bog margins
- caught within the mechanics of machinery.

2 If a n object is discovered:

- Leave it in place if it is safe to do so.
- Note its position.
- Immediately contact the **Archaeological Liaison Officer**, who will assess the situation and contact the Duty Officer of the National Museum of Ireland where required.

3 Resist the temptation to investigate the find spot further, as this may disturb fragile archaeological deposits.

4 If the object has already been dislodged or is in imminent danger:

- Remove it carefully.
- Mark the find location.
- Report it immediately to the **Archaeological Liaison Officer**.

5 Objects made of **wood, leather or textile**, particularly those removed from peat, must be kept in conditions similar to those in which they were found. This may include:

- packing the object in peat, or
- placing waterlogged items in a clean basin of water and sealing the container.

6 Do not attempt to clean or remove peat from the object.

7 If **timbers, gravel, stones or other materials that may form part of a man-made structure** are discovered:

- mark the location
- report immediately to the **Archaeological Liaison Officer**
- do not expose the structure further.

8 Report anything that appears **unnatural or unusual in the bog**. The **Archaeological Liaison Officer** will determine whether the find requires referral to the relevant authorities.

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3. Important Note

Our archaeological heritage is a finite and non-renewable resource. Once a site is destroyed, its information is lost forever. Protecting archaeological remains allows us to better understand our past, our landscape and the people who lived here before us.

All Bord na Móna staff and contractors must therefore ensure that archaeological features, buffer zones and potential stray finds are treated with care and protected at all times during operations.

Your Archaeological Liaison Officer is Enda McDonagh

Revision Index			
Revision	**Date**	**Description of change**	**Approved**
1	13/19/2020	First release	EMcD
1	24/11/2025	Change to logo and header	SG
2	10/03/2026	Addition of Archaeological Awareness and change of SOP Title	EMcD

Toar Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

Document Name:	Toar Bog Rehab Plan GIS Map Book 2026
Document File Path:	
Document Status:	**Draft v0.2**

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	0	0	12	0

Rev. 0.1	Author(s):	Checked By:	Approved By:
Name(s):	BG	CS	MMcC
Date:	10/07/2026	10/07/2026	10/07/2026
Rev. 0.2	**Author(s):**	**Checked By:**	**Approved By:**
Name(s):	BG	CS	MMcC
Date:	24/09/2026	24/09/2026	24/09/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
Name(s):			
Date:			

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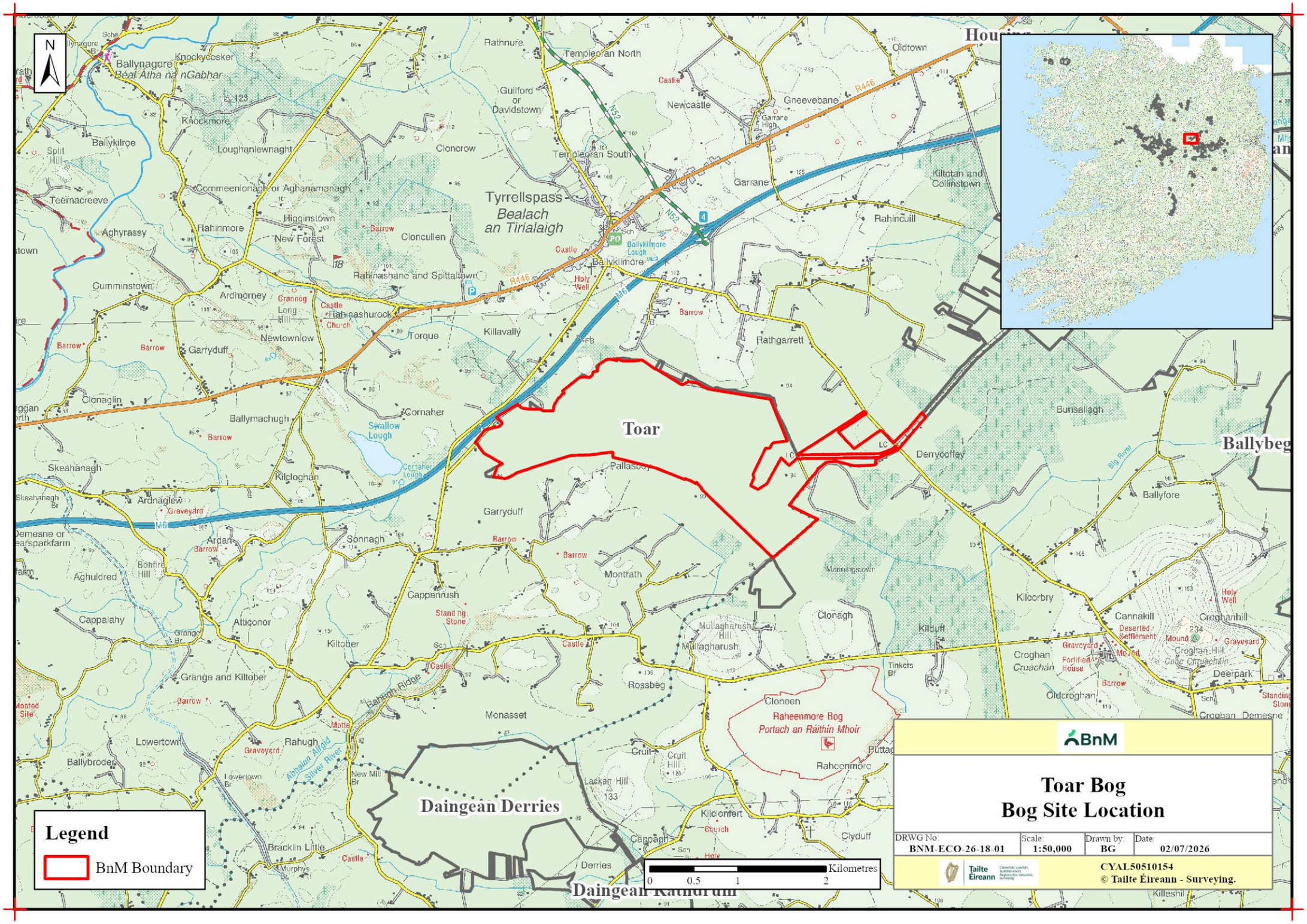
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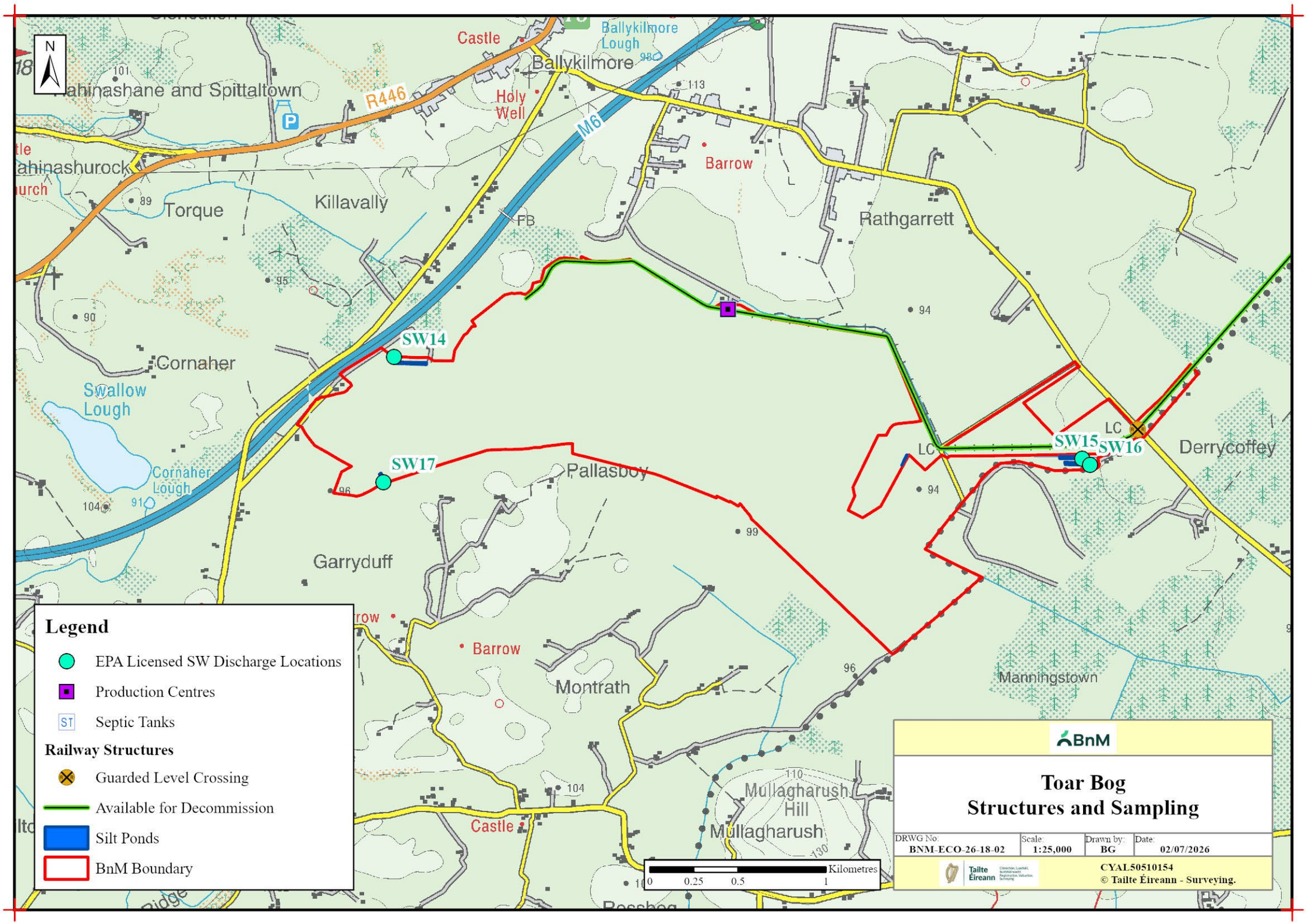
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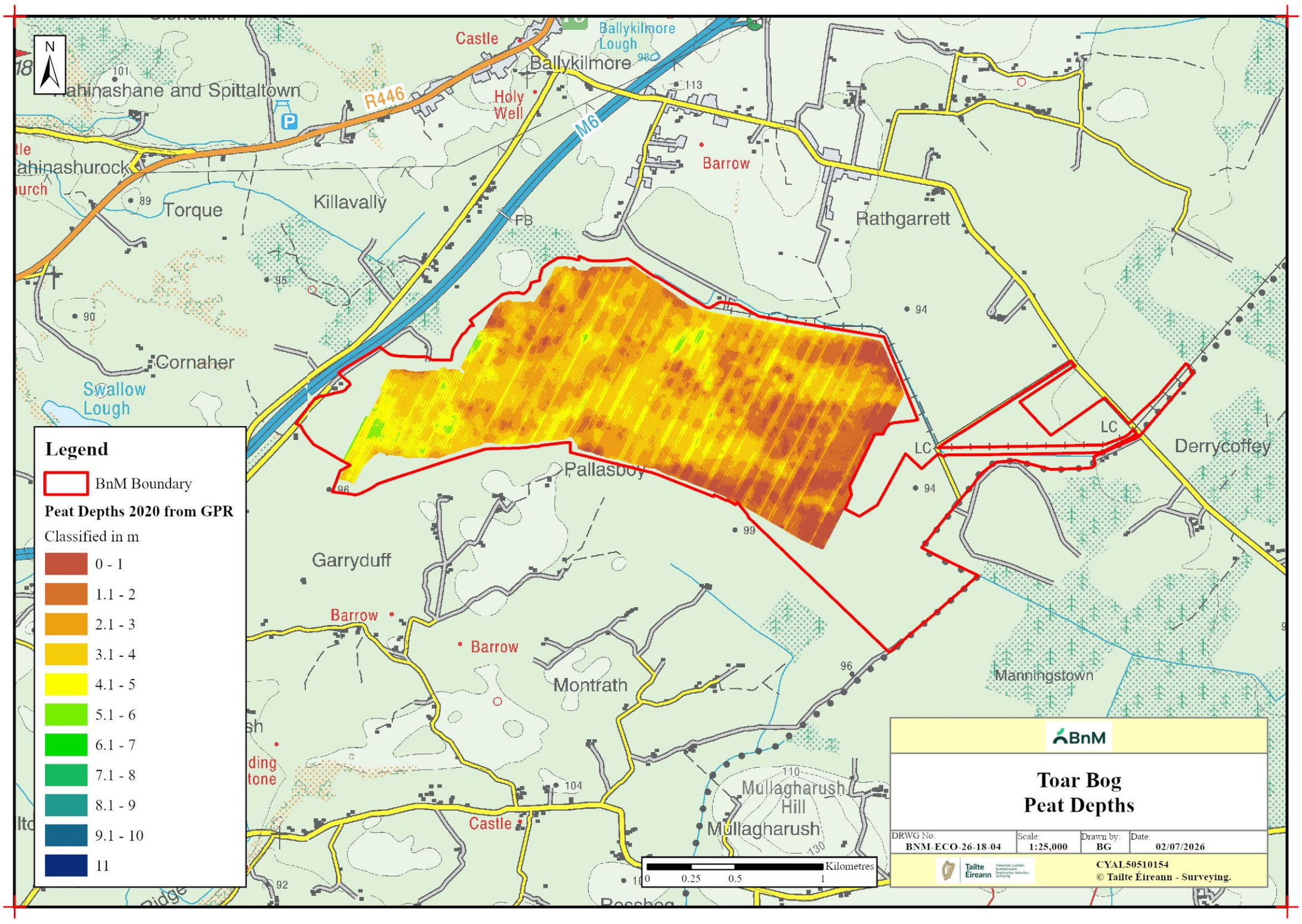
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EPA Licensed SW Discharge Locations
Production Centres
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Railway Structures
Guarded Level Crossing
Available for Decommission
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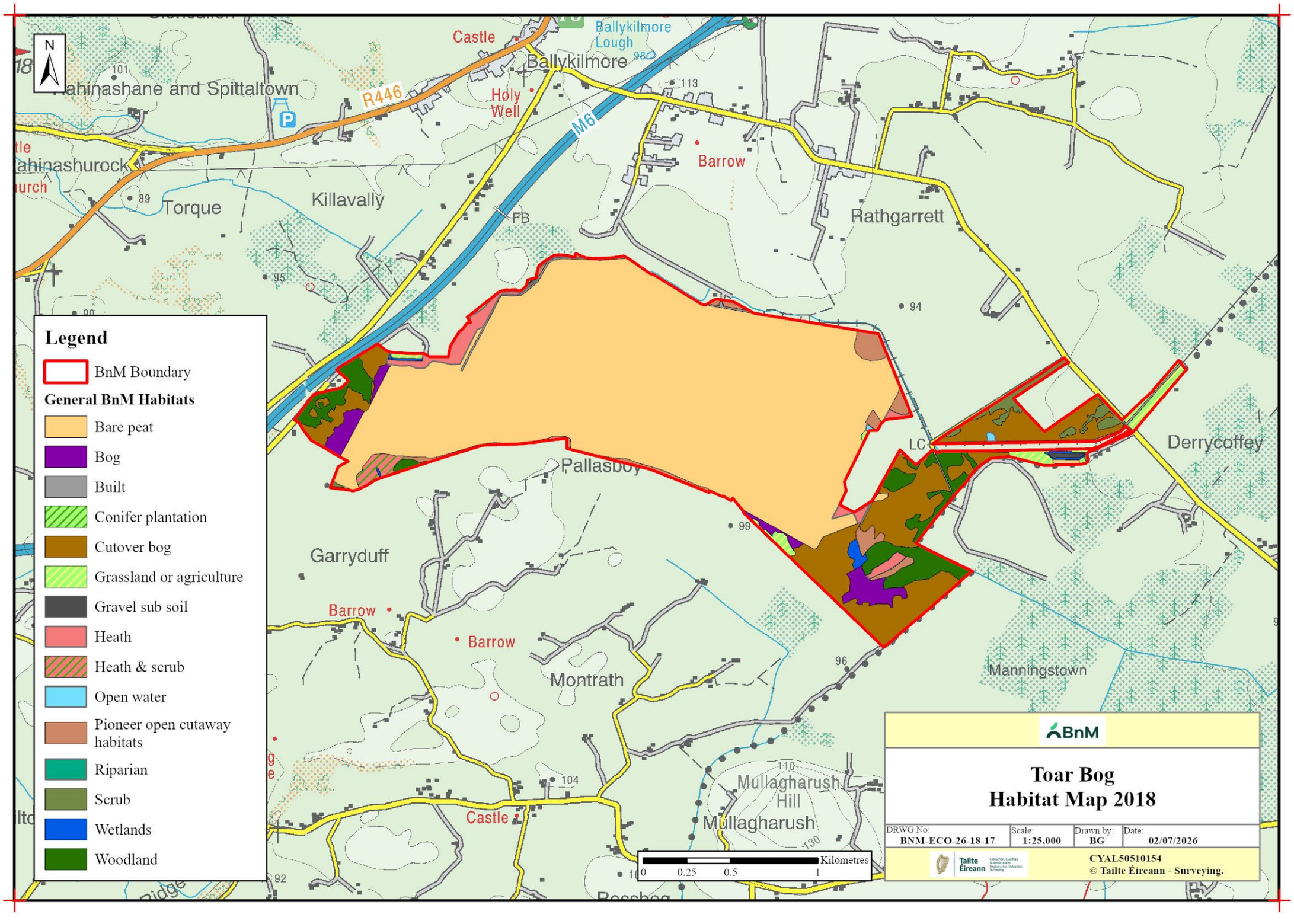
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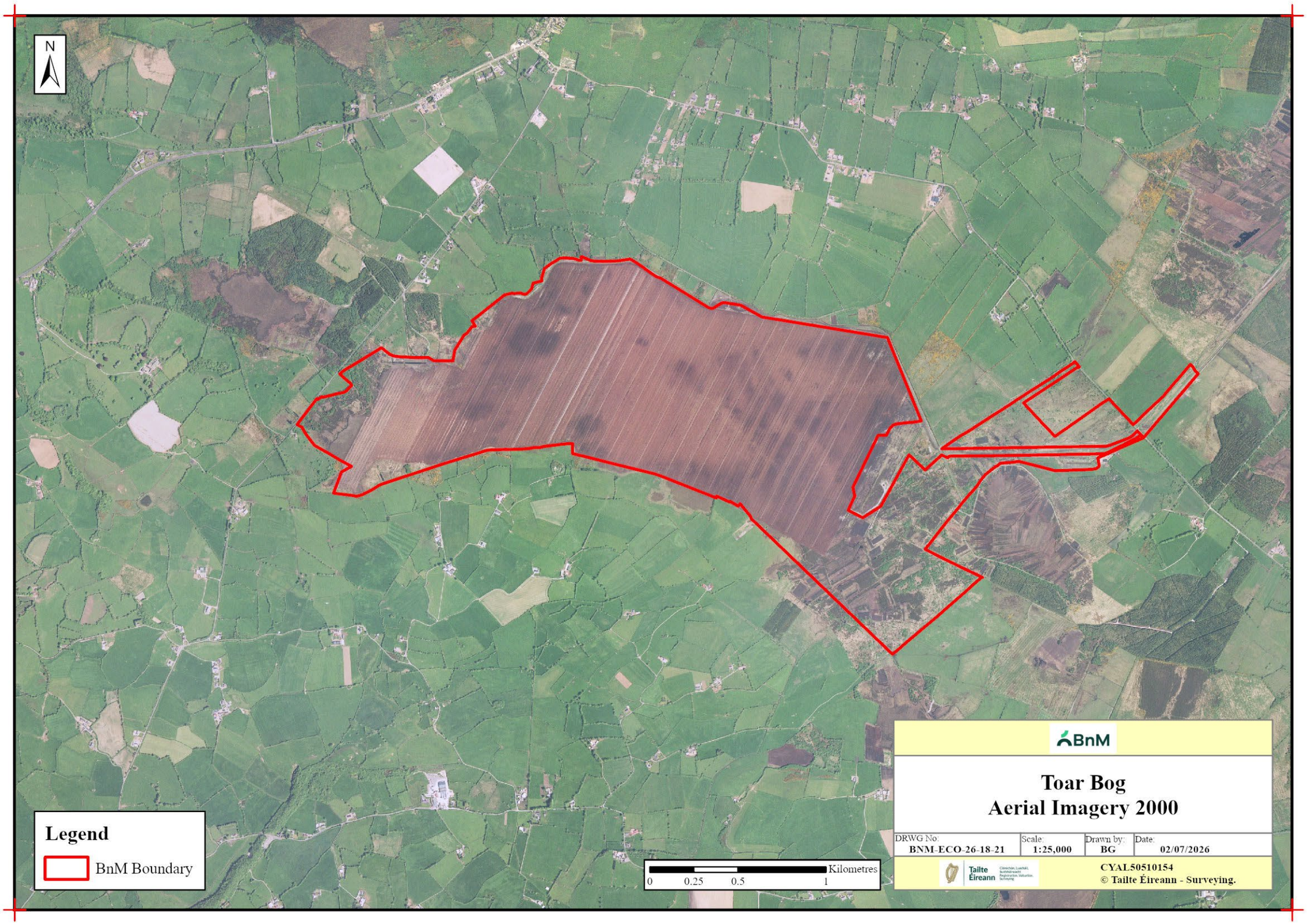
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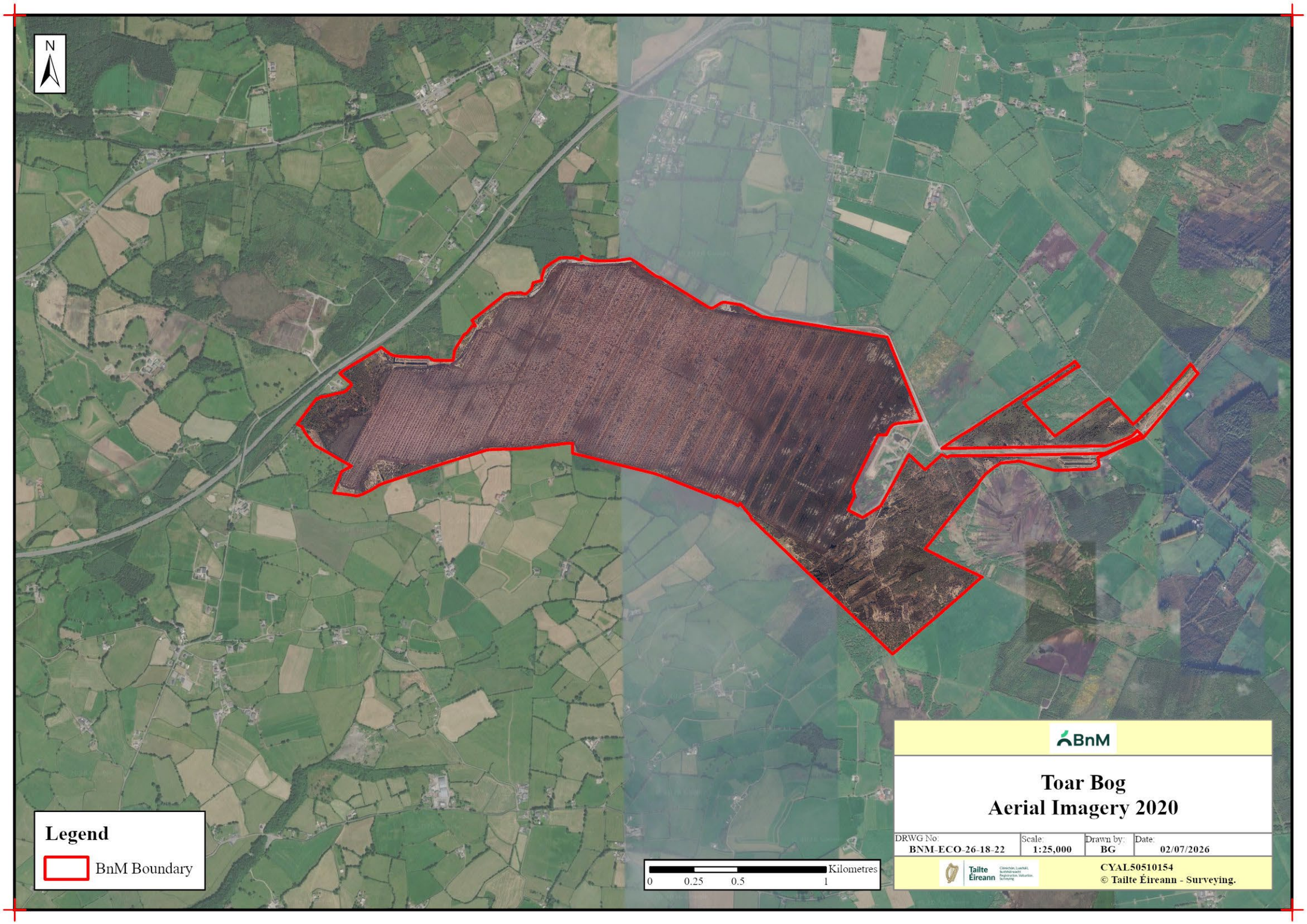
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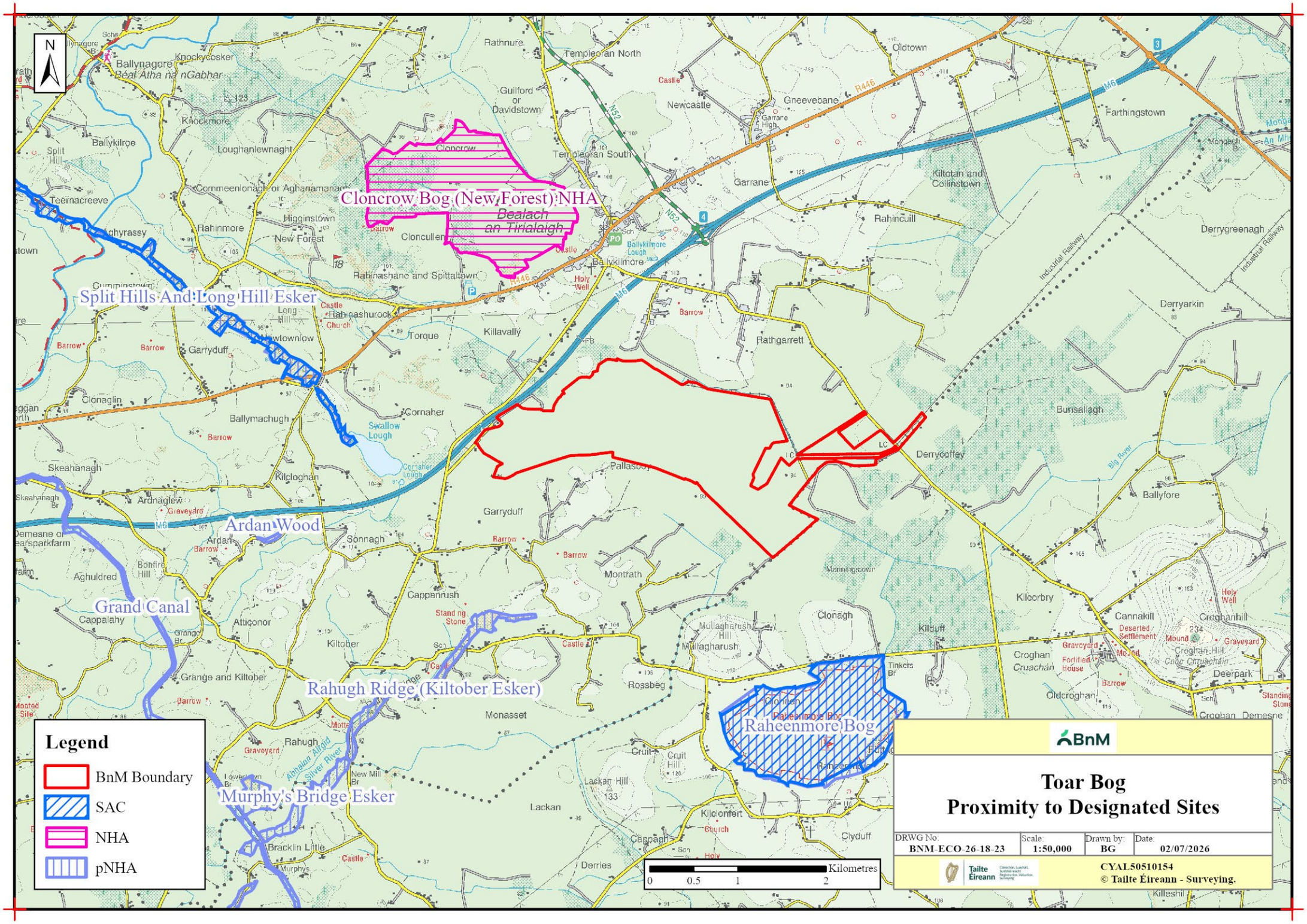
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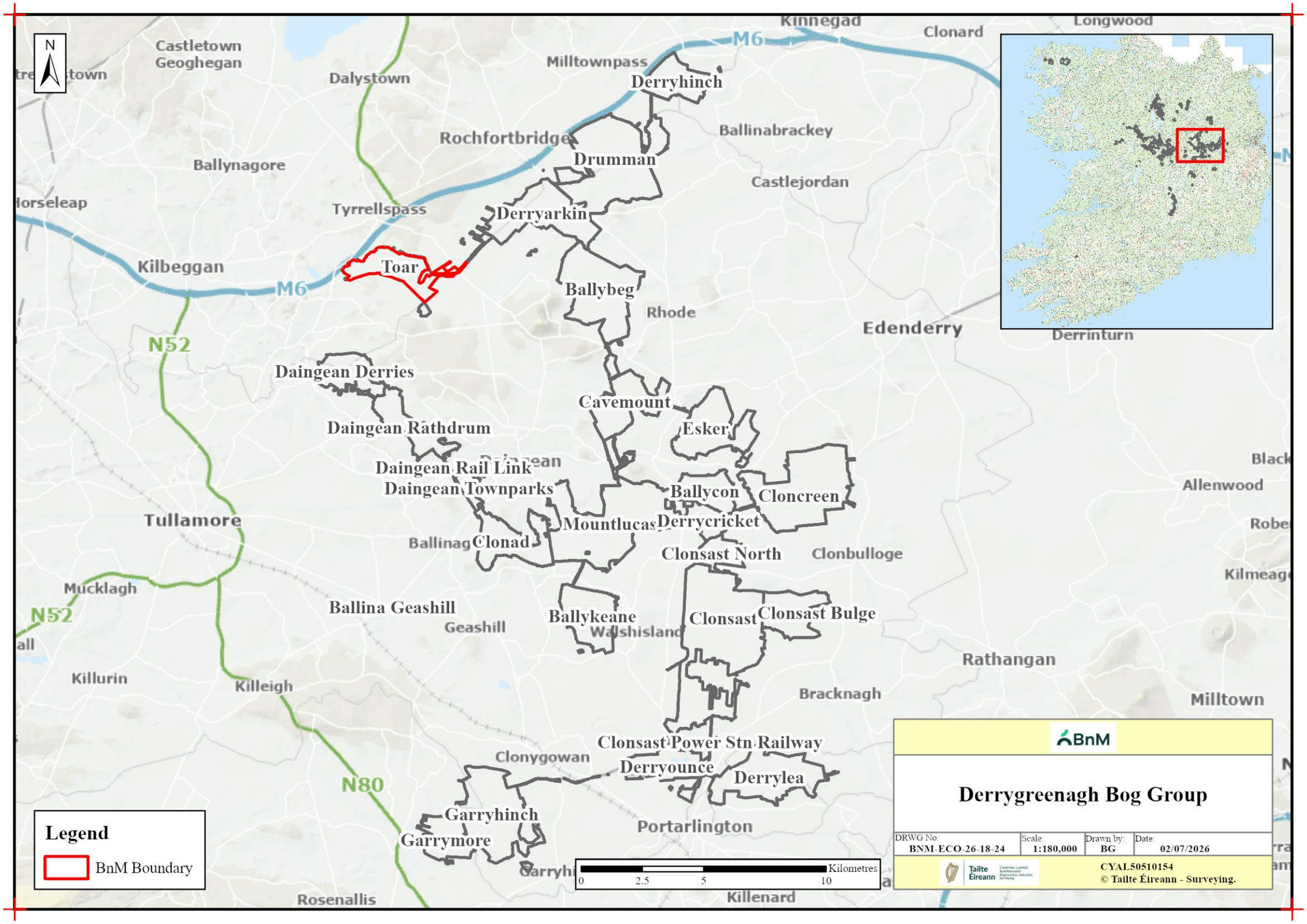
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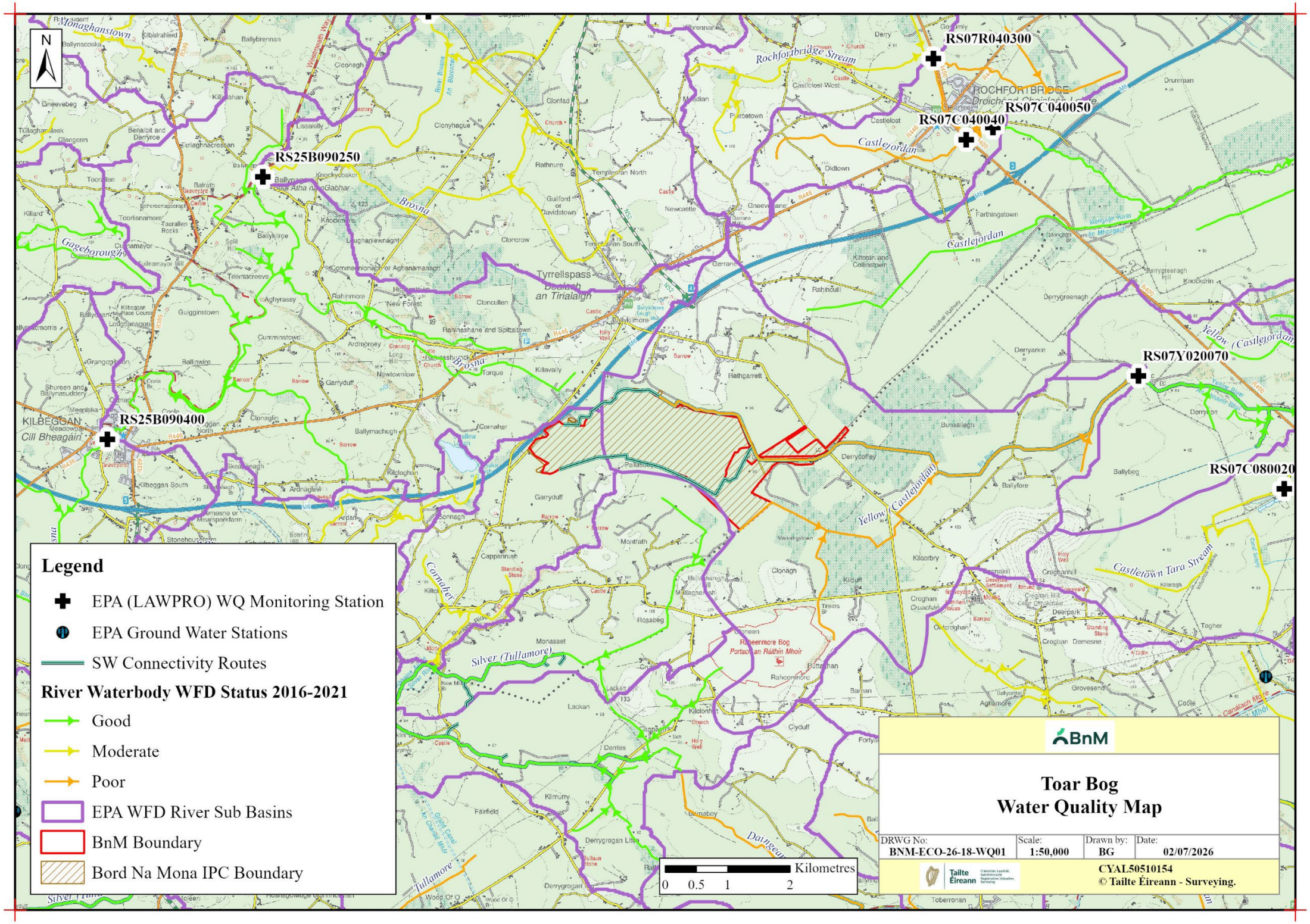
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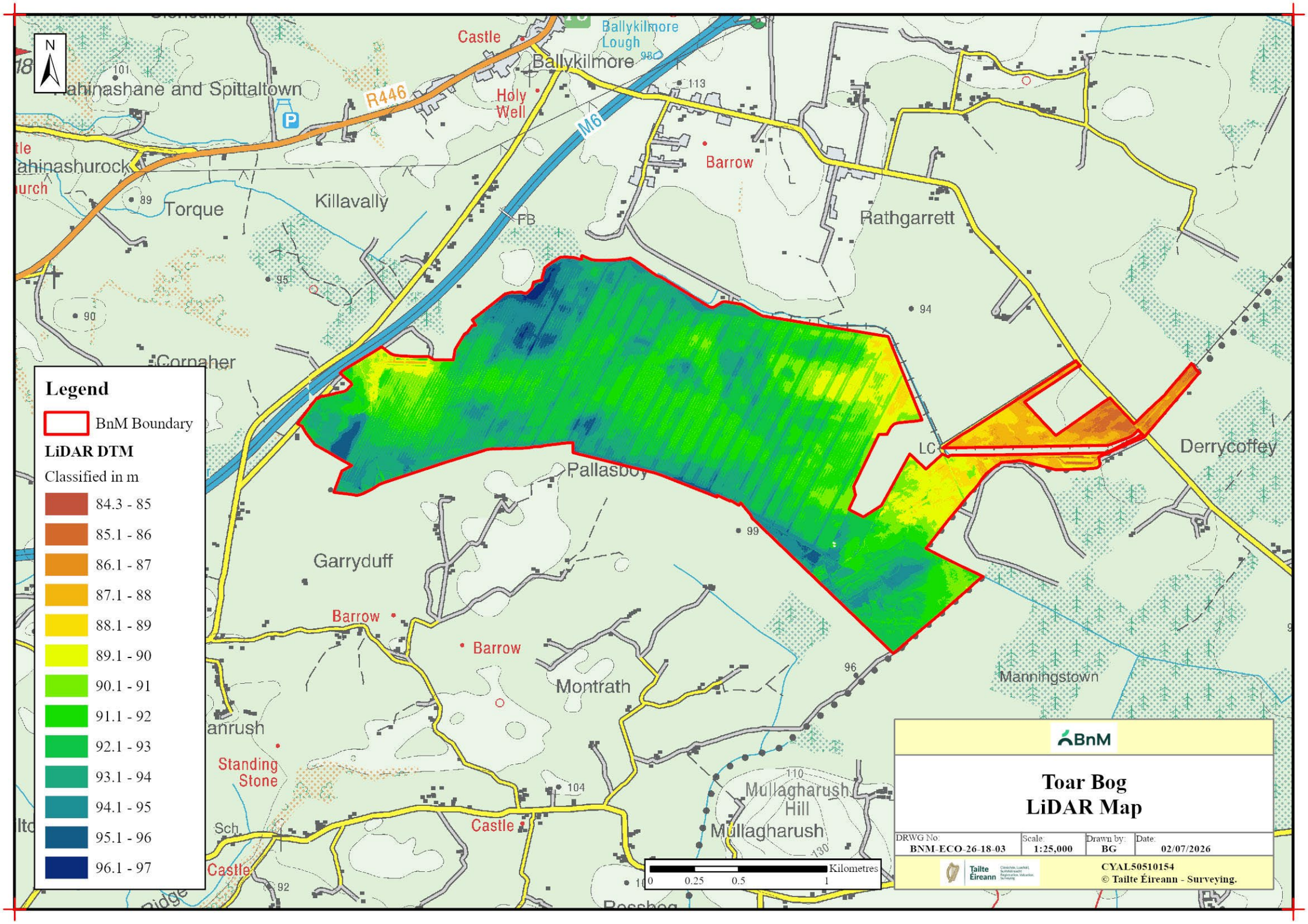
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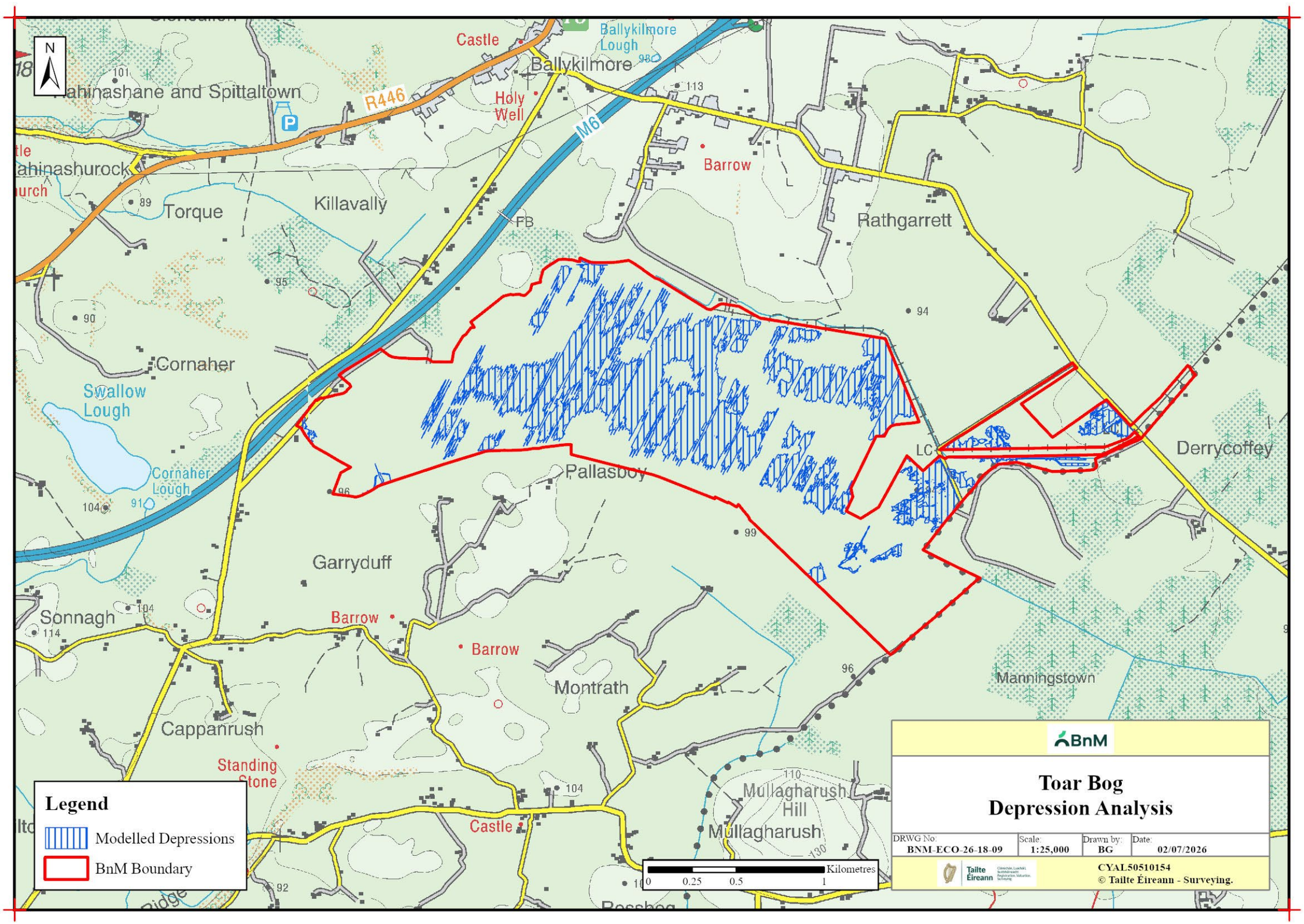
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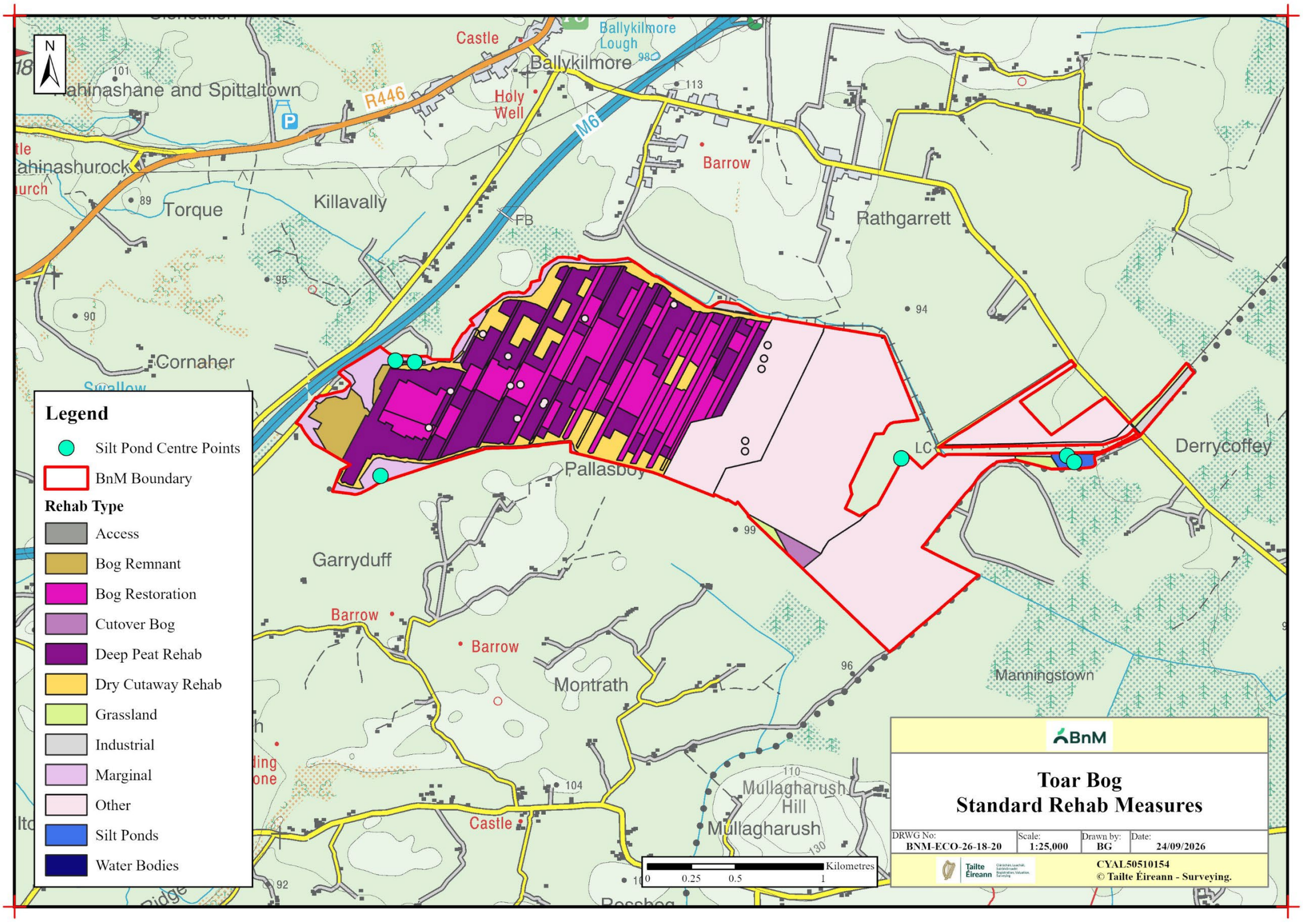
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Pallasboy
LC
Derrycoffey
Garryduff
Sonnagh
Barrow
Barrow
Montrath
Manningstown
Cappanrush
Standing Stone
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Depression Analysis
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Rehabilitation Maps


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Ballykilmore
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Barrow
Killavally
Torque
Rathgarrett
Cornaher
Pallasboy
Derrycoffey
LC
Garryduff
Barrow
Barrow
Montrath
Manningstown
Castle
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Mullagharush
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
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Bog Restoration
Cutover Bog
Deep Peat Rehab
Dry Cutaway Rehab
Grassland
Industrial
Marginal
Other
Silt Ponds
Water Bodies
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Toar Bog
Standard Rehab Measures
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Appendix B Environmental Protection Agency Integrated Pollution Control Licence - P0501-01

Headquarters,
Johnstown Castle Estate,
County Wexford, Ireland

Integrated Pollution Control Licence

Licence Register Number:	501
Licensee:	Bord na Móna Energy Limited
Location of Activity:	Derrygreenagh Group, c/o Derrygreenagh Works Rochfordbridge Mullingar County Westmeath

ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil

An Ghníomhaireacht um Chaomhnú Comhshaoil

ENVIRONMENTAL PROTECTION AGENCY ACT, 1992

INTEGRATED POLLUTION CONTROL LICENCE

Decision of Agency, under Section 83(1) of the Environmental Protection Agency Act, 1992.

Reference number in
Register of licences : 501

Further to notice dated 1st December, 1999, the Agency in exercise of the powers conferred on it by the Environmental Protection Agency Act, 1992, for the reasons hereinafter set out, hereby grants a licence to

Bord na Mona Energy Limited, Boora, Leabeg, Tullamore, County Offaly.

to carry on the following activity

- the extraction of peat in the course of business which involves an area exceeding 50 hectares

at Derrygreenagh Group, c/o Derrygreenagh Works, Rochfordbridge, Mullingar, County Westmeath, subject to the conditions as set out in the schedule attached hereto.

SEALED by the Seal of the Agency this 26th day of April 2000

PRESENT when the seal of the Agency
was affixed hereto:

Director/Authorised Person

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Glossary of Terms

The Agency	Environmental Protection Agency.
The Licensee	Bord na Móna Energy Limited, Boora, Leabeg, Tullamore, County Offaly.
Location of Activity	Derrygreenagh Works, Rochfordbridge, Mullingar, County Westmeath.
AER	Annual Environmental Report.
Annually	All or part of a period of twelve consecutive months.
BATNEEC	Best Available Technology Not Entailing Excessive Cost.
Bi-annually	All or part of a period of six consecutive months.
COD	Chemical Oxygen Demand.
Daily	During all days of plant operation, and in the case of emissions, when emissions are taking place; with no more than 1 measurement on any one day.
Day	Any 24 hr. period.
Day-time	0800 hrs to 2200 hrs.
dB(A)	Decibels (A weighted).
Dust sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of dust at nuisance levels.
EMP	Environmental Management Programme.
EWC	European Waste Catalogue (94/3/EEC, see also Agency Guidance Note on the EWC)
Fortnightly	At least 20 measurements in a calendar year with no more than one measurement in any one week.
IPC	Integrated Pollution Control.
Leq	Equivalent continuous sound level.
Lighting-up time	30 minutes after sun set.
Local Authority	Meath County Council; Offaly County Council; Westmeath County Council.
Monthly	At least 12 times per year at approximately monthly intervals.

Night-time	2200 hrs to 0800 hrs.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Quarterly	All or part of a period of three consecutive months beginning on the first day of January, April, July or October.
Screenings	Wood, stone and other debris removed from milled peat (by screening) prior to introduction to processing
Standard Methods	As detailed in "Standard Methods for the Examination of Water and Wastewater", (prepared and published jointly by A.P.H.A., A.W.W.A & W.E.F) 19th Ed. 1995, American Public Health Association, 1015 Fifteenth Street, N.W., Washington DC 20005, USA.
TA Luft	Technical Instructions on Air Quality Control - TA Luft in accordance with art. 48 of the Federal Immission Control Law (BImSchG) dated 15 March 1974 (BGBl. I p.721). Federal Ministry for Environment, Bonn 1986 and amendments.
Waste disposal operation	Means any of the operations included in the Third Schedule to the Waste Management Act 1996.
Waste recovery operation	Means any of the operations included in the Fourth Schedule to the Waste Management Act 1996.
Weekly	During all weeks of plant operation, and in the case of emissions, when emissions are taking place; with no more than one measurement in any one week.

Reasons for the Decision

The Agency is satisfied, on the basis of the information available that, subject to compliance with the conditions of this licence, any emissions from the activity will comply with and not contravene any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992.

In reaching this decision the Agency has considered the application and supporting documentation received from the applicant, all submissions and objections received and the report of its inspectors.

Activities Licensed

In pursuance of the powers conferred on it by the Environmental Protection Agency Act, 1992, the Agency hereby grants a licence to:

Bord na Móna Energy Limited, Boora, Leabeg, Tullamore, County Offaly

under Section 83(1) of the said Act to carry on the following activity,

:- the extraction of peat in the course of business which involves an area exceeding 50 hectares

at lands labelled as Derrygreenagh Group on Location Map Drawings 2.1 and 2.2 (Attachment 2) of the IPC Application subject to the following fourteen Conditions, with the reasons therefor and associated schedules attached thereto.

Conditions

Condition 1 Scope

1.1 The activity shall be controlled, operated, and maintained and emissions shall take place as set out in this Integrated Pollution Control licence. All programmes required to be carried out under the terms of this licence, become part of this licence.

1.2 No alteration to, or reconstruction in respect of, the activity or any part thereof which would, or is likely to, result in a material change or increase in:

1.2.1 The nature or quantity of any emission,

1.2.2 The abatement/treatment or recovery systems,

1.2.3 The range of processes to be carried out,

1.2.4 The fuels, raw materials, intermediates, products or wastes generated,

or any changes in:

1.2.5 The site management and control with adverse environmental significance

shall be carried out or commenced without prior notice to, and without the prior written agreement of, the Agency.

1.3 This licence is for the purposes of IPC licensing under the EPA Act, 1992 only and nothing in this licence shall be construed as negating the licensee's statutory obligations or requirements under any other enactments or regulations.

1.4 Any reference in this licence to 'site' shall mean the plan area outlined in black and labelled Derrygreenagh Group on Location Map Drawings 2.1 and 2.2 of Attachment 2 in the IPC licence application.

Reason:	*To clarify the scope of this licence.*

Condition 2 Management of the Activity

2.1 The licensee shall establish and maintain an Environmental Management System (EMS) which shall fulfil the requirements of this licence. The EMS shall assess all operations and review all practicable options for the use of cleaner technology, cleaner production and the reduction and minimisation of waste, and shall include as a minimum those elements specified in the Conditions 2.2 to 2.7 below:

2.2 Environmental Management Programme (EMP)

2.2.1 The licensee shall, not later than six months from the date of grant of this licence, establish and maintain an EMP, including a time schedule, for achieving objectives and targets. The EMP shall thereafter, form part of the AER and shall be agreed with the Agency prior to implementation. It shall include:

(i) designation of responsibility for targets;

(ii) the means by which they may be achieved;

(iii) the time within which they may be achieved.

2.2.2 The EMP shall as a minimum include the following objectives:

(i) Minimisation of suspended solids movement to surface water systems via peatland surface water drainage channels during development and operation of boglands.

(ii) Rationalisation of surface water discharge points.

(iii) Investigation of reed-bed systems for final polish of silt pond discharges.

(iv) Reduction of fugitive dust emissions during loading and transfer operation on the bog and during unloading operations at the tippler and works yard areas.

(v) Provision of measures to protect dust sensitive areas.

(vi) Provision of measures to prevent suspended solids from works yards entering surface waters.

(vii) Reuse of silt pond waste.

(viii) Collection, storage and reuse of polyethylene covering.

(ix) Use of reusable material for stockpile protection.

(x) Use of wind power technology for pumped drainage.

(xi) Separation of storm water runoff from process and non-process areas.

(xii) Effective spill/leak management of mobile fuelling units.

(xiii) Replacement (and remediation where necessary) of all underground fuel tanks.

2.2.3 A report on the programme, including the success in meeting agreed targets, shall be prepared and submitted to the Agency as part of the AER. Such reports shall be retained on-site for a period of not less than seven years and shall be available for inspection by authorised persons of the Agency.

2.3 Documentation

2.3.1 The licensee shall establish and maintain an environmental management documentation system which shall be to the satisfaction of the Agency.

2.3.2 The licensee shall issue a copy of this licence to all relevant personnel whose duties relate to any condition of this licence.

2.4 Corrective Action

2.4.1 The licensee shall establish procedures to ensure that corrective action is taken should the specified requirements of this licence not be fulfilled. The responsibility and authority for initiating further investigation and corrective action in the event of a reported non-conformity with this licence shall be defined.

2.5 Awareness and Training

2.5.1 The licensee shall establish and maintain procedures for identifying training needs, and for providing appropriate training, for all personnel whose work can have a significant effect upon the environment. Appropriate records of training shall be maintained.

2.5.2 Personnel performing specifically assigned tasks shall be qualified on the basis of appropriate education, training and/or experience, as required.

2.6 Responsibilities

2.6.1 The licensee shall ensure that a person in charge, as defined under the terms of the Environmental Protection Agency Act, 1992 shall be available on-site at all times when the activity is in operation. The person in charge shall also be available to meet with authorised persons of the Agency at all reasonable times.

2.7 Communications

2.7.1 The licensee shall, within six months of date of grant of this licence, put in place a programme to ensure that members of the public can obtain information concerning the environmental performance of the licensee at all reasonable times.

2.7.2 The licensee shall submit to the Agency, by 1 March each year commencing in 2001, an AER which shall be to the satisfaction of the Agency. This report shall include as a minimum the information specified in *Schedule 4 Recording and Reporting to the Agency* and shall be prepared in accordance with any relevant guidelines issued by the Agency.

Reason:	*To make provision for management of the activity on a planned basis having regard to the desirability of ongoing assessment, recording and reporting of matters affecting the environment.*

Condition 3 Interpretation

3.1 Emission limit values for emissions to atmosphere in this licence shall be interpreted in the following way:-

3.1.1 Dust deposition at dust sensitive locations.

(i) No value shall exceed the emission limit value.

3.2 Emission limit values for emissions to water in this licence shall be interpreted in the following way:-

3.2.1 Non-Continuous Monitoring:

(i) Eight out of ten consecutive results, on the basis of 24 hr flow proportional composite sampling, shall not exceed the emission limit value. No individual daily result similarly calculated shall exceed 1.5 times the emission limit value.

(ii) 75% of grab samples for each monitored discharge shall not exceed the emission limit value; and no individual grab sample value shall exceed 3 times the emission limit value.

3.3 Noise

3.3.1 Noise from the activity shall not give rise to sound pressure levels (Leq,T) measured at noise sensitive locations which exceed the limit value(s) by more than 2 dB(A).

Reason :	*To clarify the interpretation of emission limit values fixed under the licence.*

Condition 4 Notification

4.1 The licensee shall notify the Agency by both telephone and facsimile, if available, to the Agency's Headquarters in Wexford, or to such other Agency office as may be specified by the Agency, as soon as practicable after the occurrence of any of the following:

4.1.1 Any release to atmosphere resulting in significant impairment of, or significant interference with amenities or the environment.

4.1.2 Any emission which does not comply with the requirements of this licence.

4.1.3 Any incident with the potential for environmental contamination of surface water or groundwater, or posing an environmental threat to air or land, or requiring an emergency response by a Local Authority.

The licensee shall include as part of the notification, date and time of the incident, details of the occurrence, and the steps taken to minimise the emissions and avoid recurrence.

4.2 The licensee shall make a record of any incident as set out in Condition 4.1 above. The notification given to the Agency shall include details of the circumstances giving rise to the incident and all actions taken to minimise the effect on the environment and minimise wastes generated.

4.3 A summary report of reported incidents shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.

4.4 In the case of any incident as set out in Condition 4.1 above which relates to discharges to water, the licensee shall notify the appropriate Regional Fisheries Board, as soon as practicable after such an incident.

4.5 In the event of any incident, as set out in Condition 4.1.3 having taken place, the licensee shall notify the appropriate Local Authority as soon as practicable, after such an incident.

4.6 In the case of any incident, as set out in Condition 4.1.3, which has the potential to impact the conservation objectives of the Special Areas of Conservation and Natural Heritage Areas identified in Attachment 10.1 of the IPC application having taken place, the licensee shall notify Dúchas of the Department of Arts, Heritage, Gaeltacht and the Islands as soon as practicable after such an incident.

4.7 The licensee shall as part of their AER, or more frequently as may be necessary, notify and supply maps to the Agency of boglands, and discharges from same, intended to be included in the subsequent years' development and operational programmes.

Reason : To provide for the notification of incidents and update information on the activity.

Condition 5 Emissions to Atmosphere

5.1 Boiler Combustion Efficiency shall be tested annually and results reported on annually as part of the AER.

5.2 The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary.

5.3 Within three months of the date of grant of the licence, the licensee shall submit to the Agency for agreement, a proposal for the identification and monitoring of Dust Sensitive Locations (DSL's) on and off site for dust deposition. A report on this monitoring shall be submitted annually as part of the AER.

5.4 Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m^2/day. [The sampling method to be in accordance with German TA Luft Immission Standards for Particle Deposition (IW1)].

5.5 In relation to Dust Control the licensee shall, within six months of date of grant of this licence, develop and implement procedures to ensure that:

- shelter belts are planted in sensitive areas,
- harvesting in sensitive areas is avoided during windy weather,
- where possible machinery use grassed pathways,
- headlands are kept clean and free of excessive loose peat,
- stockpiles are sheeted where possible,
- moving machinery maintains slow speeds when travelling along dusty headlands,
- when harvesting, the jib is maintained low to the stockpile,
- shelter belts are planted around outloading facilities,
- road transported peat is adequately covered (sheeted or similar),
- wind breaks are planted where-ever possible.

Reason: *To provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions.*

Condition 6 Emissions to Water

6.1 No specified emission to water shall exceed the emission limit values set out in *Schedule 1(i) Emissions to Water* subject to Condition 3 of this licence. There shall be no other emissions to water of environmental significance.

6.2 The licensee shall within three months of date of grant of this licence submit to the Agency for approval, a proposal for a surface water discharge monitoring location programme. This programme shall, *inter alia*, have regard to the current status of each bogland (virgin, under development, operational or worked out), sensitivity of the receiving water, status of silt pond upgrade programme. This programme shall be reviewed and revised as necessary each year as part of the AER.

6.3 Monitoring and analyses of each agreed emission monitoring location shall be carried out as specified in *Schedule 1(ii) Monitoring of Emissions to Water* of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.

6.4 The licensee shall, within six months of date of grant of licence, present a proposal for the installation (on a long term basis) of a composite sampler to one representative discharge point within the licensed area. The proposal shall set out the rationale for selection of the nominated discharge point as well as the sampling programme. The results of this monitoring are to be reported each year as part of the AER. Any proposal to relocate the composite sampler is to be dealt with under Condition 6.3.

6.5 A summary report of emissions to water shall be submitted to the Agency as part of the AER. The information contained in this report shall be prepared in accordance with any relevant guidelines issued by the Agency.

6.6 The licensee shall, within six months of the date of grant of licence, develop and implement a programme to ensure that all drainage water from all boglands in the licensed area is discharged via an appropriately designed silt pond treatment arrangement. The programme, to be implemented within a period to be agreed with the Agency, shall ensure that all discharges associated with operational boglands should be prioritised within this programme.

6.7 Within three months of the date of grant of licence, the licensee shall prepare an operational procedure for de-silting of the silt ponds. The procedure shall as a minimum provide for visual inspection of all ponds on a fortnightly basis. The de-silting roster shall be based on recommendations of such visual inspection. A log of visual inspection and de-silting shall be maintained and a summary report on the de-silting programme shall be included in the AER. The licensee shall, within twelve months of the date of grant of this licence, demonstrate to the satisfaction of the Agency that the programme of inspection is adequate.

6.8 Silt ponds serving operational bogs shall be cleaned as a minimum twice a year, once before ditching and once before harvesting, and more frequently as inspections may dictate (refer Condition 6.7).

6.9 Within six months of the date of grant of licence, the licensee shall prepare a programme, for agreement with the Agency, to upgrade all the sedimentation pond treatment systems. The programme shall, *inter alia*, address provision of additional ponds, weir or pipe installation (inlet and outlet), pond configuration, use of baffles, performance efficiency and frequency of de-silting. The upgrade shall have regard to the minimum silt pond specifications detailed in Condition 6.10.

6.10 Within three years of date of grant of this licence all existing silt ponds serving operational bogs shall achieve the following minimum performance criteria (flood periods excepted):

- Maximum flow velocity $< 10\ cms^{-1}$
- Silt design capacity of lagoons, minimum 50 m^3 per nett ha of bog serviced

All new ponds installed shall be designed to achieve these stated minimum design criteria.

6.11 All silt ponds prone to flooding shall be de-silted by 1st November of each year. Excavated sludge shall be removed for disposal to a location outside the flood plain.

6.12 In respect of silt control the licensee shall, within nine months of date of grant of this licence, prepare and implement procedures to ensure that:

- drainage manholes are protected and maintained free of excessive peat,
- headlands are kept clean and free of excessive loose peat,
- all new manholes and outfalls are set well back from turning grounds, drivers of bog plant do not turn short (over drains) at headlands,
- harrows, millers, ridgers do not drag loose peat onto manholes or into drains, outside harrow spoons are directed away from drains,
- silt run-off, while piping or ditching, is minimised,
- outfalls are controlled to minimise silt discharge during cleaning operations,

- drains are ditched in dry weather,
- while ditching, outfalls are blocked and ditch towards outfall,
- outlets from stockpile field drains are blocked during stockpile loading,
- field drains adjacent to stockpiles are cleaned as soon as practicable after stockpile loading,
- adequate room is allowed for rail bed beside Peco stockpiles,
- all fields that have been milled are ridged at the end of the production season,
- all fields liable to winter flooding have been cleared of milled peat or re-compacted at the end of the production season.

Reason:	*To provide for the protection of the environment by way of control, limitation, treatment and monitoring of emissions.*

Condition 7 Waste Management

7.1 Disposal or recovery of waste shall take place only as specified in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

7.2 Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

7.3 A full record, which shall be open to inspection by authorised persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1 The names of the agent and transporter of the waste.

7.3.2 The name of the persons responsible for the ultimate disposal/recovery of the waste.

7.3.3 The ultimate destination of the waste.

7.3.4 Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.

7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

7.3.6 Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site.

7.4 Within nine months of the date of grant of licence, the licensee shall submit to the Agency for agreement, a proposal for identification and management of all ash and screening

disposal areas. Once agreed, the proposal shall be implemented within a time-scale stipulated by the Agency.

Reason: To provide for the disposal of waste and the protection of the environment.

Condition 8 Noise

8.1 Activities on-site shall not give rise to noise levels off site at any noise sensitive location which exceed the following sound pressure limits ($Leq_{,30min}$) subject to Condition 3 of this licence:

Day-time: 55 dB(A)

Night-time: 45 dB(A).

8.2 There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

Reason: To provide for the protection of the environment by control of noise.

Condition 9 Water Protection

9.1 Surface & Groundwater Protection - Workshop areas and Depots

9.1.1 No potentially polluting substance or matter shall be permitted to discharge to off-site surface waters, off site storm drains or groundwaters.

9.1.2 Monitoring and analyses of surface water discharges shall be carried out as specified in *Schedule 3 Monitoring of Workshop/Depot Surface Water Run-off* of this licence. A report on the results of this monitoring shall be submitted to the Agency quarterly.

9.1.3 In the event that any analyses or observations made on the quality or appearance of surface water runoff should indicate that contamination has taken place, the licensee shall carry out an immediate investigation to identify and isolate the source of the contamination,

(i) put in place measures to prevent further contamination and to minimise the effects of any contamination on the environment,

(ii) and notify the Agency as soon as is practicable.

9.1.4 Within twelve months of the date of grant of licence, 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, either locally or remotely, to a volume not less than the greater of the following;

(i) 110% of the capacity of the largest tank or drum within the bunded area

(ii) 25% of the total volume of substance which could be stored within the bunded area.

9.1.5 Drainage from bunded areas shall be diverted for collection and safe disposal.

9.1.6 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. A report on such tests shall be included in the AER.

9.1.7 Within twelve months of the date of grant of licence, 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.

9.1.8 With the exception of roof water, all surface water discharges from workshop areas shall, within twenty-four months of date of grant of this licence, be fitted with oil interceptors.

9.1.9 A maintenance/cleaning log for all oil interceptors and septic tanks shall be maintained. This log shall also record the observations made during weekly inspections of all oil interceptors and bi-annual inspections of septic tanks.

9.1.10 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.

9.1.11 The provision of a catchment system to collect any leaks from flanges and valves of all over ground pipes used to transport material other than water shall be examined.

9.1.12 The licensee 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. A report on the first testing shall be submitted to the Agency within twelve months of the date of grant of licence and as part of the AER thereafter.

9.1.13 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage.

9.1.14 The licensee shall within twelve months of the date of grant of licence, arrange for the removal and safe disposal of waste oil and oil contaminated soil from the scrap storage area at Derrygreenagh Works.

9.1.15 The licensee shall maintain a log of bi-annual inspections of all rail and tractor transported fuelling units. These inspections as a minimum should record any damage or leaks or flaws in rolling stock that could result in accidental spillage.

Reason: To provide for the protection of surface waters and groundwater.

Condition 10 Cutaway Bog Rehabilitation

10.1 Following termination of use or involvement of all or part of the site in the licensed activity, the licensee shall:

10.1.1 Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

10.1.2 Implement the agreed cutaway bog rehabilitation plan (refer Condition 10.2).

10.2 Cutaway Bog Rehabilitation Plan:

10.2.1 The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.

10.2.2 The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.

10.3 The Rehabilitation Plan shall include as a minimum, the following:

10.3.1 A scope statement for the plan, to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).

10.3.2 The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.

10.3.3 A programme to achieve the stated criteria.

10.3.4 Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.

10.3.5 A programme for aftercare and maintenance.

10.4 A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.

Reason: *To make provision for the proper closure of the activity ensuring protection of the environment.*

Condition 11 Monitoring

11.1 The licensee shall carry out such sampling, analyses, measurements, examinations, maintenance and calibrations as set out in Schedules:-

Schedule 1(ii) Monitoring of Emissions to Water

Schedule 3 Monitoring of Workshop/Depot Surface Water Run-off

of this licence.

11.2 Where the ability to measure a parameter is affected by mixing before emission, then, with prior written agreement from the Agency, the parameter may be assessed before mixing takes place.

11.3 All automatic monitors and samplers shall be functioning at all times (except during maintenance and calibration) when the activity is being carried on unless alternative sampling or monitoring has been agreed in writing by the Agency for a limited period. Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency.

11.4 Monitoring and analysis equipment shall be operated and maintained as necessary so that monitoring accurately reflects the emission or discharge.

11.5 The frequency, methods and scope of monitoring, sampling and analyses, as set out in this licence, may be amended with the written agreement of the Agency following evaluation of test results.

11.6 The licensee shall clearly identify and label all emission points.

11.7 The licensee shall install on all emission points such sampling equipment, including any data-logging or other electronic communication equipment, as may be required by the Agency. All such equipment shall be consistent with the safe operation of all sampling and monitoring systems.

11.8 The licensee shall provide safe and permanent access to the following sampling and monitoring points:

(i) Waste storage areas on-site,

(ii) Surface water discharges,

(iii) Dust sampling locations,

and safe access to any other sampling and monitoring points required by the Agency.

Reason:	*To ensure compliance with the requirements of other conditions of this licence by provision of a satisfactory system of measurement and monitoring of emissions.*

Condition 12 Recording and Reporting to Agency

12.1 The licensee shall record all sampling, analyses, measurements, examinations, calibrations and maintenance carried out in accordance with the requirements of this licence.

12.2 The licensee shall record all incidents which affect the normal operation of the activity and which may create an environmental risk.

12.3 The licensee shall record all complaints of an environmental nature related to the operation of the activity. Each such record shall give details of the date and time of the complaint, the name of the complainant and give details of the nature of the complaint. A record shall also be kept of the response made in the case of each complaint. The licensee shall submit a report to the Agency, during the month following such complaints, giving details of any complaints which arise. A summary of the number and nature of complaints received shall be included in the AER.

12.4 The format of all records required by this licence shall be to the satisfaction of the Agency. Records shall be retained on-site for a period of not less than seven years and shall be available for inspection by the Agency at all reasonable times.

12.5 Reports of all recording, sampling, analyses, measurements, examinations, calibrations and maintenance as set out in *Schedule 4 Recording and Reporting to the Agency* of this licence, shall be submitted to the Agency Headquarters as specified in this licence. The format of these reports shall be to the satisfaction of the Agency. One original and three copies shall be submitted as and when specified.

12.6 Provision shall also be made for the transfer of environmental information, in relation to this licence, to the Agency's computer system, as may be requested by the Agency.

12.7 All reports shall be certified accurate and representative by the licensee's Plant Manager or other senior officer designated by the Plant Manager.

12.8 All written procedures controlling operations affecting this licence shall be available on-site for inspection by the Agency at all reasonable times.

12.9 The frequency and scope of reporting, as set out in this licence, may be amended with the written agreement of the Agency following evaluation of test results.

Reason: To provide for the collection and reporting of adequate information on the activity.

Condition 13 Emergency Response

13.1 The licensee shall, within six months of date of grant of this licence, ensure that a documented Emergency Response Procedure is in place which shall address any emergency situation which may originate on-site. This Procedure shall include provision for minimising the effects of any emergency on the environment.

Reason: To provide for the protection of the environment.

Condition 14 Financial Provisions

14.1 Agency Charges

14.1.1 The licensee shall pay to the Agency an annual contribution of £4,070 or such sum as the Agency from time to time determines, towards the cost of monitoring the activity as the Agency considers necessary for the performance of its functions under the Environmental Protection Agency Act, 1992. The licensee shall in 2001 and subsequent years, not later than January 31 of each year, pay to the Agency this amount updated in accordance with changes in the Consumer Price Index from the date of the licence to the renewal date. The updated amount shall be notified to the licensee by the Agency. For 2000, the licensee shall pay a pro rata amount from the date of this licence to December 31 2000. This amount shall be paid to the Agency within one month of the date of grant of this licence.

Reason: To provide for adequate financing for monitoring and financial provisions for measures to protect the environment.

Schedule 1(i) Emissions to Water

Emission Point Reference No.: All surface water outfalls from boglands within the licensed area

Location : As detailed in Section 11 and Attachment 11 of the IPC licence application form, and any additional locations as may be agreed under Condition 4.7

Parameter	Emission Limit Value
Suspended Solids	35 mg/l

Schedule 1(ii) Monitoring of Emissions to Water

Emission Point Reference No's.: As agreed under Condition 6.3

Parameter	Monitoring Frequency	Analysis Method/Technique
pH	Quarterly	Standard Methods
Flow	Quarterly	Agreed Method
Suspended Solids	Quarterly	Standard Methods
Total Solids	Quarterly	Standard Methods
Total Phosphorus	Quarterly	Standard Methods
Ammonia	Quarterly	Standard Methods
Colour	Quarterly	Standard Methods
COD	Quarterly	Standard Methods

Schedule 2(i) Hazardous Wastes for Disposal/Recovery

Waste Materials	Method of disposal/recovery Note 1
Lubricating Oils	Agreed hazardous waste disposal contractor.
Hydraulic Oils	Agreed hazardous waste disposal contractor.
Oil/Fuel Filters	Agreed hazardous waste disposal contractor.
Lead Acid Batteries	Agreed hazardous waste disposal contractor.
Fluorescent lights	Agreed hazardous waste disposal contractor.
Degreasing still-bottoms	Agreed hazardous waste disposal contractor.
Anti- freeze liquid	Agreed hazardous waste disposal contractor.
Other Note 4	

Note 1: The licensee may treat, reuse, recycle or recover waste subject to the prior written agreement of the Agency.

Note 2: Any variation from those contractors named in the IPC licence application, or subsequent agreements, must have the prior written agreement of the Agency. In cases where a previously agreed waste contractor is considered by the Agency not to exercise due care in respect of the transport and disposal of the licensee's waste, the Agency may at any time instruct a licensee to stop using this contractor.

Note 3: Other method to be agreed with the Agency.

Note 4: No other waste shall be disposed of/recovered on or off-site without prior notice to, and prior written agreement of the Agency.

Schedule 2(ii) Other Wastes for Disposal/Recovery

Waste Materials	Method of disposal/recovery Note 1, 2, 3
Scrap Metal / Welding Rods	Agreed waste recovery contractor.
Ash/Cinders	Agreed waste disposal contractor/On- site landfill.
Polythene covering	Agreed recycling disposal contractor.
Wooden pallets and timber	Agreed waste disposal/recovery contractor.
Hand cleansing rags	Agreed waste disposal contractor.
General Office & Canteen Waste	Agreed waste disposal contractor.
Paint waste	Agreed waste disposal contractor.
Other Note 4	

Note 1: The licensee may treat, reuse, recycle or recover waste subject to the prior written agreement of the Agency.

Note 2: Any variation from those contractors named in the IPC licence application, or subsequent agreements, must have the prior written agreement of the Agency. In cases where a previously agreed waste contractor is considered by the Agency not to exercise due care in respect of the transport and disposal of the licensee's waste, the Agency may at any time instruct a licensee to stop using this contractor.

Note 3: Other method to be agreed with the Agency.

Note 4: No other waste shall be disposed of/recovered on or off-site without prior notice to, and prior written agreement of the Agency.

Schedule 3 Monitoring of Workshop/Depot Surface Water Run-off

Emission Point Reference No's.: All surface water discharges from workshops and depots associated with the licensed activity.

Parameter	Monitoring Frequency	Analysis Method/Technique
Visual inspection	Weekly	-
COD	Monthly	Standard Methods

Schedule 4 Recording and Reporting to the Agency

Completed reports shall be submitted to: The Environmental Protection Agency
Headquarters, PO Box 3000
Johnstown Castle Estate
Co Wexford
Ireland

or Any other address as may be specified by the Agency

Reports are required to be forwarded as set out below:

Recurring Reports:

Report	Reporting Frequency	Report Submission Date
Surface Water (Schedule 1(ii) and Schedule 3)	Quarterly	Ten days after end of the quarter being reported on.
Complaints (where these arise)	Monthly	Ten days after end of the month being reported on.
Annual Environmental Report (AER)	Annually	1 March of each year

Annual Environmental Report Content	
• Emissions to water summary	• Environmental management programme - proposal
• Waste management report.	• Environmental management programme - report
• Resource consumption summary	• Reported incidents summary
• Complaints summary	• Bog development and operational programme
• Air emissions report (dust/boiler efficiency)	• Bog rehabilitation progress report
• Report on de-silting programme	• Bund integrity (every two years, refer Condition 9.1.6)
• Surface water discharge monitoring location programme	• Integrity of underground fuel pipelines (refer Condition 9.1.12)

Once-off Reports:

Report	Report Submission Date
Bund integrity assessment.	Within eighteen months of the date of grant of licence.
Environmental management programme proposal.	Within six months of the date of grant of licence.
Proposal for dust monitoring locations (Condition 5.3)	Within three months of the date of grant of licence.
Proposal for surface water monitoring locations (Condition 6.2)	Within three months of the date of grant of licence.
Proposal for installation of a composite sampler (Condition 6.4)	Within six months of the date of grant of licence.
Programme for fitting of silt ponds to all bog discharges (Condition 6.6)	Within six months of the date of grant of licence.
Upgrade of sedimentation pond treatment system (Condition 6.9)	Within six months of the date of grant of licence.
Proposal for screenings disposal (Condition 7.4)	Within nine months of the date of grant of licence.
Integrity of underground fuel pipelines (Condition 9.1.12)	Within twelve months of the date of grant of licence.
Bog rehabilitation programme (Condition 10.2)	Within eighteen months of the date of grant of licence.

Signed on behalf of the Agency

Director/Authorised Person

Dated this 26th day of April 2000

Appendix C ORNITHOLOGY

Appendix C-I DERRYGREENAGH WIND AND SOLAR - BREEDING SEASON 2024 BIRD SURVEYS - SUMMARY REPORT

Appendix C-II DERRYGREENAGH WIND AND SOLAR - WINTER SEASON 2024-2025 BIRD SURVEYS - SUMMARY REPORT

Appendix C-III DERRYGREENAGH WIND AND SOLAR - BREEDING SEASON 2025 BIRD SURVEYS - SUMMARY REPORT

Appendix C-IV DERRYGREENAGH WIND AND SOLAR - WINTER SEASON 2025-2026 BIRD SURVEYS - SUMMARY REPORT

Appendix C-V DERRYGREENAGH SUBSTITUTE CONSENT - TOAR BOG DECEMBER 2025 - JULY 2026 - SUMMARY REPORT

TOBIN

Bord na Móna Derrygreenagh Wind and Solar

Breeding Season 2024 Bird Surveys: Summary Report 2024

Bord na Móna

BUILT ON KNOWLEDGE

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Figure 2-11: Woodcock transects survey observations 33

1. BACKGROUND

This report summarises the results of bird surveys undertaken by TOBIN at the proposed Derrygreenagh Wind and Solar Farm site during the Breeding Season 2024, for the survey period of April to September.

2. SUMMARY OF LOCAL BIRD ACTIVITY DURING THE BREEDING SEASON 2024

2.1 VANTAGE POINT SURVEYS

The Vantage Point (VP) surveys were carried in accordance with the methodology set out by the Scottish Natural Heritage (SNH) guidelines (SNH, 2017). Eleven (11) VPs across the Derrygreenagh Wind and Solar Farm site were set at fixed locations, which were strategically positioned to provide a maximum viewshed of the survey area over the survey period, the locations of which can be seen in Figure 2-1 and Figure 2-2. The viewshed of a given VP extended to a distance of no greater than 2km and included an arc of no greater than 180 degrees, as per SNH (2017), which encompassed the study area for the VP surveys.

The 11 VPs were surveyed for 6 hours each on each month, summing up to a total of 468 hours for the survey period of April to September 2024 (Table 2-1).

Vantage point	Apr	May	Jun	Jul	Aug	Sep	Total hours
1	6	6	6	6	6	6	**36**
2	6	6	6	6	6	6	**36**
3	6	6	6	6	6	6	**36**
4	6	6	6	6	6	6	**36**
5	6	6	6	6	6	6	**36**
6	6	6	6	6	6	6	**36**
7	6	6	6	6	6	6	**36**
8	6	6	6	6	6	6	**36**
9	6	6	6	6	6	6	**36**
10	6	6	6	6	6	6	**36**
11	6	6	6	6	6	6	**36**
12	6	6	6	6	6	6	**36**
13	6	6	6	6	6	6	**36**
Total hours	**78**	**78**	**78**	**78**	**78**	**78**	**468**

The VP surveys registered observations of 24 species flying within VP viewsheds over this survey period (Table 2-2). Black-headed Gull (*Larus ridibundus*) was largely the most abundant species observed flying during the VP surveys, with 131 individuals sighted. Kestrel (*Falco tinnunculus*) and Buzzard (*Buteo buteo*) were the most frequently recorded raptor species with 126 and 111 sightings respectively. Other species that were recorded often and require highlighting were Lesser Black-backed Gull (*Larus fuscus*) and Mallard (*Anas platyrhynchos*).

Table 2-2: Summary of Vantage Point Surveys Records of Target Species in Flight Between April to September 2024

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Black-headed Gull	Amber	-	-	5	48	68	10	-	**131**
Kestrel	Red	-	4	5	8	40	34	35	**126**
Buzzard	Green	-	10	16	29	19	17	20	**111**
Lesser Black-backed Gull	Amber	-	6	8	4	3	82	1	**104**
Mallard	Amber	-	5	31	-	25	26	-	**87**
Lapwing	Red	-	2	18	2	2		24	**48**
Golden Plover	Red	Annex I	32	-	-	-	-	-	**32**
Snipe	Red	-	1	13	11	2	-	2	**29**
Grey Heron	Green	-	8	7	4	-	4	3	**26**
Sparrowhawk	Green	-	2	-	3	5	4	7	**21**
Mute Swan	Amber	-	3	7	6	2		1	**19**
Peregrine	Green	Annex I	2	1	-	2	1	-	**6**
Tufted Duck	Amber	-	6	-	-	-	-	-	**6**
Cormorant	Amber	-	4	-	-	1	-	1	**6**
Little Egret	Green	Annex I	-	-	-	3	3	-	**6**
Common Gull	Amber	-	4	-	-	-	-	-	**4**
Woodcock	Red	-	4	-	-	-	-	-	**4**
Little Grebe	Green	-	2	2	-	-	-	-	**4**
Common Sandpiper	Amber	-	-	-	1	-	2	-	**3**
Meadow Pipit	Red	-	-	-	-	-	3	-	**3**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Swift	Red	-	-	-	-	2	-	-	**2**
Merlin	Amber	Annex I	-	-	-	2	-	-	**2**
Crane	Green	Annex I	-	1	-	-	-	-	**1**
Curlew	Red	-	-	-	1	-	-	-	**1**
Ringed Plover	Amber	-	-	1	-	-	-	-	**1**

Table 2-3 discriminates the observations at each of the VPs. The highest diversity of flying target species was recorded at VP6, with 14 species, whereas the highest abundance of flying birds was recorded at VP8, with 140 sightings of seven different species. Other VP locations of relevant flying activity abundance were VP12 (130 individuals), VP9 (93 individuals), and VP7 (72 individuals).

Table 2-3: Summary of Breeding Birds Observation Per Vantage Point (Target Species Flying Observation –April to September 2024)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
VP1									
Kestrel	Red	-	-	-	1	6	5	1	**13**
Buzzard	Green	-	1	2	1	1	-	1	**6**
Mallard	Amber	-	2	2	-	-	-	-	**4**
Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
VP2									
Buzzard	Green	-	-	3	4	3	4	1	**15**
Kestrel	Red	-	1	1	-	2	2	1	**7**
Meadow Pipit	Red	-	-	-	-	-	3	-	**3**
Mallard	Amber	-	2	-	-	-	-	-	**2**
Swift	Red	-	-	-	-	1	-	-	**1**
Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
VP3									
Buzzard	Green	-	1	1	1	1	1	-	**5**
Kestrel	Red	-	-	1	1	1	1	1	**5**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Grey Heron	Green	-	-	-	1	-	1	1	**3**
Woodcock	Red	-	1	-	-	-	-	-	**1**
VP4									
Buzzard	Green	-	5	1	5	2	1	2	**16**
Kestrel	Red	-	-	1	2	5	2	2	**12**
Mute Swan	Amber	-	-	5	-	-	-	-	**5**
Mallard	Amber	-	1	3	-	-	-	-	**4**
Grey Heron	Green	-	2	1	-	-	-	-	**3**
Swift	Red	-	-	-	-	1	-	-	**1**
Woodcock	Red	-	1	-	-	-	-	-	**1**
Lapwing	Red	-	-	1	-	-	-	-	**1**
Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
VP5									
Buzzard	Green	-	-	1	1	1	1	3	**7**
Kestrel	Red	-	1	1	2	1	1	-	**6**
Mallard	Amber	-	-	2	-	-	-	-	**2**
Lesser Black-backed Gull	Amber	-	-	-	-	1	-	-	**1**
Peregrine	Green	Annex I	-	-	-	1	-	-	**1**
Lapwing	Red	-	-	1	-	-	-	-	**1**
VP6									
Lesser Black-backed Gull	Amber	-	-	-	-	2	37	-	**39**
Golden Plover	Red	Annex I	32	-	-	-	-	-	**32**
Kestrel	Red	-	-	-	-	5	2	8	**15**
Buzzard	Green	-	-	-	5	1	2	1	**9**
Cormorant	Amber	-	4	-	-	-	-	1	**5**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Lapwing	Red	-	-	1	2	2	-	-	**5**
Mute Swan	Amber	-	-	-	3	-	-	-	**3**
Common Sandpiper	Amber	-	-	-	1	-	2	-	**3**
Little Grebe	Green	-	-	2	-	-	-	-	**2**
Sparrowhawk	Green	-	-	-	-	1	-	1	**2**
Grey Heron	Green	-	-	-	-	-	1	1	**2**
Ringed Plover	Amber	-	-	1	-	-	-	-	**1**
Woodcock	Red	-	1	-	-	-	-	-	**1**
Black-headed Gull	Amber	-	-	-	1	-	-	-	**1**
VP7									
Buzzard	Green	-	2	2	4	4	2	5	**19**
Lesser Black-backed Gull	Amber	-	-	1	-	-	14	-	**15**
Black-headed Gull	Amber	-	-	-	-	15	-	-	**15**
Kestrel	Red	-	-	-	1	4	3	4	**12**
Sparrowhawk	Green	-	-	-	1	-	1	-	**2**
Snipe	Red	-	-	-	-	-	-	2	**2**
Peregrine	Green	Annex I	2	-	-	-	-	-	**2**
Lapwing	Red	-	-	2	-	-	-	-	**2**
Cormorant	Amber	-	-	-	-	1	-	-	**1**
Woodcock	Red	-	1	-	-	-	-	-	**1**
Grey Heron	Green	-	-	-	1	-	-	-	**1**
VP8									
Black-headed Gull	Amber	-	-	2	6	41	3	-	**52**
Lapwing	Red	-	-	3	-	-	-	24	**27**
Buzzard	Green	-	-	5	3	4	1	2	**15**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Kestrel	Red	-	-	-	-	6	7	2	**15**
Snipe	Red	-	-	-	11	-	-	-	**11**
Grey Heron	Green	-	2	3	-	-	1	-	**6**
Sparrowhawk	Green	-	-	-	-	4	-	-	**4**
Mute Swan	Amber	-	1	-	-	2	-	-	**3**
Little Egret	Green	Annex I	-	-	-	-	3	-	**3**
Peregrine	Green	Annex I	-	1	-	1	-	-	**2**
Little Grebe	Green	-	2	-	-	-	-	-	**2**
VP9									
Lesser Black-backed Gull	Amber	-	-	-	-	-	31	-	**31**
Mallard	Amber	-	-	-	-	3	21	-	**24**
Kestrel	Red	-	-	1	1	3	4	3	**12**
Black-headed Gull	Amber	-	-	1	2	5	-	-	**8**
Snipe	Red	-	-	5	-	-	-	-	**5**
Buzzard	Green	-	-	-	2	1	-	2	**5**
Grey Heron	Green	-	3	1	-	-	-	-	**4**
Mute Swan	Amber	-	2	-	-	-	-	-	**2**
Lapwing	Red	-	2	-	-	-	-	-	**2**
VP10									
Kestrel	Red	-	-	-	-	6	4	11	**21**
Black-headed Gull	Amber	-	-	-	3	1	5	-	**9**
Snipe	Red	-	-	6	-	2	-	-	**8**
Lapwing	Red	-	-	8	-	-	-	-	**8**
Buzzard	Green	-	1	-	2	-	-	3	**6**
Sparrowhawk	Green	-	1	-	-	-	-	4	**5**
Mallard	Amber	-	-	2	-	-	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Grey Heron	Green	-	-	-	-	-	1	-	**1**
Peregrine	Green	Annex I	-	-	-	-	1	-	**1**
VP11									
Mallard	Amber	-	-	6	-	-	-	-	**6**
Buzzard	Green	-	-	-	1	-	3	-	**4**
Lesser Black-backed Gull	Amber	-	3	1	-	-	-	-	**4**
Snipe	Red	-	1	2	-	-	-	-	**3**
Black-headed Gull	Amber	-	-	2	-	-	-	-	**2**
Crane	Green	Annex I	-	1	-	-	-	-	**1**
Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
Grey Heron	Green	-	-	-	-	-	-	1	**1**
Kestrel	Red	-	1	-	-	-	-	-	**1**
VP12									
Black-headed Gull	Amber	-	-	-	36	6	2	-	**44**
Mallard	Amber	-	-	11	-	21	5	-	**37**
Lesser Black-backed Gull	Amber	-	3	6	4	-	-	1	**14**
Tufted Duck	Amber	-	6	-	-	-	-	-	**6**
Mute Swan	Amber	-	-	2	3	-	-	1	**6**
Kestrel	Red	-	-	-	-	-	3	2	**5**
Buzzard	Green	-	-	1	-	1	2	-	**4**
Common Gull	Amber	-	4	-	-	-	-	-	**4**
Grey Heron	Green	-	-	1	2	-	-	-	**3**
Little Egret	Green	Annex I	-	-	-	3	-	-	**3**
Merlin	Amber	Annex I	-	-	-	2	-	-	**2**
Curlew	Red	-	-	-	1	-	-	-	**1**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
VP13									
Mallard	Amber	-	-	5	-	1	-	-	**6**
Sparrowhawk	Green	-	1	-	2	-	-	-	**3**
Grey Heron	Green	-	1	1	-	-	-	-	**2**
Kestrel	Red	-	1	-	-	1	-	-	**2**
Lapwing	Red	-	-	2	-	-	-	-	**2**

During the VP surveys, 17 different species of birds were recorded not in flight (Table 2-4). Observations included a total of 506 individual birds swimming, roosting or foraging within VP viewsheds. These observations included large numbers of Mute Swan (*Cygnus olor*) – the most abundant species not in-flight during VP surveys at the Derrygreenagh Wind and Solar Farm between April and September 2024.

Additionally, four target bird species were observed exhibiting 'Confirmed' breeding behaviour during Vantage Point surveys. These were Mute Swan, Mallard, Buzzard, and Great Crested Grebe (*Podiceps cristatus*). All of these records came from VP's withing the Drumman Bog. In total, 71 confirmed breeding individuals of Mute Swan (including adults and cygnets) were observed at the Drumman quarry ponds, along with three individuals of Great Crested Grebe (two adults with one chick). Drumman quarry ponds are within the viewsheds of VP6 and VP12. Additionally, seven individuals (two adults and seven cygnets) of Mute Swan, and seven individuals of Mallard (female and six ducklings) were seen on the river within the VP4 viewshed. At least two Buzzard chicks were heard calling from the forestry within the VP7 viewshed.

Table 2-4: Summary of 2024 Breeding Birds Vantage Point Surveys (Target Species Non-flying Observations- April to September 2024)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mute Swan	Amber	-	40	12	219	55	23	24	**373**
Meadow Pipit	Red	-	12	3	9	14	3	3	**44**
Mallard	Amber	-	7	9	-	4	18	1	**39**
Great Crested Grebe	Amber	-	3	4	2	2	2	1	**14**
Snipe	Red	-	-	6	2	-	-	-	**8**
Moorhen	Green	-	-	2	-	-	4	-	**6**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Whooper Swan	Amber	Annex I	1	-	1	-	1	-	**3**
Buzzard	Green	-	-	-	1	2	-	-	**3**
Grey Heron	Green	-	-	-	-	1	1	-	**2**
Tufted Duck	Amber	-	-	2	-	-	-	-	**2**
Ringed Plover	Amber	-	-	-	1	1	-	-	**2**
Kingfisher	Amber	Annex I	-	-	-	-	-	2	**2**
Kestrel	Red	-	-	-	-	1	1	-	**2**
Water Rail	Green	-	-	-	-	-	2	-	**2**
Common Sandpiper	Amber	-	-	-	-	-	1	-	**1**
Little Grebe	Green	-	-	1	-	-	-	-	**1**
Peregrine	Green	Annex I	1	-	-	-	-	-	**1**
Swift	Red	-	-	-	1	-	-	-	**1**

The observations of non-flying birds while surveying VP6 were more diverse and more abundant than any other VP. The viewshed of this VP overlooks the Drumman quarry ponds, resulting in a high number of records of water birds, notably Mute Swan (Table 2-5).

Table 2-5: Summary of 2024 Breeding Birds Observations Per Vantage Point Surveys (Target Species Non-Flying Observation – April to September 2024)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sept	Total
VP1									
Meadow Pipit	Red	-	2	-	3	6	-	3	**14**
Grey Heron	Green	-	-	-	-	1	-	-	**1**
VP2									
Meadow Pipit	Red	-	3	-	3	5	-	-	**11**
Swift	Red	-	-	-	1	-	-	-	**1**
VP3									
Meadow Pipit	Red	-	4	-	-	-	-	-	**4**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sept	Total
VP4									
Mallard	Amber	-	7	9	-	-	2	-	**18**
Mute Swan	Amber	-	-	-	7	-	7	-	**14**
Meadow Pipit	Red	-	1	-	-	-	3	-	**4**
Moorhen	Green	-	-	-	-	-	3	-	**3**
VP4									
Meadow Pipit	Red	-	2	3	3	3	-	-	**11**
Buzzard	Green	-	-	-	1	-	-	-	**1**
Kestrel	Red	-	-	-	-	1	-	-	**1**
VP6									
Mute Swan	Amber	-	39	10	210	45	10	24	**338**
Mallard	Amber	-	-	-	-	4	16	1	**21**
Great Crested Grebe	Amber	-	3	3	2	2	2	1	**13**
Moorhen	Green	-	-	2	-	-	1	-	**3**
Water Rail	Green	-	-	-	-	-	2	-	**2**
Ringed Plover	Amber	-	-	-	1	1	-	-	**2**
Kingfisher	Amber	Annex I	-	-	-	-	-	2	**2**
Grey Heron	Green	-	-	-	-	-	1	-	**1**
Common Sandpiper	Amber	-	-	-	-	-	1	-	**1**
Little Grebe	Green	-	-	1	-	-	-	-	**1**
VP7									
Buzzard	Green	-	-	-	-	2	-	-	2
Peregrine	Green	Annex I	1	-	-	-	-		1
VP8									
Snipe	Red	-	-	2	1	-	-	-	**3**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sept	Total
VP9									
Snipe	Red	-	-	3	-	-	-	-	**3**
VP10									
Snipe	Red	-	-	1	1	-	-	-	**2**
VP11									
Kestrel	Red	-	-	-	-	-	1	-	**1**
VP12									
Mute Swan	Amber	-	1	2	2	10	6	-	21
Whooper Swan	Amber	Annex I	1	-	1	-	1	-	3
Tufted Duck	Amber	-	-	2	-	-	-	-	2
Great Crested Grebe	Amber	-	-	1	-	-	-	-	1

7°20'0"W
7°15'0"W
7°10'0"W
53°26'0"N
53°24'0"N
53°22'0"N
53°20'0"N
740000
735000
644000
649500
655000
Maxar, Microsoft



Legend

Derrygreenagh Wind and Solar -Proposed Developments Non-flight observations

- Swift
- Buzzard
- Grey Heron
- Redshank
- Golden Plover
- Moorhen
- Ringed Plover
- Mallard
- Reed Bunting
- Lesser Black-backed Gull
- Kestrel
- Mute Swan
- Snipe
- Little Grebe
- Common Gull
- Lapwing
- Meadow Pipit
- Whooper Swan
- Great Crested Grebe
- Peregrine Falcon
- Tufted Duck

Flightlines

- Black-headed Gull
- Buzzard
- Common Gull
- Common Sandpiper
- Cormorant
- Crane
- Curlew
- Golden Plover
- Grey Heron
- Kestrel
- Lapwing
- Lesser Black-backed Gull
- Little Grebe
- Mallard
- Mute Swan
- Peregrine
- Ringed Plover
- Snipe
- Sparrowhawk
- Tufted Duck
- Woodcock

0 1 2
Kilometres

NOTES

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

A	01/11/2024	First issue	S.P	J..M
Rev	Date	Description	By	Chkd.

Client:

Bord na Móna

Project:

Bord Na Mona - Derrygreenagh Wind and Solar

Title:

Figure 2.1
Vantage Points
April-June 2024 Observations

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	November 2024

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Map Ref: 11458-023-Apr..Jun24-VP-TOB-A

Draft: A

7°20'0"W
7°15'0"W
7°10'0"W
53°26'0"N
53°24'0"N
53°22'0"N
53°20'0"N
740000
735000
644000
649500
655000
Earthstar Geographics



Legend

Derrygreenagh Wind and Solar -Proposed Developments

Non-flight observations
- Swift
- Buzzard
- Grey Heron
- Moorhen
- Ringed Plover
- Mallard
- Kestrel
- Mute Swan
- Meadow Pipit
- Whooper Swan
- Great Crested Grebe
- Water Rail
- Common Sandpiper
- Kingfisher

Flightlines
- Black-headed Gull
- Buzzard
- Common Sandpiper
- Cormorant
- Grey Heron
- Kestrel
- Lapwing
- Lesser Black-backed Gull
- Mallard
- Mute Swan
- Peregrine
- Snipe
- Sparrowhawk
- Merlin
- Little Egret

0 1 2
Kilometres

NOTES

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

Rev	Date	Description	By	Chkd.
A	01/11/2024	First issue	S.P	J..M

Client: Bord na Móna

Project: Bord Na Mona - Derrygreenagh Wind and Solar

Title: Figure 2.2 Vantage Points July-September 2024 Observations

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
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Map Ref: 11458-024-Jul..Sep24-VP-TOB-A

Draft: A

2.2 BREEDING WATERBIRDS SURVEY

The Breeding Waterbirds survey involves conducting monthly counts during the survey season in wetland habitat locations within a Zone of Influence (ZoI), encompassing the proposed development site and within a 2km buffer.

Counts at each wetland habitat site were conducted on the 'look-see' basis (Bibby *et al.* 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form, along with relevant information, including numbers of waterbirds; the presence of marked birds (leg-ringed or neck-collared); and weather conditions.

A total of 2,331 observations of 22 species were recorded within the ZoI for Breeding Waterbirds Surveys between April and September 2024. Mute Swan and Mallard were the most abundant species recorded (Table 2-6). Species observations can be seen in Figure 2-3, and Figure 2-4.

Additionally, 10 target bird species were observed exhibiting 'Confirmed' breeding behaviour, with Mute Swan and Mallard being the most common. The majority of these records were concentrated at the Derryarkin and Drumman quarry ponds. The abundance of 'Confirmed' and 'Probable' sightings is listed below for the individual birds recorded for each target species (including adults, cygnets, ducklings, chicks),

Derryarkin Bog included 'Confirmed' breeding sightings of Mute Swan (31), Black-headed Gull (22), and Tufted Duck (*Aythya fuligula*) (8), and Lapwing (*Vanellus vanellus*) (1). The 'Confirmed' breeding sightings on Drumman Bog included Mute Swan (185), Mallard (53), Ringed Plover (*Charadrius hiaticula*) (20), Tufted Duck (18), Little Grebe (*Tachybaptus ruficollis*) (10), Great Crested Grebe (8), and Common Sandpiper (*Actitus hypoleucos*) (4). Little Grebe (6) and, Moorhen (*Gallinula chloropus*) (1) were 'Confirmed' breeding in North Ballybeg Bog. Additionally, 'Confirmed' breeding observations were sighted within 2km buffer zone south of Ballybeg bog included Lapwing (31), Mallard (13), Great Crested Grebe (5), and Moorhen (3). Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-5.

Moreover, 13 target bird species were identified as 'Probable' breeders, notably Lapwing (50), Mallard (45), and Little Grebe (45). The areas of concentration for these 'Probable' breeding sightings included the Derryarkin quarry ponds, wetlands in the southern part of Derryarkin Bog, Drumman quarry ponds, and wetlands located within the 2 km buffer zone south of Ballybeg Bog. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-5.

Table 2-6: Summary of Breeding Waders Survey Recorded Between April to September 2024

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mute Swan	Amber	-	120	56	216	156	146	189	**883**
Mallard	Amber	-	22	28	84	73	317	47	**571**
Lapwing	Red	-	10	20	26	44	125	4	**229**
Black-headed Gull	Amber	-	-	39	5	89	14	-	**147**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Tufted Duck	Amber	-	36	6	29	16	22	22	**131**
Little Grebe	Green	-	9	13	16	13	8	10	**69**
Lesser Black-backed Gull	Amber	-	2	11	-	4	35	13	**65**
Ringed Plover	Amber	-	5	10	22	16	3	-	**56**
Snipe	Red	-	4	6	8	4	7	5	**34**
Grey Heron	Green	-	9	7	-	2	4	12	**34**
Great Crested Grebe	Amber	-	8	8	10	3	2	2	**33**
Teal	Amber	-	-	-	-	-		24	**24**
Little Egret	Green	Annex I	3	2	2	4	2	3	**16**
Moorhen	Green	-	-	4	2	1	4	3	**14**
Common Sandpiper	Amber	-	1	-	5	-	5	-	**11**
Cormorant	Amber	-	3	2	-	1	-	2	**8**
Coot	Amber	-	-	1	-	-	-	-	**1**
Cuckoo	Green	-	-	1	-	-	-	-	**1**
Crane	Green	Annex I	-	-	-	1	-	-	**1**
Grey Wagtail	Red	-	-	-	-	-	1	-	**1**
Jack Snipe	Green	-	1	-	-	-	-	-	**1**
Kingfisher	Amber	Annex I	-	1	-	-	-	-	**1**

2.3 BREEDING RAPTORS SURVEY

The Breeding Raptors survey involves conducting monthly counts during the survey season. Counts were conducted in wetland habitat locations within a Zone of Influence (ZoI), encompassing the proposed development site and within a 2km buffer.

Counts at each potential habitat site were conducted on the 'look-see' basis (Bibby *et al.*, 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form, along with relevant information, including numbers of waterbirds; the presence of marked birds (leg-ringed or neck-collared); and weather conditions.

A total of 190 observations of four raptor species were recorded within the ZoI for Raptors Surveys between April and September 2024. The most frequently recorded species were the Buzzard and Kestrel, with 106 and 60 sightings, respectively (Table 2-7). Species observations can be seen in Figure 2-3, and Figure 2-4.

The abundance of 'Confirmed' and 'Probable' sightings is listed below for the individual birds recorded for each target species (adults and chicks).

Within the proposed windfarm site, only Ballybeg Bog included sightings of 'Confirmed' breeding of Buzzard (1). The remaining 'Confirmed' sightings came from withing the 2km buffer zone, with Kestrel (4) and Buzzard (2) records. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-5.

Additionally, raptors sighted as 'probable' breeders included the Buzzard (16), Kestrel (8), and Sparrowhawk (*Accipiter nisus*) (4). There were no sightings suggesting breeding of Peregrine (*Falco peregrinus*), at the site in 2024. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-6.

Table 2-7: Summary of Raptors Recorded Between April - September 2024 (Breeding Raptors Survey)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Buzzard	Green	-	17	18	13	19	21	18	**106**
Kestrel	Red	-	6	9	8	11	12	14	**60**
Sparrowhawk	Green	-	2	2	2	3	6	5	**20**
Peregrine	Green	Annex I	-	1	1	-	2	0	**4**

7°20'0"W
7°13'50"W
7°7'40"W
53°26'30"N
53°23'0"N
53°19'30"N
742000
736000
730000
643000
649500
656000
Earthstar Geographics



Legend

Derrygreenagh Wind and Solar - Proposed Developments

Non-flight observations

- Buzzard
- Grey Heron
- Moorhen
- Ringed Plover
- Mallard
- Lesser Black-backed Gull
- Kestrel
- Mute Swan
- Snipe
- Little Grebe
- Lapwing
- Great Crested Grebe
- Peregrine Falcon
- Tufted Duck
- Common Sandpiper
- Kingfisher
- Black-headed Gull
- Coot
- Cormorant
- Cuckoo
- Jack Snipe
- Little Egret
- Sparrowhawk

0 1 2
Kilometres

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	01/11/2024	First issue	S.P	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title:

Figure 2.3
Breeding Waders and Raptors Survey
April-June 2024 Observations

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	November 2024

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Map Ref: 11458-025-Apr..Jun24-WAD..R-TOB-A

Draft: A

7°20'0"W
7°13'50"W
7°7'40"W
53°26'30"N
53°23'0"N
53°19'30"N
742000
736000
730000
643000
649500
656000
Maxar, Microsoft



Legend

Derrygreenagh Wind and Solar - Proposed

Non-flight observations

- Buzzard
- Grey Heron
- Moorhen
- Ringed Plover
- Mallard
- Lesser Black-backed Gull
- Kestrel
- Mute Swan
- Snipe
- Little Grebe
- Lapwing
- Great Crested Grebe
- Peregrine Falcon
- Tufted Duck
- Common Sandpiper
- Black-headed Gull
- Cormorant
- Little Egret
- Sparrowhawk
- Teal
- Crane
- Grey Wagtail

0 1 2
Kilometres

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Rev	Date	Description	By	Chkd.
A	01/11/2024	First issue	S.P	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2.4 Breeding Waders and Raptors Survey July-September 2024 Observations

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	November 2024

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7°20'0"W
7°15'0"W
7°10'0"W
53°26'0"N
53°24'0"N
53°22'0"N
53°20'0"N
745000
740000
735000
730000
644000
649500
655000

Common Sandpiper
Mute Swan

Little Grebe
Mallard
Mute Swan
Tufted Duck

Little Grebe

Mallard
Mute Swan
Ringed Plover

Black-headed Gull
Mute Swan

Mallard
Mute Swan
Tufted Duck

Little Grebe
Mallard
Moorhen

Maxar, Microsoft



Legend

Energy Park - Proposed Developments

Non-flight observations

- Buzzard
- Moorhen
- Ringed Plover
- Mallard
- Kestrel
- Mute Swan
- Little Grebe
- Lapwing
- Great Crested Grebe
- Tufted Duck
- Common Sandpiper
- Black-headed Gull

0 1 2
Kilometres

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A	18/11/2024	First issue	S.P	J..M
Rev	Date	Description	By	Chkd.

Client:

Bord na Móna

Project:

Bord Na Mona - Energy Park

Title:

Figure 2.5
'Confirmed' Sightings of Breeding Waders and Raptors
April to September 2024 Observations

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	November 2024

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Map Ref:

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A

7°20'0"W
7°15'0"W
7°10'0"W
53°26'0"N
53°24'0"N
53°22'0"N
53°20'0"N
745000
740000
735000
730000
644000
649500
655000

Lapwing
Great

Mallard
Great Crested Grebe

Little Grebe
Tufted Duck

Great Crested
Grebe
Tufted Duck

Mallard
Tufted Duck

Black-headed Gull
Grey Heron
Lapwing
Little Grebe
Ringed Plover

Black-headed Gull
Great Crested Grebe
Little Grebe

Grey Heron
Moorhen
Snipe

Mallard
Moorhen
Snipe

Little Grebe
Mute Swan

Buzzard
Mallard
Snipe

Earthstar Geographics



Legend

- Energy Park - Proposed Developments

Non-flight observations

- Buzzard
- Grey Heron
- Moorhen
- Ringed Plover
- Mallard
- Kestrel
- Mute Swan
- Snipe
- Little Grebe
- Lapwing
- Great Crested Grebe
- Tufted Duck
- Common Sandpiper
- Black-headed Gull
- Sparrowhawk
- Grey Wagtail

0 1 2
Kilometres

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	18/11/2024	First issue	S.P	J..M

Client:

Bord na Móna

Project:

Bord Na Mona - Energy Park

Title:

Figure 2.6
'Probable' Sightings of Breeding Waders and Raptors
April to September 2024 Observations

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
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2.4 BREEDING BIRD TRANSECT SURVEY

Breeding Bird transect surveys were conducted to establish the distribution and abundance of birds within the proposed development site, and to allow the evaluation of the site's importance. The transect survey was adapted from CBS (2012), and involved 13 representative transects delineated across the Derrygreenagh Wind and Solar Farm site, the locations of which can be seen in Figure 2-7 and Figure 2-8. A total 1,180 observations of 25 species were recorded over the survey period (Table 2-8). Overall, Mallard, Mute Swan, Meadow Pipit (*Anthus pratensis*), Black-headed Gull were the most abundant species recorded.

A total of seven different target species were sighted expressing 'Confirmed' breeding behaviour within the boundary of the proposed site. The abundance of 'Confirmed' and 'Probable' sightings is listed below for the individual birds recorded for each target species (adults and chicks).

Druman Bog recorded the majority of 'Confirmed' breeding sightings. These were Mallard (46), Mute Swan (23), Tufted Duck (16), Little Grebe (8), Ringed Plover (3), and Kestrel (1). Derryarkin Bog recorded 'Confirmed' breeding sightings of Black-headed Gull (16), and Common Gull (2). Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-9.

Additionally, 12 target bird species identified as 'Probable' breeders during the transect surveys, notably Meadow Pipit (147), Black-headed gull (56), Lapwing (35), and Mallard (33). Species observations of 'Probable' breeding behaviour can be seen in Figure 2-10.

Table 2-8: Summary of breeding bird activity between April and September 2024

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mallard	Amber	-	7	62	18	130	111	13	**341**
Mute Swan	Amber	-	53	21	61	48	12	32	**227**
Meadow Pipit	Red	-	17	19	24	50	8	47	**165**
Black-headed Gull	Amber	-	2	29	49	25	2	-	**107**
Lapwing	Red	-	4	19	5	17	-	-	**45**
Tufted Duck	Amber	-	17	7	18	-	-	-	**42**
Buzzard	Green	-	7	-	6	11	12	5	**41**
Teal	Amber	-	-	-	-	-	-	35	**35**
Kestrel	Red	-	4	2	2	6	6	5	**25**
Snipe	Red	-	2	6	1	2	4	8	**23**
Ringed Plover	Amber	-	4	11	2	4	-	-	**21**
Grey Heron	Green	-	4	2	3	7	2	1	**19**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Little Grebe	Green	-	2	9	2	1	2	2	**18**
Common Gull	Amber	-	-	-	-	15	-	-	**15**
Sparrowhawk	Green	-	1	2	1	-	5	3	**12**
Lesser Black-backed Gull	Amber	-	-	-	-	-	10	-	**10**
Swift	Red	-	-	-	-	6	2	-	**8**
Peregrine	Green	Annex I	1	-	3	1	-	1	**6**
Moorhen	Green	-	1	2	2	-	1	-	**6**
Cormorant	Amber	-	5	-	-	-	-	-	**5**
Yellowhammer	Red	-	-	-	-	2	-	-	**2**
Great Crested Grebe	Amber	-	1	1	-	-	-	-	**2**
Redshank	Red	-	-	1	-	1	-	-	**2**
Little Egret	Green	Annex I	-	-	-	2	-	-	**2**
Common Sandpiper	Amber	-	-	-	-	1	-	-	**1**

Transect 8_2 recorded the highest diversity of the target bird species (20) and the highest abundance of individual target bird species (616). Large numbers of Mute Swan and Mallard were frequently observed at this location throughout the six months of surveys (Table 2-9).

Table 2-9: Distribution of Breeding Bird Records During Transect Surveys Between April to September 2024

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
T1									
Meadow Pipit	Red	-	1	2	-	3	-	16	**22**
Mute Swan	Amber	-	2	2	2	2	2	2	**12**
Buzzard	Green	-	2	-	1	1	1	-	**5**
Mallard	Amber	-	-	-	-	-	3	-	**3**
Swift	Red	-	-	-	-	3	-	-	**3**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Kestrel	Red	-	1	-	1	-	-	1	3
Sparrowhawk	Green	-	-	-	-	1	-	-	1
Yellowhammer	Red	-	-	-	-	-	1	-	1
T2									
Meadow Pipit	Red	-	1	1	2	7	-	-	11
Buzzard	Green	-	-	-	-	4	3	1	8
Snipe	Red	-	-	1	-	-	2	2	5
Mallard	Amber	-	2	-	-	-	-	-	2
Mute Swan	Amber	-	2	-	-	-	-	-	2
Yellowhammer	Red	-	-	-	-	1	-	-	1
Kestrel	Red	-	1	-	-	-	-	-	1
T3									
Meadow Pipit	Red	-	1	3	-	11	-	9	24
Mallard	Amber	-	-	2	-	3	-	-	5
Buzzard	Green	-	2	-	2	-	-	-	4
Grey Heron	Green	-	-	1	-	1	1	1	4
Kestrel	Red	-	-	-	-	1	2	-	3
Sparrowhawk	Green	-	-	1	-	-	1	-	2
Mute Swan	Amber	-	2	-	-	-	-	-	2
T4									
Meadow Pipit	Red	-	1	2	3	4	4	-	14
Lapwing	Red	-	-	-	-	10	-	-	10
Buzzard	Green	-	-	-	1	1	1	-	3
Sparrowhawk	Green	-	-	1	-	-	-	-	1
T5									
Black-headed Gull	Amber	-	-	10	4	16	-	-	30

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mallard	Amber	-	2	1	4	6	15	2	**30**
Tufted Duck	Amber	-	2	5	2	-	-	-	**9**
Little Grebe	Green	-	2	1	2	-	-	-	**5**
Meadow Pipit	Red	-	1	-	2	-	-	1	**4**
Snipe	Red	-	-	-	-	-	1	-	**1**
Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
T6									
Meadow Pipit	Red	-	2	5	6	6	4	2	**25**
Mallard	Amber	-	-	2	2	-	-	2	**6**
Snipe	Red	-	-	1	1	1	-	1	**4**
Kestrel	Red	-	1	1	-	1	-	-	**3**
Lesser Black-backed Gull	Amber	-	-	-	-	-	1	-	**1**
T7									
Black-headed Gull	Amber	-	-	11	37	6	2	-	**56**
Common Gull	Amber	-	-	-	-	15	-	-	**15**
Grey Heron	Green	-	2	-	1	4	-	-	**7**
Lapwing	Red	-	-	5	-	-	-	-	**5**
Meadow Pipit	Red	-	1	-	-	3	-	-	**4**
Swift	Red	-	-	-	-	3	-		**3**
Snipe	Red	-	-	-	-	-	-	2	**2**
Buzzard	Green	-	1	-	-	-	-	-	**1**
Little Egret	Green	Annex I	-	-	-	1	-	-	**1**
Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
Kestrel	Red	-	-	-	-	-	-	1	**1**
Peregrine	Green	Annex I	-	-	1	-	-		**1**
T8_1									

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mallard	Amber	-	1	42	12	120	90	6	**271**
Mute Swan	Amber	-	43	17	51	46	10	30	**197**
Teal	Amber	-	-	-	-	-	-	35	**35**
Tufted Duck	Amber	-	15	2	16	-	-	-	**33**
Black-headed Gull	Amber	-	2	7	6	3	-	-	**18**
Ringed Plover	Amber	-	4	8	-	3	-	-	**15**
Little Grebe	Green	-	-	8	-	1	2	2	**13**
Lapwing	Red	-	-	4	-	3	-	-	**7**
Lesser Black-backed Gull	Amber	-	-	-	-	-	6	-	**6**
Cormorant	Amber	-	5	-	-	-	-	-	**5**
Grey Heron	Green	-	-	1	1	1	1	-	**4**
Swift	Red	-	-	-	-	-	2	-	**2**
Great Crested Grebe	Amber	-	1	1	-	-	-	-	**2**
Redshank	Red	-	-	1	-	1	-	-	**2**
Common Sandpiper	Amber	-	-	-	-	1	-	-	**1**
Little Egret	Green	Annex I	-	-	-	1	-	-	**1**
Kestrel	Red	-	-	1	-	-	-	-	**1**
Snipe	Red	-	-	1	-	-	-	-	**1**
Meadow Pipit	Red	-	1	-	-	-	-	-	**1**
Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
T8_2									
Lapwing	Red	-	2	5	3	3	-	-	**13**
Buzzard	Green	-	1	-	1	1	4	1	**8**
Ringed Plover	Amber	-	-	3	2	1	-	-	**6**
Meadow Pipit	Red	-	1	1	-	3	-	-	**5**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Peregrine	Green	Annex I	1	-	1	-	-	1	3
Lesser Black-backed Gull	Amber	-	-	-	-	-	3	-	3
Mallard	Amber	-	-	3	-	-	-	-	3
Kestrel	Red	-	-	-	-	1	1	-	2
Sparrowhawk	Green	-	-	-	1	-	1	-	2
Snipe	Red	-	-	1	-	-	-	-	1
T9									
Lapwing	Red	-	2	2	2	1	-	-	7
Snipe	Red	-	1	1	-	1	1	2	6
Moorhen	Green	-	1	2	2	-	-	-	5
Mute Swan	Amber	-	4	1	-	-	-	-	5
Meadow Pipit	Red	-	2	1	1	-	-	-	4
Grey Heron	Green	-	1	-	1	-	-	-	2
Kestrel	Red	-	-	-	-	-	1	1	2
Buzzard	Green	-	-	-	-	1	-	1	2
Black-headed Gull	Amber	-	-	-	2	-	-	-	2
T10									
Mallard	Amber	-	1	10	-	1	3	3	18
Meadow Pipit	Red	-	3	1	5	3	-	-	12
Mute Swan	Amber	-	-	1	8	-	-	-	9
Kestrel	Red	-	1	-	1	1	-	1	4
Lapwing	Red	-	-	3	-	-	-	-	3
Snipe	Red	-	-	1	-	-	-	1	2
Grey Heron	Green	-	1	-	-	1	-	-	2
Buzzard	Green	-	-	-	-	-	2	-	2
Black-headed Gull	Amber	-	-	1	-	-	-	-	1

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Moorhen	Green	-	-	-	-	-	1	-	**1**
T11									
Meadow Pipit	Red	-	1	2	3	6	-	12	**24**
Buzzard	Green	-	1	-	1	2	1	-	**5**
Kestrel	Red	-	-	-	-	2	1	1	**4**
Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
Snipe	Red	-	1	-	-	-	-	-	**1**
T12									
Meadow Pipit	Red	-	1	1	2	4	-	7	**15**
Buzzard	Green	-	-	-	-	1	-	2	**3**
Mallard	Amber	-	1	2	-	-	-	-	**3**
Sparrowhawk	Green	-	1	-	-	-	1	-	**2**
Peregrine	Green	Annex I	-	-	1	**1**	-	-	**2**
Kestrel	Red	-	-	-	1	1	-	-	**2**

7°20'0"W
7°13'50"W
7°7'40"W
53°26'30"N
53°23'0"N
53°19'30"N
742000
736000
643000
649500
656000

Meadow Pipit
Snipe

Mallard
Meadow Pipit

Black-headed
Gull
Grey heron
Lapwing
Meadow Pipit
Moorhen
Mute Swan

Black-headed
Gull
Mute Swan
Tufted Duck

Grey Heron
Little Grebe
Mute Swan

Grey Heron
Mallard

Lapwing
Meadow Pipit

Black-headed Gull
Cormorant
Great Cresed Grebe
Mallard
Ringed Plover
Tufted Duck

Lapwing
Meadow Pipit

Black-headed Gull
Grey Heron
Lapwing
Mute Swan
Redshank
Ringed Plover

Lapwing
Ringed Plover
Snipe

Lapwing
Ringed Plover

Black-headed Gull
Lapwing

Mallard
Meadow Pipit

Black-headed Gull
Grey Heron

Black-headed Gull
Cormorant
Meadow Pipit
Mute Swan

Buzzard
Meadow Pipit

Black-headed Gull
Great Crested Grebe
Little Grebe
Mute Swan
Snipe
Tufted Duck

Mute Swan
Ringed Plover

Black-headed Gull
Tufted Duck

Lapwing
Little Grebe
Mallard
Mute Swan

Mallard
Meadow Pipit
Snipe

Black-headed Gull
Little Grebe
Mallard
Meadow Pipit
Tufted Duck

Grey Heron
Mute Swan

Meadow Pipit
Sparrowhawk

Mallard
Meadow Pipit

Mallard
Meadow Pipit

Earthstar Geographics



Legend

- Derrygreenagh Wind and Solar -Proposed

Developments Non-flight observations

- Buzzard
- Grey Heron
- Redshank
- Moorhen
- Ringed Plover
- Mallard
- Kestrel
- Mute Swan
- Snipe
- Little Grebe
- Lapwing
- Meadow Pipit
- Great Crested Grebe
- Peregrine Falcon
- Tufted Duck
- Black-headed Gull
- Cormorant
- Sparrowhawk

0 1 2
Kilometres

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A	18/11/2024	First issue	S.P	J..M

Client: Bord na Móna

Project: Bord Na Mona - Derrygreenagh Wind and Solar

Title: Figure 2.7 Transect Survey April-June 2024 Observations

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
S.Pezzetta	J.Martins	November 2024

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7°7'40"W
53°26'30"N
53°23'0"N
53°19'30"N
742000
736000
643000
649500
656000
Maxar, Microsoft

Kestrel
Meadow Pipit

Grey Heron
Mallard

Black-headed Gull
Common Sandpiper
Grey heron
Little Egret
Little Grebe
Mute Swan
Redshark
Ringed Plover

Mallard
Meadow Pipit

Little Grebe
Mallard
Mute Swan
Teal

Kestrel
Meadow Pipit

Black-headed Gull
Common Gull
Meadow Pipit
Snipe

Lesser Black-backed Gull
Sparrowhawk

Snipe
Meadow Pipit

Mallard
Mute Swan

Black-headed Gull
Little Grebe
Mallard
Meadow Pipit
Tufted Duck

Black-headed Gull
Common Gull
Grey Heron
Little Egret

Grey Heron
Mallard



Legend

Derrygreenagh Wind and Solar - Proposed Developments

Non-flight observations

- Swift
- Buzzard
- Grey Heron
- Redshank
- Moorhen
- Ringed Plover
- Mallard
- Lesser Black-backed Gull
- Kestrel
- Mute Swan
- Snipe
- Little Grebe
- Common Gull
- Lapwing
- Meadow Pipit
- Peregrine Falcon
- Common Sandpiper
- Black-headed Gull
- Little Egret
- Sparrowhawk
- Teal

0 1 2
Kilometres

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A	18/11/2024	First issue	S.P	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2.8 Transect Survey July-September 2024 Observations

Scale @ A3: 1:50,000

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7°15'0"W
7°10'0"W
53°26'0"N
53°24'0"N
53°22'0"N
53°20'0"N
740000
735000
644000
649500
655000

Little Grebe
Mallard
Mute Swan

Little Grebe
Mute Swan

Earthstar Geographics



Legend

Derrygreenagh Wind and Solar - Proposed Developments Non-flight observations

- Ringed Plover
- Mallard
- Kestrel
- Mute Swan
- Little Grebe
- Common Gull
- Tufted Duck
- Black-headed Gull

0 1 2
Kilometres

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Client:

Bord na Móna

Project:

Bord Na Mona - Derrygreenagh Wind and Solar

Title:

Figure 2.9
'Confirmed' Sightings of Breeding April to September 2024 Observations

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7°15'0"W
7°10'0"W
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53°24'0"N
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53°20'0"N
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735000
644000
649500
655000

Lapwing
Moorhen
Meadow Pipit

Black-headed Gull
Common Sandpiper
Little Grebe
Ringed Plover

Black-headed Gull
Lapwing
Redshank
Ringed Plover

Lapwing
Ringed Plover

Black-headed Gull
Little Grebe
mallard
Meadow Pipit
Tufted Duck

Lapwing
Ringed Plover
Snipe

Black-headed Gull
Great Crested Grebe
Snipe

Black-headed Gull
Grey Heron
Little Egret

Maxar, Microsoft



Legend

Derrygreenagh Wind and Solar Farm - Proposed Developments Non-flight observations

- Swift
- Buzzard
- Grey Heron
- Redshank
- Moorhen
- Ringed Plover
- Mallard
- Snipe
- Little Grebe
- Lapwing
- Meadow Pipit
- Great Crested Grebe
- Tufted Duck
- Common Sandpiper
- Black-headed Gull
- Little Egret
- Sparrowhawk
- Yellowhammer

0 1 2
Kilometres

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Client: Bord na Móna

Project: Bord Na Mona - Derrygreenagh Wind and Solar

Title: Figure 2.10 ‘Probable' Sightings of Breeding April to September 2024 Observations

Scale @ A3: 1:50,000

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Draft: A

2.5 WOODCOCK TRANSECT SURVEYS

Woodcock (*Scolopax rusticola*) Transect surveys were undertaken in areas of suitable habitat withing the area of the proposed project. The survey methodology followed the recommendations of Gilbert *et al.* (1998) for surveying Woodcock, with three survey visits undertaken between May and June 2024. Surveyors were in position from an hour before sunset until an hour after sunset. The aim of the survey was to record the presence of roding (displaying) male Woodcock and, thereby, establish the distribution and abundance of the species in the study area. A total of 74 roding Woodcock males were recorded, along with two other target species – Snipe (*Gallinago gallinago*) and Lapwing (Table 2-10).

Figure 2-11 displays the observations recorded during the Woodcock Transect Survey at the locations identified in Table 2-11.

Table 2-10: Summary of Woodcock Transect Surveys in May and June 2024

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Number of observations over the survey period
Woodcock	Red	-	74
Snipe	Red	-	4
Lapwing	Red	-	1

Table 2-11: Distribution of Woodcock Transect Surveys in May and June 2024

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Number of observations over the survey period
WK1			
Woodcock	Red	-	14
Snipe	Red	-	2
Lapwing	Red	-	1
WK2			
Woodcock	Red	-	37
WK3			
Woodcock	Red	-	10
WK4			
Woodcock	Red	-	13
Snipe	Red	-	2

7°20'0"W
7°13'50"W
7°7'40"W
53°26'30"N
53°23'0"N
53°19'30"N
742000
736000
643000
649500
656000
Maxar, Microsoft



Legend

- Derrygreenagh Wind and Solar - Proposed Developments
- Non-flight observations
  - Snipe
  - Lapwing
  - Woodcock

0 1 2
Kilometres

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Title:

Figure 2.11
Woodcock Survey
May-June 2024 Observations

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
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Draft: A

3. CONCLUSION

This report summarises the results of bird surveys undertaken by TOBIN at the proposed Derrygreenagh Wind and Solar Farm site during the Breeding Season 2024 (April to September).

In total, 37 target species of birds were identified at the proposed wind farm site and hinterland during breeding season during all surveys. The most common birds sighted were Mute Swan, Mallard, Black-headed Gull, and Lapwing. Additionally, five raptor species were recorded at the site – Buzzard, Kestrel, Sparrowhawk, Peregrine, and Merlin (*Falco columbarius*).

Target species recorded at the Derrygreenagh Wind and Solar Farm site and hinterland during the breeding bird season 2024 included several species listed in Annex I of the Birds Directive [i.e. Crane (*Grus grus*),Golden Plover(*Pluvialis apricaria*), Kingfisher (*Alcedo atthis*), Little Egret (*Egretta garzetta*),

Merlin, Peregrine and Whooper Swan (*Cygnus cygnus*)] and ten species classified by Gilbert *et al.* (2021) as red listed ([i.e. Curlew (*Numenius Arquata*), Golden Plover, Grey Wagtail (*Motacilla cinerea*), Kestrel, Lapwing, Meadow Pipit, Redshank (*Tringa tetanus*), Snipe, Swift (*Apus apus*)and Woodcock]. Notably, 13 target bird species were sighted as 'Confirmed' breeders, and 22 as 'Probable' breeders. The areas of the most significant breeding activity of the target bird species withing the proposed wind farm site are Derryarkin Bog and Drumman Bog, especially the vicinity of the quarry ponds at both locations.

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Gilbert, G., Stanbury, A. and Lewis, L. (2021) *Birds of Conservation Concern in Ireland 4: 2020–2026, Irish Birds*, 43, pp. 1–22.

SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms.* Scottish Natural Heritage.

TOBIN

Bord na Móna Derrygreenagh Wind and Solar Winter Season 2024-2025 Bird Surveys: Summary Report

Bord na Móna

BUILT ON KNOWLEDGE

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1. BACKGROUND

This report summarises the results of bird surveys undertaken by TOBIN at the proposed Derrygreenagh Wind and Solar Farm site during the Winter Season 2024 - 2025, for the survey period of October to March.

2. SUMMARY OF LOCAL BIRD ACTIVITY DURING THE WINTER SEASON 2024-2025

2.1 VANTAGE POINT SURVEYS

The Vantage Point (VP) surveys were carried in accordance with the methodology set out by the Scottish Natural Heritage (SNH) guidelines (SNH, 2017). Thirteen (13) VPs across the Derrygreenagh Wind and Solar Farm site were set at fixed locations, which were strategically positioned to provide a maximum viewshed of the survey area over the survey period, the locations of which can be seen in Figure 2-1. The viewshed of a given VP extended to a distance of no greater than 2km and included an arc of no greater than 180 degrees, as per SNH (2017), which encompassed the study area for the VP surveys.

The 13 VPs were surveyed for 6 hours each on each month, summing up to a total of 468 hours for the survey period of October 2024 to March 2025 (Table 2-1).

Table 2-1: Summary of Winter Vantage Point Survey Effort Between October 2024 to March 2025

Vantage point	Oct	Nov	Dec	Jan	Feb	Mar	Total hours
1	6	6	6	6	6	6	**36**
2	6	6	6	6	6	6	**36**
3	6	6	6	6	6	6	**36**
4	6	6	6	6	6	6	**36**
5	6	6	6	6	6	6	**36**
6	6	6	6	6	6	6	**36**
7	6	6	6	6	6	6	**36**
8	6	6	6	6	6	6	**36**
9	6	6	6	6	6	6	**36**
10	6	6	6	6	6	6	**36**
11	6	6	6	6	6	6	**36**
12	6	6	6	6	6	6	**36**
13	6	6	6	6	6	6	**36**
Total hours	**78**	**78**	**78**	**78**	**78**	**78**	**468**

7°22'48"W
7°16'30"W
7°10'12"W
53°27'12"N
53°23'40"N
53°20'8"N
742800
737600
732400
644000
649500
655000





Legend

- Derrygreenagh Wind and Solar -Proposed Developments
- Proposed wind farm
- 500m buffer
- VPs
- Viewshed Coverage

0 1,000 2,000
Meters

NOTES

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Rev	Date	Description	By	Chkd.
A	18/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-1: Vantage Points Survey Locations and Viewshed

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Draft: A

The VP surveys registered observations of 21 species flying within VP viewsheds over this survey period (Table 2-2). European Golden Plover (*Pluvialis apricaria*) was the most abundant species observed flying during the VP surveys, with 3686 sightings. Second most common species see was Northern Lapwing (*Vanellus Vanellus*), with 2938 sightings. Both European Golden Plover and Northern Lapwing were seen regularly flying in large flocks over the Derrygreenagh Wind and Solar Farm site.

Common Kestrel (*Falco tinnunculus*) and Common Buzzard (*Buteo buteo*) were the most frequently recorded raptor species with 98 and 86 sightings respectively. Other species that were recorded often and require highlighting were Lesser Black-backed Gull (*Larus fuscus*). Whooper Swan (*Cygnus cygnus)* and Mute Swan (*Cygnus olor*). Species observations can be seen in Figure 2-2 and Figure 2-3.

Table 2-2: Summary of Vantage Point Surveys Records of Target Species in Flight Between October 2024 to March 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
European Golden Plover	Red	-	1395	670	100	215	1131	175	**3686**
Northern Lapwing	Red	-	325	605	1170	36	772	30	**2938**
Black-headed Gull	Amber	-	-	-	2	-	5	392	**399**
Whooper Swan	Amber	Annex I	23	16	12	37	-	33	**121**
Mute Swan	Amber	-	18	37	10	30	14	3	**112**
Common Kestrel	Red	-	19	17	14	17	15	16	**98**
Common Buzzard	Green	-	14	3	7	13	20	29	**86**
Mallard	Amber	-	3	-	-	25	3	14	**45**
Great Cormorant	Amber	-	5	1	2	9	12	7	**36**
Hen Harrier	Amber	Annex I	8	2	3	7	4	1	**25**
Eurasian Sparrowhawk	Green	Annex I	3	4	-	5	6	4	**22**
Grey Heron	Green	-	1	2	-	3	8	4	**18**
Lesser Black-backed Gull	Amber	-	10	-	1	3	1	-	**15**
Peregrine Falcon	Green	Annex I	1	-	1	6	-	2	**10**
Eurasian Curlew	Red	-	-	-	8	-	-	-	**8**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Snipe	Red	-	7	-	-	-	-	-	**7**
Merlin	Amber	Annex I	-	2	3	-	2	-	**7**
Eurasian Woodcock	Red	-	-	-	2	-	-	-	**2**
Little Egret	Green	Annex I	1	1	-	-	-	-	**2**
Western Marsh Harrier	Amber	Annex I	1	-	-	-	-	-	**1**
Great Egret	Green	Annex I	-	-	-	-	1	-	**1**

Table 2-3 presents the observations at each of the VPs. The highest diversity and abundance of target species in flight was recorded at VP10, with 2571 observations comprising of 17 target species. Other VP locations with abundant flight activity included VP8 (1674 sightings of 13 target species), VP9 (795 sightings of 14 target species), and VP4 (535 sightings of 10 target species).

Table 2-3: Summary of Wintering Birds Observations Per Vantage Point (Target Species Flying Observation –October 2024 to March 2025)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
VP1									
European Golden Plover	Red	Annex I	-	75	-	-	60	-	**135**
Common Kestrel	Red	-	4	1	1	2	1	1	**10**
Common Buzzard	Green	-	1	1	-	1	-	3	**6**
Whooper Swan	Amber	Annex I	-	-	5	-	-	-	**5**
Peregrine Falcon	Green	Annex I	-	-	1	-	-	-	**1**
Grey Heron	Green	-	1	-	-	-	-	-	**1**
VP2									
European Golden Plover	Red	Annex I	26	150	100	-	25	70	**371**
Common Buzzard	Green	-	1	1	1	-	2	2	**7**
Common Kestrel	Red	-	-	2	1	1	1	1	**6**
Whooper Swan	Amber	Annex I	3	-	-	-	-	-	**3**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**
VP3									
European Golden Plover	Red	Annex I	70	-	-	25	-	-	**95**
Common Buzzard	Green	-	2		-	2	4	4	**12**
Common Kestrel	Red	-	-	1	-	1	1	1	**4**
Eurasian Sparrowhawk	Green	-	-	1	-	-	1	-	**2**
VP4									
European Golden Plover	Red	Annex I	296	200	-	-	-	-	**496**
Northern Lapwing	Red	-	-	-	-	18	-	-	**18**
Common Kestrel	Red	-	-	1	-	4	-	2	**7**
Common Buzzard	Green	-	-	-	-	2	5	-	**7**
Grey Heron	Green	-	-	-	-	1	-	1	**2**
Mallard	Amber	-	-	-	-	-	-	1	**1**
Little Egret	Green	-	-	1	-	-	-	-	**1**
Eurasian Sparrowhawk	Green	Annex I	1	-	-	-	-	-	**1**
Lesser Black-backed Gull	Amber	-	-	-	-	-	1	-	**1**
Great Cormorant	Amber	-	-	-	-	-	1	-	**1**
VP5									
European Golden Plover	Red	Annex I	-	70	-	-	39	-	**109**
Common Kestrel	Red	-	2	1	-	1	2	2	**8**
Common Buzzard	Green	-	1	-	-	2	-	3	**6**
Whooper Swan	Amber	Annex I	-	-	-	-	-	2	**2**
Grey Heron	Green	-	-	-	-	-	1	-	**1**
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**
VP6									

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
European Golden Plover	Red	Annex I	12	-	-	-	-	65	**77**
Black-headed Gull	Amber	-	-	-	-	-	-	31	**31**
Whooper Swan	Amber	Annex I	10	4	-	2	-	-	**16**
Great Cormorant	Amber	-	1	1	1	2	3	3	**11**
Lesser Black-backed Gull	Amber	-	8	-	-	-	-	-	**8**
Hen Harrier	Amber	Annex I	-	-	2	3	1	-	**6**
Mute Swan	Amber	-	-	-	-	4	2	-	**6**
Common Buzzard	Green	-	1	-	-	1	-	4	**6**
Common Kestrel	Red	-	2	-	1	-	-	2	**5**
Peregrine Falcon	Green	Annex I	-	-	-	1	-	1	**2**
Grey Heron	Green	-	-	2	-	-	-	-	**2**
Merlin	Amber	Annex I	-	1	-	-	-	-	**1**
Eurasian Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
Great Egret	Green	Annex I	-	-	-	-	1	-	**1**
VP7									
European Golden Plover	Red	Annex I	275	-	-	-	-	40	**315**
Common Buzzard	Green	-	2	-	3	3	7	4	**19**
Common Kestrel	Red	-	1	3	2	3	2	-	**11**
Northern Lapwing	Red	-	-	-	-	-	6	3	**9**
Eurasian Curlew	Red	-	-	-	8	-	-	-	**8**
Eurasian Sparrowhawk	Green	-	-	1	-	2	1	4	**8**
Mallard	Amber	-	-	-	-	-	3	2	**5**
Mute Swan	Amber	-	-	3	-	-	-	-	**3**
Whooper Swan	Amber	Annex I	-	-	-	2	-	-	**2**
Peregrine Falcon	Green	Annex I	-	-	-	-	-	1	**1**
VP8									

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Northern Lapwing	Red	-	-	596	420	16	-	1	**1033**
European Golden Plover	Red	Annex I	16	-	-	190	250	-	**456**
Black-headed Gull	Amber	-	-	-	-	-	-	98	**98**
Whooper Swan	Amber	Annex I	3	-	-	3	-	31	**37**
Mute Swan	Amber	-	-	10	-	8	-	-	**18**
Common Kestrel	Red	-	3	-	2	2	2	1	**10**
Common Snipe	Red	-	7	-	-	-	-	-	**7**
Common Buzzard	Green	-	-	-	1	-	-	3	**4**
Hen Harrier	Amber	Annex I	1	-	-	-	3	-	**4**
Grey Heron	Green	-	-	-	-	1	3	-	**4**
Merlin	Amber	Annex I	-	-	-	-	1	-	**1**
Eurasian Sparrowhawk	Green	-	-	1	-	-	-	-	**1**
Peregrine Falcon	Green	Annex I	-	-	-	1	-	-	**1**
VP9									
European Golden Plover	Red	Annex I	590	-	-	-	90	-	**680**
Black-headed Gull	Amber	-	-	-	-	-	-	33	**33**
Northern Lapwing	Red	-	-	9	-	-	11	-	**20**
Great Cormorant	Amber	-	4	-	1	5	7	-	**17**
Mute Swan	Amber	-	1	4	3	3	2	1	**14**
Common Kestrel	Red	-	1	2	2	1	3	1	**10**
Whooper Swan	Amber	Annex I	-	7	-	-	-	-	**7**
Common Buzzard	Green	-	-	1	-	-	-	2	**3**
Eurasian Sparrowhawk	Green	-	-	-	-	1	2	-	**3**
Grey Heron	Green	-	-	-	-	1	1	1	**3**
Mallard	Amber	-	-	-	-	-	-	2	**2**
Hen Harrier	Amber	Annex I	1	-	-	-	-	-	**1**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Merlin	Amber	Annex I	-	1	-	-	-	-	**1**
Peregrine Falcon	Green	Annex I	-	-	-	1	-	-	**1**
VP10									
Northern Lapwing	Red	-	270	-	750	2	305	23	**1350**
European Golden Plover	Red	Annex I	110	135	-	-	667	-	**912**
Black-headed Gull	Amber	-	-	-	-	-	5	230	**235**
Whooper Swan	Amber	Annex I	5	5	7	-	-	-	**17**
Common Kestrel	Red	-	4	2	4	-	3	3	**16**
Common Buzzard	Green	-	2	-	2	2	2	3	**11**
Hen Harrier	Amber	Annex I	6	-	-	2	-	-	**8**
Merlin	Amber	Annex I	-	-	3	-	1	-	**4**
Peregrine Falcon	Green	Annex I	1	-	-	2	-	-	**3**
Great Cormorant	Amber	-	-	-	-	-	-	3	**3**
Mute Swan	Amber	-	-	-	2	1	-	-	**3**
Eurasian Woodcock	Red	-	-	-	2	-	-	-	**2**
Lesser Black-backed Gull	Amber	-	2	-	-	-	-	-	**2**
Eurasian Sparrowhawk	Green	-	1	-	-	-	1	-	**2**
Grey Heron	Green	-	-	-	-	-	1	-	**1**
Little Egret	Green	Annex I	1	-	-	-	-	-	**1**
Western Marsh Harrier	Amber	Annex I	1	-	-	-	-	-	**1**
VP11									
Northern Lapwing	Red	-	55	-	-	-	-	-	**55**
European Golden Plover	Red	Annex I	-	40	-	-	-	-	**40**
Mallard	Amber	-	3	-	-	-	-	2	**5**
Mute Swan	Amber	-	-	2	-	-	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Kestrel	Red	-	-	-	1	-	-	-	**1**
Hen Harrier	Amber	Annex I	-	-	1	-	-	-	**1**
VP12									
Northern Lapwing	Red	-	-	-	-	-	300	3	**303**
Mute Swan	Amber	-	17	18	4	8	8	2	**57**
Mallard	Amber	-	-	-	-	25	-	7	**32**
Whooper Swan	Amber	Annex I	-	-	-	30	-	-	**30**
Common Kestrel	Red	-	-	4	-	2	-	-	**6**
Great Cormorant	Amber	-	-	-	-	2	1	1	**4**
Lesser Black-backed Gull	Amber	-	-	-	1	3	-	-	**4**
Common Buzzard	Green	-	2	-	-	-	-	-	**2**
Black-headed Gull	Amber	-	-	-	2	-	-	-	**2**
Grey Heron	Green	-	-	-	-	-	1	1	**2**
Hen Harrier	Amber	Annex I	-	1	-	-	-	1	**2**
Peregrine Falcon	Green	Annex I	-	-	-	1	-	-	**1**
VP13									
Northern Lapwing	Red	-	-	-	-	-	150	-	**150**
Mute Swan	Amber	-	-	-	1	6	2	-	**9**
Common Kestrel	Red	-	2	-	-	-	-	2	**4**
Hen Harrier	Amber	Annex I	-	1	-	2	-	-	**3**
Common Buzzard	Green	-	2	-	-	-	-	1	**3**
Eurasian Sparrowhawk	Green	-	1	1	-		-	-	**2**
Whooper Swan	Amber	Annex I	2	-	-	-	-	-	**2**
Grey Heron	Green	-	-	-	-	-	1	1	**2**

During the VP surveys, 16 different species of birds were recorded not in flight (Table 2-4). Observations included a total of 367 birds swimming, roosting or foraging within VP viewsheds.

A large number of Mute Swans (171 records) were recorded during the VP surveys over the survey period, representing the most frequently observed non-flying species at the Derrygreenagh Wind and Solar Farm between October 2024 to March 2025.

Table 2-4: Summary of Wintering Birds Observations During Vantage Point Surveys (Target Species Non-Flying Observation –October 2024 to March 2025)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Mute Swan	Amber	-	89	29	18	10	14	11	**171**
Tufted Duck	Amber	-	76	6	-	1	-	20	**103**
Eurasian Wigeon	Amber	-	7	12	-	7	-	-	**26**
Eurasian Teal	Amber	-	-	6	-	-	8	2	**16**
Great Cormorant	Amber	-	-	-	-	-	-	14	**14**
Redwing	Red	-	-	-	-	8	-	-	**8**
Mallard	Amber	-	-	-	2	2	2	2	**8**
Whooper Swan	Amber	Annex I	-	-	-	-	-	7	**7**
Great Crested Grebe	Amber	-	1	1	1	-	-	1	**4**
Common Snipe	Red	-	-	-	-	-	-	3	**3**
Merlin	Amber	Annex I	-	-	1	1	-	-	**2**
Eurasian Sparrowhawk	Green	-	-	1	-	-	-	-	**1**
Common Redshank	Red	-	-	-	1	-	-	-	**1**
Common Moorhen	Green	-	-	-	-	-	-	1	**1**
Common Kestrel	Red	-	-	1	-	-	-	-	**1**
Smew	Amber	Annex I	-	-	1	-	-	-	**1**

The location with the most abundance and diversity of species was VP 6, where 9 different target species were recorded not in-flight, with notable numbers of Mute Swan, Tufted Duck (*Aythya fuligula*), and Eurasian Wigeon (*Mareca Penelope*). The viewshed of this VP overlooks the Drumman quarry ponds, resulting in a high number of water bird records (Table 2-5).

Table 2-5: Summary of Wintering Birds Observations Per Vantage Point Surveys (Target Species Non-Flying Observation – October 2024 to March 2025)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
VP3									
Redwing	Red	-	-	-	-	8	-	-	**8**
Common Kestrel	Red	-	-	1	-	-	-	-	**1**
Eurasian Sparrowhawk	Green	-	-	1	-	-	-	-	**1**
VP4									
Mute Swan	Amber	-	-	-	-	-	-	2	**2**
Eurasian Teal	Amber	-	-	2	-	-	-	-	**2**
VP6									
Mute Swan	Amber	-	84	17	13	10	8	5	**137**
Tufted Duck	Amber	-	76	6	-	1	-	4	**87**
Eurasian Wigeon	Amber	-	7	12	-	7	-	-	**26**
Eurasian Teal	Amber	-	-	4	-	-	8	2	**14**
Mallard	Amber	-	-	-	2	2	2	2	**8**
Great Crested Grebe	Amber	-	1	1	1	-	-	1	**4**
Great Cormorant	Amber	-	-	-	-	-	-	3	**3**
Common Redshank	Red	-	-	-	1	-	-	-	**1**
Smew	Amber	Annex I	-	-	1	-	-	-	**1**
VP8									
Common Snipe	Red	-	-	-	-	-	-	2	**2**
VP9									
Common Snipe	Red	-	-	-	-	-	-	1	**1**
VP10									
Merlin	Amber	Annex I	-	-	1	1	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Moorhen	Green	-	-	-	-	-	-	1	**1**
VP12									
Mute Swan	Amber	-	5	12	5	-	6	4	**32**
Tufted Duck	Amber	-	-	-	-	-	-	16	**16**
Great Cormorant	Amber	-	-	-	-	-	-	11	**11**
Whooper Swan	Amber	Annex I	-	-	-	-	-	7	**7**

7°22'48"W
7°16'30"W
7°10'12"W
53°27'12"N
53°23'40"N
53°20'8"N
742800
737600
732400
644000
649500
655000

Great Crested Grebe
Tufted Duck
Mute Swan
Eurasian Wigeon

Maxar, Microsoft



Legend

- Derrygreenagh Wind and Solar - Proposed Developments
- Proposed Wind Farm 500m Buffer

Non-Flight Observations

- Common Kestrel
- Common Redshank
- Eurasian Sparrowhawk
- Eurasian Teal
- Eurasian Wigeon
- Great Crested Grebe
- Mallard
- Merlin
- Mute Swan
- Redwing
- Smew
- Tufted Duck

Flightlines

- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Snipe
- Eurasian Curlew
- Eurasian Sparrowhawk
- Eurasian Woodcock
- European Golden Plover
- Hen Harrier
- Lesser Black-backed Gull
- Little Egret
- Mallard
- Merlin
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Western Marsh Harrier
- Whooper Swan
- Great Cormorant
- Grey Heron

0 1,000 2,000
Meters

NOTES

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3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	18/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-2: Vantage Points October - December 2024 Observations

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Map Ref: 11458-035-VP-Oct..Dec.24-TOB-A

Draft: A

7°18'12"W

7°7'54"W

745000

736000

53°24'20"N

53°18'48"N

644700

655400

Mute Swan
Mallard
Great Crested Grebe
Eurasian Teal
Merlin
Rewing
Great Cormorant

Mute Swan
Little Grebe

Mallard
Mute Swan

Mute Swan
Tufted Duck
Great Cormorant

Earthstar Geographics



Legend

- Derrygreenagh Wind and Solar - Proposed Developments
- Proposed Wind Farm 500m Buffer

Non-Flight Observations

- Common Moorhen
- Common Snipe
- Eurasian Teal
- Eurasian Wigeon
- Great Cormorant
- Great Crested Grebe
- Mallard
- Mute Swan
- Tufted Duck
- Whooper Swan

Flightlines

- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Eurasian Sparrowhawk
- European Golden Plover
- Great Cormorant
- Grey Heron
- Hen Harrier
- Lesser Black-backed Gull
- Mallard
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Whooper Swan
- Great Egret

0 2,000
Meters

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	18/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-3: Vantage Point Survey January-March 2025 Observations

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Map Ref: 11458-036-VP-Jan..Mar25-TOB-A

Draft: A

2.2 I-WeBS/Waterbird Survey

The I-WeBS/Waterbird survey involves conducting monthly counts during the survey season. Counts were conducted in wetland habitat locations within a Zone of Influence (ZoI), encompassing the proposed development site and within a 10km buffer. Survey site locations can be seen in the Figure 2-4.

Counts at each wetland habitat site were conducted on the 'look-see' basis (Bibby et al. 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form, along with relevant information, including numbers of waterbirds; the presence of marked birds (leg-ringed or neck-collared); and weather conditions.

A total of 5248 observations of 32 species were recorded within the Zone of Infulence (ZoI) during I-WeBS/Waterbirds Surveys conducted between October 2024 and March 2025. The surveys identified the Derryarkin and Drumman quarry ponds as important locations for wintering bird species, particularly swans, ducks, and waders. The summary of the I-Webs/Waterbird surveys can be found in Table 2-6.

Table 2-6: Summary of IWeBS/Waterbird Surveys Recorded Between October 2024 - March 2025.

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Mute Swan	Amber	-	110	208	212	266	197	232	**1225**
European Golden Plover	Red	Annex I	22	175	647	66	6	-	**916**
Northern Lapwing	Red	-	-	-	22	75	376	25	**498**
Mallard	Amber	-	51	100	65	127	85	67	**495**
Tufted Duck	Amber	-	165	22	74	87	72	70	**490**
Eurasian Coot	Amber	-	124	3	2	155	68	13	**365**
Whooper Swan	Amber	Annex I	-	2	91	120	121	11	**345**
Eurasian Teal	Amber	-	53	33	36	43	51	31	**247**
Eurasian Wigeon	Amber	-	12	8	18	30	62	35	**165**
Common Snipe	Red	-	8	21	18	24	34	31	**136**
Little Grebe	Amber	-	14	4	4	16	12	21	**71**
Grey Heron	Green	-	11	10	10	12	8	6	**57**
Great Cormorant	Amber	-	5	5	14	3	10	8	**45**
Black-headed Gull	Amber	-	1	-	1	8	-	20	**30**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Great Crested Grebe	Amber	-	2	4	2	8	6	6	**28**
Common Moorhen	Green	-	1	2	4	1	6	8	**22**
Common Buzzard	Red	-	2	1	2	5	1	5	**16**
Little Egret	Green	Annex I	5	4	3	-	1	3	**16**
Common Ringed Plover	Amber	-	-	-	-	-	10	4	**14**
Common Kestrel	Red	-	6	1	1	1	2	2	**13**
Eurasian Curlew	Red	-	-	-	-	-	12	-	**12**
Common Goldeneye	Red	-	-	-	-	8	-	-	**8**
Northern Shoveler	Red	-	-	-	-	-	-	8	**8**
Great Egret	Green	Annex I		2	3	1	1	1	**8**
Eurasian Sparrowhawk	Green	-	1	1	1	-	1	-	**4**
Common Redshank	Red	-	-	-	-	1	1	2	**4**
Common Pochard	Red	-	-	3	-	-	-	-	**3**
Water Rail	Green	-	1	-	1	-	-	-	**2**
Merlin	Amber	Annex I		1	-	1	-	-	**2**
Common Kingfisher	Amber	Annex I	1	-	-	-	-	-	**1**
Common Greenshank	Green	-	-	-	-	1	-	-	**1**
Hen Harrier	Amber	Annex I	-	-	-	1	-	-	**1**

Mute Swan was the most abundant species recorded, with 1225 sightings within the Derrygreenagh Wind and Solar Farm site and within the 10 km buffer zone. Large numbers of Mute Swan were consistently recorded throughout the survey period at Drumman quarry ponds. Whooper Swans were also regularly observed during I-WeBS/Waterbird survey at Derryarkin quarry ponds.

Drumman and Derryarkin quarry ponds were sites of regular sightings of wintering European Golden Plover, Mallard (*Anas platyrhynchos*), Eurasian Widgeon, and Eurasian Teal (*Anas crecca*).

The comprehensive list of species recorded at each survey site during the I-WeBS/Waterbird surveys can be found in Table 2-7.

Table 2-7. Distribution of IWeBS/Waterbird Survey Bird Activity Between October 2024 to March 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Site 2									
Northern Lapwing	Red	-	-	-	-	12	-	12	**24**
Whooper Swan	Amber	Annex I	-	-	-	6	-	-	**6**
Mallard	Amber	-	2	-	-	-	-	4	**6**
Grey Heron	Green	-	1	-	-	-	-	-	**1**
Site 3									
Eurasian Coot	Amber	-	120	-	150	-	63	12	**345**
Tufted Duck	Amber	-	45	-	32	55	-	-	**132**
Mute Swan	Amber	-	12	-	12	15	35	18	**92**
Mallard	Amber	-	10	-	12	12	6	8	**48**
Northern Lapwing	Red	-	-	-	45	-	-	-	**45**
Little Grebe	Amber	-	8	-	4	8	3	8	**31**
Black-headed Gull	Amber	-	-	-	-	-	-	16	**16**
Great Crested Grebe	Amber	-	2	-	2	2	2	6	**14**
Great Cormorant	Amber	-	-	-	-	2	2	4	**8**
Common Goldeneye	Red	-	-	-	-	8	-	-	**8**
Grey Heron	Green	-	2	-		1	-	-	**3**
Site 5									
Common Snipe	Red	-	-	-	2	3	18	19	**42**
Eurasian Teal	Amber	-	-	-	12	6	-	-	**18**
Site 6									
Eurasian Wigeon	Amber	-	-	-	-	20	-	-	**20**
Black-headed Gull	Amber	-	-	-	-	8	-	-	**8**
Eurasian Teal	Amber	-	-	-	-	8	-	-	**8**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Mallard	Amber	-	-	-	-	4	-	-	**4**
Site 7									
Eurasian Wigeon	Amber	-	12	6	18	10	56	35	**137**
Eurasian Teal	Amber	-	8	4	16	8	7	10	**53**
Mallard	Amber	-	6	-	6	12	2	-	**26**
Northern Shoveler	Red	-	-	-	-	-	-	8	**8**
Eurasian Coot	Amber	-	2	-	-	3	1	-	**6**
Common Snipe	Red	-	-	3	-	-	-	3	**6**
Mute Swan	Amber	-	2	1	2	-	-	-	**5**
Common Moorhen	Amber	-	1	-	3	-	-	-	**4**
Grey Heron	Green	-	-	-	1	1	-	-	**2**
Site 9									
European Golden Plover	Red	Annex I	-	163	35	-	-	-	**198**
Mallard	Amber	-	8	-	8	8	4	3	**31**
Northern Lapwing	Red	-	-	-	22	-	-	-	**22**
Eurasian Teal	Amber	-	-	-	-	-	16	4	**20**
Eurasian Coot	Amber	-	2	-	2	2	4	1	**11**
Common Moorhen	Green	-	-	2	-	1	-	2	**5**
Common Snipe	Red	-	-	-	-	-	4	-	**4**
Grey Heron	Green	-	-	1	1	-	1	-	**3**
Little Grebe	Amber	-	1	-	-	-	-	1	**2**
Site 11									
Mallard	Amber	-	2	4	6	2	8	4	**26**
Little Grebe	Amber	-	5	4	2	4	4	3	**22**
Mute Swan	Amber	-	2	2	2	2	2	2	**12**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Grey Heron	Green	-	1	1	-	-	2	1	**5**
Common Moorhen	Green	-	-	-	-	-	1	-	**1**
Site 12									
Eurasian Teal	Amber	-	25	12	-	12	16	12	**181**
Mallard	Amber	-	8	16	-	16	6	16	**90**
Common Snipe	Red	-	1	1	-	-	2	--	**14**
Site 14									
Common Kestrel	Red	-	-	-	-	-	-	1	**1**
Common Buzzard	Green	-	-	-	-	-	1	-	**1**
Site 15									
Common Kestrel	Red	-	-	-	-	1	-	-	**1**
Grey Heron	Green	-	-	-	-	1	-	-	**1**
Common Moorhen	Green	-	-	-	1	-	-	-	**1**
Site 16									
Whooper Swan	Amber	Annex I	-	-	56	-	-	-	**56**
Mute Swan	Amber	-	-	-	8	-	2	-	**10**
Little Grebe	Amber	-	-	-	-	-	2	3	**5**
Mallard	Amber	-	-	-	-	-	-	4	**4**
Common Snipe	Red	-	-	-	-	-	2	-	**2**
Eurasian Coot	Amber	-	-	1	-	-	-	-	**1**
Common Moorhen	Green	-	-	-	-	-	-	1	**1**
Site 17									
Northern Lapwing	Red	-	-	-	-	2	250	-	**252**
Whooper Swan	Amber	Annex I	-	-	-	62	72	11	**145**
Mute Swan	Amber	-	-	-	-	2	-	8	**10**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Kestrel	Red	-	-	-	-	-	-	1	**1**
Site 18									
Mallard	Amber	-	-	13	-	18	-	2	33
Mute Swan	Amber	-	6	11	6	2	5	2	32
Tufted Duck	Amber	-	-	-	-	-	8	12	20
Eurasian Curlew	Red	-	-	-	-	-	12	-	12
Whooper Swan	Amber	Annex I	-	-	8	4	-	-	12
Black-headed Gull	Amber	-	1	-	-	-	-	4	5
Great Crested Grebe	Amber	-	-	1	-	-	-	-	1
Grey Heron	Green	-	-	-	-	-	-	1	1
Site 19									
Mute Swan	Amber	Annex I	-	92	84	121	48	4	**349**
Tufted Duck	Amber	-	-	-	74	-	18	-	**92**
Mallard	Amber	-	-	-	10	20	10	2	**42**
Eurasian Teal	Amber	-	20	-	-	-	-	-	**20**
Great Cormorant	Amber	-	-	-	8	-	3	-	**11**
Great Crested Grebe	Amber	-	-	-	1	4	3	-	**8**
Common Ringed Plover	Amber	-	-	-	-	-	4	-	**4**
Grey Heron	Green	-	-	-	1	1	1	-	**3**
Common Kestrel	Red	-	1	-	-	-	-	-	**1**
Merlin	Amber	Annex I	-	-	-	1	-	-	**1**
Site 20									
Mute Swan	Amber	-	46	33	72	84	44	8	**287**
Tufted Duck	Amber	-	120	-	-	-	32	33	**185**
Mallard	Amber	-	4	-	-	9		2	**15**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Great Cormorant	Amber	-	3	5	1	-	1	-	**10**
Grey Heron	Green	-	-	-	3	-	1	-	**4**
Eurasian Teal	Amber	-	-	2	-	-	-	-	**2**
Great Crested Grebe	Amber	-	-	-	1	-	-	-	**1**
Site 21									
Mute Swan	Amber	-	-	18	6	-	-	160	**184**
Tufted Duck	Amber	-	-	22	-	-	12	25	**59**
Eurasian Teal	Amber	-	-	8	-	-	-	-	**8**
Grey Heron	Green	-	-	1	1	1	-	1	**4**
Mallard	Amber	-	-	-	-	-	-	4	**4**
Great Cormorant	Amber	-	-	-	1	-	-	2	**3**
Common Pochard	Red	-	-	3	-	-	-	-	**3**
Great Crested Grebe	Amber	-	-	2	-	-	1	-	**3**
Common Snipe	Red	-	-	-	-	1	-	-	**1**
Site 22									
Mute Swan	Amber	-	22	15	8	12	49	5	**111**
Grey Heron	Green	-	-	1	-	1	-	-	**2**
Little Grebe	Amber	-	-	-	-	-	-	2	**2**
Common Moorhen	Green	-	-	-	-	-	2	-	**2**
Common Buzzard	Green	-	-	-	-	1	-	-	**1**
Great Cormorant	Amber	-	1		-	-	-	-	**1**
Site 23									
Mute Swan	Amber	-	-	21	3	-	-	2	**26**
Mallard	Amber	-	-	-	4	-	4	-	**8**
Eurasian Wigeon	Amber	-	-	2	-	-	6	-	**8**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Moorhen	Green	-	-	-	-	-	2	-	**2**
Tufted Duck	Amber	-	-	-	-	-	2	-	**2**
Great Cormorant	Amber	-	-	-	1	-	1	-	**2**
Great Crested Grebe	Amber	-	-	1	-	-	-	-	**1**
Site 25									
Mute Swan	Amber	-	-	-	4	-	-	1	**5**
Mallard	Amber	-	-	-	-	-	-	3	**3**
Little Grebe	Amber	-	-	-	2	-	1	-	**3**
Eurasian Coot	Amber	-	-	2	-	-	-	-	**2**
Site 26									
Northern Lapwing	Red	-	-	-	-	8	55	7	**70**
Mallard	Amber	-	3	25	7	3	16	12	**66**
Whooper Swan	Amber	Annex I	-	2	15	26	19	-	**62**
Mute Swan	Amber	-	4	4	7	6	6	16	**43**
Eurasian Teal	Amber	-	-	5	8	3	12	4	**32**
Common Snipe	Red	-	2	12	2	3	1	-	**20**
Grey Heron	Green	-	2	2	-	3	1	1	**9**
Little Egret	Green	Annex I	1	-	1		1	3	**6**
Common Buzzard	Green	-	1	-	-	-	-	4	**5**
Great Egret	Green	Annex I	-	1	1	1	1	1	**5**
Common Redshank	Red	-	-	-	-	1	1	2	**4**
Little Grebe	Amber	-	-	-	-	-	-	3	**3**
Great Cormorant	Amber	-	-	-	1	-	1	1	**3**
Common Kestrel	Red	-	1	-		-	1	-	**2**
Water Rail	Green	-	1	-	1	-	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Moorhen	Green	-	-	-	-	-	-	2	**2**
Hen Harrier	Amber	Annex I	-	-	-	1	-	-	**1**
Black-headed Gull	Amber	-	-	-	1	-	-	-	**1**
Eurasian Sparrowhawk	Green	-	1	-	-	-	-	-	**1**
Common Greenshank	Green	-	-	-	-	1	-	-	**1**
Common Kingfisher	Amber	Annex I	1	-	-	-	-	-	**1**
Merlin	Amber	Annex I	-	1	-	-	-	-	**1**
Site 27									
Northern Lapwing	Red	-	-	-	-	-	35	-	**35**
European Golden Plover	Red	Annex I	10	-	-	-	-	-	**10**
Mallard	Amber	-	-	6	1	-	-	-	**7**
Common Ringed Plover	Amber	-	-	-	-	-	6	1	**7**
Whooper Swan	Amber	Annex I	-	-	6	-	-	-	**6**
Little Egret	Amber	-	-	3	-	-	-	-	**3**
Common Snipe	Red	-	-	-	-	2	-	-	**2**
Grey Heron	Green	-	1	-	1	-	-	-	**2**
Site 28									
Mallard	Amber	-	3	6	5	5	-	-	**19**
Common Snipe	Red	-		2	4	2	2	2	**12**
Mute Swan	Amber	-	2	2		2	2	2	**10**
Common Moorhen	Green	-	-	-	-	-	1	-	**1**
Common Buzzard	Green	-	-	-	1	-	-	-	**1**
Grey Heron	Green	-	3	6	5	-	-	1	**1**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Site 29									
European Golden Plover	Red	Annex I	-	-	50	60	-	-	**110**
Mute Swan	Amber	-	4	2	2	2	2	2	**14**
Mallard	Amber	-	-	4	-	-	6	-	**10**
Common Snipe	Red	-	2	-	1	2	1	-	**6**
Great Cormorant	Amber	-	1	-	-	-	1	1	**3**
Grey Heron	Green	-	-	1	-	1	-	-	**2**
Common Moorhen	Green	-	-	-	-	-	-	1	**1**
Site 30									
European Golden Plover	Red	Annex I	-	-	550	-	-	-	**550**
Mallard	Amber	-	5	26	12	6	14	3	**66**
Whooper Swan	Amber	Annex I	-	-	6	22	12	-	**40**
Northern Lapwing	Red	-	-	-	-	8	22	-	**30**
Grey Heron	Green	-	2	3	2	2	2	-	**11**
Mute Swan	Amber	-	4	-	2	2	-	-	**8**
Eurasian Teal	Amber	-	-	2	-	6	-	-	**8**
Common Buzzard	Green	-	-	1	-	2	-	1	**4**
Great Cormorant	Amber	-	-	-	2	1	1	-	**4**
Common Snipe	Red	-	-	-	2	-	-	1	**3**
Great Egret	Green	Annex I	-	1	1	-	-	-	**2**
Common Kestrel	Red	-	1	-	-	-	-	-	**1**
Common Moorhen	Green	-	-	-	-	-	-	1	**1**
Little Egret	Green	Annex I	-	1	-	-	-	-	**1**
Site 31									
Common Snipe	Red	-	3	-	3	5	-	3	**14**

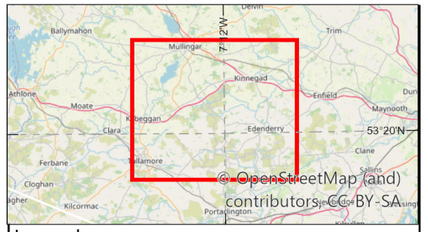
Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Mute Swan	Amber	-	2	2	2	2	2	2	**12**
Common Kestrel	Red	-	2	1	1	-	1	-	**5**
Grey Heron	Green	-	-	-	-	-	-	1	**1**
Site 33									
Whooper Swan	Amber	Annex I	-	-	-	-	18	-	**18**
Mute Swan	Amber	-	4	5	2	-	-	-	**11**
Mallard	Amber	-	-	-	-	-	9	-	**9**
Little Egret	Green	Annex I	4	-	1	-	-	-	**5**
Little Grebe	Amber	-	-	-	-	-	2	1	**3**
Common Buzzard	Green	-	-	-	1	1	-	-	**2**
Northern Lapwing	Red	-	-	-	-	-	-	2	**2**
Common Snipe	Red	-	-	-	-	-	-	1	**1**
Common Kestrel	Red	-	1	-	-	-	-	-	**1**
Eurasian Sparrowhawk	Green	-	-	-	1	-	-	-	**1**
Grey Heron	Green	-	1	-	-	-	-	-	**1**
Common Moorhen	Green	-	-	-	-	-	-	1	**1**
Common Ringed Plover	Amber	-	-	-	-	-	-	1	**1**
Eurasian Teal	Amber	-	-	-	-	-	-	1	**1**
Great Egret	Green	Annex I	-	-	1	-	-	-	**1**
Site 34									
European Golden Plover	Red	Annex I	12	12	12	6	6	-	**48**
Common Snipe	Red	-	-	3	4	6	4	2	**19**
Northern Lapwing	Red	-	-	-	-	-	14	4	**18**
Mallard	Amber	-	-	-	6	-	-	-	**6**
Mute Swan	Amber	-	-	-	2	2	-	-	**4**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Ringed Plover	Amber	-	-	-	-	-	-	2	**2**
Eurasian Sparrowhawk	Green	-	-	1	-	-	1		**2**
Common Buzzard	Green	-	1	-	-	1	-	-	**2**
Little Egret	Green	Annex I	-	-	1	-	-	-	**1**
Grey Heron	Green	-	1	-	-	-	-	-	**1**

7°28'30"W
7°18'12"W
7°7'54"W
6°57'36"W
53°29'52"N
53°24'20"N
53°18'48"N
754000
745000
736000
727000
634000
644700
655400
666100

Site 1
Site 2
Site 3
Site 4
Site 5
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Site 7
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Site 32
Site 33
Site 34

Earthstar Geographics



Legend

- Derrygreenagh Wind and Solar Proposed Developments
- Proposed Wind Farm 10Km Buffer
- Water Bird Site Locations

0 2,000 4,000
Meters

NOTES

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

Rev	Date	Description	By	Chkd.
A	20/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-4: I-WeBS/Waterbird Survey Locations

Scale @ A3: 1:120,000

Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Map Ref: 11458-037-WT.S-BUFF10-TOB-A

Draft: A

2.3 HEN HARRIER ROOST SURVEYS

Hen Harrier roost watches were undertaken within the proposed development site, following methodologies outlined within Hardey *et al.* (2013), as recommended by SNH (2017). Roost surveys were conducted at a vantage point an hour before the sunset and until last visible light. Information recorded at vantage points included a number of Hen Harrier entering a roost, time, age and sex, where it was possible to discern. The aim of this survey was to establish the distribution and abundance of Hen Harrier (*Circus cyaneus*) and other wintering raptors within the study area.

Hen Harrier was recorded throughout the survey period (13 sightings), with two potential roosting areas identified. The first was located in the north-west of Drumman Bog, west of the quarry ponds and near the track. The second potential roosting area was identified in the south-eastern part of Derryarkin Bog.

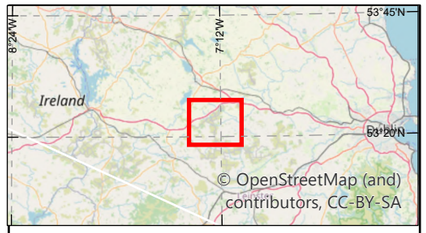
Other species recorded during the winter as part of the Hen Harrier Roost Surveys included 14 target species, with European Golden Plover (660 signtings) and Whooper Swan (30 sightings) being the most frequently observed (Table 2-8). Species observations can be seen in Figure 2-5.

Table 2-8: Summary of Hen Harrier Roost Surveys Between October 2024 - March 2025.

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
European Golden Plover	Red	Annex I	60	-	-	600	-	-	**660**
Whooper Swan	Amber	Annex I	4	-	-	-	26	-	**30**
Common Kestrel	Red	-	2	2	4	3	3	2	**16**
Hen Harrier	Amber	Annex I	2	1	4	2	2	2	**13**
Mallard	Amber	-	-	-	-	-	-	7	**7**
Great Cormorant	Amber	-	-	-	-	-	-	7	**7**
Mute Swan	Amber	-	2	2	2	-	-	-	**6**
Little Egret	Green	Annex I	2	1	-	-	-	-	**3**
Grey Heron	Green	-	-	-	-	1	2	-	**3**
Common Buzzard	Green	-	-	-	-	-	-	3	**3**
Eurasian Woodcock	Red	-	-	-	-	-	-	2	**2**
Common Snipe	Red	-	-	-	-	-	1	-	**1**
Great Egret	Green	Annex I	-	-	-	-	1	-	**1**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**

7°18'12"W
7°7'54"W
745000
736000
53°24'20"N
53°18'48"N
644700
655400
Maxar, Microsoft



Legend

- Derrygreenagh Wind and Solar -Proposed Developments

Non-Flight Observations
- Common Buzzard
- Common Kestrel
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Woodcock
- European Golden Plover
- Great Cormorant
- Great Egret
- Grey Heron
- Hen Harrier
- Little Egret
- Mallard
- Mute Swan
- Whooper Swan

0 1,000 2,000
Meters

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Rev	Date	Description	By	Chkd.
A	19/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-5: Hen Harrier Roost Survey October 2024 – March 2025 Observations

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Map Ref: 11458-039-HH-Oct..Mar25-TOB-A

Draft: A

2.4 WINTER BIRD TRANSECT SURVEY

Wintering Bird transect surveys were conducted to establish the distribution and abundance of birds within the proposed development site, and to allow the evaluation of the site's importance. The transect survey was adapted from CBS (2012), and involved 13 representative transects delineated across the Derrygreenagh Wind and Solar Farm site. Transect layout for the winter 2024/2025 can be seen in Figure 2-6.

7°22'48"W 7°16'30"W 7°10T2"W

53°24'N 53°20'N

742800 737600 732400

T11 T12 T9 T10 T8_1 T8_2 T5 T7 T6 T4 T3 T2 T1

644000 649500 655000



Legend

Derrygreenagh Wind and Solar - Proposed development

Transects

0 1,000 2,000
Meters

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A	04/06/2025	First issue	K.K	J..M

Client: Bord no Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-6: Vantage Points Survey Locations and Viewshed

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Map Ref: 11458-043-TR S-VDA-TOB-A

Draft: A

A total 1136 observations of 25 species were recorded over the survey period (Table 2-9). Overall, European Golden Plover, Northern Lapwing, Mute Swan and Mallard were the most abundant species recorded. Species observations can be seen in Figure 2-7 and Figure 2-8.

Table 2-9: Summary of Winter Transect Survey Bird Activity Between October 2024 and March 2025.

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
European Golden Plover	Red	Annex I	102	21	6	66	6	33	**234**
Northern Lapwing	Red	-	-	110	8	45	26	4	**193**
Mute Swan	Amber	-	10	29	17	44	18	30	**148**
Mallard	Amber	-	-	58	18	28	20	9	**133**
Common Snipe	Red	-	30	14	19	20	28	15	**126**
Eurasian Teal	Amber	-	6	-	7	12	9	14	**48**
Tufted Duck	Amber	-	1	-	5	17	14	2	**39**
Common Kestrel	Red	-	4	5	7	8	3	7	**34**
Great Cormorant	Amber	Annex I	-	-	11	5	6	9	**31**
Common Buzzard	Green	-	4	2	3	6	4	10	**29**
Black-headed Gull	Amber	-	-	-	-	-	-	19	**19**
Redwing	Red	-	-	-	12	6	-	-	**18**
Grey Heron	Green	-	-	3	5	2	5	3	**18**
Eurasian Sparrowhawk	Green	-	2	1	1	5	2	3	**14**
Whooper Swan	Amber	Annex I	5	-	7	-	-	-	**12**
Little Grebe	Amber	-	-	1	-	-	3	5	**9**
Common Ringed Plover	Amber	-	-	-	-	-	-	7	**7**
Great Crested Grebe	Amber	-	-	-	1	2	3	-	**6**
Common Pochard	Red	-	-	-	-	-	-	4	**4**
Peregrine Falcon	Green	Annex I	1	-	-	2	1		**4**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Moorhen	Green	-	1	-	-		2	-	**3**
Hen Harrier	Amber	Annex I	-	-	1	1	-	-	**2**
Eurasian Wigeon	Amber	-	-	2	-	-	-	-	**2**
Merlin	Amber	Annex I	-	-	-	1	1	-	**2**
Little Egret	Green	Annex I	-	-	-	1	-	-	**1**

Transect 8_1 recorded the highest diversity of target bird species, with 18 species observed. This transect route passes by the Drumman quarry ponds, where swans, ducks, waders, and raptors are frequently recorded. However, the transect with the highest abundance of individual target species (327) was Transect 7, which follows a route through the Derryarkin quarry ponds, where flying flocks of Northern Lapwing and European Golden Plover were observed (Table 2-10).

Table 2-10: Distribution of Winter Transect Survey Bird Activity Between October 2024 to March 2025.

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
T1									
Mute Swan	Amber	-	2	-	-	2	2	2	**8**
Common Kestrel	Red	-	1	1	1	-	-	1	**4**
Common Buzzard	Green	-	-	-	-	1	-	2	**3**
Grey Heron	Green	-	-	1	1	-	1	-	**3**
Common Snipe	Red	-	-	1	-	-	2	-	**3**
Eurasian Sparrowhawk	Green	-	-	-	-	1	1	1	**3**
Great Cormorant	Amber	-	-	-	1	-	-	-	**1**
T2									
Common Snipe	Red	-	3	1	2	2	4	3	**15**
European Golden Plover	Red	Annex I	-	14	-	-	-	-	**14**
Common Buzzard	Green	-	-	-	1	1	-	1	**3**
Common Kestrel	Red	-	-	-	-	1	1	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
T3									
Common Snipe	Red	-	3	2	2	3	3	-	**13**
Mallard	Amber	-	-	-	5	-	-	3	**8**
Common Kestrel	Red	-	1	1	1	1	1	1	**6**
Grey Heron	Green	-	-	1	1	1	1	1	**5**
Common Buzzard	Green	-	-	1	-	-	-	1	**2**
T4									
Redwing	Red	-	-	-	12	6	-	-	**18**
Whooper Swan	Amber	Annex I	5	-	7	-	-	-	**12**
Northern Lapwing	Red	-	-	-	8	-	-	-	**8**
Common Buzzard	Green	-	2	-	-	1	-	1	**4**
Eurasian Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
T5									
Eurasian Teal	Amber	-	6	-	4	4	5	2	**21**
Mallard	Amber	-	-	-	6	12	-	1	**19**
Tufted Duck	Amber	-	1	-	-	2	6	2	**11**
Little Grebe	Amber	-	-	1	-	-	3	4	**8**
Common Pochard	Red	-	-	-	-	-		4	**4**
Common Moorhen	Green	-	1	-	-	-	1	-	**2**
Mute Swan	Amber	-	-	-	-	-	2	-	**2**
Hen Harrier	Amber	Annex I	-	-	1	-	-	-	**1**
Peregrine Falcon	Green	Annex I	1	-	-	-	-	-	**1**
T6									
Common Snipe	Red	-	1	1	-	4	-	-	**6**
Mallard	Amber	-	-	-	-	5	-	-	**5**
Common Kestrel	Red	-	-	1	-	1	1	2	**5**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Common Buzzard	Green	-	-	-	-	-	2	-	**2**
Grey Heron	Green	-	-	-	-	-	1	-	**1**
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**
T7									
Northern Lapwing	Red	-	-	110	-	45	25	1	**181**
European Golden Plover	Red	Annex I	30	-	-	60	-	-	**90**
Mallard	Amber	-	-	6	-	8	-	-	**14**
Black-headed Gull	Amber	-	-	-	-	-	-	14	**14**
Common Snipe	Red	-	7	-	2	-	1	-	**10**
Mute Swan	Amber	-	-	2	-	-	-	4	**6**
Great Cormorant	Amber	-	-	-	-	-	4	1	**5**
Eurasian Sparrowhawk	Green	-	1	-	-	1	-	-	**2**
Grey Heron	Green	-	-	-	-	-	1	1	**2**
Common Kestrel	Red	-	1	-	1	-	-	-	**2**
Little Grebe	Amber	-	-	-	-	-	-	1	**1**
T8_1									
Mute Swan	Amber	-	5	25	17	40	14	24	**125**
Tufted Duck	Amber	-	-	-	5	15	8	-	**28**
Mallard	Amber	-	-	1	4	3	14	5	**27**
Great Cormorant	Amber	-	-	-	10	5	2	8	**25**
Eurasian Teal	Amber	-	-	-	3	8	-	12	**23**
European Golden Plover	Red	Annex I	3	-	-	-	-	18	**21**
Common Ringed Plover	Amber	-	-	-	-	-	-	7	**7**
Common Snipe	Red	-	2	-	2	2	-	-	**6**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Great Crested Grebe	Amber	-	-	-	1	2	3	-	**6**
Grey Heron	Green	-	-	1	3	1	1	-	**6**
Black-headed Gull	Amber	-	-	-	-	-	-	5	**5**
Common Kestrel	Red	-	-	-	-	2	-	-	**2**
Common Buzzard	Green	-	-	1	-	1	-	-	**2**
Peregrine Falcon	Green	Annex I	-	-	-	1	-	-	**1**
Hen Harrier	Amber	Annex I	-	-	-	1	-	-	**1**
Eurasian Sparrowhawk	Green	-	1	-	-	-	-	-	**1**
Little Egret	Green	Annex I	-	-	-	1	-	-	**1**
Northern Lapwing	Red	-	-	-	-	-	-	1	**1**
T8_2									
European Golden Plover	Red	Annex I	63	-	-	-	-	-	**63**
Mallard	Amber	-	-	42	-	-	-	-	**42**
Common Snipe	Red	-	1	1	2	1	1	2	**8**
Common Buzzard	Green	-	1	-	1	1	2	1	**6**
Common Kestrel	Red	-	-	1	1	1	-	-	**3**
Northern Lapwing	Red	-	-	-	-	-	1	1	**2**
Peregrine Falcon	Green	Annex I	-	-	-	1	1		**2**
Eurasian Sparrowhawk	Green	-	-	-	-	2	-	-	**2**
T9									
Common Snipe	Red	-	7	3	1	1	5	4	**21**
Mallard	Amber	-	-	6	-	-	4	-	**10**
Common Buzzard	Green	-	-	-	1	-	-	2	**3**
Common Kestrel	Red	-	-	-	1	-	-	1	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Oct	Nov	Dec	Jan	Feb	Mar	Total
Eurasian Wigeon	Amber	-	-	2	-	-	-	-	**2**
Northern Lapwing	Red	-	-	-	-	-	-	1	**1**
Merlin	Amber	Annex I	-	-	-	1	-		**1**
T10									
Common Snipe	Red	-	2	1	4	1	8	3	**19**
European Golden Plover	Red	Annex I	-	-	-	-	-	15	**15**
Mallard	Amber	-	-	3	3	-	2	-	**8**
Mute Swan	Amber	-	3	2	-	2	-	-	**7**
Eurasian Teal	Amber	-	-	-	-	-	4	-	**4**
Common Kestrel	Red	-	-	-	1	1		1	**3**
Common Moorhen	Green	-	-	-	-	-	1	-	**1**
Merlin	Amber	Annex I	-	-	-	-	1	-	**1**
Grey Heron	Green	-	-	-	-	-	-	1	**1**
Eurasian Sparrowhawk	Green	-	-	1	-	-	-	-	**1**
T11									
Common Snipe	Red	-	1	3	3	4	3	2	**16**
Common Buzzard	Green	-	1	-	-	-	-	2	**3**
Common Kestrel	Red	-	-	-	1	1	-	1	**3**
T12									
European Golden Plover	Red	Annex I	6	7	6	6	6	--	**31**
Common Snipe	Red	-	3	1	1	2	1	1	**9**
Eurasian Sparrowhawk	Green	-	-	-	1	-	1	1	**3**
Common Kestrel	Red	-	1	1	-	-	-	-	**2**
Common Buzzard	Green	-	-	-	-	1	-	-	**1**

7°18'12"W

7°7'54"W

53°24'20"N

736000

644700

655400

T11

T12

T9

T10

T8_1

T8_2

T7

T5

T6

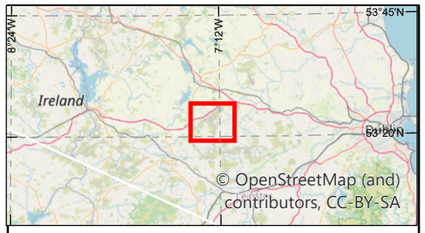
T4

T3

T2

T1

Maxar, Microsoft



Legend

- Derrygreenagh Wind and Solar - Proposed Developments
- Non-Flight Observations
- Common Buzzard
- Common Kestrel
- Common Moorhen
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Teal
- Eurasian Wigeon
- European Golden Plover
- Great Cormorant
- Great Crested Grebe
- Grey Heron
- Hen Harrier
- Little Grebe
- Mallard
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Redwing
- Tufted Duck
- Whooper Swan
- Transect Route

0 2,000
Meters

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Rev	Date	Description	By	Chkd.
A	20/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-7: Transect Survey October-December 2024 Observations

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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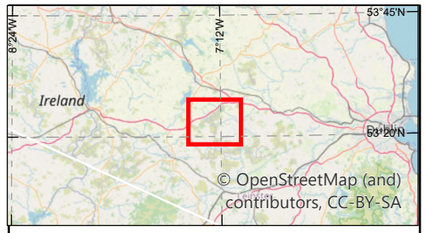
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Map Ref: 11458-040-TR-Oct..Dec24-TOB-A

Draft: A

7°18'12"W
7°7'54"W
53°24'20"N
53°18'48"N
745000
736000
644700
655400
Maxar, Microsoft



Legend

- Derrygreenagh Wind and Solar - Proposed Developments

Non-Flight Observations

- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Moorhen
- Common Pochard
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Teal
- European Golden Plover
- Great Cormorant
- Great Crested Grebe
- Grey Heron
- Hen Harrier
- Little Egret
- Little Grebe
- Mallard
- Merlin
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Redwing
- Tufted Duck
- Transect Routes

0 2,000
Meters

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Rev	Date	Description	By	Chkd
A	20/06/2025	First issue	K.K	J..M

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-8: Transect Survey January-March 2025 Observations

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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2.5 INCIDENTAL SIGHTING

Incidental sightings were recorded at the Derrygreenagh Wind and Solar Farm site, but outside of the scheduled surveys. This could be sighting of target species observed during the walk to the VP location, during VP 30 min break, or outside of the viewshed. Incidental sightings are summarised in Table 2-11. Species observations can be seen in Figure 2-9.

Table 2-11: Summary of Incidental Sighting Surveys between October 2024 and March 2025.

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Number of observations over the survey period
Black-headed Gull	Amber	-	**66**
Whooper Swan	Amber	Annex I	**19**
Mallard	Amber	-	**12**
Little Grebe	Amber	-	**1**
Northern Lapwing	Red	-	**1**
Eurasian Woodcock	Red	-	**1**
Merlin	Amber	Annex I	**1**

7°18'12"W

7°7'54"W

745000

736000

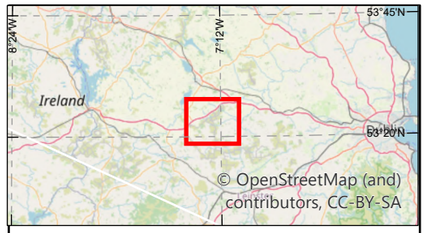
53°24'20"N

53°18'48"N

644700

655400

Maxar, Microsoft



Legend

- Derrygreenagh Wind and Solar - Proposed Developments Non-Flight Observations
- Black-headed Gull
- Eurasian Woodcock
- Little Grebe
- Mallard
- Merlin
- Northern Lapwing
- Whooper Swan

0 2,000
Meters

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A	20/06/2025	First issue	K.K	J..M
Rev	Date	Description	By	Chkd

Client:

Bord na Móna

Project:

Bord na Mona - Derrygreenagh Wind and Solar

Title:

Figure 2-9:
Incidental sightings observations

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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3. CONCLUSION

In total, 38 target bird species were identified at the Derrygreenagh Wind and Solar Farm site and its hinterland during the winterseason across all surveys. The most commonly sighted species were European Golden Plover, Northern Lapwing, Mute Swan, and Mallard. Additionally, seven raptor species were recorded at the site: Common Buzzard, Common Kestrel, Eurasian Sparrowhawk (*Accipiter nisus*), Hen Harrier, Peregrine Falcon (*Falco peregrinus*), Merlin (*Falco columbarius*), and Western Marsh Harrier (*Circus aeruginosus*).

Target species recorded at the Derrygreenagh Wind and Solar Farm site and its hinterland during the winter season 2024–2025 included eight species listed in Annex I of the Birds Directive [i.e. European Golden Plover, Whooper Swan, Hen Harrier, Peregrine Falcon, Merlin, Little Egret (*Egretta garzetta*),Great Egret (*Egretta garzetta*), and Western Marsh Harrier], and ten species classified as Red-listed by Gilbert et al. (2021) [i.e. Eurasian Curlew (*Numenius arquata*), European Golden Plover,Common Kestrel, Northern Lapwing, Northern Shoveler (*Anas clypeata*), Common Goldeneye (*Bucephala clangula*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Common Redshank (*Tringa totanus*), Common Snipe (*Gallinago Gallinago*), and Eurasian Woodcock (*Scolopax rusticola*)].

The winter 2024–2025 surveys at the Derrygreenagh Wind and Solar Farm site highlighted Hen Harrier activity at the site, with two potential roosts identified: one in the north-western area of Drumman Bog, and another in the south-eastern part of Derryarkin Bog. Additionally, Hen Harriers were observed in flight during the winter season in other parts of the Derrygreenagh Wind and Solar Farm, including Ballybeg Bog and the western area of Derryarkin Bog.

4. REFERENCES

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TOBIN

Bord na Móna Derrygreenagh Wind and Solar

Wind Farm Breeding Season 2025 Bird Surveys: Summary Report

Bord na Móna

BUILT ON KNOWLEDGE

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1. BACKGROUND

This report summarises the results of bird surveys undertaken by TOBIN at the proposed Derrygreenagh Wind and Solar Farm site during the Breeding Season 2025, for the survey period of April to September.

2. SUMMARY OF LOCAL BIRD ACTIVITY DURING THE BREEDING SEASON 2025

2.1 VANTAGE POINT SURVEYS

The Vantage Point (VP) surveys were carried in accordance with the methodology set out by the Scottish Natural Heritage (SNH) guidelines (SNH, 2017). Thirteen (13) VPs across the Derrygreenagh Wind and Solar Farm development site were set at fixed locations, which were strategically positioned to provide a maximum viewshed of the survey area over the survey period, the locations of which can be seen in Figure 2-1. The viewshed of a given VP extended to a distance of no greater than 2km and included an arc of no greater than 180 degrees, as per SNH (2017), which encompassed the study area for the VP surveys.

The 13 VPs were surveyed for 6 hours each on each month, summing up to a total of 468 hours for the survey period of April to September 2025 (Table 2-1).

Table 2-1: Summary of Summer Vantage Point Survey Effort Between April to September 2025

Vantage point	Apr	May	Jun	Jul	Aug	Sep	Total hours
1	6	6	6	6	6	6	**36**
2	6	6	6	6	6	6	**36**
3	6	6	6	6	6	6	**36**
4	6	6	6	6	6	6	**36**
5	6	6	6	6	6	6	**36**
6	6	6	6	6	6	6	**36**
7	6	6	6	6	6	6	**36**
8	6	6	6	6	6	6	**36**
9	6	6	6	6	6	6	**36**
10	6	6	6	6	6	6	**36**
11	6	6	6	6	6	6	**36**
12	6	6	6	6	6	6	**36**
13	6	6	6	6	6	6	**36**
Total hours	**78**	**78**	**78**	**78**	**78**	**78**	**468**

7°22'48"W
7°16'30"W
7°10'12"W
53°27'12"N
53°23'40"N
53°20'8"N
742800
737600
732400
644000
649500
655000





Legend

- Derrygreenagh Wind and Solar - Proposed Developments
- Proposed wind farm 500m buffer
- VPs
- Viewshed Coverage

0 1,000 2,000
Meters

NOTES

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

Rev	Date	Description	By	Chkd.
A	18/06/2025	First issue	K.K	J..M

Client:

Bord na Móna

Project:

Bord na Mona - Derrygreenagh Wind and Solar

Title:

Figure 2-1:
Vantage Points Survey Locations and Viewshed

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
K.Kale	J.Martins	June 2025

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Map Ref: 11458-034-VP-Oct..Dec.24-TOB-A

Draft: A

The VP surveys registered observations of 22 species flying within VP viewsheds over this survey period (Table 2-2). Northern Lapwing (*Vanellus vanellus*) was the most abundant species observed flying during the VP surveys, with 289 sightings, including a flock of 120 individuals. The highest concentrations of Northern Lapwing flight records were over the Derryarkin and Drumman quarry ponds, cutover bog in the north-western part from Derryarkin Bog and northern part of the Derryhinch Bog.

Common Buzzard (*Buteo buteo*) and Common Kestrel (*Falco tinnunculus*) and were the most frequently recorded raptor species with 147 and 116 sightings respectively Observations typically involved between one and five Buzzards, and between one to three Kestrels. Both species were observed consistently across Derryarkin, Drumman and Derryhinch bogs. Additionally, Peregrine was recorded in all survey months, with a total 16 sightings, predominantly involving single bird, with one record of two birds and another of three birds, including one juvenile. A single Hen Harrier (*Circus cyaneus*) was observed in flight once in September.

Notably, fiveAnnex I species were observed in flight at the Derrygreenagh Wind and Solar Farm during the breeding season. These were: European Golden Plover (*Pluvialis apricaria*), Peregrine Falcon (*Falco peregrinus*), Great Egret (*Ardea alba*), Little Egret (*Egretta garzetta*) and Hen Harrier.

Overall, the flightlines recorded during the Vantage Point surveys represent a typical and expected flight patterns over the Derrygreenagh Wind and Solar Farm development site during the breeding season and similar to previous years of surveys. Species observations can be seen in Figure 2-2 and Figure 2-3.

Table 2-2: Summary of Vantage Point Surveys Records of Target Species in Flight Between April to

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Northern Lapwing	Red	-	72	24	71	2	120	-	**289**
Black-headed Gull	Amber	-	87	49	42	16	-	-	**194**
Common Buzzard	Green	-	33	25	29	24	17	19	**147**
European Golden Plover	Red	Annex I	97	-	-	-	-	42	**139**
Common Kestrel	Red	-	15	6	23	8	30	34	**116**
Mallard	Amber	-	3	12	2	19	62		**98**
Lesser Black-backed Gull	Amber	-	4	-	11	-	21	29	**65**
Grey Heron	Green	-	11	11	4	5	5	-	**36**
Mute Swan	Amber	-	6	8	7	6	4	3	**34**
Eurasian Sparrowhawk	Green	-	3	2	5	7	4	7	**28**
Peregrine Falcon	Green	Annex I	1	4	1	8	1	1	**16**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Snipe	Red	-	5	1	4	1	-	-	**11**
Common Ringed Plover	Amber	-	4	-	1	-	1	-	**6**
Eurasian Teal	Amber	-	-	-	-	-	4	-	**4**
Tufted Duck	Amber	-	4	-	-	-	-	-	**4**
Eurasian Woodcock	Red	-	-	-	3	-	-	-	**3**
Great Cormorant	Amber	-	-	-	-	-	3	-	**3**
Great Egret	Green	Annex I	-	-	2	-	-	-	**2**
Greylag Goose	Amber	-	2	-	-	-	-	-	**2**
Little Egret	Green	Annex I	-	-	-	-	-	1	**1**
Eurasian Curlew	Red	-	-	-	-	-	1	-	**1**
Hen Harrier	Amber	Annex I	-	-	-	-	-	1	**1**

Table 2-3 summarises the observations at each of the VPs. The highest diversity of flying target species was recorded at VP6 located in Drumman Bog, with 13 species, whereas the highest abundance of flying birds was recorded at VP10 located in Derryarking Bog, with 266 sightings of seven different species. Other VP locations of relevant flying activity abundance were VP12 (108 sightings), VP7 (184 sightings), and VP9 (140 sightings).

Table 2-3: Summary of Breeding Birds Observation Per Vantage Point (Target Species Flying Observation –April to September 2025)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
VP1									
European Golden Plover	Red	Annex I	12	-	-	-	-	6	**18**
Lesser Black-backed Gull	Amber	-	-	-	-	-	11	5	**16**
Common Buzzard	Green	-	5	1	1	5	1	-	**13**
Common Kestrel	Red	-	-	-	6	2	1	2	**11**
Northern Lapwing	Red	-	1	3	-	-	-	-	**4**
VP2									
Common Kestrel	Red	-	5	-	4	1	2	7	**19**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Buzzard	Green	-	2	2	3	1	3	2	**13**
European Golden Plover	Red	Annex I	-	-	-	-	-	12	**12**
Peregrine Falcon	Green	Annex I	-	-	1	8	-	-	**9**
Grey Heron	Green	-	-	1	-	2	-	-	**3**
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**
VP3									
European Golden Plover	Red	Annex I	-	-	-	-	-	24	**24**
Lesser Black-backed Gull	Amber	-	-	-	-	-	10	-	**10**
Common Buzzard	Green	-	2	1	1	-	3	1	**8**
Common Kestrel	Red	-	2	1	1	-	2	1	**7**
Eurasian Sparrowhawk	Green	-	-	-	1	-	1	-	**2**
Grey Heron	Green	-	-	1		-	-	-	**1**
VP4									
Common Buzzard	Green	-	3	-	1	2	1	2	9
Lesser Black-backed Gull	Amber	-	-	-	-	-	-	6	6
Mallard	Amber	-	-	-	-	-	6	-	6
Grey Heron	Green	-	2	1	-	1	1	-	5
Common Kestrel	Red	-	-	-	1	1	1	2	5
Common Snipe	Red	-	-	-	4	-	-	-	4
Mute Swan	Amber	-	4	-	-	-	-	-	4
Eurasian Sparrowhawk	Green	-	-	-	-	-	-	2	2
VP5									
Common Buzzard	Green	-	10	6	2	1	-	1	**20**
Black-headed Gull	Amber	-	7	1	5	-	-	-	**13**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Kestrel	Red	-	-	2	1	-	3	4	**10**
Northern Lapwing	Red	-	-	-	4	-	-	-	**4**
Eurasian Sparrowhawk	Green	-	-	-	2	1	-	-	**3**
Peregrine Falcon	Green	Annex I	1	-	-	-	-	-	**1**
VP6									
Black-headed Gull	Amber	-	17	1	1	-	-	-	**19**
Common Buzzard	Green	-	2	-	3	2	1	2	**10**
Mute Swan	Red	-	-	2	-	6	-	-	**8**
Grey Heron	Green	-	1	3	1	1	1	-	**7**
Common Ringed Plover	Amber	-	4	-	1	-	1	-	**6**
Common Kestrel	Red	-	2	1	3	-	-	-	**6**
Eurasian Sparrowhawk	Green	-	-	-		2	1	2	**5**
Lesser Black-backed Gull	Amber	-	-	-	3	-	-	-	**3**
Northern Lapwing	Red	-	1	1	-	-	-	-	**2**
Great Egret	Green	Annex I	-	-	2	-	-	-	**2**
Little Egret	Green	Annex I	-	-	-	-	-	1	**1**
Peregrine Falcon	Green	Annex I	-	-	-	-	-	1	**1**
Hen Harrier	Amber	Annex I	-	-	-	-	-	1	**1**
VP7									
European Golden Plover	Red	Annex I	85	-	-	-	-	-	**85**
Northern Lapwing	Red	-	55	-	-	-	-	-	**55**
Common Buzzard	Green	-	6	3	3	1	3	2	**18**
Common Kestrel	Red	-	1	1	2	-	10	2	**16**
Lesser Black-backed Gull	Amber	-	-	-	6	-	-	-	**6**
Mute Swan	Amber	-	-	2	-	-	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mallard	Amber	-	-	1	-	-	-	-	**1**
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**
VP8									
Black-headed Gull	Amber	-	31	5	7	-	-	-	**43**
Common Buzzard	Green	-	2	3	8	2	4	1	**20**
Mallard	Amber	-	-	-	-	15	-	-	**15**
Lesser Black-backed Gull	Amber	-	-	-	-	-	-	4	**4**
Grey Heron	Green	-	1	2	-	-	-	-	**3**
Common Kestrel	Red	-	-	-	-	-	1	1	**2**
Mute Swan	Amber	-	2	-	-	-	-	-	**2**
Common Snipe	Red	-	1	-	-	-	-		**1**
VP9									
Mallard	Amber	-	3	-	-	-	55	-	**58**
Black-headed Gull	Amber	-	7	11	5	3	-	-	**26**
Common Kestrel	Red	-	3	1	1	3	5	11	**24**
Common Buzzard	Green	-	-	1	3	3	1	1	**9**
Grey Heron	Green	-	1	3	1	1	-	-	**6**
Eurasian Sparrowhawk	Green	-	-	2	-	1	-	1	**4**
Eurasian Teal	Amber	-	-	-	-	-	4	-	**4**
Mute Swan	Amber	-	-	-	2	-	2	-	**4**
Peregrine Falcon	Green	Annex I	-	3	-	-	-	-	**3**
Lesser Black-backed Gull	Amber	-	-	-	2	-	-	-	**2**
VP10									
Northern Lapwing	Red	-	6	19	67	2	120	-	**214**
Black-headed Gull	Amber	-	8	-	3	1	-	-	**12**
Common Buzzard	Green	-	1	1	3	4	-	2	**11**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Kestrel	Red	-	2		3		2	3	**10**
Lesser Black-backed Gull	Amber	-	-	-	-	-	-	6	**6**
Eurasian Sparrowhawk	Green	-	3	-	-	-	2	1	**6**
Mallard	Amber	-	-	3	-	-	-	-	**3**
Common Snipe	Red	-	1	1	-	1	-	-	**3**
Peregrine Falcon	Green	Annex I	-	1	-	-	-	-	**1**
VP11									
Black-headed Gull	Amber	-	-	8	-	7	-	-	**15**
Northern Lapwing	Red	-	8	-	-	-	-	-	**8**
Mallard	Amber	-	-	3	1	2	-	-	**6**
Common Buzzard	Green	-	-	1	1	-	-	2	**4**
Common Snipe	Red	-	3	-	-	-	-	-	**3**
Eurasian Woodcock	Red	-	-	-	3	-	-	-	**3**
Grey Heron	Green	-	1	-	-	-	1	-	**2**
Common Kestrel	Red	-	-	-	1	-	1	-	**2**
Eurasian Sparrowhawk	Green	-	-	-	1	1	-	-	**2**
Eurasian Curlew	Red	-	-	-	-	-	1	-	**1**
VP12									
Black-headed Gull	Amber	-	13	23	21	5	-	-	**62**
Mute Swan	Amber	-	-	3	5	-	2	1	**11**
Common Buzzard	Green	-	-	5	-	2	-	1	**8**
Grey Heron	Green	-	2	-	2	-	-	-	**4**
Tufted Duck	Amber	-	4	-	-	-	-	-	**4**
Mallard	Amber	-	-	1	-	2	1	-	**4**
Lesser Black-backed Gull	Amber	-	4	-	-	-	-	-	**4**
Great Cormorant	Amber	-	-	-	-	-	3	-	**3**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Kestrel	Red	-	-	-	-	1	2	-	**3**
Northern Lapwing	Red	-	1	1	-	-	-	-	**2**
Greylag Goose	Amber	-	2	-	-	-	-	-	**2**
Peregrine Falcon	Green	Annex I	-	-	-	-	1	-	**1**
VP13									
Lesser Black-backed Gull	Amber	-	-	-	-	-	-	8	8
Mallard	Amber	-	-	4	1	-	-	-	5
Grey Heron	Green	-	3	-	-	-	2	-	5
Common Buzzard	Green	-	-	1	-	1	-	2	4
Black-headed Gull	Amber	-	4	-	-	-	-	-	4
Mute Swan	Amber	-	-	1	-	-	-	2	3
Eurasian Sparrowhawk	Green	-	-	-	1	-	-	1	2
Common Kestrel	Red	-	-	-	-	-	-	1	1

During the Vantage Point surveys, 16 different species of birds were recorded not in flight (Table 2-4). Observations included a total of 244 birds swimming, roosting or foraging within VP viewsheds. These observations included large numbers of Mute Swan (*Cygnus olor*) – the most abundant species not in-flight during VP surveys at the Derrygreenagh Wind and Solar Farm between April and September 2025.

Three species were displaying a 'Confirmed' breeding behaviour, most notably Mute Swan with four observations of adult birds with cygnets at Drumman Bog (VP6) and Derryarkin Bog (VP10 and VP12). Additionally, one nest of Northern Lapwing was evidence of 'Confirmed' breeding of the species in the north Derryarkin Bog (VP10). Lastly, chicks of Common Moorhen (*Gallinula chloropus*) were seen foraging near VP7 in east section of Drumman Bog.

Table 2-4: Summary of 2025 Breeding Birds Vantage Point Surveys (Target Species Non-flying Observations- April to September 2025)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mute Swan	Amber	-	11	17	29	71	3	54	**185**
Meadow Pipit	Red	-	-	-	4	-	4	5	**13**
Common Snipe	Red	-	3	5	2	1	-	-	**11**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mallard	Amber	-	-	6	-	-	-	-	**6**
Common Ringed Plover	Amber	-	-	2	-	-	-	3	**5**
Tufted Duck	Amber	-	-	3	2	-	-	-	**5**
Northern Lapwing	Red	-	-	4	-	-	-	-	**4**
Great Crested Grebe	Amber	-	1	2	1	-	-	-	**4**
Common Sandpiper	Amber	-	-	2	-	-	-	-	**2**
Peregrine Falcon	Green	Annex I	-	2	-	-	-	-	**2**
Common Moorhen	Green	-	-	-	-	2	-	-	**2**
Water Rail	Green	-	-	-	-	1	-	-	**1**
Great Cormorant	Amber	-	-	-	-	1	-	-	**1**
Common Kestrel	Red	-	-	-	-	-	1	-	**1**
Common Swift	Red	-	-	-	-	-	1	-	**1**
Eurasian Woodcock	Red	-	1	-	-	-	-	-	**1**

The observations of non-flying birds while surveying VP6 were more diverse and more abundant than any other VP. The viewshed of this VP overlooks the Drumman quarry ponds, resulting in a high number of records of water birds, notably Mute Swan (Table 2-5).

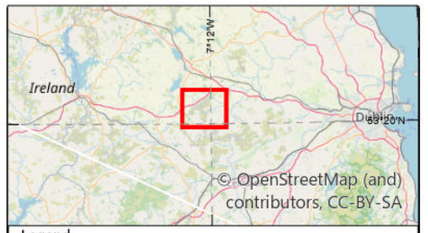
Table 2-5: Summary of 2025 Breeding Birds Observations Per Vantage Point Surveys (Target Species Non-Flying Observation – April to September 2025)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sept	Total
VP1									
Northern Lapwing	Red	-	-	1	-	-	-	-	**1**
VP3									
Meadow Pipit	Red	-	-	-	4		4	5	**13**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sept	Total
Common Kestrel	Red	-	-	-	-	-	1	-	**1**
Common Swift	Red	-	-	-	-	-	1	-	**1**
VP4									
Mallard	Amber	-	-	4	-	-	-	-	**4**
Tufted Duck	Amber	-	-	3	-	-	-	-	**3**
Common Snipe	Red	-	-	1	-	-	-	-	**1**
Mute Swan	Amber	-	1	-	-	-	-	-	**1**
VP6									
Mute Swan	Amber	-	8	13	28	68	-	36	**153**
Common Ringed Plover	Amber	-	-	2	-	-	-	3	**5**
Great Crested Grebe	Amber	-	1	2	1	-	-	-	**4**
Common Sandpiper	Amber	-	-	2	-	-	-	-	**2**
Tufted Duck	Amber	-	-	-	2	-	-	-	**2**
Common Snipe	Red	-	-	1	-	-	-	-	**1**
Water Rail	Green	-	-	-	-	1	-	-	**1**
Eurasian Woodcock	Red	-	1	-	-	-	-	-	**1**
Great Cormorant	Amber	-	-	-	-	1	-	-	**1**
VP7									
Common Moorhen	Green	-	-	-	-	2	-	-	2
VP8									
Common Snipe	Red	-	1	2	1	-	-	-	4
VP9									
Common Snipe	Red	-	1	1	1	-	-	-	**3**
Peregrine Falcon	Green	Annex I	-	2	-	-	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sept	Total
VP10									
Northern Lapwing	Red	-	-	3	-	-	-	-	**3**
Common Snipe	Red	-	1	-	-	1	-	-	**2**
VP12									
Mute Swan	Amber	-	2	4	1	3	3	18	**31**
Mallard	Amber	-	-	2	-	-	-	-	**2**

7°21'40"W
7°14'8"W
53°26'42"N
741000
734000
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657000
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R400
R441
M6
Milltown
(Fartullagh By)
Castlelost
Rahanine
Rathgarrett
Laurencetown
Fahy
Rathcobican
Toberdaly
Clonmor
(Warrenst
By)
re
Microsoft, Vantor, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Legend

- Site Boundary
- 500m Buffer

Flightlines

- Black-headed Gull
- Buzzard
- Common Buzzard
- Common Kestrel
- Common Ringed Plover
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Woodcock
- European Golden Plover
- Great Egret
- Grey Heron
- Greylag Goose
- Lesser Black-backed Gull
- Mallard
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Tufted Duck

Non - Flight Observations

- Common Ringed Plover
- Common Sandpiper
- Common Snipe
- Eurasian Woodcock
- Great Crested Grebe
- Mallard
- Meadow Pipit
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Tufted Duck

0 1 2
Kilometers

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Rev	Date	Description	By	Chkd.
A	05/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2.2: Vantage Point Survey April-June 2025

Scale @ A3: 1:50,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	November 2025

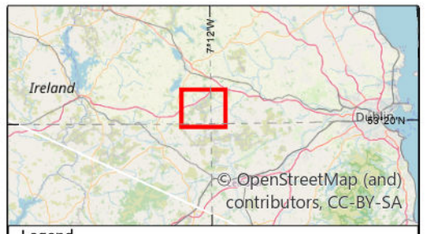
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Map Ref: 11458-047-VP-April..June25-TOB-A

Draft: A

7°21'40"W
7°14'8"W
53°26'42"N
741000
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R446
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R441
M6
Milltown
(Fartullagh B...)
Castlelost
Rahanine
Imore
Rathgarrett
Fahy
Laurencetown
Rathcobican
Toberdaly
Clon
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B
Microsoft, Vantor, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Legend

- Site Boundary
- 500m Buffer

Flightlines

- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Ringed Plover
- Common Snipe
- Eurasian Sparrowhawk
- European Golden Plover
- Grey Heron
- Lesser Black-backed Gull
- Mallard
- Mute Swan
- Northern Lapwing
- Peregrine Falcon
- Eurasian Curlew
- Eurasian Teal
- Hen Harrier
- Great Cormorant
- Little Egret

Non - Flight Observations

- Common Kestrel
- Common Moorhen
- Common Ringed Plover
- Common Snipe
- Common Swift
- Great Cormorant
- Meadow Pipit
- Mute Swan
- Water Rail

0 1 2
Kilometers

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Rev	Date	Description	By	Chkd.
A	05/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-3: Vantage Point Survey July to September 2025

Scale @ A3:	1:50,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	November 2025

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Map Ref: 11458-048-VP-July..Sept25-TOB-A

Draft: A

2.2 BREEDING WATERBIRDS SURVEY

The Breeding Waterbirds survey involves conducting monthly counts during the survey season in wetland habitat locations within a study area, encompassing the Derrygreenagh Wind and Solar Farm development site and within a 2km buffer.

The Breeding Waterbirds survey involves conducting monthly counts during the survey season in wetland habitat locations within the study area for the proposed development, this study area encompasses the Derrygreenagh Wind and Solar Farm development site and suitable breeding waterbird habitat, such as lakes, rivers, canals, quarry ponds and turloughs within 2km from the site boundary as recommended by the SNH guidelines (SNH, 2017).

Counts at each wetland habitat site were conducted on the 'look-see' basis (Bibby *et al.* 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form, along with relevant information, including numbers of waterbirds; the presence of marked birds (leg-ringed or neck-collared); and weather conditions.

A total of 3025 sightings of 26 species were recorded within the study area for Breeding Waterbirds Surveys between April and September 2025. Mute Swan and Mallard (*Anas platyrhynchos*) were the most abundant species recorded (Table 2-6). Species observations can be seen in Figure 2-4 and Figure 2-5.

Additionally, 9 target bird species were observed exhibiting 'Confirmed' breeding behaviour, with Mute Swan, Mallard, and Lapwing being the most common. The most common locations and the abundance of 'Confirmed' and 'Probable' sightings is listed below for the birds recorded for each target species (observations of incubation, nests, chicks, or nest protection).

Derryarkin Bog included 'Confirmed' breeding sightings of Mute Swan (three records of nests, seven of adults with cygnets), Black-headed Gull (*Chroicocephalus ridibundus*) (three records of nest), and Mallard (four records of female with ducklings), Lapwing (one record of a nest), Little Grebe (*Tachybaptus ruficollis*) (three records of a female with recently fledged young), Common Ringed Plover (*Charadrius hiaticula*) (three records of nest protection and chicks) and Common Moorhen (three record of chicks).

The 'Confirmed' breeding sightings on Drumman Bog included Mute Swan (8 records of nests, 26 records of adults with cygnets), Northern Lapwing (three records of juveniles), Great Crested Grebe (*Podiceps cristatus*) (one record of a nest, two records of chicks) Mallard (one record of female with ducklings), Black-headed Gull (one record of a nest), Common Ringed Plover (one record of chicks), and Little Grebe (one record of chicks).

Additionally, 'Confirmed' breeding observations were sighted within 2km buffer zone south of Ballybeg bog included Mute Swan (one record of a nest and two records of adults with cygnets) Lapwing (one record of nest protection displays). No "Confirmed" breeding was observed in Ballybeg and Derryhich during the Breeding Waterbird Surveys in 2025. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-6.

Moreover, 8 target bird species were identified as 'Probable' breeders, notably Mute Swan (23 observations of pairs in the breeding habitat), Common Ringed Plover (8 records of alarm/agitated behaviour), and Great Crested Grebe (six records of pairs in breeding habitat). The areas of concentration for these 'Probable' breeding sightings included the Derryarkin

quarry ponds, wetlands in the southern part of Derryarkin Bog, Drumman quarry ponds, and wetlands located within the 2 km buffer zone south of Ballybeg Bog. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-6.

Table 2-6: Summary of Breeding Waterbirds Survey Recorded Between April to September 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Mute Swan	Amber	-	188	206	253	232	290	221	**1390**
Mallard	Amber	-	60	40	43	146	396	22	**707**
Tufted Duck	Amber	-	116	19	29	25	7	2	**198**
Northern Lapwing	Red	-	25	36	25	30	1	-	**117**
Eurasian Teal	Amber	-	2	1	-	-	27	65	**95**
Common Ringed Plover	Amber	-	21	24	23	16	5	-	**89**
Black-headed Gull	Amber	-	35	22	26	-	-	-	**83**
Common Snipe	Red	-	16	6	22	16	7	10	**77**
Grey Heron	Green	-	5	6	10	22	9	3	**55**
Common Moorhen	Green	-	27	3	5	6	11	3	**55**
Little Grebe	Amber	-	3	7	9	13	11	3	**46**
Great Crested Grebe	Amber	-	16	12	4	6	2	-	**40**
European Golden Plover	Red	Annex I	25	-	-	-	-	2	**27**
Little Egret	Green	Annex I	-	-	-	6	1	1	**8**
Lesser Black-backed Gull	Amber	-	-	-	-	-	8	-	**8**
Water Rail	Green	-	3	1	1	1	-	-	**6**
Common Sandpiper	Amber	-	-	-	1	2	-	1	**4**
Eurasian Curlew	Red	-	-	-	-	-	4		**4**
Common Kingfisher	Amber	Annex I	-	-	2	2	-	-	**4**
Great Egret	Green	Annex I	-	2	-	-	-	-	**2**
Dunlin	Red	Annex I	-	1	-	1	-	-	**2**
Common Redshank	Red	-	2	-	-	-	-	-	**2**
Green Sandpiper	Green	-	-	-	-	-	2	-	**2**
Great Cormorant	Amber	-	2	-	-	-	-	-	**2**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Black-tailed Godwit	Red	-	-	-	1	-	-	-	**1**
Smew	Amber	Annex I	1	-	-	-	-	-	**1**

2.3 BREEDING RAPTORS SURVEY

The Breeding Raptors survey involves conducting monthly counts during the survey season. Counts were conducted in suitable raptor habitat locations within a study area encompassing the Derrygreenagh Wind and Solar Farm development site and within a 2km buffer as recommended by the SNH guidelines (SNH, 2017).

Counts at each potential habitat site were conducted on the 'look-see' basis (Bibby *et al.*, 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form, along with relevant information, such as evidence of breeding, including occupied nests, territorial behaviour, courtship, food pass, calls, and observation of raptor bird species in a suitable breeding habitat (Hardey *et al.*, 2013).

A total of 213 observations of four raptor species were recorded within study area during Raptors Surveys between April and September 2025. The most frequently recorded species were the Buzzard and Kestrel, with 138 and 55 sightings, respectively (Table 2-7). Species observations can be seen in Figure 2-4 and Figure 2-5.

The abundance of 'Confirmed' and 'Probable' sightings is listed below for the number of observations of breeding behaviour each target species (observations of incubation, nests, chicks, or nest protection).

The Breeding Raptor Surveys did not identify any raptor breeding record within the area of the Derrygreenagh Wind and Solar Farm development site. However, four 'Confirmed' sightings of Common Kestrel came from within the 2km buffer zone, of the same breeding pair at Rattin Castle – northeast of the Derryhinch Bog. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-6.

Additionally, raptors sighted as 'Probable' breeders included the Buzzard (three records of courtship and flight displays) and Kestrel (five records of the same pair at Rattin Castle). There were no sightings suggesting breeding of Peregrine, at the site in 2025. Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-6.

Table 2-7: Summary of Raptors Recorded Between April - September 2025 (Breeding Raptors Survey)

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Buzzard	Green	-	23	24	21	27	23	20	**138**
Common Kestrel	Red	-	10	11	14	7	7	6	**55**
Eurasian Sparrowhawk	Green	-	2	4	6	4	2	-	**18**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Peregrine Falcon	Green	Annex I	-	1	-	-	-	1	**2**

7°21'40"W 7°14'8"W 7°6'36"W

53°26'42"N 53°19'24"N

741000 734000 727000

643000 650000 657000

Carrick (Fartullagh By)

Kinnegad

Athlone Road

Milltown (Fartullagh By)

Castlelost

Rahanine

Knockersally

Ballykilmore

Rathgarrett

Clonmore (Warrenstown By)

Laurencetown

Fahy

Monasteroris

Rathcobican

Toberdaly

Drumcod

Townparks (Philipstown Lower By)

R400 R446 R441 R401 N52 M6

Eurasian Sparrowhawk
Northern Lapwing

Northern Lapwing
Dunlin

Black-headed Gull
Eurasian Woodcock

Common Kingfisher
Peregrine Falcon
Common Ringer Plover
Eurasian Sparrowhawk
Northern Lapwing

Common Kestrel
Peregrine Falcon
Common Snipe

Common Buzzard
Eurasian Sparrowhawk

Tufted Duck
Great Crested Grebe
Mute Swan
Common Moorhen
Great Cormorant
Mallard
Northern Lapwing
Common Ringed Plover
Eurasian Teal

Great Crested Grebe
Common Ringed Plover
Northern Lapwing
European Golden Plover
Mute Swan
Tufted Duck

Common Snipe
Northern Lapwing
Common Moorhen
Mute Swan
Black-headed Gull

Common Ringed Plover
Peregrine Falcon
Northern Lapwing
Mallard
Meadow Pipit

Eurasian Woodcock
Mute Swan

Water Rail
Eurasian Woodcock
Kingfisher
Eurasian Sparrowhawk

Meadow Pipit
Common Moorhen
Grey Heron
Mute Swan
Common Snipe

Peregrine Falcon
Water Rail

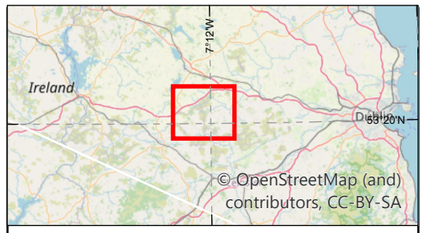
Great Egret
Northern Lapwing
Common Snipe
Common Moorhen
Mallard

Grey Heron
Northern Lapwing
Eurasian Teal
Water Rail
Common Snipe
Mallard
Great Egret

Little Grebe
Northern Lapwing
Tufted Duck
Common Moorhen
Water Rail
Mallard
Mute Swan

Northern Lapwing
Mallard

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community Earthstar Geographics



Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Grey Heron
- Mallard
- Mute Swan
- Little Grebe
- Great Crested Grebe
- Tufted Duck
- Water Rail
- Common Sandpiper
- Black-headed Gull
- Black-tailed Godwit
- Common Buzzard
- Common Kestrel
- Common Kingfisher
- Common Moorhen
- Common Redshank
- Common Ringed Plover
- Common Snipe
- Dunlin
- Eurasian Sparrowhawk
- Eurasian Teal
- European Golden Plover
- Great Cormorant
- Great Egret
- Northern Lapwing
- Peregrine Falcon
- Smew

0 1 2
Kilometers

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Rev	Date	Description	By	Chkd.
A	05/12/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-4: Breeding Waders and Raptor Surveys April–June 2025 Observations

Scale @ A3:	1:70,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	December 2025

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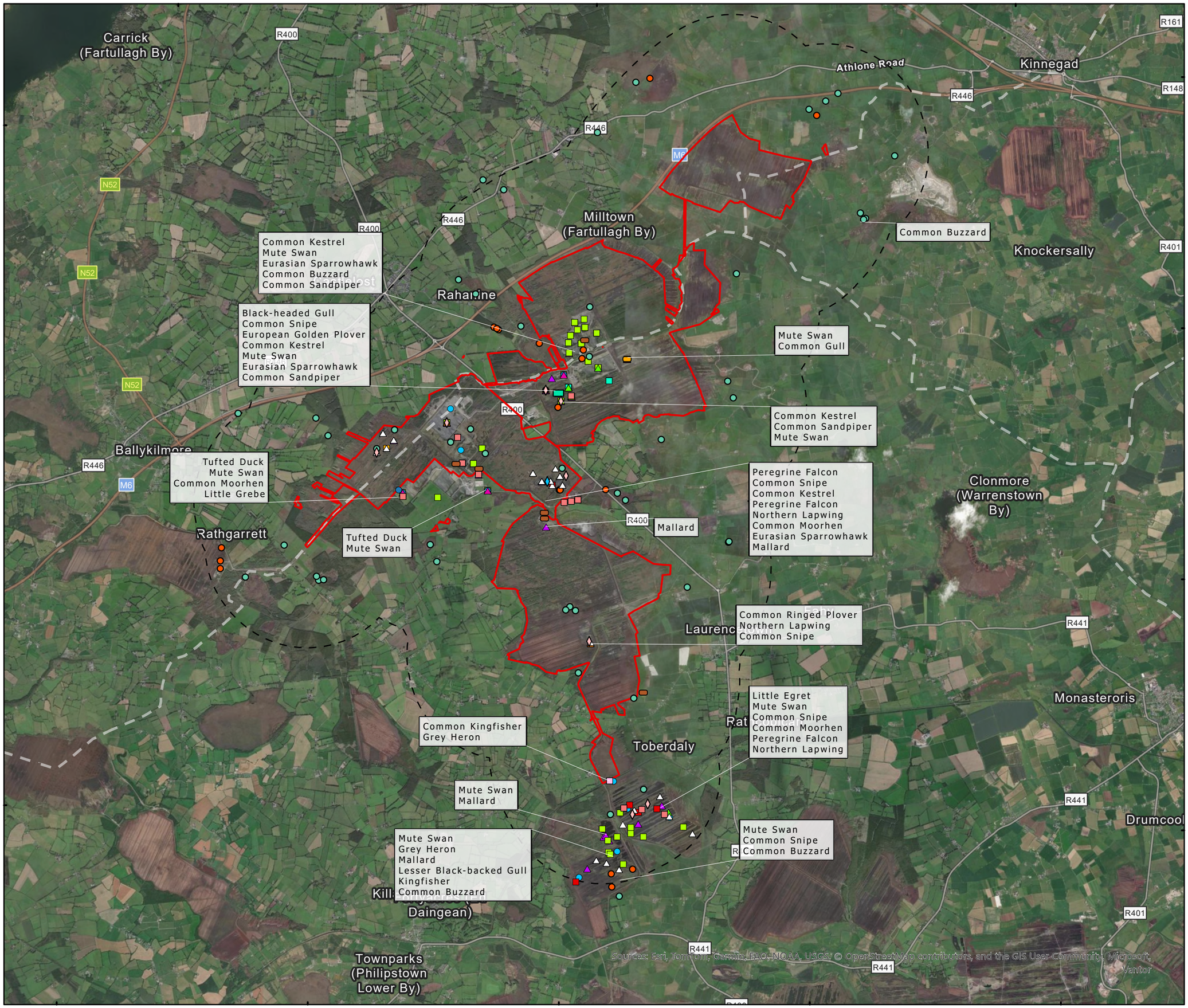
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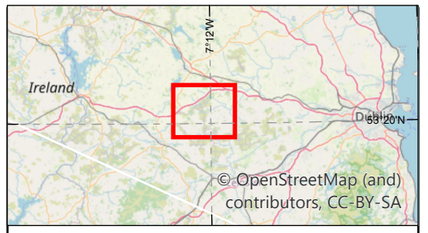
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53°26'42"N 53°19'24"N

745000 740000 735000 730000

640000 645000 650000 655000 660000





Legend

- Site Boundary
- 2 KM Buffer

Non - Flight Observations

- Grey Heron
- Mallard
- Lesser Black-backed Gull
- Mute Swan
- Little Grebe
- Great Crested Grebe
- Tufted Duck
- Water Rail
- Common Sandpiper
- Little Egret
- Common Buzzard
- Common Kestrel
- Common Kingfisher
- Common Moorhen
- Common Ringed Plover
- Common Snipe
- Dunlin
- Eurasian Sparrowhawk
- Eurasian Teal
- European Golden Plover
- Northern Lapwing
- Peregrine Falcon

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Kilometers

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A	05/12/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-5: Breeding Waders and Raptor Survey July-September 2025

Scale @ A3:	1:70,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	December 2025

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53°26'42"N

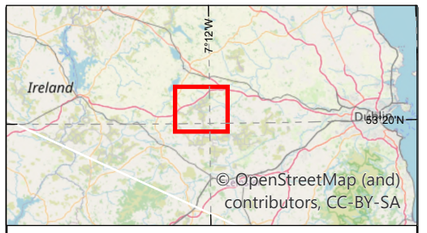
53°19'24"N

741000

734000

643000 650000 657000





Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Mallard
- Mute Swan
- Little Grebe
- Great Crested Grebe
- Black-headed Gull
- Common Kestrel
- Common Moorhen
- Common Ringed Plover
- Northern Lapwing

0 1 2
Kilometers

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A	05/12/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-6: 'Confirmed' Sightings of Breeding Waders and Raptors April to September 2025

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	December 2025

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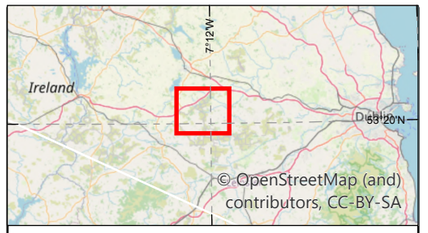
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53°26'42"N 53°19'24"N

745000 740000 735000 730000

645000 650000 655000 660000





Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Mallard
- Mute Swan
- Great Crested Grebe
- Tufted Duck
- Common Sandpiper
- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Moorhen
- Common Ringed Plover
- Common Snipe
- Eurasian Teal
- Northern Lapwing

0 1 2
Kilometers

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A	05/12/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-7: 'Probable' Sightings of Breeding Waders and Raptors April to September 2025 Observations

Scale @ A3:	1:60,000	
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K.Kale	L.Shinkwin	December 2025

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Draft: A

2.4 BREEDING BIRD TRANSECT SURVEY

Breeding Bird transect surveys were conducted to establish the distribution and abundance of birds within the Derrygreenagh Wind and Solar Farm development site, and to allow the evaluation of the site's importance. The transect survey was adapted from CBS (2012), and involved 13 representative transects delineated across the Derrygreenagh Wind and Solar Farm site, the locations of which can be seen in Figure 2-8 and Figure 2-9. A total 1159 sightings of 24 species were recorded over the survey period (Table 2-8). Overall, Meadow Pipit (*Anthus pratensis*), Mute Swan, Black-headed Gull, Mallard,were the most abundant species recorded.

The most common locations and the abundance of 'Confirmed' and 'Probable' sightings is listed below for the birds recorded for each target species (observations of incubation, nests, chicks, or nest protection).

A total of 10 different target species were sighted expressing 'Confirmed' breeding behaviour within the boundary of the proposed site. Drumman Bog recorded the majority of 'Confirmed' breeding sightings. These were Mallard (3), Mute Swan (2), Common Ringed Plover (2), Northern Lapwing (1), and Common Buzzard (1). Derryarkin Bog recorded 'Confirmed' breeding sightings of Meadow Pipit (3), Black-headed Gull (2), Little Grebe (1) and Tufted Duck (*Aythya fuligula*) (1). Derryhinch Bog recorded 'Confirmed' breeding sightings of Meadow Pipit (3) and Northern Lapwing (1). Lastly, Ballybeg Bog recorded two observations of 'Confirmed' breeding behaviour of Sparrowhawk.

Species observations of 'Confirmed' breeding behaviour can be seen in Figure 2-10.

Additionally, 12 target bird species identified as 'Probable' breeders during the transect surveys, notably Northern Lapwing (23), Black-headed gull (7), and Common Ringed Plover (5). Species observations of 'Probable' breeding behaviour can be seen in Figure 2-11.

Table 2-8: Summary of breeding bird activity between April and September 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Meadow Pipit	Red	-	21	41	87	100	56	10	315
Mute Swan	Amber	-	19	14	7	37	36	124	237
Black-headed Gull	Amber	-	8	77	51	7	-	-	143
Mallard	Amber	-	16	1	26	35	8	9	95
Northern Lapwing	Red	-	18	18	11	9	2	-	58
Tufted Duck	Amber	-	31	15	3	7	-	-	56
Common Buzzard	Green	-	11	4	8	11	8	9	51
Common Snipe	Red	-	11	3	11	3	6	8	42
European Golden Plover	Red	Annex I	27	-	-	-	-	-	27

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Ringed Plover	Amber	-	1	3	6	10	2	-	22
Common Kestrel	Red	-	2	2	2	4	5	5	20
Grey Heron	Green	-	3	2	3	5	5	2	20
Eurasian Teal	Amber	-	-	-	4	6	4	-	14
Eurasian Sparrowhawk	Green	-	1	3	2	2	4	2	14
Little Grebe	Amber	-	1	1	3	2	5		12
Common Moorhen	Green	-	2	2	-	-	3	4	11
Yellowhammer	Red	-	1	-	2	1	1		5
Great Crested Grebe	Amber	-	2	-	-	-	-	3	5
Whooper Swan	Amber	Annex I	4	-	-	-	-	-	4
Little Egret	Green	Annex I	-	-	-	-	2	-	2
Water Rail	Green	-	-	-	-	2	-	-	2
Peregrine Falcon	Green	Annex I	1	-	-	-	-	-	1
Common Gull	Amber	-	1	-	-	-	-	-	1
Green Sandpiper	Green	-	-	-	-	-	1	-	1

Transect 8_1, which follows a track along the Drumman quarry ponds, recorded the highest diversity of the target bird species (14) and the highest abundance of individual target bird species (405 sightings). Large numbers of Mute Swan and Mallard were frequently observed at this location throughout surveys (Table 2-9).

Table 2-9: Distribution of Breeding Bird Records During Transect Surveys Between April to September 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
T1									
Meadow Pipit	Red	-	2	4	7	9	-	-	**22**
Common Kestrel	Red	-	2	-	1	1	1	-	**5**
Grey Heron	Green	-	-	-	1	-	-	2	**3**
Mute Swan	Amber	-	-	-		1	1	-	**2**
Common Buzzard	Green	-	-	-	1	-	1	-	**2**
Eurasian Sparrowhawk	Green	-	1	-	-	-	-	1	**2**
Yellowhammer	Red	-	1	-	-	-	-	-	**1**
Common Moorhen	Green	-	1	-	-	-	-	-	**1**
T2									
Meadow Pipit	Red	-	1	2	7	10	7	-	**27**
Common Snipe	Red	-	1	-	2	-	3	2	**8**
Common Buzzard	Green	-	1	1	1	1	-	-	**4**
Black-headed Gull	Amber	-	-	3	-	-	-	-	**3**
Common Kestrel	Red	-	-	1	-	-	1	-	**2**
Yellowhammer	Red	-	-	-	1	-	-	-	**1**
T3									
Meadow Pipit	Red	-	2	4	5	16	12	-	**39**
Grey Heron	Green	-	1	-	1	1	1	-	**4**
Common Ringed Plover	Amber	-	-	2	1	1	-	-	**4**
Common Buzzard	Green	-	2	-	-	-	1	1	**4**
Mallard	Amber	-	3	-	-	-	-	-	**3**

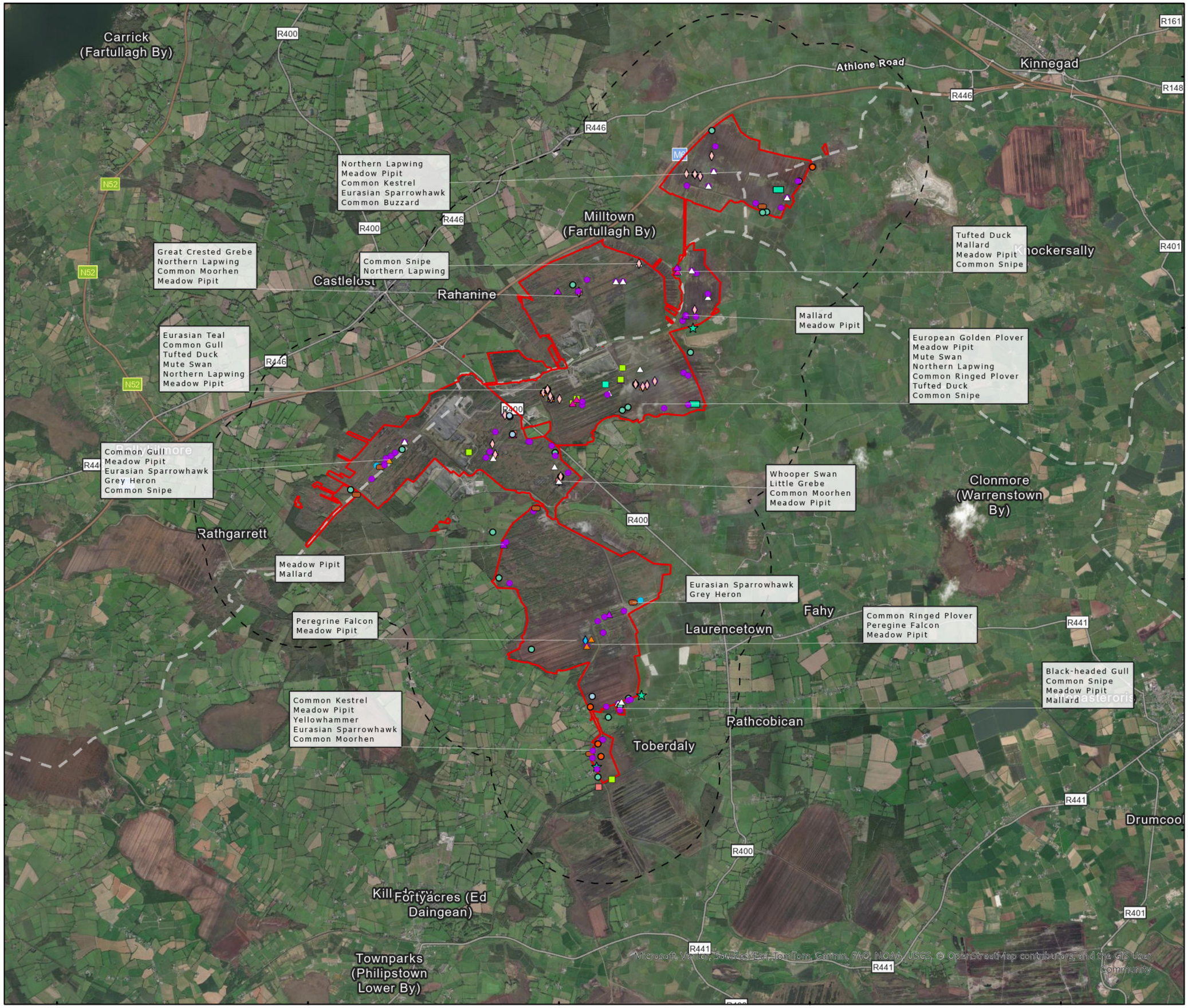
Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Kestrel	Red	-	-	-	-	1	1	1	**3**
Peregrine Falcon	Green	Annex I	1	-	-	-	-	-	**1**
Common Snipe	Red	-	-	-	-	1	-	-	**1**
Green Sandpiper	Green	-	-	-	-	-	1	-	**1**
Eurasian Sparrowhawk	Green	-	-	1	-	-	-	-	**1**
T4									
Meadow Pipit	Red	-	1	2	3	5	4	-	**15**
Common Buzzard	Green	-	1	-	1	3	1	-	**6**
Mallard	Amber	-	2	-	-	-	-	-	**2**
Grey Heron	Green	-	-	-	-	1	1	-	**2**
Common Kestrel	Red	-	-	-	-	-	-	1	**1**
Eurasian Sparrowhawk	Green	-	-	-	1	-	-	-	**1**
T5									
Black-headed Gull	Amber	-	-	66	48	5	-	-	**119**
Meadow Pipit	Red	-	2	3	8	4	-	-	**17**
Tufted Duck	Amber	-	-	6	1	7	-	-	**14**
Mallard	Amber	-	5	-	-	-	2	6	**13**
Little Grebe	Amber	-	1	1	3	1	5	-	**11**
Northern Lapwing	Red	-	5	2	-	-	-	-	**7**
Common Snipe	Red	-	4	-	3	-	-	-	**7**
Common Moorhen	Green	-	1	1	-	-	3	-	**5**
Whooper Swan	Amber	Annex I	4	-	-	-	-	-	**4**
Common Buzzard	Green	-	1	-	-	-	-	1	**2**
Mute Swan	Amber	-	2	-	-	-	-	-	**2**
Grey Heron	Green	-	-	1	-	-	-	-	**1**
Water Rail	Green	-	-	-	-	1	-	-	**1**
T6									

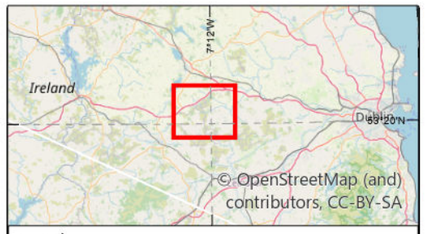
Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Meadow Pipit	Red	-	2	5	9	7	4	-	**27**
Common Buzzard	Green	-	2	-	-	1	1	1	**5**
Eurasian Sparrowhawk	Green	-	-	1	1	-	1	-	**3**
Common Snipe	Red	-	-	-	1	1	-	-	**2**
Lesser Black-backed Gull	Amber	-	-	-	-	1	-	-	**1**
Water Rail	Green	-	1	-	-	-	-	-	**1**
Common Gull	Amber	-	-	-	-	-	-	1	**1**
Common Kestrel	Red	-	1	-	-	-	-	-	**1**
T7									
Meadow Pipit	Red	-	1	2	6	9		-	**18**
Mute Swan	Amber	-	4	-	-	-	-	14	**18**
Black-headed Gull	Amber	-	-	4	3	-	-	-	**7**
Northern Lapwing	Red	-	4	1	-	-	-	-	**5**
Little Egret	Green	Annex I	-	-	-	-	2	-	**2**
Common Snipe	Red	-	-	-	1	-	-	-	**1**
Common Ringed Plover	Amber	-	-	-	-	1	-	-	**1**
Eurasian Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
T8_1									
Mute Swan	Amber	-	11	14	6	37	36	108	**212**
Mallard	Amber	-	2	-	22	28	6	-	**58**
Tufted Duck	Amber	-	31	6	2	-	-	-	**39**
Northern Lapwing	Red	-	4	3	5	8	1	-	**21**
Meadow Pipit	Amber	-	1	5	6	3	4	-	**19**
Black-headed Gull	Amber	-	8	4	-	2	-	-	**14**
Eurasian Teal	Amber	-	-	-	4	6	4	-	**14**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Common Ringed Plover	Amber	-	1	1	2	6	2	-	**12**
Great Crested Grebe	Amber	-	2	-	-	-	-	3	**5**
Common Snipe	Red	-	2	-	-	-	-	1	**3**
Grey Heron	Green	-	-	-	-	1	1	1	**3**
Common Kestrel	Red	-	-	-	-	1	1	-	**2**
Common Moorhen	Green	-	-	-	-	-	-	2	**2**
Common Buzzard	Green	-	1	-	-	-	-	-	**1**
T8_2									
Meadow Pipit	Red	-	1	5	6	5	6	-	**23**
Common Buzzard	Green	-	1	1	3	2	2	3	**12**
Northern Lapwing	Red	-	1	2	2	-	1	-	**6**
Common Ringed Plover	Amber	-	-	-	3	2	-	-	**5**
Mute Swan	Amber	-	2	-	-	-	-	-	**2**
Common Snipe	Amber	-	-	1	-	-		1	**2**
European Golden Plover	Red	Annex I	2	-	-	-	-	-	**2**
Eurasian Sparrowhawk	Green	-	-	-	-	-	1	-	**1**
T9									
Meadow Pipit	Red	-	2	2	3	3	5	-	**15**
Northern Lapwing	Red	-	4	3	2	1	-	-	**10**
Common Snipe	Red	-	1	-	2	1	3	2	**9**
Common Buzzard	Green	-	-	2	-	2	1	-	**5**
Mallard	Amber	-	4	-	-	-	-	-	**4**
Grey Heron	Green	-	-	-	2	1	-	-	**3**
Common Moorhen	Green	-	-	1	-	-	-	-	**1**
Common Kestrel	Red	-	-	-	-	-	-	1	**1**

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Eurasian Sparrowhawk	Green	-	-	-	-	1	-	-	**1**
T10									
Meadow Pipit	Red	-	3	2	10	14	6	-	**35**
Mallard	Amber	-	-	1	4	7	-	-	**12**
Common Snipe	Red	-	2	-	2	-	-	1	**5**
Yellowhammer	Red	-	-	-	1	1	1	-	**3**
Tufted Duck	Amber	-	-	3	-	-	-	-	**3**
Grey Heron	Red	-	1	1	-	-	1	-	**3**
Common Moorhen	Amber	-	-	-	-	-	-	2	**2**
Eurasian Sparrowhawk	Green	-	-	-	-	-	-	1	**1**
Northern Lapwing	Red	-	-	1	-	-	-	-	**1**
Little Grebe	Amber	-	-	-	-	1	-	-	**1**
T11									
Meadow Pipit	Red	-	1	2	6	8	3	4	**24**
Northern Lapwing	Red	-	-	6	2	-	-	-	**8**
Common Buzzard	Green	-	-	-	1	1	1	3	**6**
Mallard	Amber	-	-	-	-	-	-	3	**3**
Common Snipe	Red	-	1	1	-	-	-	1	**3**
Common Kestrel	Red	-	-	-	1	-	-	1	**2**
T12									
Meadow Pipit	Red	-	2	3	11	7	5	6	34
European Golden Plover	Red	Annex I	25	-	-	-	-	-	25
Common Buzzard	Green	-	2	-	1	1	-	-	4
Common Kestrel	Red	-	-	1	-	1	1	-	3
Eurasian Sparrowhawk	Green	-	-	1	-	1	1	-	3
Common Snipe	Red	-	-	1	-	-	-	-	1

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Apr	May	Jun	Jul	Aug	Sep	Total
Grey Heron	Green	-	-	-	-	-	-	1	1





Legend

- Site Boundary
- 2 KM Buffer

Non - Flight Observations

- Grey Heron
- Mallard
- Mute Swan
- Little Grebe
- Common Gull
- Meadow Pipit
- Whooper Swan
- Great Crested Grebe
- Tufted Duck
- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Moorhen
- Common Ringed Plover
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Teal
- European Golden Plover
- Northern Lapwing
- Peregrine Falcon
- Yellowhammer

0 1 2
Kilometers

NOTES

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Rev	Date	Description	By	Chkd.
A	05/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-8: Transect Survey April-June 2025

Scale @ A3:	1:70,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	November 2025

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Map Ref: 11458-053-April..June25-TR-TOB-A

Draft: A

7°21'40"W 7°14'8"W 7°6'36"W

53°26'42"N 53°19'24"N

741000 734000 727000

643000 650000 657000

Carrick (Fartullagh By)

Eurasian Sparrowhawk
Meadow Pipit
Grey Heron
Eurasian Teal

Common Kestrel
Common Buzzard
Eurasian Sparrowhawk

Common Snipe
Grey Heron
Northern Lapwing
Black-headed Gull

Northern Lapwing
Black-headed Gull
Water Rail
Tufted Duck
Mute Swan
Great Crested Grebe

Tufted Duck
Common Moorhen
Mallard
Black-headed Gull
Great Crested Grebe
Mute Swan

Peregrine Falcon
Common Kestrel
Meadow Pipit

Meadow Pipit
Eurasian Sparrowhawk
Common Buzzard

Common Ringed Plover
Meadow Pipit

Common Kestrel
Eurasian Sparrowhawk
Meadow Pipit
Common Buzzard

Townparks (Philipstown Lower By)

Rathgarrett

Ballykilmore

Castlelost

Rahanine

Milltown (Fartullagh By)

Athlone Road

Kinnegad

Knockersally

Meadow Pipit
Mallard
Tufted Duck

Meadow Pipit
Mallard

European Golden Plover
Meadow Pipit
Mute Swan
Northern Lapwing
Common Ringed Plover
Tufted Duck
Common Snipe

Whooper Swan
Little Grebe
Common Moorhen
Meadow Pipit

Clonmore (Warrenstown By)

Laurencetown

Common Ringed Plover
Peregine Falcon
Meadow Pipit

Black-headed Gull
Common Snipe
Meadow Pipit

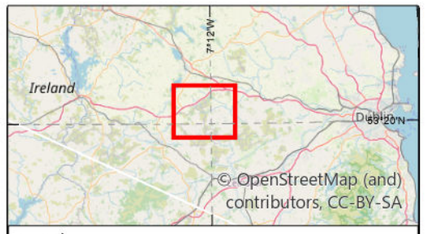
Rathcobican

Toberdaly

Monasteroris

Drumcool

R400 R446 R161 R148 R401 R441 N52 M6



Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Grey Heron
- Mallard
- Mute Swan
- Little Grebe
- Common Gull
- Meadow Pipit
- Whooper Swan
- Great Crested Grebe
- Tufted Duck
- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Moorhen
- Common Ringed Plover
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Teal
- European Golden Plover
- Northern Lapwing
- Peregrine Falcon
- Yellowhammer

0 1 2
Kilometers

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Rev	Date	Description	By	Chkd.
A	05/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-9: Transect Survey July-September 2025

Scale @ A3:	1:70,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	November 2025

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Map Ref: 11458-054-July..Sept25-TR-TOB-A

Draft: A

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7°21'40"W
7°14'8"W
53°26'42"N
53°19'24"N
741000
734000
643000
650000
657000

Milltown
(Fartullagh By)
Castlelost
Rahanine
Rathgarrett
Laurencetown
Fahy
Rathcobican
Toberdaly
Clonm
(Warren
By

R446
R400
R441
M6

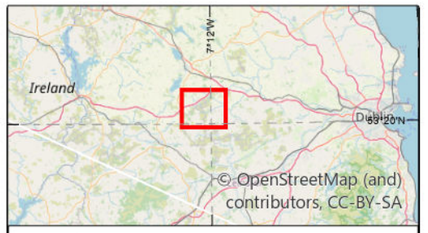
Northern Lapwing
Common Gull

Mute Swan
Common Gull

Tufted Duck
Black-headed Gull
Meadow Pipit

Meadow Pipit

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Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Mallard
- Mute Swan
- Little Grebe
- Meadow Pipit
- Tufted Duck
- Black-headed Gull
- Common Buzzard
- Common Ringed Plover
- Eurasian Sparrowhawk
- Northern Lapwing

0 1 2
Kilometers

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Rev	Date	Description	By	Chkd.
A	04/11/2025	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-10: 'Confirmed' Breeding Sightings During Transect Surveys April to September 2025

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Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	November 2025

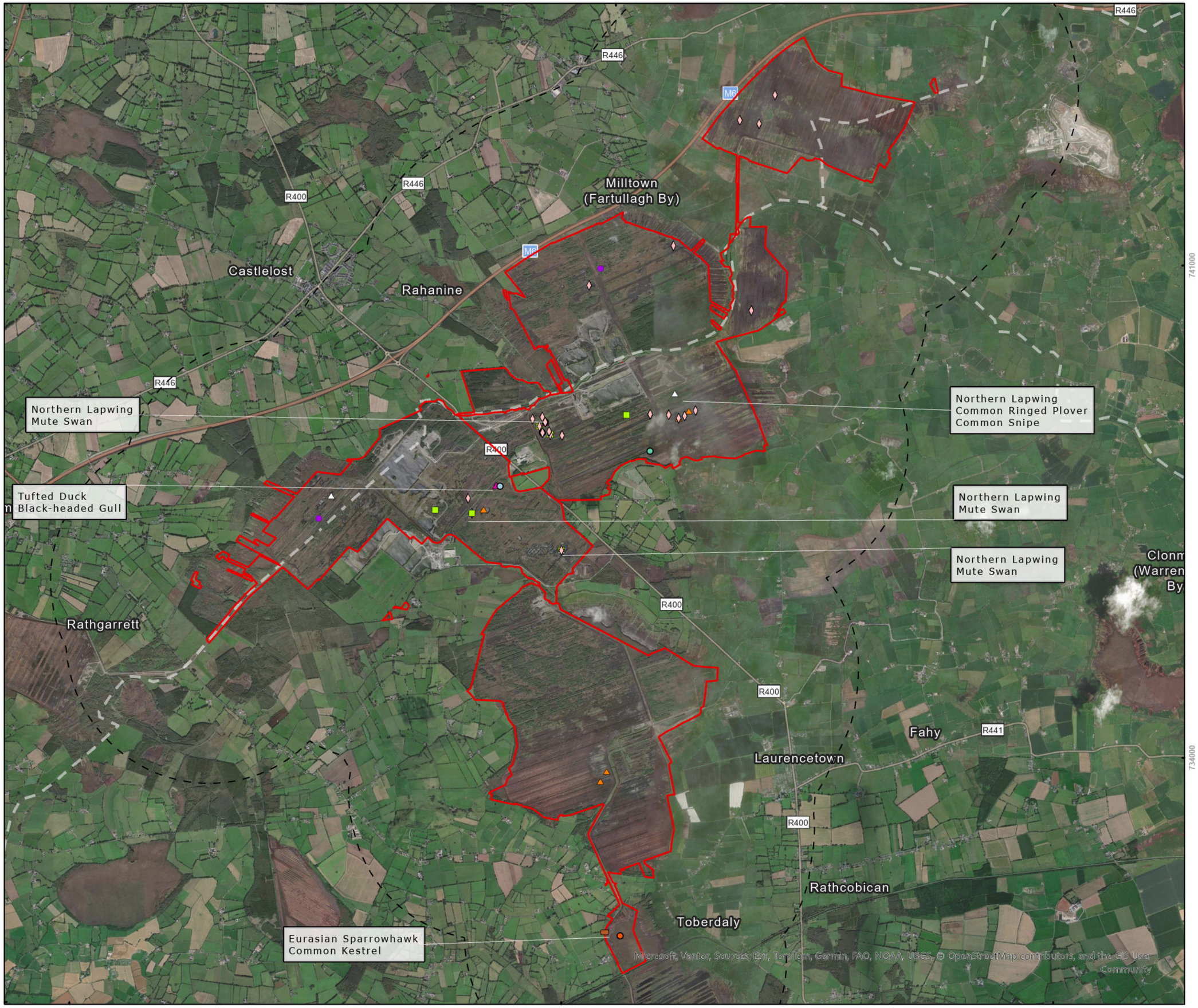
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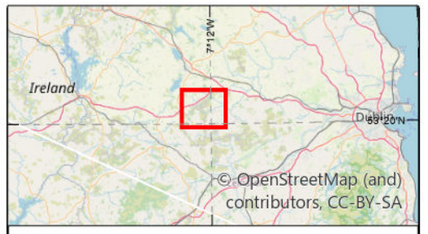
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Map Ref: 11458-055-April..Sept25-TR..Con-TOB-A

Draft: A

7°21'40"W
7°14'8"W
53°26'42"N
53°19'24"N
741000
734000
643000
650000
657000





Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Mute Swan
- Meadow Pipit
- Tufted Duck
- Black-headed Gull
- Common Buzzard
- Common Kestrel
- Common Ringed Plover
- Common Snipe
- Eurasian Sparrowhawk
- Eurasian Teal
- Northern Lapwing

0 1 2
Kilometers

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Rev	Date	Description	By	Chkd.
A	04/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona Derrygreenagh Wind and Solar

Title: Figure 2-11: 'Probable' Breeding Sightings During Transect Surveys April to September 2025

Scale @ A3:	1:50,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	November 2025

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Draft: A

2.5 WOODCOCK TRANSECT SURVEYS

Woodcock (*Scolopax rusticola*) Transect surveys were undertaken in areas of suitable habitat within the area of the proposed project. The survey methodology followed the recommendations of Gilbert *et al.* (1998) for surveying Woodcock, with three survey visits undertaken between May and June 2025. Surveyors were in position from an hour before sunset until an hour after sunset. The aim of the survey was to record the presence of roding (displaying) male Woodcock and, thereby, establish the distribution and abundance of the species in the study area. A total of 58 roding Woodcock males were recorded, along with one other target species – Common Snipe (*Gallinago gallinago*) (Table 2-10).

Figure 2-12 displays the observations recorded during the Woodcock Transect Survey at the locations identified in Table 2-11.

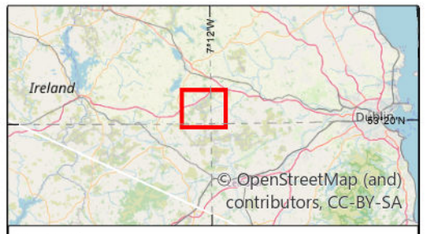
Table 2-10: Summary of Woodcock Transect Surveys in May and June 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Number of observations over the survey period
Eurasian Woodcock	Red	-	56
Common Snipe	Red	-	4

Table 2-11: Distribution of Woodcock Transect Surveys in May and June 2025

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Number of observations over the survey period
WK1			
Eurasian Woodcock	Red	-	13
Common Snipe	Red	-	3
WK2			
Eurasian Woodcock	Red	-	26
WK3			
Eurasian Woodcock	Red	-	10
WK4			
Eurasian Woodcock	Red	-	9
Common Snipe	Red	-	1

7°21'40"W
7°14'8"W
53°26'42"N
53°19'24"N
643000
650000
657000
741000
734000
R446
R400
R441
M6
Milltown
(Fartullagh By)
Castlelost
Rahanine
Rathgarrett
Fahy
Laurencetown
Rathcobican
Toberdaly
Clonm
(Warren
By
more
Microsoft, Vantor, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community



Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Common Snipe
- Eurasian Woodcock

0 1 2
Kilometers

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A	04/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-12: Woodcock transects survey observation 2025

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2.6 INCIDENTAL SIGHTINGS

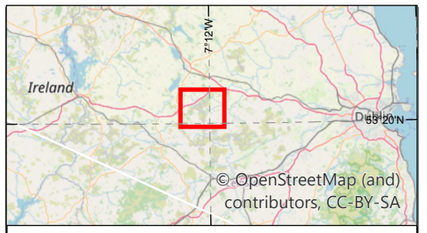
Incidental sightings were recorded at the Derrygreenagh Wind and Solar Farm site, but outside of the scheduled surveys. This could be sighting of target species observed during the walk to the VP location, during VP breaks, or outside of the viewshed. Incidental sightings are
summarised in Table 2-12. Species observations can be seen in Figure 2-13.

Table 2-12: Summary of Incidental Sighting Surveys between April to September 2025.

Species	BoCCI (Gilbert et al., 2021)	Annex I of Birds Directive (2009/147/EC)	Number of observations over the survey period
Black-headed Gull	Amber	-	257
Tufted Duck	Amber	-	30
Mallard	Amber	-	11
Little Grebe	Amber	-	9
Common Pochard	Red	-	4
Peregrine Falcon	Green	Annex I -	2
Eurasian Sparrowhawk	Amber	-	1
Common Kestrel	Red	-	1
Northern Lapwing	Red	-	1

7°21'40"W
7°14'8"W
53°26'42"N
53°19'24"N
741000
734000
643000
650000
657000

Tufted Duck
Black-headed Gull
Common Pochard



Legend

- Site Boundary
- 2km Buffer

Non - Flight Observations

- Mallard
- Little Grebe
- Tufted Duck
- Black-headed Gull
- Common Kestrel
- Common Pochard
- Eurasian Sparrowhawk
- Northern Lapwing
- Peregrine Falcon

0 1 2
Kilometers

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A	03/11/2025	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-13: Incidental sightings observations April-September 2025

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3. CONCLUSION

This report summarises the results of bird surveys undertaken by TOBIN at the proposed Derrygreenagh Wind and Solar development site during the Breeding Season 2025 (April to September).

In total, 40 target species of birds were identified at the proposed Derrygreenagh Wind and Solar development site and hinterland during breeding season during all surveys. The most common birds sighted were Mute Swan, Mallard, Black-headed Gull, and Lapwing. Additionally, five raptor species were recorded at the site – Buzzard, Kestrel, Sparrowhawk (*Accipiter nisus*), Peregrine, and Hen Harrier.

Target species recorded at the Derrygreenagh Wind and Solar site and hinterland during the breeding bird season 2025 included eight species listed in Annex I of the Birds Directive. These were: European Golden Plover, Peregrine Falcon, Little Egret, Whooper Swan (*Cygnus cygnus*), Great Egret,Common Kingfisher (*Alcedo atthis*), Smew (*Mergellus albellus*), and Hen Harrier. Additionally,

12 species classified by Gilbert *et al.* (2021) as Red Listed [i.e. Northern Lapwing, Meadow Pipit, European Golden Plover, Common Snipe, Eurasian Woodcock, Yellowhammer (*Emberiza citronella*), Eurasian Curlew (*Numenius Arquata*), Common Redshank (*Tringa tetanus*), Dunlin (*Calidris alpina*), Black-tailed Godwit (*Limosa limosa*), Common Swift (*Apus apus*)] were seen. Notably, 14 target bird species were sighted as 'Confirmed' breeders, and 17 as 'Probable' breeders. The areas of the most significant breeding activity of the target bird species within the proposed Derrygreenagh Wind and Solar development site are Derryarkin Bog and Drumman Bog, especially the vicinity of the quarry ponds at both locations.

4. REFERENCES

Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000). *Bird Census Techniques.* Academic Press.

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Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D (2013) *Raptors: A Field Guide for Surveys and Monitoring (Third Edition).* Scottish Natural Heritage: Edinburgh.

SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms.* Scottish Natural Heritage.

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Bord na Móna - Derrygreenagh Wind and Solar Winter Season 2025/2026 Bird Surveys: Summary Report

Bord na Móna

BUILT ON KNOWLEDGE

Document Control Sheet	
Document Reference	Winter Season 2025/2026 Bird Surveys: Summary Report
Client:	Bord na Moná
Project Reference	11838

Rev	Description	Author	Date	Reviewer	Date	Approval	Date
D01	Final	JM	13/05/2026	JS	01/07/2026	LS	01/07/2026

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1. BACKGROUND

This report summarises the results of bird surveys undertaken by TOBIN at the proposed Bord na Móna Derrygreenagh Wind and Solar Farm site (herein referred to as the 'proposed project'), during the Winter Season 2025/2026, for the survey period of October 2025 to March 2026.

2. FIELD SURVEY METHODOLOGIES

2.1 VANTAGE POINT SURVEYS

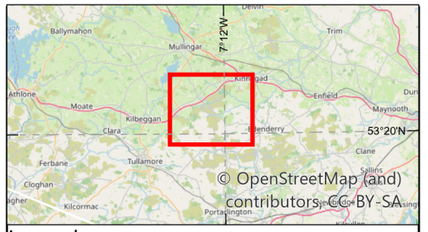
The Vantage Point (VP) surveys were carried in accordance with the methodology set out by the NatureScot (formally Scottish Natural Heritage) guidelines (NatureScot, 2025). Thirteen (13) VPs across the proposed project site were set at fixed locations, which were strategically positioned to provide a maximum viewshed of the survey area over the survey period, the locations of which can be seen in Figure 2-1. The viewshed of a given VP extended to a distance of no greater than 2km and included an arc of no greater than 180 degrees, as per NatureScot (2025), which encompassed the study area for the VP surveys.

The 13 VPs were surveyed for 6 hours each

on each month, summing up to a total of 468 hours for the survey period of October 2025 to March 2026 (Table 2-1).

Vantage point	Oct	Nov	Dec	Jan	Feb	Mar	Total hours
1	6	6	6	6	6	6	**36**
2	6	6	6	6	6	6	**36**
3	6	6	6	6	6	6	**36**
4	6	6	6	6	6	6	**36**
5	6	6	6	6	6	6	**36**
6	6	6	6	6	6	6	**36**
7	6	6	6	6	6	6	**36**
8	6	6	6	6	6	6	**36**
9	6	6	6	6	6	6	**36**
10	6	6	6	6	6	6	**36**
11	6	6	6	6	6	6	**36**
12	6	6	6	6	6	6	**36**
13	6	6	6	6	6	6	**36**
Total hours	**78**	**78**	**78**	**78**	**78**	**78**	**468**

7°22'48"W
7°16'30"W
7°10'12"W
53°27'12"N
53°23'40"N
53°20'8"N
742800
737600
732400
644000
649500
655000
VP1
VP2
VP3
VP4
VP5
VP6
VP7
VP8
VP9
VP10
VP11
VP12
VP13
Microsoft, Vantor



Legend

- Energy Park - Proposed Developments
- Proposed wind farm 500m buffer
- VPs
- Viewshed Coverage

0 1,000 2,000
Meters

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Rev	Date	Description	By	Chkd.
A	06/10/2026	First issue	K.K	J.F

Client: Bord na Móna

Project: Bord Na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-1: Vantage Point Layout and Viewshed Coverage for Winter Bird Surveys 2025/2026

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
K.Kale	J.Forde	October 2026

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2.2 Winter Bird Transect Survey

Wintering Bird transect surveys were conducted to establish the distribution and abundance of birds within the proposed project site, and to allow the evaluation of the site's importance. The transect survey was adapted from CBS (2012), and involved 13 representative transects delineated across the Derrygreenagh Wind and Solar Farm site to achieve maximum coverage of locally representative habitat and bird activity. The transects were walked once each month from October 2025 to March 2026, at a standard speed. On each transect, all bird species encountered (seen or heard) within two distance bands (<100m, >100m) from the observer were recorded and their abundance noted.

Transect layout for the winter 2025/2026 can be seen in Figure 2-2.

2.3 Hen Harrier Roost Surveys

Hen Harrier roost surveys were undertaken by TOBIN between October 2025 to March 2026. The Hen Harrier roost surveys were conducted in the areas of suitable roosting habitat found within the proposed wind farm site or within the study area and were aimed to identify active winter hen harrier roosts. Suitable roosting habitat is typically restricted to dense vegetation, such as heather or young commercially planted conifers. Hen Harrier breed in upland areas, but the wintering population is widely dispersed and can be frequently found in lowland areas.

The Hen Harrier Roost Survey methods followed those set out by Gilbert et al. (1998) and were in accordance with recommendations outlined O'Donoghue et al. (2019). Ten potential areas for roosting Hen Harrier were identified and each of the locations was surveyed at a vantage point six times during the wintering season (once per month). Surveyors were in place an hour and a half before the sunset and stayed onsite until the last visible light. Information recorded by surveyors from the vantage points included the number of Hen Harrier entering or exiting a roost, the time, age, and sex, where it was possible to discern.

Hen Harrier roost survey locations layout for the winter 2025/2026 can be seen in Figure 2-2

2.4 Wetland Bird Survey

The Wetland Bird Survey involve conducting monthly counts in wetland habitat locations within the proposed wind farm site and the 10 km buffer. Wetland Bird Survey surveys were undertaken by TOBIN between October 2025 to March 2026 and included a monthly count at each wetland habitat site. Counts were conducted at 'look-see' basis (Bibby et al. 2000), which involved scanning across the survey area and counting all the birds seen. Birds were recorded on a count form, along with relevant information, including numbers of waterbirds; the presence of marked birds (leg-ringed or neck-collared); and weather conditions.

Survey site locations can be seen in the Figure 2-3.

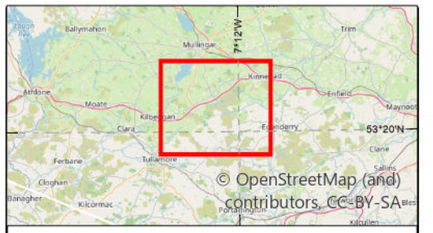
2.5 Incidental Sighting

Incidental sightings were recorded at the Derrygreenagh Wind and Solar Farm site, but outside of the scheduled surveys. This could be sighting of target species observed during the walk to the VP location,during VP 30 min break, or outside of the viewshed.

7°21'40"W
7°14'8"W
7°6'36"W
53°26'42"N
53°19'24"N
748000
741000
734000
727000
636000
643000
650000
657000

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg
T1
T2
T3
T4
T5
T6
T8
T9
T10
T11
T12

Microsoft, Vantor



Legend

- Derrygreenagh Wind and Solar - Proposed Development
- Hen Harrier Survey Locations
- Transects

0 2 4
Kilometers

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A	15/06/2026	First issue	K.K	L.S

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Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-2: Transect Survey Routes and Hen Harrier Survey Locations

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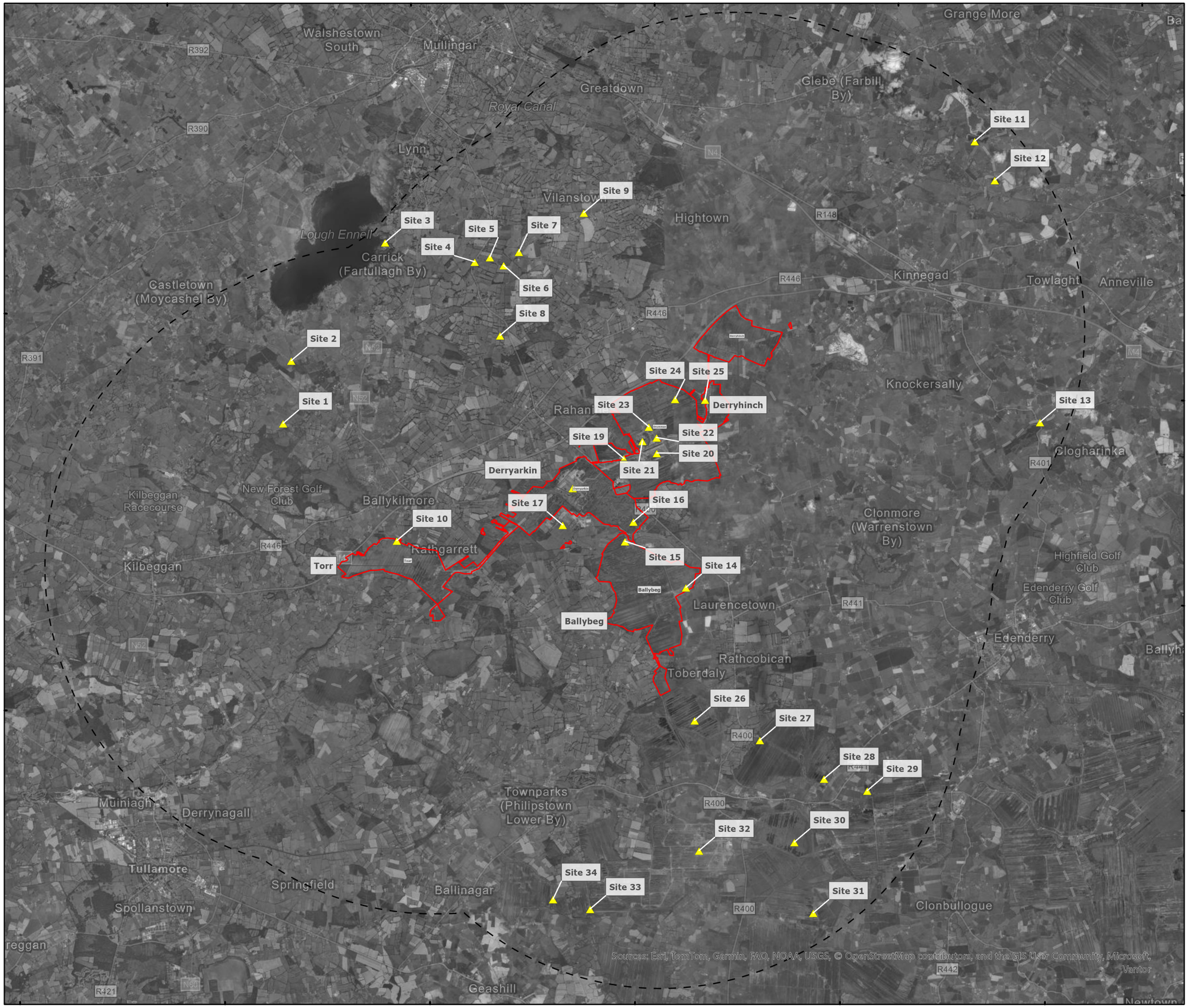
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K.Kale	L.Shinkwin	June 2026

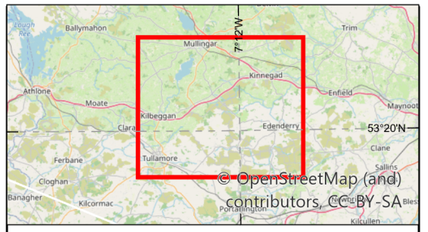
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Legend

- Site Boundary
- 10km Buffer
- Wetland Bird Survey locations

0 3 6
Kilometers

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Rev	Date	Description	By	Chkd.
A	06/10/2026	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord Na Mona - Derrygreenagh Wind and Solar

Title: Figure 2-3: Wetland Bird Survey Locations

Scale @ A3: 1:120,000

Prepared by:	Checked by:	Date:
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3. FIELD SURVEY RESULS

This section summarises the results of the winter ornithological surveys within the study area during the field surveys between October 2025 and March 2026. All recorded species, their presence within the site or within the 10 km buffer, and their protection and conservation status is provided in Table 3-1 for targets species and Table 3-2 for non -target species. The data and locations of all species observed over the survey period are plotted and presented on figures within Appendix A-I. Species account of all target species recorded over the survey period are discussed below.

In this summary, the terms regular, occasional, irregular, and rare are used to describe the frequency of species occurrence within and around the proposed project site. These categories are based on the number and consistency of observations recorded during surveys, informed by professional judgment and established good practice. The following general definitions apply:

- Regular – Species recorded consistently across all months, typically observed in >50% of relevant surveys.
- Occasional – Species recorded less frequently, typically in 10–50% of surveys.
- Irregular – Species with no discernible seasonal or annual pattern, and whose presence is unpredictable.
- Rare – Species recorded only once or twice during the survey period.

These classifications follow principles of transparent, evidence-based ecological assessment, and the use of professional judgment, as outlined in CIEEM (2018) and NatureScot (2025).

Table 3-1. Full target species list of birds recorded at the proposed project site and with 10 km buffer during the winter season between October 2025 and March 2026.

Target Species	Protection and Conservation Status*	Occurrence during winter season October 2025 – March 2026
Black-headed Gull (*Larus ridibundus*)	WA, BoCCI Amber List	Occasional within the site boundary
Common Buzzard (*Buteo buteo*)	WA, BoCCI Green List	Regular within the site boundary
Common Goldeneye (*Bucephala clangula*)	WA, BoCCI Red List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Common Gull (*Larus canus*)	WA, BoCCI Amber List	No on-site records; species occurs within 10 km Wetland Bird Survey)
Common Kestrel (*Falco tinnunculus*)	WA, BoCCI Red List	Regular within the site boundary

Target Species	Protection and Conservation Status*	Occurrence during winter season October 2025 – March 2026
Common Kingfisher (*Alcedo atthis*)	WA, Annex I Birds Directive, BoCCI Amber List	Occasional within the site boundary
Common Merganser (*Mergus merganser*)	WA, BoCCI Red List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Common Moorhen (*Gallinula chloropus*)	WA, BoCCI Green List	Occasional within the site boundary
Common Pochard *(Aythya ferina)*	WA, BoCCI Red List	Rare within the site boundary
Common Ringed Plover (*Charadrius hiaticula*)	WA, BoCCI Amber List	Occasional within the site boundary
Common Snipe (*Gallinago gallinago*)	WA, BoCCI Red List	Regular within the site boundary
Eurasian Coot (*Fulica atra*)	WA, BoCCI Amber List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Eurasian Curlew (*Numenius arquata*)	WA, BoCCI Red List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Eurasian Sparrowhawk (*Accipiter nisus)*	WA, BoCCI Green List	Regular within the site boundary
Eurasian Teal *(Anas crecca)*	WA, BoCCI Amber List	Regular within the site boundary
Eurasian Wigeon (Mareca penelope)	WA, BoCCI Amber List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Eurasian Woodcock (Scolopax rusticola)	WA, BoCCI Red List	Rare within the site boundary
European Golden Plover (*Pluvialis apricaria*)	WA, Annex I Birds Directive, BoCCI Red List	Regular within the site boundary
Gadwall (*Mareca strepera*)	WA, BoCCI Amber List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Great Black-backed Gull (*Larus marinus*)	WA, BoCCI Amber List	Rare within the site boundary
Great Cormorant (*Phalacrocorax carbo*)	WA, BoCCI Amber List	Regular within the site boundary

Target Species	Protection and Conservation Status*	Occurrence during winter season October 2025 – March 2026
Great Crested Grebe (*Podiceps cristatus)*	WA, BoCCI Amber List	Occasional within the site boundary
Great Egret (*Ardea alba*)	WA, Annex I Birds Directive, BoCCI Green List	Occasional within the site boundary
Grey Heron (*Ardea cinerea*)	WA, BoCCI Green List	Regular within the site boundary
Greylag Goose (*Anser anser*)	WA, BoCCI Amber List	Rare within the site boundary
Hen Harrier (*Circus cyaneus*)	WA, Annex I Birds Directive, BoCCI Amber List	Regular within the site boundary
Jack Snipe (*Lymnocryptes minimus)*	WA, BoCCI Green List	Rare within the site boundary
Lesser Black-backed Gull *(Larus fuscus)*	WA, BoCCI Amber List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Little Egret (*Egretta garzetta*)	WA, BoCCI Green List, Annex I Birds Directive	Occasional within the site boundary
Little Grebe (*Tachybaptus ruficollis*)	WA, BoCCI Amber List	Occasional within the site boundary
Mallard *(Anas platyrhynchos)*	WA, BoCCI Amber List	Regular within the site boundary
Merlin *(Falco columbarius)*	WA, Annex I Birds Directive, BoCCI Amber List	Occasional within the site boundary
Mute Swan *(Cygnus olor)*	WA, BoCCI Amber List	Regular within the site boundary
Northern Lapwing (*Vanellus vanellus*)	WA, BoCCI Red List	Regular within the site boundary
Osprey (*Pandion haliaetus*)	WA, Annex I Birds Directive	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Peregrine Falcon *(Falco peregrinus)*	WA, BoCCI Green List, Annex I Birds Directive	Rare within the site boundary

Target Species	Protection and Conservation Status*	Occurrence during winter season October 2025 – March 2026
Red-crested Pochard (*Netta rufina*)	WA	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Scaup (*Anas marila*)	WA, BoCCI Red List	No on-site records; species occurs within 10 km (Wetland Bird Survey)
Short-eared Owl (*Asio flammeus*)	WA, Annex I Birds Directive, BoCCI Amber List	Rare within the site boundary
Tufted Duck (*Aythya fuligula*)	WA, BoCCI Amber List	Regular within the site boundary
Water Rail (*Rallus aquaticus*)	WA, BoCCI Green List	Rare within the site boundary
Western Barn Owl (*Tayo alba*)	WA, BoCCI Red List	Rare within the site boundary
White-tailed Eagle (*Haliaeetus albicilla*)	WA, BoCCI Red List, Annex I Birds Directive	Rare within the site boundary
Whooper Swan (*Cygnus cygnus*)	WA, Annex I Birds Directive, BoCCI Amber List	Regular within the site boundary

* EU BD = European Union Birds Directive, WA = Wildlife Acts, BoCCI = Birds of Conservation Concern Ireland 2020-2026.

Table 3-2. Full list of non-target bird species recorded within the proposed project site during the winter season between October 2025 and March 2026.

Target Species	Protection and Conservation Status*
Coal Tit (*Periparus ater*)	WA, BoCCI Green List
Common Blackbird (*Turdus merula*)	WA, BoCCI Green List
Common Linnet (*Linaria cannabina*)	WA, BoCCI Amber List
Common Pheasant (*Phasianus colchicus*)	WA, BoCCI Green List
Common Reed Bunting (*Emberiza schoeniclus*)	WA, BoCCI Green List

Target Species	Protection and Conservation Status*
Common Starling (*Sturnus vulgaris*)	WA, BoCCI Amber List
Common Woodpigeon (*Columba palumbus*)	WA, BoCCI Green List
Dunnock (*Prunella modularis*)	WA, BoCCI Green List
Eurasian Blue Tit (*Sylvia atricapilla*)	WA, BoCCI Green List
Eurasian Bullfinch (*Pyrrhula pyrrhula*)	WA, BoCCI Green List
Eurasian Chaffinch (*Fringilla coelebs*)	WA, BoCCI Green List
Eurasian Jay (*Garrulus glandarius*)	WA, BoCCI Green List
Eurasian Magpie (*Pica pica*)	WA, BoCCI Green List
Eurasian Siskin (*Spinus spinus*)	WA, BoCCI Green List
Eurasian Skylark (*Alauda arvensis*)	WA, BoCCI Amber List
Eurasian Wren (*Troglodytes troglodytes*)	WA, BoCCI Green List
European Goldfinch (*Carduelis carduelis*)	WA, BoCCI Green List
European Robin (*Erithacus rubecula*)	WA, BoCCI Green List
European Stonechat (*Saxicola rubicola*)	WA, BoCCI Green List
Fieldfare (*Turdus pilaris*)	WA, BoCCI Green List
Goldcrest (*Regulus regulus*)	WA, BoCCI Amber List
Great Spotted Woodpecker (*Dendrocopos major*)	WA, BoCCI Green List
Great Tit (*Parus major*)	WA, BoCCI Green List
Hooded Crow (*Corvus cornix*)	WA, BoCCI Green List
House Sparrow (*Passer domesticus*)	WA, BoCCI Amber List
Lesser Redpoll (*Acanthis flammea*)	WA, BoCCI Green List
Long-tailed Tit (*Aegithalus caudatus*)	WA, BoCCI Green List
Mistle Thrush (*Turdus viscivorus*)	WA, BoCCI Green List
Northern Raven (*Corvus corax*)	WA, BoCCI Green List

Target Species	Protection and Conservation Status*
Northern Wheatear (*Oenanthe Oenanthe*)	WA, BoCCI Amber List
Pied Wagtail (*Motacilla alba*)	WA, BoCCI Green List
Redwing (*Turdus iliacus*)	WA, BoCCI Red List
Rook (*Corvus frugilegus*)	WA, BoCCI Green List
Song Thrush (*Turdus philomelos*)	WA, BoCCI Green List
Western Jackdaw (*Corvus monedula*)	WA, BoCCI Green List

3.1 RESULTS SUMMARY

This summary highlights the survey records that in TOBIN's preliminary opinion are ecological constraints and may affect the project design/planning application for Derrygreenagh Wind and Solar.

With regards to ornithological constraints, the bird species of importance are:

- Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
- Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert *et al,* 2021).
- Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and/or international importance for the species.
- Species that may be vulnerable to disturbance or sensitive to wind farm developments (BES, 2020; Cutts *et al*, 2013; Goodship & Furnness, 2022, Mc Guinness *et al*, 2015).
- Unusual, or very rare records for the specific geographic area.

3.1.1 Regularly Occurring Species

3.1.1.1 Mute Swan

Mute Swan was regularly recorded within the proposed project site and the surrounding 10 km buffer, with a total of 1,823 sightings, across 193 records, both in flight and on water. These records were primarily concentrated at the Drumman and Derryarkin quarry ponds. However mute swans were widely distributed at wetlands throughout the development site, and within the 10km buffer. Mute Swans often occurred in pairs, but groups of up to 75 individuals were recorded.

The highest daily count took place on 4 December 2025, when 174 individuals were recorded during Wetland Bird Survey survey withing the development site. Notably, the highest daily counts between October 2025 to January 2026 exceeded the national (110 individuals) and

international (110 individuals) importance threshold for the species, as defined by Burke *et al.* (2025).

Given that the regular presence of Mute Swan within the development site, and the occurrence of daily counts reaching national and international site importance thresholds, this species warrants specific consideration in the future impact assessment. The locations of Mute Swan observations are presented in Figure A- I.

3.1.1.2 Whooper Swan

Whooper Swan was regularly recorded within the proposed project site and the surrounding 10 km buffer, with a total of 719 sightings across 62 records, both in flight, at roosting locations and at feeding grounds. These records were partially concentrated in north Derryarkin Ponds, which has been identified as regular roosting site, and at a regular feeding ground located north of Ballybeg bog, and withing 250 meters from the site boundary. Additional Whooper Swan records were made in other areas of the development site such as Drumman and Ballybeg Bogs, with birds recorded both on ground and in flight, albeit with lower frequency and numbers. Additional observations of Whooper Swan were made at a various wetland with 10 km buffer during Wetland Bird Survey surveys.

The highest maximum daily count of Whooper Swan within the development site was recorded on 6 January 2026, when 80 individuals were observed. The current national (190 individuals) and international (430 individuals) site importance thresholds for the species, as by as defined by Burke *et al.* (2025), were not reached during the winter season 2025/2026. However, the flock numbers did exceed the county importance threshold for Offaly (>15) and Westmeath (>10), as defined by Burke *et al.* (2021).

The locations of Whooper Swan observations are presented in Figure A- I.

3.1.1.3 European Golden Plover

European Golden Plover was recorded regularly within the proposed project site and the surrounding 10 km buffer, with a total of 9,570 sightings recorded across 78 records, predominantly observed in flight, in flocks ranging in size from six to 650 individuals. The highest concentration of flight records occurred at Derryarking quarry ponds, Drumman Bog and Derryhinch. Golden Plover flocks were also recorded outside the proposed project site but within the 10 km buffer during Irish Wetland Bird Survey surveys, particularly at rewetted cutover bogs located to the south of the site. Additionally, roost locations for Golden Plover were identified in the southern section of Drumman Bog.

The largest flock, made up of 650 individuals, was recorded on two occasions on 1 December 2025, circling over Derryarking quarry ponds. The national (910 individuals) and international (12,000 individuals) threshold values, as defined by Burke *et al.* (2025), were not reached during the 2025/2026 winter season.

The locations of Golden Plover observations are present in Figure A- II.

3.1.1.4 Northern Lapwing

Northern Lapwing was recorded regularly within the proposed project site and the surrounding 10 km buffer, with a total of 5,574 sightings recorded across 83 records, predominantly observed in flight, in flocks ranging from single individuals to a maximum of 400 birds. The

highest concentration of Lapwing records was associated with various wetland habitats within Derryarkin Bog. However, Lapwing were also recorded at Drumman Bog and Derryhinch Bog, as well as at multiple wetland sites within the 10 km buffer, notably rewetted cutover bogs located to the south of the proposed project site.

The largest flock, comprising 400 individuals, was recorded on 1 December 2025, circling over Derryarkin quarry ponds. The national (820 individuals) and international (72,300 individuals) threshold values, as defined by Burke *et al.* (2025), were not exceeded during the 2025/2026 winter season.

The locations of Northern Lapwing observations are present in Figure A- III.

3.1.1.5 Mallard

Mallard was recorded regularly within the proposed project site and the surrounding 10 km buffer, with a total of 1,025 sightings recorded across 127 records. Mallard was observed throughout the site, with localised concentrations associated with quarry ponds and other wetland features within Derryarkin, Drumman and Ballybeg Bogs. Records made up of individuals observed both in flight and on water, in flocks ranging from single birds to a maximum of 84 individuals.

The highest maximum daily count of Mallard within the proposed development area was recorded on 4 December 2025, when 140 individuals were observed during an Irish Wetland Bird Survey of wetlands within the proposed development. The national (250 individuals) and international (53,000 individuals) site importance thresholds for the species, as defined by Burke *et al.* (2025), were not reached during the 2025/2026 winter season.

The locations of Mallard observations are presented in Figure A- V.

3.1.1.6 Tufted Duck

Tufted Duck was recorded regularly within the proposed project site and the surrounding 10 km buffer, with a total of 611 sightings recorded across 21 records. Most records were made up of flocks observed swimming and foraging (diving) within the Derryarkin and Drumman quarry ponds. Flock sizes ranged from two to 150 individuals. Additionally, Tufted Duck was recorded during Irish Wetland Bird Survey surveys within the 10 km buffer at Lough Ennell.

The highest maximum daily count of Tufted Duck within the proposed development area was recorded on 4 December 2025, when 150 individuals were recorded at Drumman quarry ponds. The national (160 individuals) and international (8,900 individuals) site importance thresholds for the species, as defined by Burke *et al.* (2025), were not reached during the 2025/2026 winter season.

The locations of Tufted Duck observations are presented in Figure A- IV.

3.1.1.7 Common Snipe

Common Snipe occurred regularly throughout the proposed project site and the surrounding 10 km buffer, with total of 327 sightings, across 107 records, with majority of individual birds flushed from cover by the surveyor. Additionally, Common Snipe was also seen in flight commuting over site. Due to the cryptic behaviour, Common Snipe is difficult to detect, and the spatial distribution of records were closely associated with the surveyors transect routes, and

survey locations (VPs, HHVPs, Wetland Bird Survey sites). There are currently no national population estimates available for wintering Common Snipe in Ireland.

The locations of Common Snipe observations are presented in Figure A- V.

3.1.1.8 Common Buzzard

Common Buzzard was recorded regularly throughout the proposed project site and the surrounding 10 km buffer, with 162 sightings across 133 records. All records made up of birds observed in flight, predominantly of one individual. However, small groups of up to four individuals were recorded, notably during March 2026. There is currently no available national wintering population estimates for Common Buzzard in Ireland.

3.1.1.9 The locations of Common Buzzard observations are presented in Figure A-VI,Common Kestrel

Common Kestrel was recorded regularly throughout the proposed project site and surrounding 10 km buffer, with 150 sightings across 143 records, mostly of a single individual in flight hunting or commuting. with birds occasionally recorded perched. There is currently no available national wintering population estimates for Common Kestrel in Ireland.

The locations of Common Kestrel observations are presented in Figure A- VII.

3.1.1.10 Hen Harrier

Hen Harrier was recorded during each month of the survey period (October 2025 to March 2026), with a total of 39 sightings, across 38 records. Hen Harrier was observed across the proposed project site, with notable concentration of records within the Drumman Bog. However, the species was seen in in flight in Derryarkin, Ballybeg, Derryhinch Bogs and within 10 km buffer during Wetland Bird Survey surveys at rewetted cutover bog south of the site. All observations were made of a ringtail individual - female or a juvenile Hen Harrier.

No confirmed roost locations were identified during the 2025/2026 winter survey period. However, potential roosts areas were identified in the western part of the Drumman Bog and in the southern part of Derryarkin Bog. The regular presence of Hen Harrier at dusk, near suitable roosting habitat, within the proposed project site, together with previously confirmed roosts recorded during previous winter seasons, warrants specific consideration in the future impact assessment

The locations of Hen Harrier observations are presented in Figure A- VIII.

3.1.1.11 Merlin

Merlin was recorded occasionally recorded withing the proposed project site with a total of eight individual records. These observations were made of either hunting males and females within Derryarking and Drumman Bogs.

The locations of Merlin observations are presented in Figure A- IX.

3.1.1.12Grey Heron

Grey Heron was recorded regularly during each month of the survey period (October 2025 to March 2026), with a total of 119 sightings across 86 records. The species was widespread throughout the proposed project site, and was frequently observed in flight while commuting,

as well as foraging at a range of wetland features within the proposed project site and within the 10 km buffer during Irish Wetland Bird Survey surveys.

The locations of Grey Heron observations are presented in Figure A- X.

3.1.1.13 Great Cormorant

Great Cormorant was regularly recorded withing the proposed project site and the surrounding 10 km buffer, with a total of 553 sightings across 161 records. The species was observed hunting and resting at various wetlands and was frequently observed in flight commuting over the site, with notable concentration of records identified at Derryarkin and Drumman quarry ponds.

The highest maximum daily count of Great Cormorant within the proposed project was recorded on 28 March 2026, when 38 individuals were recorded during Wetland Bird Survey survey within the site. The national (120 individuals) and international (970 individuals) site importance thresholds for the species, as by as defined by Burke *et al.* (2025), were not reached during the winter season 2025/2026.

The locations of Great Cormorant observations are presented in Figure A- XI.

3.1.1.14 Eurasian Teal

Eurasian Teal was recorded regularly within the proposed project site and the surrounding 10 km buffer, with a total of 140 sightings across 24 records. Most records were made of flocks swimming and roosting withing the Drumman quarry ponds, and various other wetlands within the site. The flocks varied in size from 2 to 14 individuals. Additionally, Eurasian Teal was observed during Wetland Bird Survey surveys withing 10 km buffer at Lough Ennell.

The highest maximum daily count of Eurasian Teal within the proposed project area was recorded on 15 December 2025, when 14 individuals were seen at a wetland in south Derryarkin Bog. The national (440 individuals) and international (6,700 individuals) site importance thresholds for the species, as by as defined by Burke *et al.* (2025), were not reached during the winter season 2025/2026.

The locations of Eurasian Teal observations are presented in Figure A- XII.

3.1.1.15 Eurasian Sparrowhawk

Eurasian Sparrowhawk was recorded regularly throughout the proposed project site and the surrounding 10 km buffer, with 45 sightings, across 44 records. All observations were made of birds in flight, mostly of single individuals. However, on one occasion a displaying pair was observed at a wetland withing the 10 km buffer on 22 December 2025 during a Wetland Bird Survey – an unusual record for this time of the year. There are currently no available national wintering population estimates for Eurasian Sparrowhawk in Ireland.

The locations of Eurasian Sparrowhawk observations are presented Figure A- XIII.

3.1.2 Less frequent target species within site boundary

Various target species were recorded with the proposed project site boundary that had occasional, irregular or rare presence over the survey period is listed in the section, along with the number of sightings and number of records in brackets.

These were: Black-headed Gull; Lesser Black-backed Gull, Little Grebe; Great Crested Grebe; Common Moorhen; Common Pochard; Little Egret; Great Egret; Water Rail; Peregrine Falcon; Common Ringed Plover; Greater Black-backed Gull; Common Kingfisher; Short-eared Owl; White-tailed Eagle; Greylag Goose; Eurasian Woodcock; Western Barn Owl; and Jack Snipe

The locations of irregular or rare observations are presented in Figure A- XIV.

3.1.3 Species recorded only outside of the site boundary

Various target species were recorded during the survey period, but only outside of the proposed project site boundary, and within 10 km buffer during Wetland Bird Survey surveys.

These were: Eurasian Coot, Common Goldeneye, Eurasian Wigeon, Eurasian Curlew, Common Gull, Goosander, Gadwall, Red-crested Pochard, Scaup, Osprey

The locations of irregular or rare observations are presented in Figure A- XV.

4. CONCLUSION

In total, 46 target bird species were recorded at the proposed project site and the 10 km buffer during the 2025/2026 winter season, across all survey types. The areas within the proposed project site with the highest concentration of wintering bird activity were concentrated at various wetlands, most predominantly Derryarkin and Drumman quarry ponds. Areas of highest wintering bird activity within the proposed project site were associated with wetland habitats, most notably Derryarkin and Drumman quarry ponds. The most frequently recorded species within the site were European Golden Plover, Northern Lapwing, Mute Swan and Mallard.

Additionally, nine raptor species were recorded within the proposed project site and surrounding 10 km buffer, comprising Common Buzzard, Common Kestrel, Eurasian Sparrowhawk, Hen Harrier, Merlin, Peregrine Falcon, White-tailed Eagle, Short-eared Owl and Western Barn Owl.

In terms of conservation importance, wetlands within the proposed project site supported nationally and internationally important site-level numbers of Mute Swan. Furthermore, ten species listed on Annex I of the Birds Directive were recorded, namely European Golden Plover, Whooper Swan, Hen Harrier, Peregrine Falcon, Merlin, Little Egret, Great Egret, Common Kingfisher, White-tailed Eagle and Short-eared Owl. In addition, ten species classified as Red-listed in Ireland by Gilbert *et al.* (2021) were recorded: European Golden Plover, Northern Lapwing, Common Snipe, Common Kestrel, Common Pochard, Eurasian Woodcock, Western Barn Owl, Yellowhammer and White-tailed Eagle.

The 2025/2026 winter surveys at the Derrygreenagh Wind and Solar Farm site highlighted regular Hen Harrier activity,with two areas identified as potential roost locations: one in the north-western part of Drumman Bog, and another in the south-eastern part of Derryarkin Bog. Additionally, Hen Harrier was recorded in flight across other areas of the Derrygreenagh Wind and Solar Farm during the winter season,including Ballybeg Bog, Derryarkin Bog and Derryhinch Bog.

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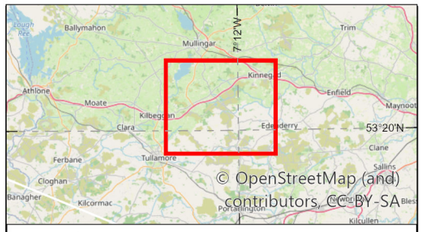
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Appendix A-I

7°21'40"W
7°14'8"W
7°6'36"W
53°29'42"N
53°19'24"N
748000
741000
734000
727000
636000
643000
650000
657000

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

Microsoft, Vantor



Legend

- Derrygreenagh Wind and Solar - Proposed Development
- Flightlines
- Non - Flight Observations

0 2 4
Kilometers

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Rev	Date	Description	By	Chkd.
A	05/05/2026	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-I: Mute Swan

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

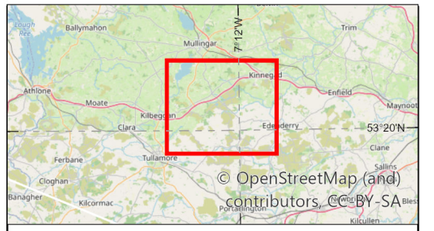
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Map Ref: 11458-069-MS-S.BO-TOB-A

Draft: A

7°21'40"W
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7°6'36"W
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Derryarkin
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A	05/05/2026	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-II: Whooper Swan

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

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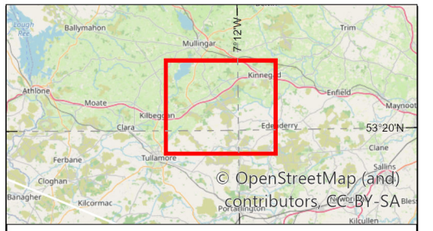
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Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

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Legend

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Kilometers

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A	05/05/2026	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A- III: European Golden Plover

Scale @ A3:	1:80,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

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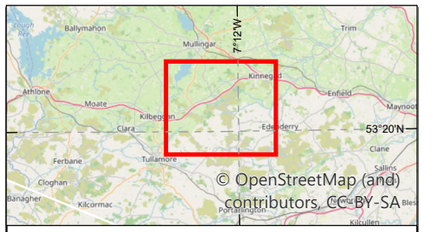
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Draft: A

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Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A- IV: Northern Lapwing

Scale @ A3:	1:80,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

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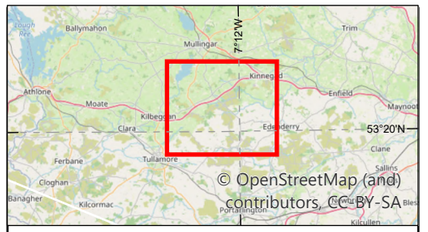
Map Ref: 11458-072-L-S.BO-TOB-A

Draft: A

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7°14'8"W
7°6'36"W
53°29'42"N
53°19'24"N
748000
741000
734000
727000
636000
643000
650000
657000

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

Earthstar Geographics



Legend

- Derrygreenagh Wind and Solar - Proposed Development
- Flightlines
- Non - Flight Observations

0 2 4
Kilometers

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-V: Mallard

Scale @ A3: 1:80,000

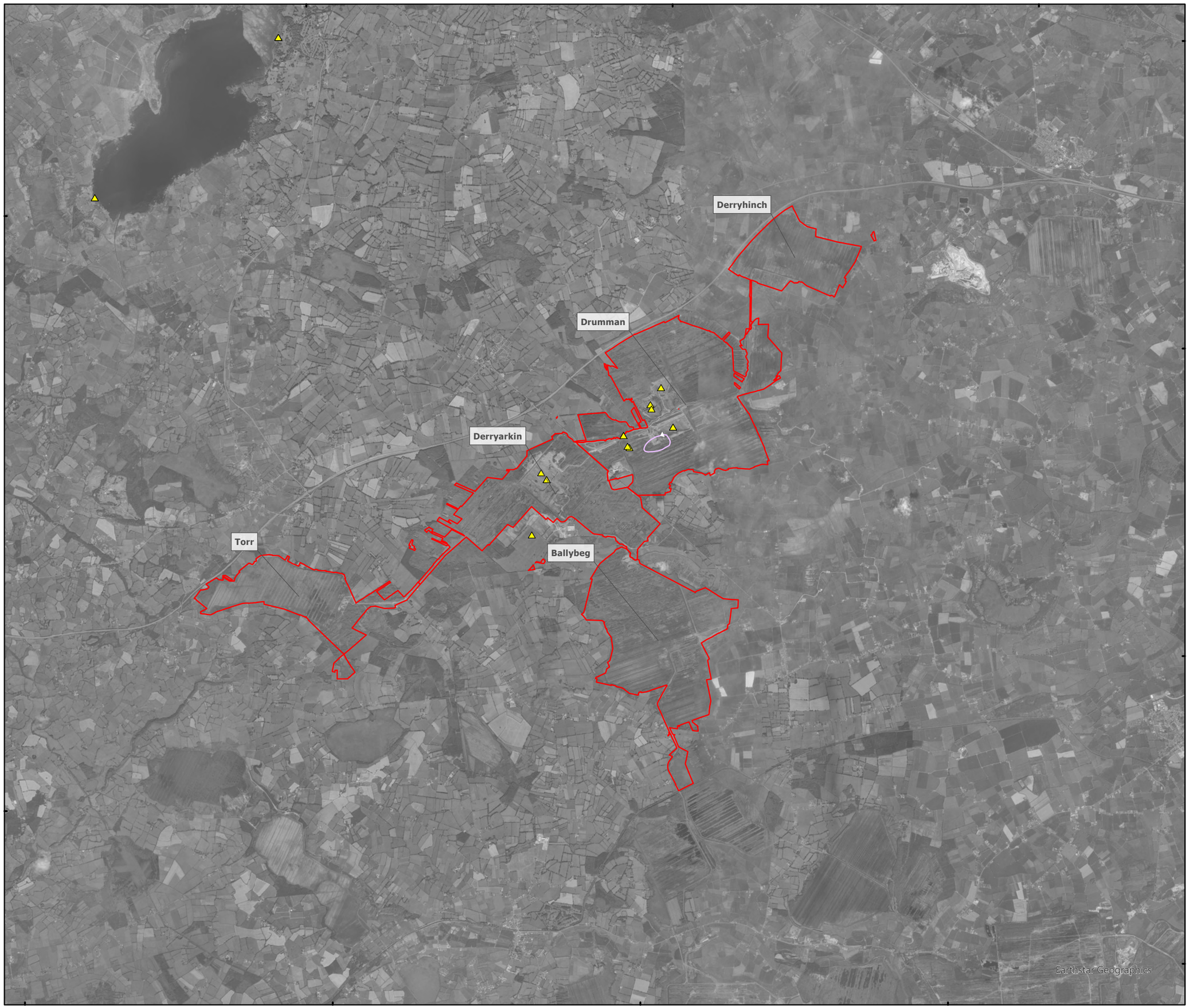
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

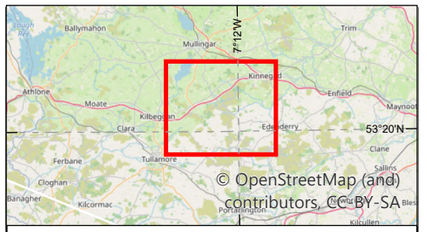
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Map Ref: 11458-073-MA-S.BO-TOB-A

Draft: A





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Kilometers

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-VI: Tufted Duck

Scale @ A3:	1:80,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

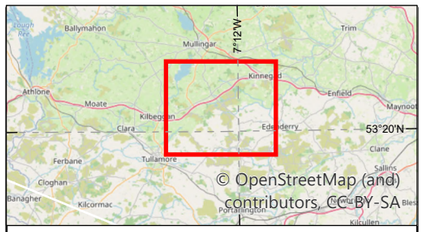
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Map Ref: 11458-074-TD-S.BO-TOB-A

Draft: A

7°21'40"W
7°14'8"W
7°6'36"W
53°29'42"N
53°19'24"N
748000
741000
734000
727000
636000
643000
650000
657000
Derryhinch
Drumman
Derryarkin
Torr
Ballybeg
Microsoft, Vantor



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- Flightlines
- Non - Flight Observations

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Kilometers

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A	06/05/2026	First issue	K.K	L.S
Rev	Date	Description	By	Chkd

Client:

Bord na Móna

Project:

Bord na Mona - Derrygreenagh Wind and Solar

Title:

Figure A-VII: Common Snipe

Scale @ A3: 1:80,000

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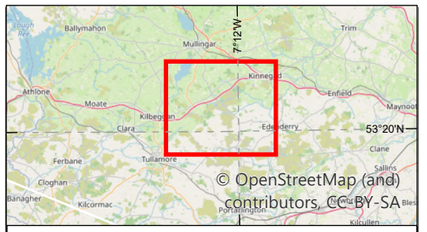
Map Ref: 11458-075-SN-S.BO-TOB-A

Draft: A

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7°14'8"W
7°6'36"W
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53°19'24"N
748000
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727000
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643000
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657000

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

Microsoft, Vantor



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- Flightlines
- Non - Flight Observations

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Kilometers

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-VIII: Common Buzzard

Scale @ A3: 1:80,000

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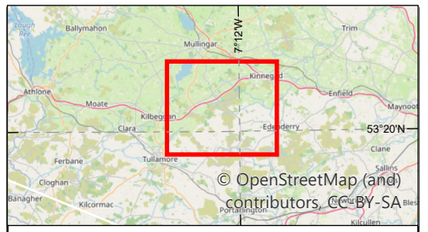
Map Ref: 11458-076-BZ-S.BO-TOB-A

Draft: A

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7°14'8"W
7°6'36"W
53°29'42"N
53°19'24"N
748000
741000
734000
727000
636000
643000
650000
657000

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

Microsoft, Vantor



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- Non - Flight Observations

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Kilometers

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-IX: Common Kestrel

Scale @ A3: 1:80,000

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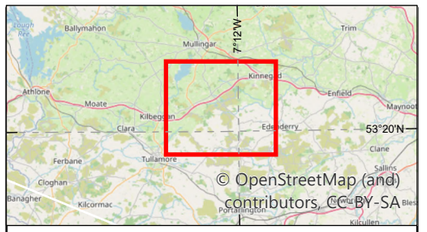
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Map Ref: 11458-077-K-S.BO-TOB-A

Draft: A

7°21'40"W
7°14'8"W
7°6'36"W
53°29'42"N
53°19'24"N
748000
741000
734000
727000
636000
643000
650000
657000

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg



Legend

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- Flightlines
- Non - Flight Observations

0 2 4
Kilometers

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-X: Hen Harrier

Scale @ A3:	1:80,000	
Prepared by:	Checked by:	Date:
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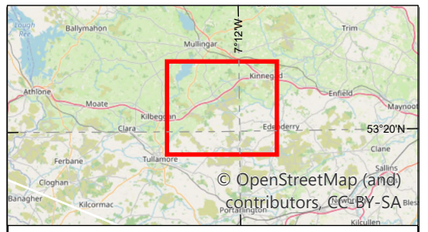
Map Ref: 11458-078-HH-S.BO-TOB-A

Draft: A

Earthstar Geographics

7°21'40"W
7°14'8"W
7°6'36"W
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741000
734000
727000
53°24'2"N
53°19'24"N
636000
643000
650000
657000
Microsoft, Vantor

Derryhinch
Drumman
Derryarkin
Torr
Ballybeg



Legend

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- Flightlines
- Non - Flight Observations

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-XI: Merlin

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
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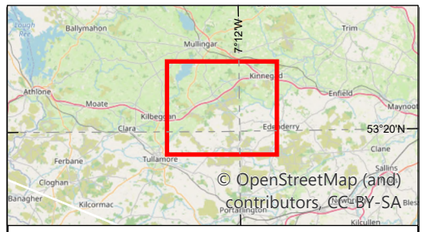
Map Ref: 11458-079-M-S.BO-TOB-A

Draft: A

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643000
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Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

Earthstar Geographics



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- Non - Flight Observations

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-XII: Grey Heron

Scale @ A3: 1:80,000

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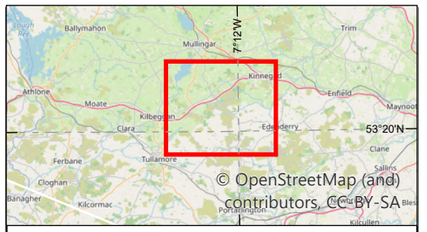
Map Ref: 11458-079-M-S.BO-TOB-A

Draft: A

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Derryarkin
Torr
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A	06/05/2026	First issue	K.K	L.S
Rev	Date	Description	By	Chkd

Client:

Bord na Móna

Project:

Bord na Mona - Derrygreenagh Wind and Solar

Title:

Figure A-XIII: Great Cormorant

Scale @ A3:	1:80,000	
Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

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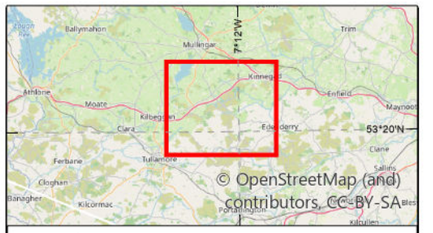
Map Ref: 11458-081-CA-S.BO-TOB-A

Draft: A

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53°19'24"N
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Derryhinch
Drumman
Derryarkin
Torr
Ballybeg

Microsoft



Legend

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Non - Flight Observations

Eurasian Teal

0 2 4
Kilometers

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Rev	Date	Description	By	Chkd.
A	16/07/2026	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-XIV: Eurasian Teal

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	July 2026

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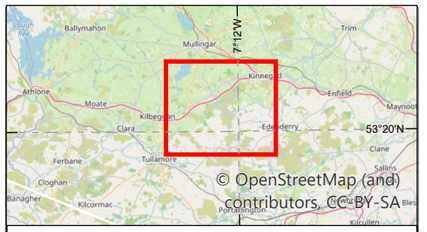
Map Ref: 11458-082-T-S.BO-TOB-A

Draft: A

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Drumman
Derryarkin
Torr
Ballybeg

Earthstar Geographics



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- Flightlines
- Non - Flight Observations

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Kilometers

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Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A-XV: Eurasian Sparrowhawk

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
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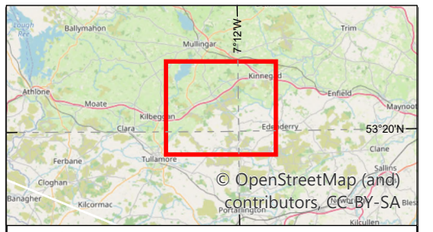
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Map Ref: 11458-083-SK-S.BO-TOB-A

Draft: A





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Species

- Black-headed Gull
- Eurasian Woodcock
- Great Black-backed Gull
- Great Egret
- Greylag Goose
- Lesser Black-backed Gull
- Little Egret
- Peregrine Falcon
- White-tailed Eagle
- Common Pochard
- Common Ringed Plover
- Eurasian Woodcock
- Great Black-backed Gull
- Great Crested Grebe
- Great Egret
- Jack Snipe
- Lesser Black-backed Gull
- Little Egret
- Little Grebe
- Peregrine Falcon
- Short-eared Owl

Species

- Black-headed Gull
- Common Kingfisher
- Common Moorhen
- Water Rail
- Western Barn Owl
- White-tailed Eagle

0 2 4
Kilometers

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	06/05/2026	First issue	K.K.	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A- XVI: Occasional, irregular, or rare species within the site

Scale @ A3: 1:80,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	May 2026

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Map Ref: 11458-084-ICSO-S.BO-TOB-A

Draft: A

7°29'12"W 7°21'40"W 7°14'8"W 7°6'36"W 6°59'4"W

755000 748000 741000 734000 727000 720000

53°26'42"N 53°19'24"N

Derryhinch

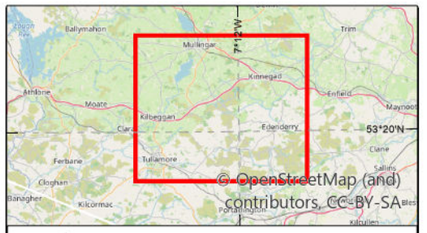
Drumman

Derryarkin

Torr

Ballybeg

629000 636000 643000 650000 657000 664000



Legend

- Derrygreenagh Wind and Solar - Proposed Development
- 10km Buffer

Non - Flight Observations selection

Species

- Common Goldeneye
- Common Gull
- Goosander
- Eurasian Coot
- Eurasian Curlew
- Eurasian Sparrowhawk
- Eurasian Teal
- Eurasian Wigeon
- Gadwall
- Osprey
- Red-crested Pochard
- Scaup

0 2 4
Kilometers

NOTES

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

Rev	Date	Description	By	Chkd.
A	16/07/2026	First issue	K.K	L.S

Client: Bord na Móna

Project: Bord na Mona - Derrygreenagh Wind and Solar

Title: Figure A- XVII: Species recorded outside of the proposed project site and within 10 km buffer

Scale @ A3: 1:125,000

Prepared by:	Checked by:	Date:
K.Kale	L.Shinkwin	July 2026

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Map Ref: 11458-084-ICSO-S.BO-TOB-A

Draft: A

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: DECEMBER 2025 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in December 2025.

An initial walkover survey was conducted on the 17th of December to identify suitable vantage points and establish viable transect routes through the site's terrain. Two vantage points ('VPs'), located at 53.36820, -7.348594 and 53.37324, -7.380712, were deemed potentially suitable and were subsequently surveyed during follow-up visits on the 18th and 19th of December. Additionally, two transect routes were selected to ensure adequate coverage of habitats representative of the site and the bird species associating with each habitat type. Figure 1 provides an overview of the vantage points and transects locations within the site.

The surveys completed in December: 1 Scoping Visit, 2 Vantage Point surveys, and 2 Transects. No limitations were encountered during surveys, and all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of December 2025, the following bird species of conservation interest were recorded (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: European Golden Plover (7), Merlin (1).

Red List: Northern Lapwing (90) Common Snipe (2).

One group of Golden Plover (7) were recorded flying over the centre of Toar Bog, not appearing to be directly interacting with the site. One flock of lapwing (90) was observed in flight over the general area in the eastern section of the site. This flock was not recorded interacting with or actively using the site. One merlin was recorded flying alongside the extensive log piles that occur within the site. The site provides suitable hunting habitat for this Annex I species.

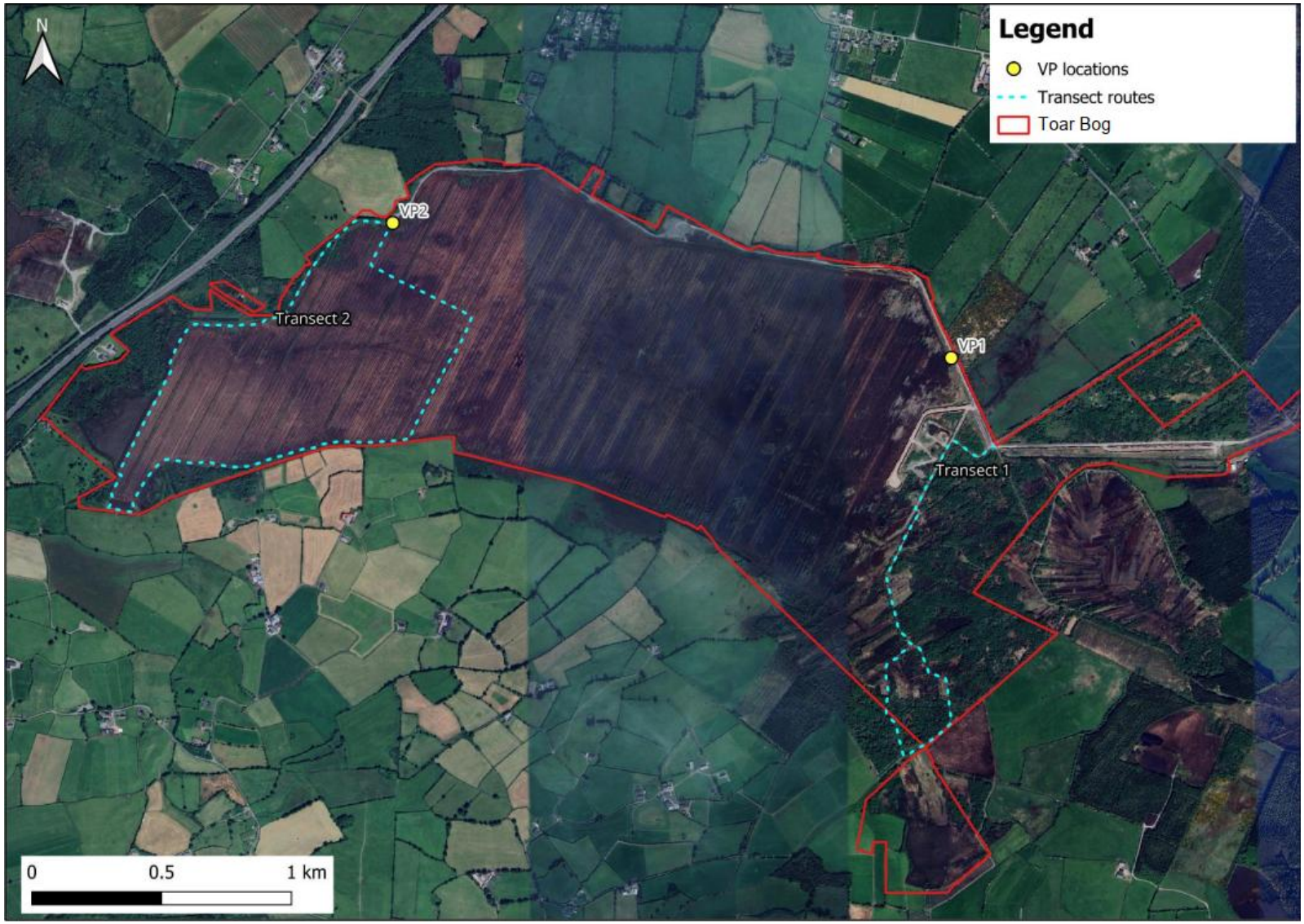


Figure 1: Overview of VPs and Transect Routes

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: JANUARY 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in January 2026.

The surveys completed in January: 2 Vantage Point surveys, and 2 Transect surveys. No limitations were encountered during surveys, and all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of January 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: European Golden Plover (52), Peregrine Falcon (1).
Red List: Eurasian Woodcock (2), Common Snipe (1).
Amber List: Mallard (2)
Other: Grey Heron (1)

European Golden Plover were recorded during Vantage Point with a flock of 30 birds recorded flying over Toar Bog. A single bird was recorded on the ground in Toar Bog during a Transect survey. This bird flushed several metres away before landing back on the bog.

A single Peregrine Falcon was recorded perched on the ground within Toar bog. This bird was observed perched for approximately 45 minutes before taking flight.

Two Eurasian Woodcocks were recorded in flight heading north from Toar bog toward the adjacent agricultural fields. As this record was made after sunset and thus visibility levels were low, it is not clear if this pair were actively utilising Toar bog or were in transit through the site.

During transect surveys a single Common Snipe and a pair of Mallards were flushed from the bog and associated drainage ditches. These species are noted as directly interacting with the site for foraging purposes.

A single Grey Heron was observed perching on top of a log pile along the main access track into the site.

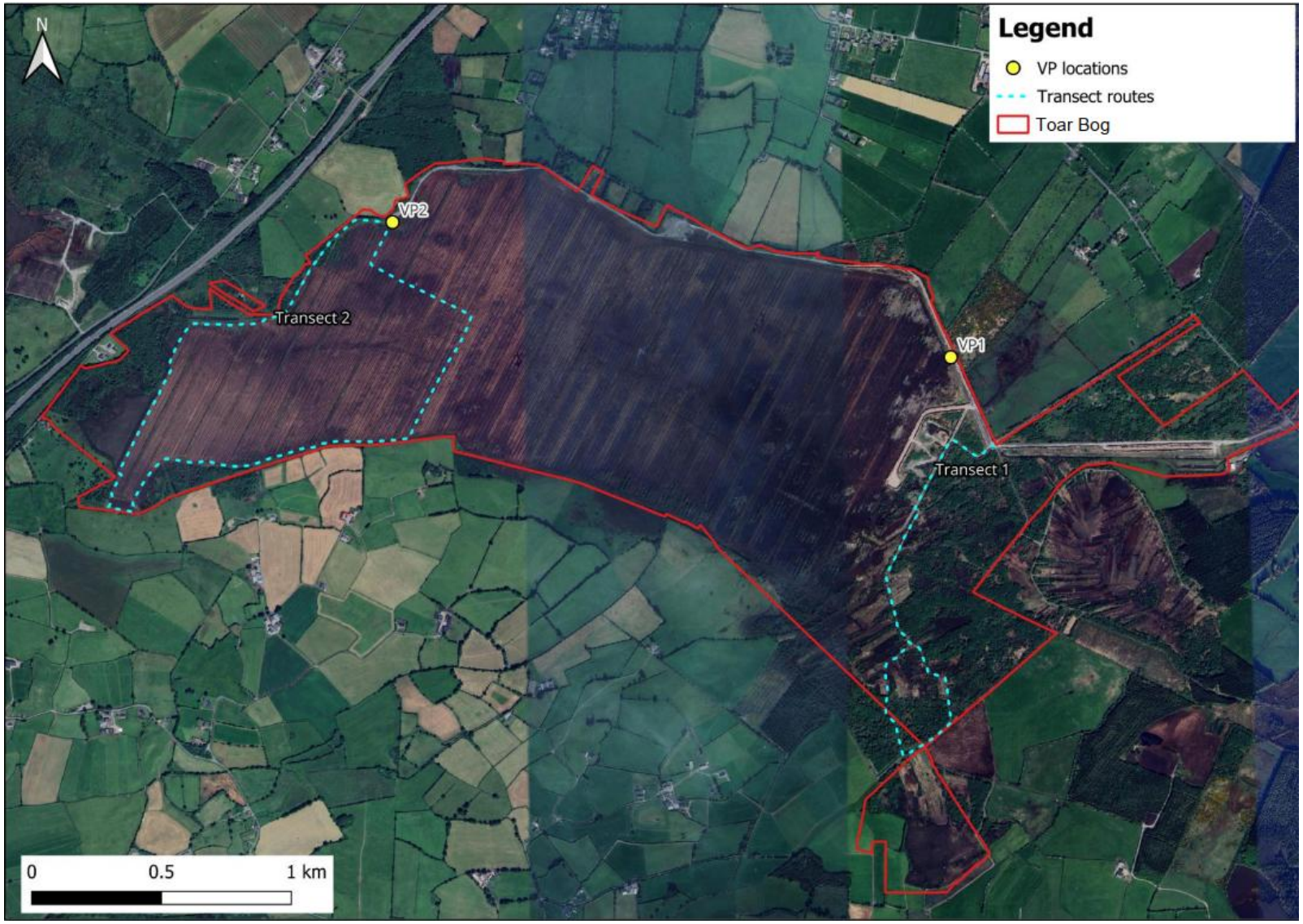


Figure 1: Overview of VPs and Transect Routes

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: FEBRUARY 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in February 2026.

The surveys completed in February: 2 Vantage Point surveys, and 2 Transect surveys. No limitations were encountered during surveys, and all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of February 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: European Golden Plover (49), Common Kingfisher (1).
Red List: Common Snipe (5).
Amber List: Mallard (2)
Other: Grey Heron (1)

European Golden Plover were recorded during Vantage Point and Transect surveys on the 25th February with a flock of 42 birds recorded foraging within and flying over Toar Bog. Another group of 7 European Golden Plover was recorded foraging in another area of the bog. Both groups were observed to be directly interacting with Toar Bog.

A single Common Kingfisher was recorded flying over an artificial pond in the eastern section of Toar bog, adjacent to the primary access track used by trucks carrying log deliveries. This bird was noted to be in transit only as aquatic features present on site provide limited suitable foraging habitat for this species.

During transect surveys, five Common Snipe and a pair of Mallards were flushed from the bog and associated drainage ditches. These species are noted as directly interacting with the site for foraging purposes.

A single Grey Heron was observed at an artificial pond in the wester section of Toar bog.

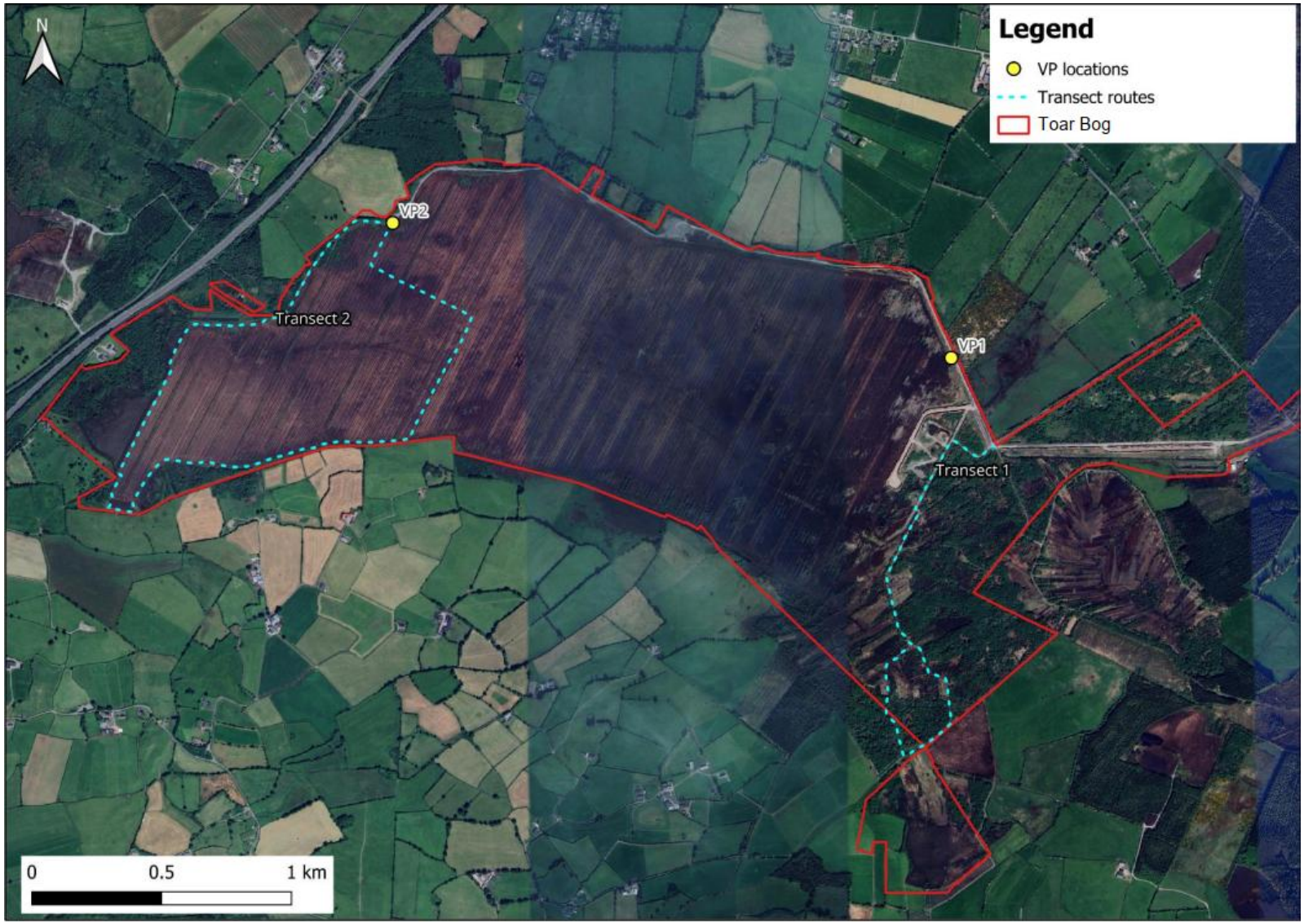


Figure 1: Overview of VPs and Transect Routes

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: MARCH 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in March 2026.

The surveys completed in March: 2 Vantage Point surveys, and 2 Transect surveys. No limitations were encountered during surveys, and all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of March 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: European Golden Plover (4)
Red List: Common Snipe (6), Kestrel (1), Redwing (1)
Amber List: Mallard (2)
Other: Buzzard (5)

European Golden Plover were recorded during Vantage Point surveys on the 26th March with a flock of 4 birds recorded flying over Toar Bog.

A single male Kestrel was observed hunting over the access track that fringes the northern section of Toar Bog in addition to the surrounding landscape.

One Redwing was recorded perched in an area of scrub during transect surveys. This species overwinters in Ireland between October and mid-March and does not breed in Ireland.

During transect surveys, six Common Snipe and a pair of Mallards were flushed from the bog and associated drainage ditches. These species are noted as directly interacting with the site for foraging purposes.

An increase in Buzzard activity was observed compared to previous surveys, with up to three birds engaged in territorial displays over Toar Bog and the surrounding landscape. There are suitable nesting trees in the lands surrounding Toar Bog and it is unlikely that Buzzards will utilise Toar Bog directly for nesting purposes.

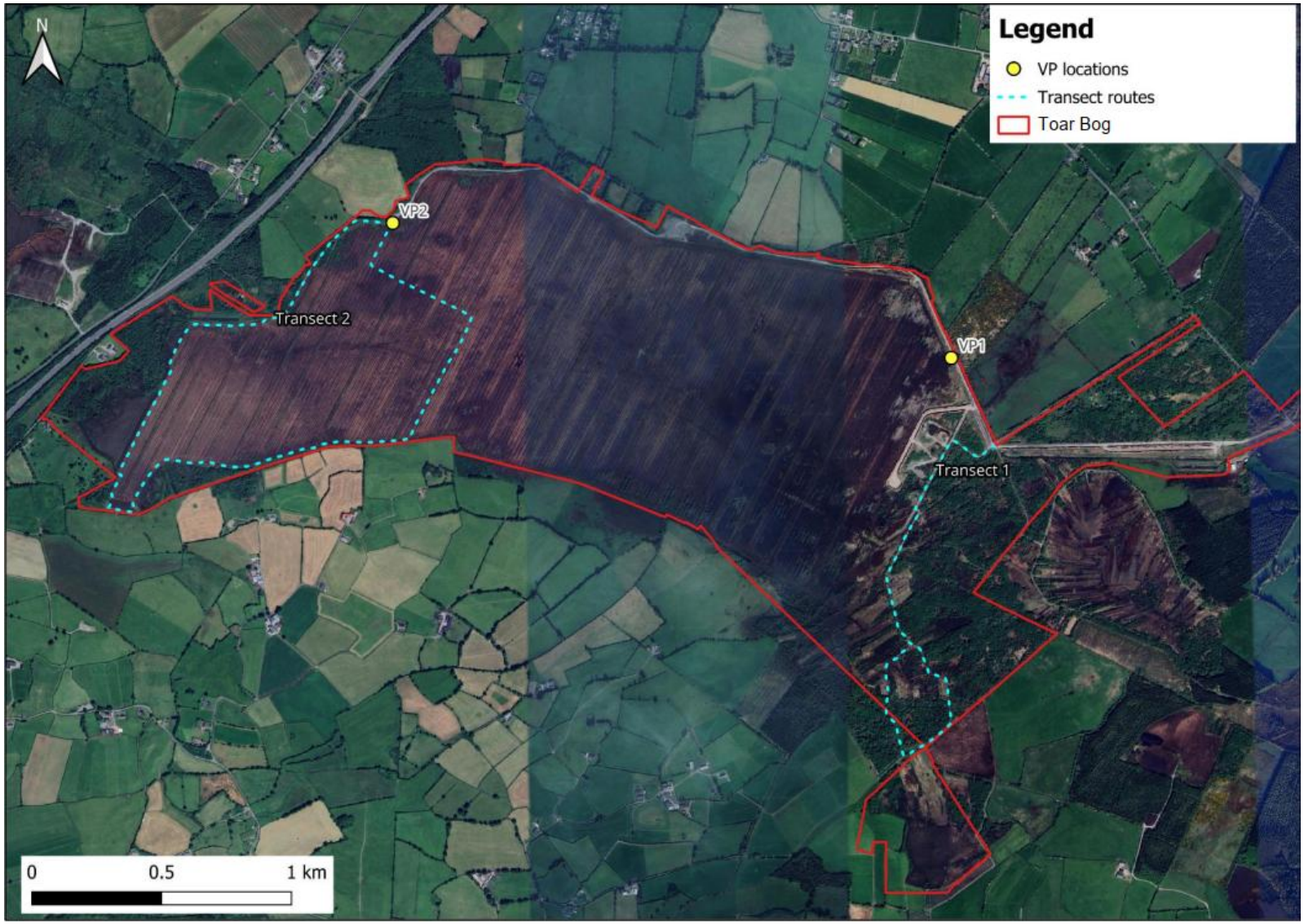


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2. BIBLIOGRAPHY

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: APRIL 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in April 2026.

The surveys completed in April: 2 Vantage Point surveys, and 3 Transect surveys. Transect surveys were increased to cover dusk and dawn periods to record the potential occurrence of breeding activity of crepuscular species. No limitations were encountered during surveys, and all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of April 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: Common Kingfisher (1)
Red List: Eurasian Woodcock (5), Kestrel (1)
Amber List: Mallard (5), Sand Martin (2)
Other: Buzzard (8)

A single Common Kingfisher was recorded flying over an artificial pond in the eastern section of Toar bog, adjacent to the primary access track used by trucks carrying log deliveries. This bird briefly perched on a rock overlooking the pond, which was noted as providing limited suitable foraging habitat for this species. The steep banks overlooking the pond are primarily composed of hard rocky/gravel material however some softer faces were evident. A single nest hole was recorded at this location, and a pair of sand martin were directly observed entering and leaving this nest hole. Kingfisher and Sand Martin have similar nesting requirements, therefore this location may provide suitable nesting opportunities for Kingfisher.

A single Kestrel was observed hunting over woodland in the northwestern corner of the site, not observed to be directly interacting with Toar Bog.

During the dusk transect survey, roding Woodcock were observed on several occasions in the southeastern section of the site. Roding is the characteristic display flight carried out by males in the breeding season, suggesting that this species is likely breeding in the area. This area will continue to be monitored in future surveys to confirm this.

As stated, a single confirmed Sand Martin nest hole was recorded in the steep bank of the artificial pond with two individuals observed entering and leaving this nest hole. During transect surveys, Mallards were flushed from the bog and associated drainage ditches. These species are noted as directly interacting with the site for foraging purposes.

Buzzard activity continued to increase from previous months, with this species being recorded on all surveys. Activity included hunting, flying, commuting and up to three individuals engaged in soaring display flights over the area. No active nests were recorded, however there are suitable trees for nesting in the lands surrounding Toar Bog and it is unlikely that Buzzards will utilise Toar Bog directly for nesting purposes.

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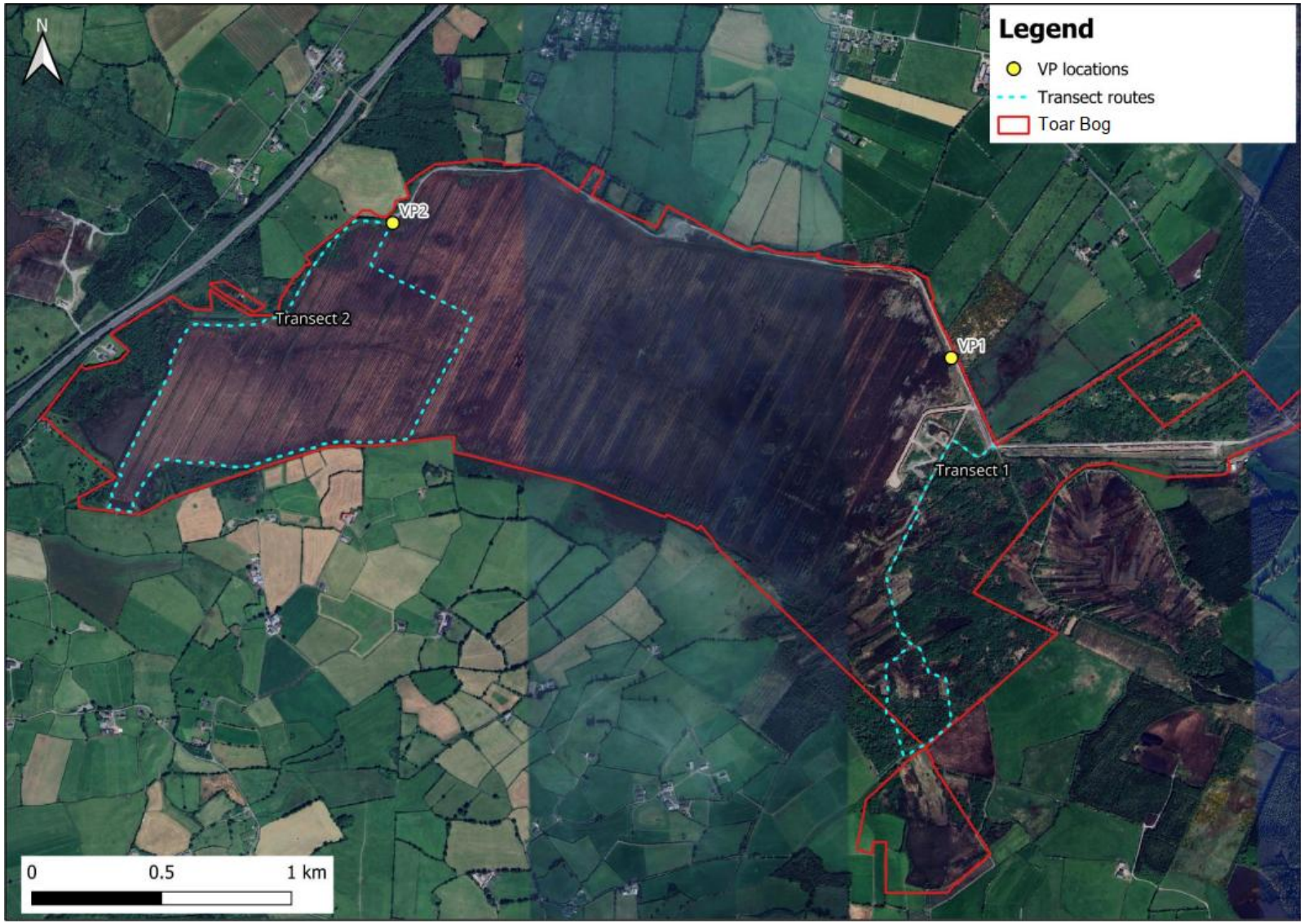


Figure 1: Overview of VPs and Transect Routes

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: MAY 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in May 2026.

The surveys completed in May: 2 Vantage Point surveys, 1 Kingfisher Vantage Point Survey and 1 Transect survey. A targeted Kingfisher survey was undertaken to further investigate Kingfisher activity on site that was initially detected during surveys in April 2026. A 4-hour watch was implemented to record this fast moving and cryptic species, as per Transport Infrastructure Ireland (TII) guidance (TII, 2009).

Similarly to last month, a Transect survey was undertaken at dusk in the southeastern section of the site to obtain more data regarding potentially breeding woodcock that were recorded in this area in April 2026.

No limitations were encountered during surveys, and all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of May 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: Common Kingfisher (1)
Red List: Eurasian Woodcock (2)
Amber List: Mallard (5), Sand Martin (2)
Other: Buzzard (3)

In April, a single Common Kingfisher was recorded flying over an artificial pond in the eastern section of Toar bog, adjacent to the primary access track used by trucks carrying log deliveries. The banks of this pond are steep and were noted as mostly comprised of hard rocky/gravel material unsuitable for Kingfisher nests. However softer bank faces were evident containing nest holes that Sand Martin were recorded emerging from. Kingfisher and Sand Martin have similar nesting requirements; therefore a Kingfisher-focused VP was carried out to investigate the potential for Kingfisher to utilise this area for breeding. A single Kingfisher was recorded throughout the watch making repeated visits to the pond before shortly departing each time. No evidence was recorded of this species exhibiting breeding behaviour at this location. Whilst this species is not likely to be breeding here, it is clear that this artificial pond belongs to this individual's territory and therefore may be breeding in the wider area.

As for April surveys, during the dusk transect survey, roding Woodcock were observed on several occasions in the southeastern section of the site. Roding is the characteristic display

flight carried out by males in the breeding season, suggesting that this species is likely breeding in the area. This area will continue to be monitored in future surveys to confirm this.

As stated, a single confirmed Sand Martin nest hole was recorded in the steep bank of the artificial pond with two individuals observed entering and leaving this nest hole.

During transect surveys, Mallards were flushed from the bog and associated drainage ditches. These species are noted as directly interacting with the site for foraging purposes.

Although Buzzard was recorded on all surveys, this species' activity was lower than previous months. Activity included hunting, flying, and commuting. No active nests were recorded, however there are suitable trees for nesting in the lands surrounding Toar Bog and it is unlikely that Buzzards will utilise Toar Bog directly for nesting purposes..

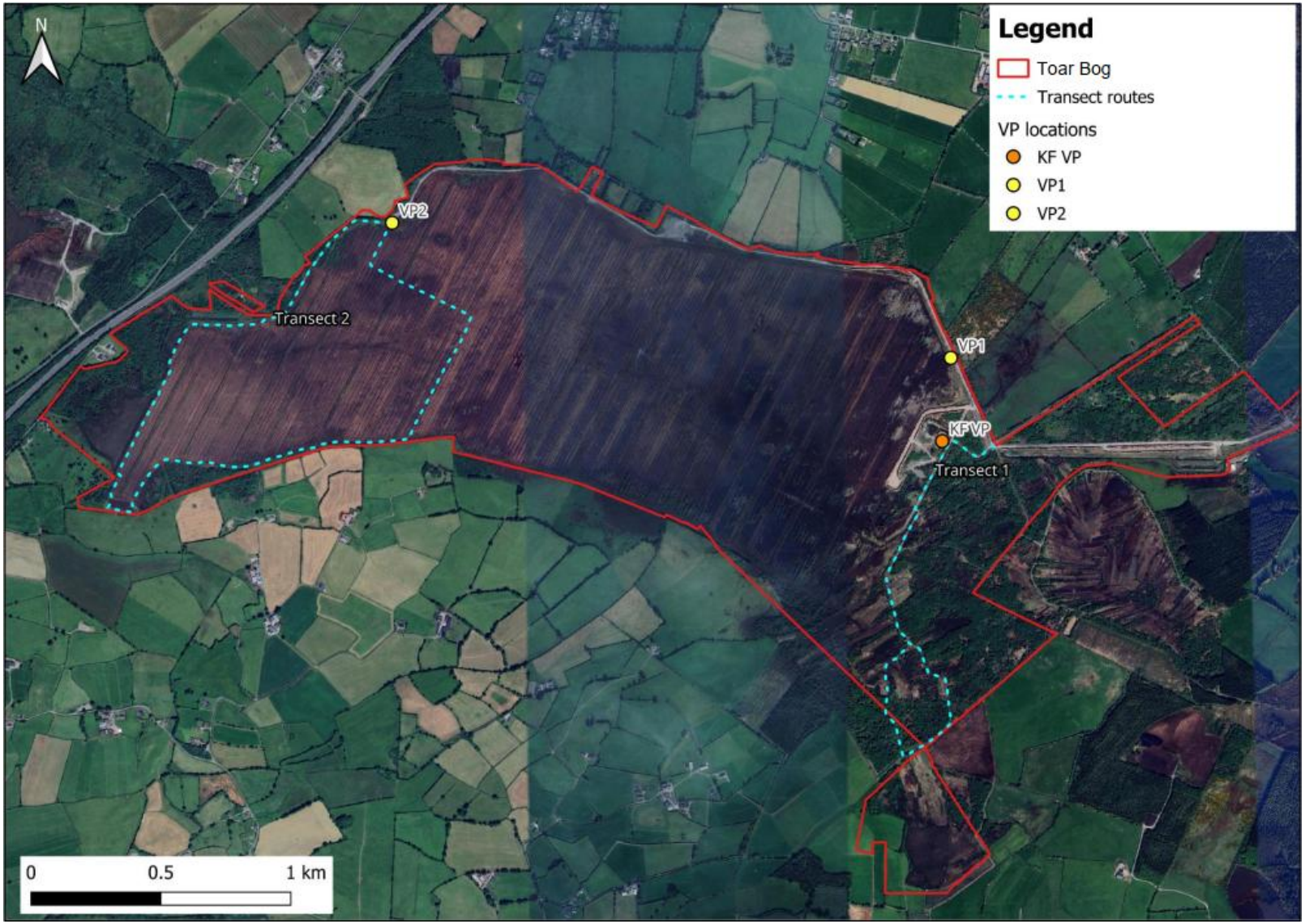


Figure 1: Overview of VPs and Transect Routes

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- Infrastructure in the Republic of Ireland. BirdWatch Ireland, Kilcoole, Wicklow.
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TOBIN

Derryhinch, Drumman, Derryarkin, Ballybeg and Toar Bogs – Application for Substitute Consent

Toar Bog - (June 2026) - Summary Ornithology Report

September 2026

BnM

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: JUNE 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in June 2026.

The surveys completed in June: 2 Vantage Point surveys and 2 Transect surveys. A locked forestry gate prevented access to VP2 and Transect 2, therefore suitable replacements were obtained. VPA was positioned overlooking the southeastern section of the site. This area is typically more species-rich than the area covered by VP2, so this was monitored to capture bird activity in a more forested/vegetated landscape. Transect A provides coverage of the same cutover bog habitat that is normally provided by Transect 2, therefore similar species were expected to be recorded for Transect A as for Transect 2.

And all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of June 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Amber List: Swallow (4)
Other: Buzzard (3)

During transect surveys, an active barn swallow nest with 4 chicks was recorded within a disused BnM canteen facility along the main access track at the northern edge of the site. Additionally, two unoccupied swallow nests were recorded in a nearby storage container. This species is regularly observed foraging and commuting over Toar bog and the surrounding agricultural landscape.

Buzzard was recorded on all surveys. Activity included hunting, flying, and commuting. No active nests were recorded, however there are suitable trees for nesting in the lands surrounding Toar Bog and it is unlikely that Buzzards will utilise Toar Bog directly for nesting purposes.

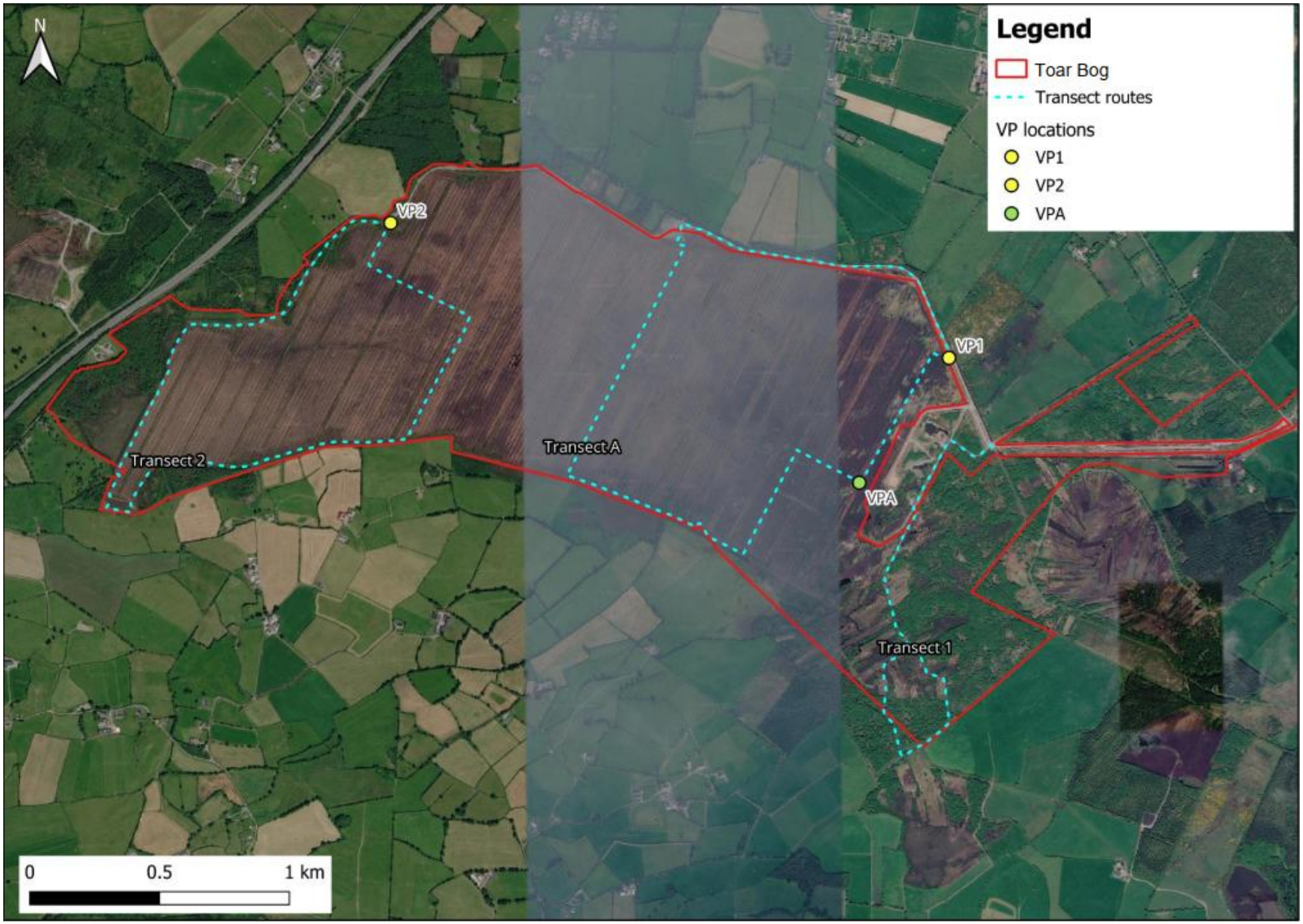


Figure 1: Overview of VPs and Transect Routes

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1. DERRYGREENAGH SUB CON ORNITHOLOGY SURVEY: JULY 2026 SUMMARY

The following is a summary of the ornithological surveys that took place at the BnM Toar Bog, part of the Derrygreenagh substitute consent, in July 2026.

The surveys completed in July: 2 Vantage Point surveys and 2 Transect surveys. A locked forestry gate prevented access to VP2 and Transect 2, therefore as for June surveys, suitable arrangements were made to capture representative survey data of the site. A new VP was established ("VPB") within the centre of Toar Bog which allowed for long-range viewing of the majority of the cutover bog habitat and surrounding habitats including agricultural fields and woodlands. Transect A was utilised again in July, which provided coverage of the same cutover bog habitat that is normally provided by Transect 2, therefore similar species were expected to be recorded for Transect A as for Transect 2.

Access to VP1 and Transect 1 was available as for previous survey visits, therefore there was no requirement for alterations.

And all fieldwork was conducted under suitable weather conditions. Visibility, wind levels, and precipitation were consistently within acceptable thresholds, ensuring that survey results were reliable and representative of the site's typical bird activity.

With regards to conservation and ornithological constraints, the bird species of importance are:

a) Listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).
b) Red and Amber species on the Birds of Conservation Concern Ireland List (BoCCI) (Gilbert et al, 2021).
c) Species that may not be of conservation concern but occur in large enough numbers for the site to be considered of national and international importance for the species.
d) Species that may be vulnerable to disturbance (BES, 2020; Cutts et al, 2013; Godship & Furnness, 2022, Mc Guinness et al, 2015).
e) Unusual, or very rare records for the specific geographic area.

During the month of July 2026, the following bird species of conservation interest were recorded at the BnM Toar Bog (flying and non-flying). The list is organized according to the most relevant classification.

Annex I: Hen harrier (1)
Red List: Kestrel (1)
Amber List: Swallow (Nest), Mallard (2)
Other: Buzzard (3)

A single sighting of a female Hen harrier was made during the transect survey on the 28th of July. This individual was observed commuting across Toar bog and was not recorded actively interacting with the site.

During transect surveys, an active barn swallow nest with 3 eggs was recorded within a disused BnM canteen facility along the main access track at the northern edge of the site. This was a separate nest within the unit from the active nest recorded in June 2026. This species is regularly observed foraging and commuting over Toar bog and the surrounding agricultural landscape.

During transect surveys, a pair of Mallards were flushed from an artificial pond directly south of VP1. This species is often recorded foraging and commuting within the site, however no evidence of breeding was recorded on this occasion.

Buzzard was recorded on all surveys. Activity included hunting, flying, and commuting. No active nests were recorded, however there are suitable trees for nesting in the lands surrounding Toar Bog and it is unlikely that Buzzards will utilise Toar Bog directly for nesting purposes.

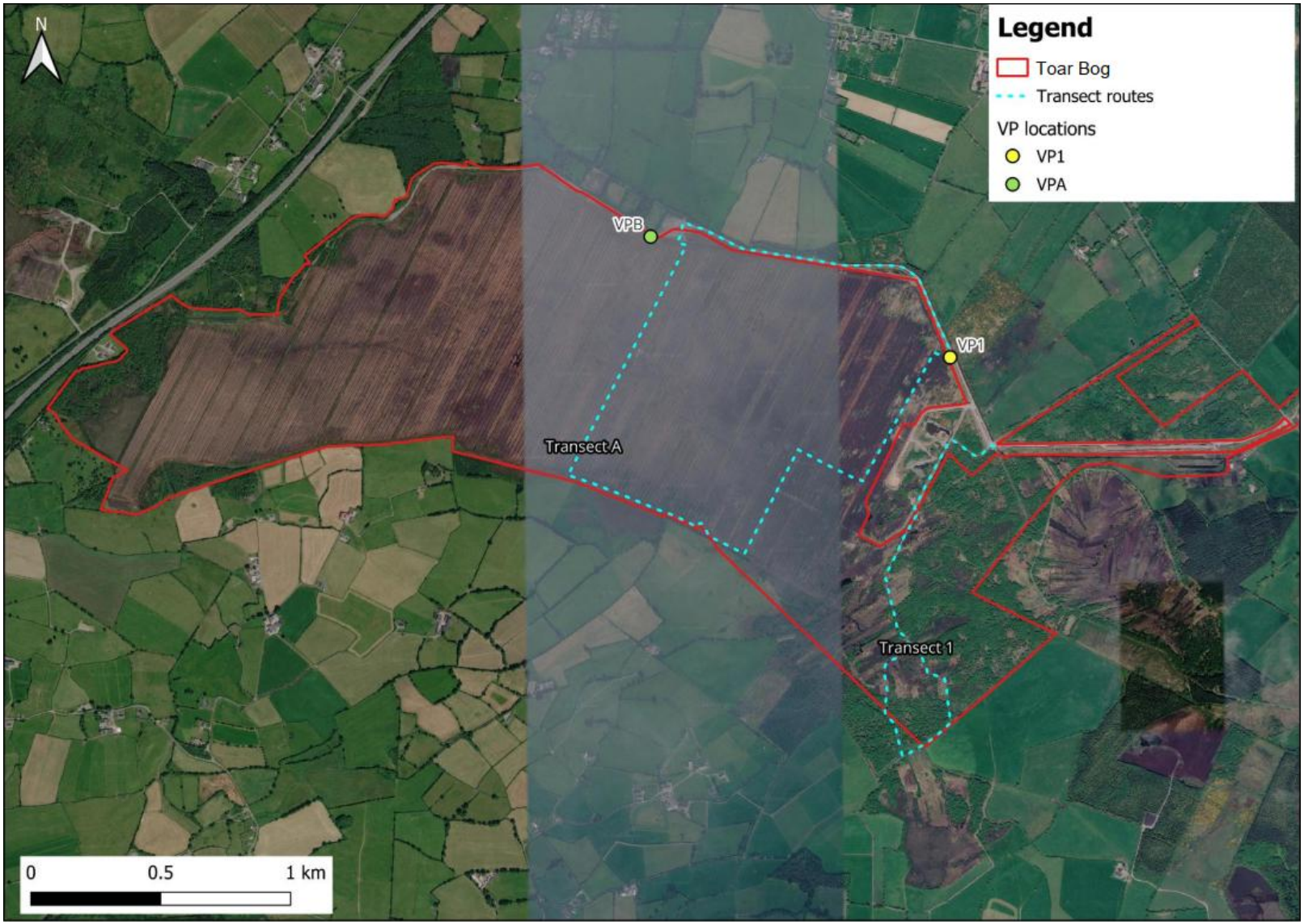


Figure 1: Overview of VPs and Transect Routes

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Appendix D AQUATIC ECOLOGY

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Bord Na Mona

Derrygreenagh Substitute Consent

Aquatic Ecology

70 Years of TOBIN CONSULTING ENGINEERS
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1. AQUATIC ECOLOGY TECHNICAL APPENDIX

1.1 BACKGROUND

This report presents the findings of the aquatic field surveys undertaken by TOBIN ecologists within and downstream of the Application Site. The objective of the aquatic surveys was to establish baseline conditions within within the freshwater environment of the study area and to characterise the ecological value and sensitivity of the watercourses in relation to fisheries, aquatic habitats, biological water quality and protected aquatic species. Particular emphasis was placed on species of of conservation importance, such as Atlantic Salmon (*Salmon salar*), Lamprey species, White-clawed Crayfish (*Austropotamobius pallipes*) and Otter (*Lutra lutra*).

This baseline report presented presents the findings of the aquatic surveys and describes the existing fisheries resource, biological water quality, macroinvertebrate communities, riverine habitats, aquatic macrophytes, invasive species, and protected aquatic and semi-aquatic fauna

1.2 RELEVANT GUIDANCE AND LEGISLATION

The aquatic surveys were carried out with regard to the following legislation:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, hereafter referred to as the Habitats Directive
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009) and (Amendment) Regulations 2012 and 2015
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) (as amended)
- European Union (EU) Water Framework Directive (2000/60/EC) (WFD), transposed into Irish law in 2009 (S.I. 792 of 2009, European Communities Environmental Objective (Surface Water) Regulations 2009 as amended; hereafter referred to as the WFD Regulations
- Wildlife Act 1976 (as amended)
- Inland Fisheries Acts 1959 to 2017 as amended, hereafter referred to as the Fisheries Acts
- Invasive Alien Plant (IAPS) listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024)

1.3 CONSULTATION AND LICENCING

TOBIN obtained a Section 14 Authorisation from the Department of the Environment, Climate and Communications (DECC) on the 9th of April 2026, under the Fisheries Consolidation Act 1959, as substituted by section 4 of the Fisheries (Amendment) Act 1962, to conduct an electro-fishing assessment of the selected watercourses.

TOBIN also obtained a full crayfish licence from National Parks and Wildlife Services on the 14th of June 2026 to carry out a crayfish survey (Licence No. C142/2026).

2. METHODOLOGY

2.1 DESKTOP REVIEW

An ecological desktop review was carried out to collate information on aquatic faunal species and protected species in the environs of the study area and to identify features of aquatic ecological importance within the study area (refer to Section 2.4.1. and 2.4.2). This information was obtained by accessing the website of the National Parks & Wildlife Service (NPWS)[1], IFI[2] and the database of the National Biodiversity Data Centre (NBDC)[3]. The document '*Quantification of the Freshwater Salmon Habitat Asset in Ireland'* by McGinnity *et al.* (2003) was also reviewed to classify salmonid habitats in the study area.

A search of the NBDC database was carried out within the 10km grid square, N43, N44, N53 and N54 for freshwater species protected under the EU Habitats Directive and for species listed S.I No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations (2011). Protected species included including White Clawed Crayfish, Atlantic salmon (*Salmo salar*) and lamprey sp. *(Lampetra sp*). Characteristics of river sites were checked on Ordnance Survey (OS) maps before each survey, and previous information on the presence and distribution of protected freshwater species was consulted when selecting survey sites.

2.2 AQUATIC ECOLOGICAL EVALUATION

The evaluation of aquatic ecological receptors contained within this report uses the geographic scale and criteria defined in the *'Guidelines for Assessment of Ecological Impacts of National Road Schemes'* (NRA, 2009).

2.3 AQUATIC FIELD SURVEYS

The aquatic surveys were undertaken to establish baseline conditions within the freshwater environment of the study area and to characterise the aquatic habitats, biological communities and species assemblages associated with watercourses in the vicinity of the proposed development. The surveys focused on riverine habitats, biological water quality, aquatic macrophytes, fisheries resources, and protected aquatic and semi-aquatic species, including species of conservation importance where present.

Survey effort was directed towards both instream and riparian habitats at each aquatic survey location to provide a comprehensive baseline description of the receiving aquatic environment.

The aquatic field surveys comprised:

- Riverine habitat assessment;
- Biological water quality assessment using aquatic macroinvertebrate sampling (Q-sampling);
- Aquatic macrophyte surveys;

[1] Available at: https://www.npws.ie/maps-and-data
[2] Available at: https://www.fisheriesireland.ie/
[3] Available at: http://www.biodiversityireland.ie/

- Fisheries habitat assessment, including an appraisal of salmonid spawning and nursery habitat;
- Surveys for invasive alien species (IAS);
- White-clawed Crayfish surveys;
- Environmental DNA (eDNA) sampling; and
- Electrofishing surveys to determine the presence and distribution of fish species and lamprey.

The objective of the biological water quality surveys was to establish baseline water quality conditions within the watercourses draining the study area. Water quality was assessed through macroinvertebrate sampling and the assignment of EPA Q-values in accordance with established EPA methodologies.

The fisheries surveys were undertaken to characterise fish populations and fisheries habitat within the study area, including the suitability of watercourses for Atlantic Salmon, Brown Trout (*Salmo trutta)*, Lamprey species and other fish species of ecological interest.

Aquatic surveys were undertaken by TOBIN ecologists in June 2023 and again in June and July 2026 under baseflow conditions. Detailed river habitat and macroinvertebrate surveys were completed between 15 and 19 June 2026. Electrofishing surveys were undertaken between 6 and 9 July 2026. White-clawed Crayfish surveys were completed between 15 and 19 June 2026, while eDNA sampling was undertaken on 6 July 2026.

The findings of these surveys provide a baseline description of aquatic ecological conditions within the study area and identify the principal aquatic ecological receptors associated with the receiving environment.

2.3.1 Watercourse Survey Site Selection

All freshwater watercourses which could be affected directly or indirectly by the Project were considered as part of the current aquatic baseline. Representative survey locations on watercourses within the study area were selected for surveying using expert judgement, taking account of hydrological connectivity, watercourse characteristics, accessibility, existing ecological information, and their relationship to the historical peat extraction and ancillary activities undertaken at the Application Site.

Survey locations were selected to provide a representative coverage of the receiving aquatic environment and included:

- Sites within and adjacent to the Application Site, to characterise aquatic ecological conditions in watercourses associated with the historical peat extraction area;
- Sites downstream of the Application Site, to characterise aquatic habitats and ecological conditions within receiving waters hydrologically connected to the Application Site; and
- Sites upstream of the Application Site, where available, to provide representative reference locations for comparison with downstream survey sites

Additional considerations in survey site selection included safe access, stream order, watercourse morphology, flow characteristics, previous EPA biological water quality data, and the need to obtain a representative overview of aquatic ecological conditions across the study area..

A total of 14 aquatic survey locations were selected for detailed survey. These locations were situated within the Castlejordan_020, Castlejordan_030, Yellow (Castlejordan)_010, Yellow (Castlejordan)_020, Yellow (Castlejordan)_030, Kinnegad_010, Milltownpass_010 and Castletown Tara Stream_010 river waterbodies. The survey locations were located within the Yellow [Castlejordan]_SC_010, Figile_SC_020 and Boyne_SC_030 sub-catchments and were selected from watercourses mapped by the Environmental Protection Agency (EPA) and Ordnance Survey Ireland (OSI).

A list of survey types, dates and location are provided in Table 2-1. A map of the entire study area and the survey locations within the study area is shown on **Error! Reference source not found.**.

While survey sites down-gradient of the proposed development may be influenced by factors outside of the site boundary, downstream biota are nonetheless receptors for the proposed development, and acquisition of baseline information at these locations was deemed important to provide a complete understanding of aquatic sensitivities. It is acknowledged that the larger size of watercourses downstream of the proposed development provide more habitat and are considered to have the potential to contain more salmonids than reaches inside the proposed project boundary.

2.4 DESCRIPTION OF WATERCOURSES IN THE STUDY AREA

The study area was defined as surface waters potentially affected by the proposed project, including watercourses within the proposed project site and those downstream draining the proposed project site. There was no fixed distance applied for the study area downstream, as site specific conditions determine the potential for pollution generation, downstream transport, and any consequential effects.

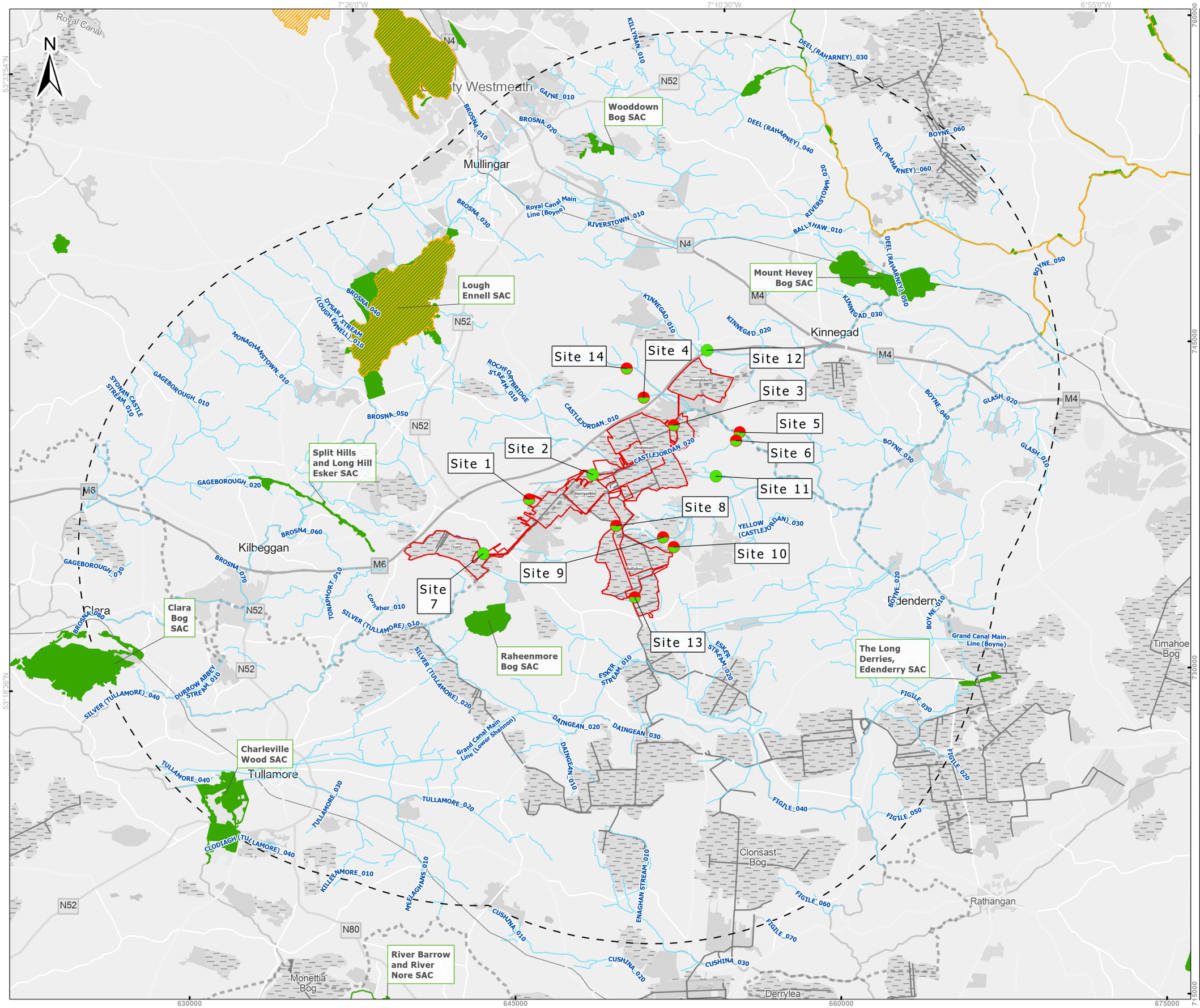
The proposed project and study area is located in the WFD catchments/ Hydrometric Area 07 within the Boyne Catchment and Yellow [Castlejordan]_SC_010 subcatchment. The site is flat and low lying in nature. The site falls in an easterly direction.

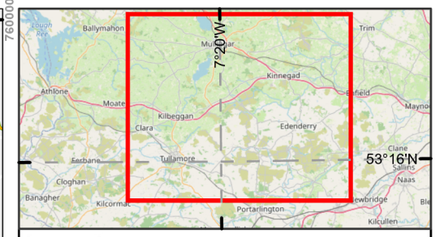
The study area includes the eight river water bodies (RWB), Castlejordan_020, Castlejordan_030, Yellow (Castlejordan)_010, Yellow (Castlejordan)_020, Yellow (Castlejordan)_030, Kinnegad_010, Castletown Tara Stream_010 (RWB) and Milltownpass_010 located within both the proposed wind farm site and adjacent or downstream of the site. The water features in the study area are illustrated in **Error! Reference source not found.**.

These all flow in an eastly direction before flowing into the Boyne_040 RWB approximately 12km downstream of the proposed project site. The proposed project and associated infrastructure is not located within a European site although there is downstream hydrological connectivity (via several watercourses) with the River Boyne and River Blackwater SPA (004232) and the River Boyne And River Blackwater SAC (002299). These sites are designations for freshwater species and habitats.

Due to the low elevation of the proposed project site and its location in the environs of the catchments' watershed, the watercourses within the site are no larger than 3rd order rivers. The watercourses are of gradual sloping gradient and generally slow to moderately flowing and categorised as depositing/lowland rivers with reference to Fossitt (2000).

These waterbodies represent historically modified channels that have been straightened and deepened for land drainage, with some channels been directed to others and cut off. The banks have been raised and sloped, and the original riverbed has been removed. The natural physical and ecological features of the rivers corridors have been removed causing an imbalance in natural hydromorphology of these rivers in sections, thus affecting the flow regime of the study watercourses within the study area.





Legend

- Site Boundary

Designated Sites

- Special Protected Areas (SPAs)
- Special Areas of Conservations (SACs)
- WFD - Rivers

Electrofishing

- eDNA, Crayfish, Electrofishing, Kick sampling, and RHAT
- Crayfish, Electrofishing, Kick sampling and RHAT

0 1.5 3
Kilometers

Spatial Reference
Datum: IRENET95
EPSG: 2157

Copyrights:
Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri, ©

Rev	Date	Description	By	Chkd.
A	06/10/2026	First issue	K.K	B.K

Client: BnM

Project:
Derrygreenagh Substitute Consent

Title:
Figure 2-1:
Overview of the Watercourses Within the Study Area and Aquatic Survey Site Locations

Scale @ A3:	1:160,000	
Prepared by:	Checked by:	Date:
K.Kale	B.Kasonde	October 2026

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Map Ref: 12334-003-E.FISH-AE..AA-TOB-A

Draft: A

Table 2-1: Aquatic Ecological Survey Site Locations on Watercourses Within the Study Area of the Project

Site	Survey Type: eDNA| KS (Kick sampling) | EFS (Electrofishing)| CFS (Crayfish survey)	WFD River Sub-Catchment	WFD Watercourse	EPA Name	EPA Code	ITM (x)	ITM (y)
1	KS| EFS |CFS	Yellow [Castlejordan]_SC_010	Castlejordan_020	Kiltotan and Collinstown	07K04	645626	737730
2	KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Castlejordan_020	Kiltotan and Collinstown	07Y04	648560	738871
3	KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Castlejordan_020	Castlejordan 07	07C04	652284	741142
4	KS | EF |CFS	Yellow [Castlejordan]_SC_010	Castlejordan_020	Null	Null	650902	742412
5	eDNA | KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Castlejordan_020	Castlejordan 07	07C04	655323	740817
6	KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Castlejordan_030	Baltinoran	07B59	655155	740432
7	KS | EF | CFS	Yellow [Castlejordan]_SC_010	Yellow (Castlejordan)_010	Rathgarrrett	07_508	643514	735235
8	KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Yellow (Castlejordan)_010	Yellow [Castlejordan]	07Y02	649633	736513
9	KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Yellow (Castlejordan)_020	Yellow [Castlejordan]	07Y02	651796	735984
10	KS | EF |CFS	Yellow [Castlejordan]_SC_010	Yellow (Castlejordan)_020	Coolcor stream	07C08	652286	735537
11	eDNA | KS | EFS | CFS	Yellow [Castlejordan]_SC_010	Yellow (Castlejordan)_030	Null	Null	654231	738794
12	eDNA | KS | EFS | CFS	Boyne_SC_030	Kinnegad_010	Kinnegad 07	07K01	653822	744590



Site	Survey Type: eDNA| KS (Kick sampling) | EFS (Electrofishing)| CFS (Crayfish survey)	WFD River Sub-Catchment	WFD Watercourse	EPA Name	EPA Code	ITM (x)	ITM (y)
13	KS | EF |CFS	Yellow [Castlejordan]_SC_010	CastletownTara Stream_010	Coolcor stream	07C08	650491	733231
14	KS | EF | CFS	Yellow [Castlejordan]_SC_010	Milltownpass_010	Milltownpass	07M04	650122	743749

2.4.1 Riverine Habitat Survey

The aquatic ecological assessment included a habitat assessment of the receiving watercourses within the study area. The habitat assessment of the watercourses followed methodologies outlined in the Environment Agency's *'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual'* (EA, 2003) and the Irish Heritage Council's *'A Guide to Habitats in Ireland'* (Fossitt, 2000).

Riverine habitat surveys were undertaken at each selected survey location to characterise the physical, hydromorphological and ecological characteristics of the watercourses. Concurrent aquatic surveys, including macroinvertebrate sampling, were also undertaken to establish baseline biological water quality conditions.

All watercourse survey locations were assessed in terms of:

- Stream width and depth, bank height and width and other physical characteristics including associated evidence of historical drainage
- Substrate type, listing substrate fractions in order of dominance, i.e. bedrock, boulder, cobble, gravel, sand, silt etc
- Flow type, listing percentage of riffle, glide and pool in the sampling area
- In-stream macrophyte and bryophyte communities occurring and their percentage coverage of the stream bottom at each sampling site
- Percentage of overhead shade present
- Riparian vegetation composition on banksides

The diversity and condition of riverine habitats were assessed through the recording of natural and semi-natural features within the channel and river corridor. Features such as point bars, side bars, mid-channel bars, eroding riverbanks, large woody debris, waterfalls, backwaters and floodplain wetlands were recorded, where present. Channel substrate, flow characteristics, instream vegetation, riparian tree and hedgerow cover, and adjacent land use were also documented.

Evidence of hydromorphological modification, including channel straightening, deepening, bank reinforcement and other artificial alterations, was noted where present. The information collected was used to characterise the condition and ecological quality of the surveyed watercourses and to identify aquatic habitats with the potential to support species of conservation importance. Anthropogenic influences, including agricultural activities, drainage works and livestock access, were also recorded where observed along the surveyed reaches..

2.4.2 Fisheries Habitat

Each sampling site along the watercourse was described in terms of the aquatic habitats present and the aquatic species recorded, with particular attention given to species and habitats of conservation importance.

A fisheries assessment was carried out at each watercourse utilising methodology elements of (O'Grady, 2006), Armstrong *et al.* (2003), Harvey & Cowx (2003) and Hendry & Cragg-Hine, 2003) to characterise the channel morphology, substrate composition, flow characteristics and overall fisheries habitat quality.

A broad appraisal/overview of the upstream and downstream habitat at each site was undertaken to characterise the suitability of watercourses for fish species and to identify habitats of potential importance for salmonid and lamprey spawning, nursery and holding habitat.

The suitability of the habitat to support aquatic species of conservation concern (e.g. white-clawed crayfish, river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*), and Atlantic salmon was also recorded.

Potential lamprey habitats within the study area was assessed with reference to methodologies outlined in '*Ecology of the River, Brook, and Sea Lamprey'* (Maitland, 2003) and also NPWS Irish Wildlife Manuals lamprey surveys (O'Connor, 2007). A visual assessment was carried out on the habitat suitability for lamprey such as slower flowing water, nursery areas of sandy silt beds, an assessment on potential barriers on migration route, potential spawning areas, suitable hiding places and clean spawning gravels over stretches of running water. Juvenile lamprey habitat was identified from the descriptions given in Maitland (2003). Substrate depth and composition was examined for potential ammocoete habitat, especially focusing on the composition of mud, silt, or silt and sand and its suitability for ammocoetes. Areas where suitable spawning gravels may occur, were searched, especially at tails of pools where the gravels have been deposited from upstream and the scouring of pools were examined for potential spawning habitats for adults.

Any fish captured were identified with reference to the Freshwater Biological Association's publication *'Key to British Freshwater Fish with notes on their ecology and distribution'* (Maitland, 2003) and other referenced sources.

2.4.3 Macrophytes

Aquatic plants as well as rare and/or protected plant species and Invasive Alien Species (IAS) flora were identified and recorded at each site where present while wading at each site or from visual assessment from the riverbank. Plant species nomenclature followed '*New Flora of the British Isles'* (Stace 2019). An assessment of the aquatic vegetation community to identify any rare macrophyte species (Flora Protection Order or Wyse-Jackson *et al.*, 2016) and to determine whether the surveyed watercourses supported habitat characteristics consistent with Annex I aquatic habitats including '*Water courses of plain to montane levels, with submerged or floating vegetation of the Ranunculion fluitantis and Callitricho-Batrachion (low water level during summer) or aquatic mosses [3260]*, commonly referred to as '*floating river vegetation'*.

2.4.4 Biological Water Quality Sampling

Biological water quality surveys were undertaken to establish baseline ecological conditions within the receiving watercourses against which any future changes can be assessed. Aquatic macroinvertebrate communities were used as indicators of ecological condition and biological water quality.

Biological water quality was assessed through macroinvertebrate sampling undertaken at accessible survey locations. The survey results were used to assign EPA Biological Quality Ratings (Q-values) in accordance with established EPA methodologies. The resulting Q-values

provide an indication of the ecological condition and biological water quality of the surveyed watercourses at the time of survey.

2.4.4.1 Kick Sampling

Semi-quantitative sampling of benthic (or bottom dwelling) aquatic macroinvertebrates was undertaken at each site using standard EPA kick-sampling methods (Toner *et al.*, 2005). A two-minute kick-sample was conducted at each site, principally from the faster flowing riffle habitats, but glides, margins and pools were included according to their proportional presence. A standard 500µm mesh D-shaped kick net was submerged on the riverbed with the mouth of the net directed upstream. The substrate just upstream of the net was disturbed (with the foot, in a kicking motion) in order to dislodge invertebrates into the net. The surveyor moved in a diagonal direction upstream to ensure that different micro-habitats in the waterbody, such as fast-moving riffles and glides were included in the sample.

A further one-minute hand search was carried out to locate macroinvertebrates that may have remained attached to the underside of the cobbles (Toner *et al.*, 2005). This approach is designed to achieve maximise taxonomic representation and improve the detection of less abundant or less mobile taxa. This sampling approach requires avoidance of obvious localized disturbance (e.g. cattle access points) which may adversely influence the sample taken.

Following collection, the macroinvertebrate samples were identified to family level using the standard range of identification keys published by the Freshwater Biological Association (FBA), AIDGAP and others, and their relative abundance was recorded on the riverbank. The relative abundance of each taxon was recorded to facilitate subsequent biological water quality assessment and Q-value determination. Once all taxa and their relative abundance were recorded, the sample was returned to the river.

2.4.4.2 Water Quality

2.4.4.2.1 Biotic Indices

The Biological River Classification System (Q-Scheme)

The Biological River Quality Classification System Quality Rating (Q) System (Toner *et al.,* 2005) was used to obtain a water quality rating for each site. The Biotic Index is a quality measurement for freshwater bodies. In order to determine the biological quality of the river, the Q-scheme index is used whereby the analyst assigns a Biotic Index value (Q-Value) based on macroinvertebrate results.

The macroinvertebrate data were used to derive a Biotic Index value Q-value to the sampled streams using the EPA methodology (McGarrigle *et al.,* 2002) and assigned to WFD status classes based on the presence and relative abundance of sensitive groups and the consideration of additional qualifying criteria, as described by Toner *et al.* (2005). The resulting species list was used to assign a Biotic Index value (Q-Value) to the sampled watercourses. This involved recording the taxa present at a suitable and attainable taxonomic resolution and their categorical relative abundance determined using approximate counts. This Q-value system is a five point scale (Q1-Q5: with intermediate scores obtainable, e.g. Q3-4) based on the proportions of five groups of macroinvertebrates, with different pollution tolerances with Q1 being of poorest quality and Q5 being pristine/unpolluted (see Table 2-2). The system facilitates rapid and

effective assessment of the water quality of rivers and streams. Each site was assigned a biological status on a scale of High-Good-Moderate-Poor-Bad.

The Quality Rating System has been shown to be a robust and sensitive measure of riverine water quality and has been linked with both chemical status and land use pressures in catchments (Donohue *et al.*, 2006).

Table 2-2:Reference Categories for EPA Q-Ratings

Biotic Index	WFD Quality Status	Pollution status	Quality Class	Condition
Q5 or 4-5	High status	(Unpolluted)	Class A	Satisfactory
Q4	Good status	(Unpolluted)	Class B	Satisfactory
Q3-4	Moderate status	(Slightly Polluted)	Class C	Unsatisfactory
Q3 or 2-3	Poor status	(Moderately Polluted)	Class D	Unsatisfactory
Q2, 1-2 or 1	Bad status	(Seriously Polluted)	Class E	Unsatisfactory

2.4.5 Fisheries Assessment (Electrofishing)

An electro-fishing survey across the study area to characterise fish communities and fisheries resources within watercourses associated with the Application Site. The survey was designed to establish the distribution and relative abundance of fish species present and to characterise the suitability of the surveyed watercourses as habitats for salmonids, lamprey (*Lampetra* spp.), European eel (*Anguilla anguilla*) and other fish species.

A total of 14 riverine survey sites were selected were selected for fisheries assessment. Electrofishing surveys were carried out at 11 sites. Three sites (Site 2, 4 and 9) could not be surveyed by electrofishing due to water depth, dense instream vegetation or where the channel had completely dried out. The survey limitations around these sites are further discussed in Section 2.2.10 of this report.

2.4.5.1 Methodology

A single anode Smith-Root LR24 backpack (12V DC input; 300V, 100W DC output) and electrofishing dip nets were used to electrofish sites on watercourses in the vicinity of the proposed project. Ten-minute electrofishing surveys were carried out following the methodology set out by Beaumont (2016) and Matson *et al.,* (2018). The electrofishing methodology and technique also complied with the European Committee for Standardisation (CEN) guidelines for fish stock assessment in wadable rivers (CEN, 2003) and Section 14 licensing requirements. Water temperature and conductivity were measured at each sampling site and habitat characteristics were recorded, including sediment type, water depth, flow type, shading, channel modification etc.

For salmonids, electro-fishing was conducted in an upstream direction at each site for a standard ten-minute fishing (Matson *et al.,* 2018) Catch Per Unit Effort (CPUE). Approximately 50-75m of channel was surveyed at each site, where feasible. Lamprey species were specifically targeted in areas of low/reduced flow and with a higher proportion of soft sediment.

2.4.5.2 Electrofishing Settings

Two separate electrofishing methodologies were employed, incorporating different settings based on target species i.e. lamprey and salmonids, during the electro-fishing surveys.

The threshold values for different fish responses to electric current differ based on the level of water conductivity in the water and the resistance to the passage of an electric current through it (Zalewski and Cowx, 1990). Conductivity (µs) was therefore measured on-site with a conductivity meter prior to any electro-fishing activity. The appropriate voltage and frequency settings were applied based on conductivity readings.

In order to minimise potential damage and undue stress, electrofishing settings were modified to target specific species at the site. For salmonids, a voltage of approximately 200-220V, frequency of 40-45Hz and pulse duration of ten minutes was used to draw fish to the anode without causing physical damage.

Electrofishing for lamprey sp. ammocoetes was conducted within a defined area ($1m^2$) as per Harvey & Cowx (2003), where sand/silt were encountered. As lamprey take longer to emerge from silt, a low frequency (20-30Hz) setting was used within soft sediment areas. Settings for lamprey followed those recommended and used by Harvey & Cowx (2003), APEM (2004) and Niven & McAuley (2013).

The anode was placed under the water surface, approximately 10–15cm above the sediment, to prevent immobilising lamprey ammocoetes within the sediment. The anode was energised with 100V of pulsed DC for 15-20 seconds and then turned off for approximately five seconds to allow ammocoetes to emerge from their burrows. The anode was switched on and off in this way for approximately two minutes. Immobilised ammocoetes were collected by a second operator using a fine mesh hand net as they emerged.

2.4.5.3 Fish Handling and Processing

Once immobilised, salmonids, European eel, lamprey sp., and other captured fish species were transferred to a holding container with oxygenated water following capture. To reduce stress on the captured fish and aid processing and recovery times, anaesthesia (clove oil) was applied. All fish were speciated and measured to the nearest centimetre (standard length (SL) for eel and lamprey; fork length (FL) for all other species). Any fish captured during biological sampling were identified and recorded with reference to the Freshwater Biological Association's publication *'Key to British Freshwater Fish with notes on their ecology and distribution*' (Maitland, 2004) and other referenced sources.

Lampreys were identified using the document '*Identifying Lamprey - A field key for Sea, River and Brook Lamprey'* by Gardiner (2003). Lamprey ammocoetes were identified as Lamprey sp. as they could not be differentiated onsite by eye. Fish were then placed into a freshly oxygenated bucket of water to recover and allowed sufficient time to recover before being returned to the river. Any fish that struggled to recover, were given additional time to do so until they were able to swim. Lamprey were returned to the silt habitat they were removed from. Handling of live fish was kept to a minimum when processing any captured individuals.

Fish were only humanely euthanised if showing no sign of recovery. This is carried out with blunt force to the top of the head.

2.4.6 White-clawed Crayfish Survey

The White-clawed Crayfish survey was carried out under licence as prescribed by Sections 9, 23 and 34 of the Wildlife Act (1976-2023), to capture and release crayfish to their site of capture in late June 2026, when there is no "berried" females or females with young hatchling still attached. Under this licence, any mortalities during the collection of crayfish were to be recorded and reported to NPWS. The survey was carried out when crayfish are most active and present in shallow waters (Reynolds 2006).

Following the guidelines set out by NPWS within the licence, the crayfish survey method included two methods used to capture crayfish from this river channel. The survey methodology used was based on the standard approached by Reynolds *et al.* (2010), O'Connor *et al.*, 2009 and Peay (2003). These include, trapping and hand/visual searching for both adult and juvenile crayfish. By using these two methods, it was hoped all life stages and sexes would be collected from the river (Reynolds (2006), Gallagher *et al.,* (2006)) during the both the least active and most active times. A crayfish habitat assessment was also carried out at each site.

Suitable survey sites were selected within close proximity to the proposed project and also based on flow conditions, heterogeneous habitat and access. A total of 14 sites were selected, however the crayfish surveys were carried out at 12 sites. Two sites (Site 2 and 4) were inaccessible due to water depth, dense instream vegetation or heavy tunnelling of riparian vegetation across the river and hand searching at these sites was not feasible however traps were set at all 14 sites. The survey limitations around these sites are further discussed in Section 2.2.10 of this report.

All captured crayfish were held in buckets prior to processing. Measurements and notes were taken of crayfish as appropriate, including carapace length, sex, evidence of breeding status, evidence of recent moulting, and signs of damage or disease while on site.

2.4.6.1 Trapping

Trapping was used in both wadable and non-wadable areas and would chiefly capture larger crayfish. Trapping was undertaking within areas of suitable habitat including abundant refuges and vegetation in wadable and non-wadable water or where hand searching was not ideal or suitable.

Trapping was carried at out using cylindrical plastic crayfish traps (Trappy™ crayfish trap, Virserum, Sweden), 50cm long and 20cm in diameter with 25 x 35mm mesh and a 51mm diameter aperture. These traps were set symmetrically down both sides of the riverbank and spaced approximately 5-10m apart based on suitable habitat and location and laid parallel to the riverbank along the river channel where access is available. Each trap was labelled and attached to a light rope and pegged to the riverbank to prevent the baited traps from being moved.

Each trap was pre-weighted on the outside of the trap to allow it to sink to the bottom of the river and remain in place. These traps aimed to target both juvenile and adult crayfish. Traps were baited with fresh fish (cod and salmon). These baited traps can attract crayfish from a radius of several meters. Each trap was baited and left for 24 hours before been lifted and removed. A total of 56 traps were set, four traps at each location within the study site.

2.4.6.2 Habitat Assessment

A habitat suitability assessment to support White-clawed Crayfish was undertaken along all wadable sites (12 sites). The habitat suitability survey assessed the quality of the watercourse and riparian habitat following (Peay, 2002). This included an assessment of:

- Water quality
- Physical properties of the watercourse including the type of watercourse, depth, flow and channel width
- Refuges in the channel and bank
- Substrate composition
- Pollution, erosion and siltation

Habitat assessments were conducted across a 50-100m length of each survey site. Habitat features for each survey site was recorded if present. This included searching soft riverbanks for burrows, suitable instream vegetation, boulders, rocks and wooden debris that provides shelter and cover for crayfish. It also included assessing the suitability of gravels for hatchlings and several water features including riffles pools and glides as areas of food sources (macroinvertebrates) for the crayfish. Shaded areas are also important to ensure crayfish are in waters of optimal temperatures. Pressures such as pollution was also assessed at each site. Habitat characteristics of the sites were recorded on field data sheets adapted from Reynolds *et al.* (2010) and Peay (2003).

2.4.7 Environmental DNA

To further validate site surveys and detect potentially cryptically low populations of high conservation value aquatic species within the survey area, aquatic Environmental DNA (eDNA) sampling survey was carried out at four of the 14 aquatic survey sites (Site 5, 7, 11 and 12) within and upstream of the proposed project to detect the presence of the Salmon, Freshwater Pearl mussel, River and Brook lamprey.

Water samples were collected using single-use nitrile gloves, plastic sample bag and a 30 ml ladle supplied in the eDNA kit. Samples were taken against the flow of the river in a diagonal pattern ensuring no disturbed sediment and organic matter was collected in the sample. Each sample was taken from the middle of the water column (where possible) and at least 10cm below surface water level. After collecting the complete water sample (min. 600 ml) in the sample bag, the sample bag was agitated to mix the sample. After mixing, 500 ml was filtered using a 50 ml syringe and filter element. All samples were labelled and stored at room temperature and sent to the laboratory for analysis with 24 hours of collection. where twelve replicates of each sample were tested for Salmon, Freshwater Pearl mussel, River and Brook lamprey eDNA. A total of n=12 qPCR replicates were analysed for the site. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and or upstream of the sampling point. Please refer to Appendix E for full eDNA laboratory analysis methodology

2.4.8 Otter Signs

The presence of Otter was determined through the recording of otter signs within 150m radius of each survey site. Notes on the age and location of signs (ITM coordinates) were made, in addition to the quantity and visible constituents of spraint (i.e. remains of fish, crustaceans, molluscs etc.). Particular attention was given under bridges on ledges and large boulders for spraint and fresh mud for paw prints.

2.4.9 Biosecurity

A strict biosecurity protocol, recommended by IFI, was adhered to during surveys. As per Inland Fisheries Ireland aquatic biosecurity recommendations, all surveys started at the uppermost site(s) of each catchment or sub-catchment in the survey area to minimise the risk of transfer invasive propagules (including crayfish plague) in an upstream direction. All equipment and Personal Protection Equipment (PPE) was disinfected with Virkon® prior to and post-survey completion, and best practice precautions were employed to prevent the potential spread of invasive species and water-borne pathogens between sites, according to standard IFI biosecurity protocols (IFI 2010).

2.4.10 Survey Limitations

For aquatic surveys, some sites contained deep sections of the watercourses that were unwadable and too deep to fully access. Other watercourses limitations included low flows, excessive depths, unsuitable substrate conditions, completely dried out channels, which prevented electrofishing and crayfish surveys at certain locations or reduced sampling efficiency. Every effort was made to carry out the surveys, including adaptation of the methodology to suit site conditions.

Access was limited to 12 of the 14 survey sites to conduct the biological water quality assessment, and 11 sites of the 14 survey sites for electrofishing and crayfish hand searching. This was due to steep banks, heavy vegetation and deep waters.

3. RESULTS

This section provides the results of the desk study undertaken and findings of aquatic habitats, fish, crayfish, macroinvertebrates and water quality surveys undertaken within the study area.

3.1 DESKTOP STUDY

A comprehensive desktop review of available data (NPWS, NBDC, BSBI & other data) for 10km grid squares N43, N44, N53 and N54 containing and adjoining the proposed project site was carried out to identified records of rare and or protected aquatic species and aquatic Invasive Alien Plant (IAPS) listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024) within the vicinity of the proposed project.

3.1.1 Invasive Aquatic Species

Results from NBDC show records of no First Schedule aquatic plant species within the grid squares. The aquatic mollusc Jenkins' Spire Snail (*Potamopyrgus antipodarum*) shows 23 records from the national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA) database. These species are listed as Medium Impact Invasive species. Zebra Mussel (*Dreissena (Dreissena) polymorpha*), a high impact invasive species show four records from National Invasive Species Database and All Ireland Non-Marine Molluscan Database since 2003. The American Mink (*Neovison vison*), show 14 records in the General Biodiversity Records from Ireland database from 2014 and 2015.

Below in Table 3-1shows a recorded aquatic fauna within the grid squares.

Table 3-1: Aquatic Invasive Species Recorded with 10km Grid Squares with the Study Area of the Proposed Project

Species name	Grid Square	Count	Latest Record	Title of dataset	Designation
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	N43	1	12/09/2012	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)	Medium Impact
	N44	5	26/06/2018		
	N53	11	28/06/2018		
	N54	6	18/07/2018		
Zebra Mussel (*Dreissena (Dreissena) polymorpha*)	N44	2	30/06/2010	National Invasive Species Database	High Impact >> Regulation S.I. 477 (Ireland) Invasive Species: Regulation S.I. 374/2024 (Ireland)
	N53	2	07/04/2003	All Ireland Non-Marine Molluscan Database	
American Mink (*Neovison vison*)	N43	4	30/01/2015	General Biodiversity Records from Ireland	EU Invasive Alien Species Regulation No. 1143/2014 || Regulation S.I. 477/2011 (Ireland) ||
	N44	1	21/10/2014		
	N53	6	21/10/2014		

Species name	Grid Square	Count	Latest Record	Title of dataset	Designation
	N54	3	23/10/2014		Invasive Species: High Risk Invasive Species (2013 Report) || Regulation S.I. 374/2024 (Ireland) || The Wildlife (Northern Ireland) Order 1985

3.1.2 Protected Aquatic Species

A comprehensive desktop review of available data (NPWS, NBDC, BSBI, IFI, National Crayfish Plague Surveillance Programme (NCPSP), EPA and other data) within the 10km grid squares containing and adjoining the proposed project was carried out and identified records for rare and or protected aquatic species within the vicinity of the proposed project. Note all data pre 2006 (20 years ago or more) is outdated and therefore considered historic. The results of the available data are summarised hereunder.

3.1.1 Fish

The Kinnegad_030, Yellow (Castlejordan)_030 are known to support *Lampetra sp.* (O'Connor, 2006) as well as good stocks of small-sized Brown trout. The Castlejordan RWB supports Brown trout , Lamprey (*Lampetra sp.*), Stone loach (*Barbatula barbatula*), Perch (*Perca fluviatilis*), Pike (*Esox lucius*) and Three-spined stickleback (*Gasterosteus aculeatus*).

The Kinnegad_030 and Castlejordan_030 RWB support a genetically distinct sub-population of Brown trout within the Boyne catchment (Massa-Gallucci & Mariani, 2011).

Previous ecological reports (Triturus 2023) have recorded Brown trout, lamprey (Lampetra sp.) and pike were recorded in the Milltownpass River.

IFI assessed the status of fish stocks in the Yellow (Castlejordan)_020 and Yellow (Castlejordan)_030 RWB as part of the WFD fish stock assessment in 2022.

A total of one Habitats Directive Annex II fish species, Atlantic Salmon was recorded in the Yellow (Castlejordan)_030 RWB. No other Annex II fish species were recorded within the catchment. Brown trout, Minnow and Stone loach were recorded present within the Yellow (Castlejordan)_020 RWB. Brown trout, Minnow, and Salmon were recorded within Yellow (Castlejordan)_030 RWB.

These waterbodies received a WFD Moderate fish ecological status. Fisheries data for the other watercourses within the survey area was not available at the time of survey. There are no other records of fish within the study area available.

3.1.1.1 White Clawed Crayfish

Existing data on the presence and distribution of White-clawed Crayfish within the Study Area was consulted on the NBDC mapping portal.

Current records show the presence of White-clawed Crayfish within Yellow (Castlejordan)_010 RWB, Yellow (Castlejordan)_030 and Castlejordan_030 RWB within the study area. NBDC shows records of White-clawed Crayfish within grid squares N43, N53, and N53 at seven locations, with several records from different locations within the same river. Additionally, records from Article 17 spatial data (NPWS, 2019b) were also reviewed and the results are listed in Table 3-2.

Table 3-2: Records of White-Clawed Crayfish Within the Study Area

Grid square/ I.D Location	EPA Station and RWB	Latest Record	Data Source
N43 N497364	RS07Y020070 Yellow (Castlejordan)_010	28/06/2018	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)
N525423	Boyne / Milltown	22/08/2006	Crayfish of Ireland, Central Fisheries Board
N53 N554407	RS07C040100 Castlejordan_030	10/08/2009	A national macroinvertebrate dataset collected for the biomonitoring of Ireland's river network, 2007–2018 (EPA)
N53/N54 N591387	RS07C040190 Castlejordan_030	11/08/2009	
N595375	RS07Y020300 Yellow (Castlejordan)_030		

3.1.1.2 Freshwater Pearl Mussel

There is no record of 'FPM sensitive areas' in the Yellow [Castlejordan]_SC_010 subcatchment.

3.1.1.3 Otter

There is a moderate record of European Otter (in the relevant grid square, (*n*=9 records in grid N43, n=17 in grid N53 and n=7 in grid N 54). These are from 2015 in the Atlas of Mammals in Ireland 2010-2015 and General Biodiversity Records from Ireland database.

3.1.2 Fisheries Habitats

The results of the general physical habitat assessment are presented in Appendix A. This gives the physical characteristics of the aquatic study sites and the substrate composition at each site.

A review of the current barrier atlas map of Europe[4] was undertaken across the study site. There is no evidence of barriers located within the study site, as shown in Figure 3.1. However, it cannot be stated that there are no potential barriers within the study site, as there may be structures present along the rivers within or downstream of the study site that are yet to be recorded onto this atlas map. It is known that structures such as culverts, weirs, ramps etc, form migration barriers to diadromous fish species such as Sea lamprey, River lamprey and Atlantic Salmon.

[4] https://amber.international/european-barrier-atlas/

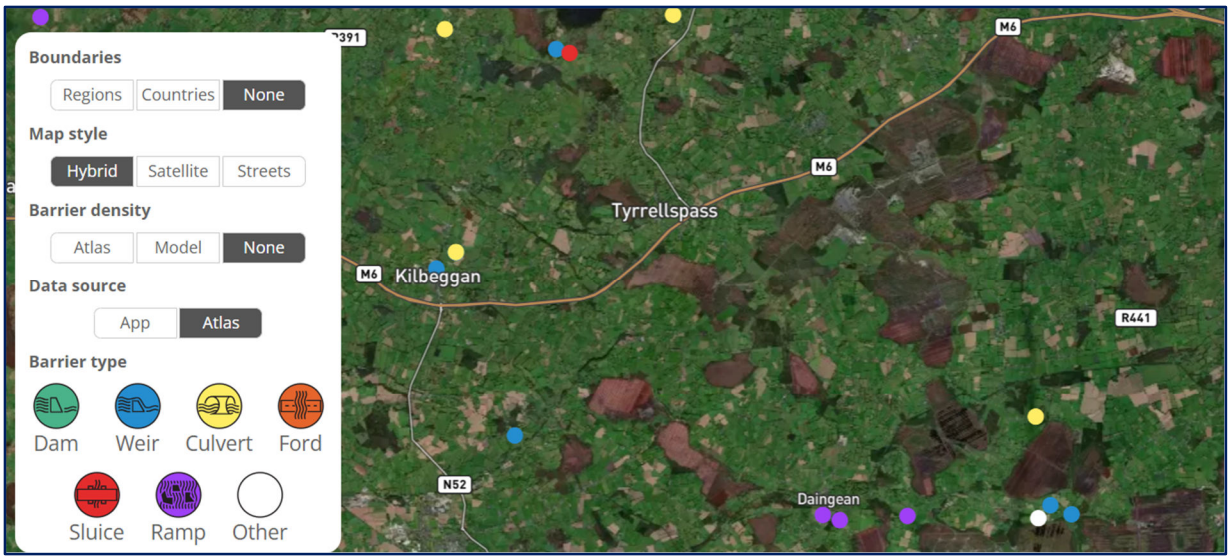


Figure 3-1: A Map of The Physical Barriers on Rivers Located Within the Study Area

3.1.3 Existing Water Quality Records

3.1.3.1 EPA Water Quality Data

A search of the EPA Unified GIS Application[5] and the EPA Catchments database (EPA 2026)[6] was conducted for the water quality status of watercourses located within the ZoI. Table 3-3 lists the most recent Q-value assessment available of relevant EPA monitoring stations located upstream, and downstream of the proposed project providing data on overall water quality in the area. Based on the data presented in Table 3-3, the overall water quality in the area surrounding the proposed Project Site and the proposed GCR has been of Poor to Good status since regular monitoring commenced, with Q-values being consistently between Q3 and Q4.

The most recent EPA biological water quality results at WFD monitoring stations in the study area are located on the Kinnegad_010, Kinnegad_020, Milltownpass_010, Castlejordan_020, Castlejordan_030, Castletown Tara Stream_010, Yellow (Castlejordan)_010, Yellow (Castlejordan)_020, and Yellow (Castlejordan)_030 RWB and are presented in Table 3-3 below. These are within close proximity to the proposed project and indicate the overall water quality in this area. The most recent EPA biological water quality results at stations that achieved Moderate ecological quality overall indicate that they are not meeting the requirements of the Water Framework Directive (2000/60/EEC). Stations achieving a Q4 'Good' status in 2024, indicates it is meeting the requirements of the WFD (2000/60/EEC).

[5] Available at https://gis.epa.ie/EPAMaps/. Accessed in January 2026
[6] Available at https://www.catchments.ie/. Accessed in January 2026

Table 3-3: Most Recent EPA Biological Quality Ratings (Q-values) at Stations Within the Study Area

River	Station Code	Station Name	Year	Q - Valus and Status	WFD River Waterbody Approved Risks
Kinnegad_010	RS07K010060	Br SE of Cloonfad Ho	2024	Q 3-4 Moderate	At Risk
Kinnegad_020	RS07K010070	Br on L8021 (u/s Kinnegad)	2024	Q 3 Poor	Under Review
Milltownpass_010	RS07M040400	Br in Milltownpass	2024	Q 3 Poor	At Risk
Castlejordan_020	RS07C040100	Baltinoran Br	2024	Q 3-4 Moderate	Under Review
Castlejordan_030	RS07C040190	Castlejordan Br	2024	Q 4 Good	Not at Risk
	RS07C040200	Castlejordan - 0.5km d/s Castlejordan Br	1985	Q 3-4 Moderate	Not at Risk
Castletown Tara Stream_010	RS07C080020	Rhode WWTW upstream	2024	Q 3 Poor	At Risk
	RS07C080190	Rhode WWTW downstream	2024	Q 3 Poor	At Risk
Yellow (Castlejordan)_010	RS07Y020060	Yellow (Castlejordan) - Nr Derryarkin	2003	Q 3 Poor	At Risk
	RS07Y020070	Br d/s Big R confl	2024	Q 3 Poor	At Risk
Yellow (Castlejordan)_020	RS07Y020100	Garr Br	2024	Q 3-4 Moderate	Not at Risk
Yellow (Castlejordan)_030	RS07Y020200	Yellow (Castlejordan) - Sheep Br	1990	Q 3-4 Moderate	Not at Risk
	RS07Y020300	Clongall Br	2024	Q 4 Good	Not at Risk

3.2 AQUATIC FIELD SURVEY RESULTS

This section provides a description of each of the survey sites (1-14), in terms of physical characteristics and hydromorphological condition. In addition, the fisheries habitats, as well as the results of the biological water quality (Q-sample), eDNA sampling, White-clawed Crayfish,

IAS and macrophyte communities in the study area, based on the 14 survey sites examined (Section 3.2.1 to Section 3.2.8). The results of the survey at each site are discussed below in terms of fish population structure, population size and the suitability and value of the surveyed areas as nursery and spawning habitat for salmonids, European Eel and lamprey species. The sites are discussed

Please refer to Appendix A on the Physical Characteristics, and Appendix B on the Electrofishing site characteristics of the study sites.

The Biological water quality (Q-sample) results for each survey site are provided in Appendix C. Detailed fisheries species results and length is provided in Appendix D.

3.2.1 Fisheries Assessment

3.2.2 Riverine Habitat and Riparian Zone Characteristics

The watercourses in the study area are generally moderate flowing. The stream and river substrates comprised mainly of cobble and gravel. The limited presence of riffle and complete absence of pool habitat, modified banks provide limited salmonid nursery habitat in the watercourses surveyed. All surveyed sites lacked adequate deeper areas and holding pools for adult salmonids.

The results of the general physical habitat assessment are presented in Appendix A. This gives the physical characteristics of the aquatic study sites and the substrate composition at each site.

Based on the habitats present at the sites surveys, as well as the poor to moderate water quality, the watercourses draining the site are considered poor for the early life stages of salmonids. There is an absence of heterogenous fluvial habitat that would provide ideal rearing conditions for salmonids. These sites were of poor quality salmonid nursery being degraded due to historical drainage, poor flow rates, heavy siltation and evident enrichment. The quality of spawning habitat was also poor (for both salmonids and lamprey) being reduced by the deterioration of the bed from algae and sedimentation.

While gravel and cobble substrates with the potential to support salmonid spawning were recorded at several survey locations, the suitability of spawning habitat varied across the study area due to differing levels of substrate siltation (see Appendix A). Sites 7, 8, 9, 12 and 14 contained relatively low proportions of fine sediment and supported the most suitable spawning substrates, with clean gravel and cobble being well represented within the channel bed. In contrast, Sites 1, 5, 10, 11 and 13 exhibited elevated levels of fine sediment deposition, with silt comprising between 30% and 90% of the channel substrate. These sites are therefore considered sub-optimal to poor for salmonid spawning. Excessive siltation can clog the interstitial spaces within spawning gravels, reducing water circulation and oxygen availability to developing eggs, impeding alevin emergence and reducing the survival and fitness of juvenile salmonids. Consequently, although appropriate spawning substrates were present at a number of locations, the overall quality of spawning habitat within the study area is constrained by sedimentation pressures associated with historical channel modification, low flow velocities and peat-derived fine sediment deposition.

Despite the agility and persistence of Salmon in leaping obstacles, falls and rapids on certain reaches of watercourses are considered barriers for upstream migrating Salmon, and perhaps

European eel also. Other barriers to migration include bridge aprons and perched culverts. For instance, there is one bridge plinth on the Yellow [Castlejordan]_SC_010 at Site 2 and on the Castlejordan_020 at Site 7. These represents an upstream migration barrier for some species including lamprey and perhaps European eel. However, this location is upstream of the proposed wind farm site.

The riparian zones of the surveyed watercourses were generally characterised by narrow corridors of semi-natural vegetation comprising grasses, rushes, fool's watercress, marginal scrub and scattered riparian trees. In many locations, riparian habitats were modified by historical drainage and channel maintenance works, resulting in reduced structural diversity and limited development of natural riparian features. Agricultural land use, drainage infrastructure and channel modification were common influences throughout the study area.

Instream vegetation was generally dominated by common lowland and slow-flowing watercourse species including Fool's Watercress (*Apium nodiflorum*), Sparganium spp., Pondweed (*Potamogeton* spp.), Water Mint (*Mentha aquatica*), Water Plantain (*Alisma plantago-aquatica*), Reedmace (*Typha latifolia*) and occasional Duckweed (*Lemna* spp.). Macrophyte cover varied considerably between sites, reflecting differences in flow, substrate composition, channel morphology and levels of siltation

3.2.3 Salmonids

During the kick sampling surveys, juvenile Brown Trout (0+ age class) were recorded at a number of survey locations, confirming successful recruitment within parts of the study area. Brown Trout were also observed within watercourses containing suitable riffle and gravel habitats, indicating that sections of the surveyed watercourses provide suitable spawning and nursery habitat for salmonids. In addition, Brown Trout were observed actively utilising several watercourses during the surveys. No Atlantic Salmon were recorded during the kick sampling surveys.



Plate 3-1: Brown Trout Present in the Kick Sample

3.2.4 Lamprey

Scoop tests were carried out at survey sites that contained suitable silt deposits. Lamprey were detected at three of the five sites sampled, including sites within the Yellow [Castlejordan]_SC_010 River and Site 16 on the Boyne_SC_030 River. A total of five lamprey were on the Yellow River and one lamprey ammocete in the Boyne River. The length frequency

ranged from 2-5cm indication indicates ongoing recruitment in this reach of each river. Overall, the survey sites were of moderate value for lamprey ammocoetes with minimal localised shallow silt deposits supporting a low density population.



Plate 3-2: Lamprey Ammocoetes Recorded in fine sediment in the Yellow River and the Boyne River

3.2.5 European Eel

All watercourses in the study area have the potential to support European eel. Suitable habitat for this species occurs in the smallest of watercourses affected by the proposed development, namely rocky substrates.

3.2.6 Other fish

Four individuals of Three spine stickleback were recorded in kick samples at Site 12 .

3.2.7 Electrofishing Survey

Electrofishing site characteristics at aquatic survey sites examined for the proposed project are provided in Appendix D.

A total of 104 fish of nine species were recorded during the electrofishing surveys. Salmon (n=1), Brown trout (n=61), European eel (n=3), Three-spine stickleback (*Gasterosteus aculeatus*) (n=9), Minnow (*Phoxinus phoxinus*) (n=2), Pike (*Esox lucius*) (n=1), Perch (*Perca fluviatilis*) (n=1), Lamprey (Lampetra sp), (n=24) and Stone loach (*Barbatula barbatula*) (n=2).

The lengths of the fish caught during the electrofishing can be seen in Appendix D. The overall results of fish caught at each site is presented in Table 3 4 below.

Table 3-4: Summary of Fish Species and Quantity Recorded at Each Site During Electrofishing Surveys in the vicinity of the Proposed Project

Site No.	1	2	4	7	8	9	10	11	12	13	14	Total
Brown Trout	2		6	1		13	4		9		26	61
Salmon											1	1
Minnow							2					2
Eel			1					1	1			3

3 Spined Stickleback	1		1	1			2	3	1			9
Lamprey sp.						2	2	13	1		6	24
Pike					1							1
Perch										1		1
Stoneloach						1	1					2
Total	**3**	**0**	**8**	**2**	**1**	**16**	**11**	**17**	**12**	**1**	**33**	**104**

3.2.8 Environmental DNA

Samples were collected at four sites across the on the EPA waterbodies Castlejordan_020, Yellow (Castlejordan)_030, Kinnegad_010 and Yellow (Castlejordan)_010. An overview of the eDNA laboratory analysis results is provided in Table 3 2 (the full report can be found in Appendix E). Results showed that freshwater pearl mussel is not present within the watercourses of the study area. A positive result for Salmon shows its presence within the Castlejordan_020 and Yellow (Castlejordan)_030 and a positive result for Brook/River lamprey showing that this species is present within the Castlejordan_020, Yellow (Castlejordan)_030 and Kinnegad_010 watercourses and absent within the Yellow (Castlejordan)_010 which is upstream of the Yellow (Castlejordan)_030.

Table 3-5: eDNA Results (Positive qPCR Replicates out of 12 in Parentheses)

Site	EPA Watercourse	Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Atlantic Salmon (*Salmo salar*)	Brook/River Lamprey (*Lampetra planeri/Lampetra fluviatilis*)
5	Castlejordan_020	0	3	12
7	Yellow (Castlejordan)_010	0	0	0
11	Yellow (Castlejordan)_030	0	2	12
12	Kinnegad_010	0	0	12

3.3 INVERTEBRATES

3.3.1 Macroinvertebrates

Macroinvertebrate sampling was undertaken at 12 out of the 14 aquatic survey sites. Biological water quality data, as prescribed by the EPA (Toner *et al.* 2005), group invertebrates into classes whereby species highly intolerant to pollution and low dissolved oxygen levels are denoted Class A, and species with greater tolerance to pollution and dissolved oxygen levels fall into the successive classes B through E respectively. As such the presence or absence of these groups and their relative abundances facilitates an assessment of biological river health.

The results from these sites are discussed in this context in order to interpret potential changes in the riverine community composition. A detailed list of the macroinvertebrate taxa recorded during the surveys with the classification of macroinvertebrate species recorded in terms of their pollution sensitivity is provided in Appendix C. The species listed are separated by the EPA taxonomic classes as prescribed above and colour coded for clarity.

The macroinvertebrate communities recorded at survey sites comprised of a range of macroinvertebrate taxa and generally confirmed the local pressures to the aquatic environment, as well as the failure of the majority of the WFD river water bodies to achieve the WFD objectives. The macroinvertebrate assemblages were dominated by Group C taxa, with frequent assemblages of D were present, whereas only a limited number of sites supported Group A and B taxa in low abundance and an absence of E taxa. The Q-values were assigned on the basis of the sensitivity groups present in abundance, % representation and taxon richness. The Q-value and the ecological status of each sampled site is provided in Table 3-6. Of the 12 sites sampled, the target of Q4 unpolluted water was not achieved at any of the sampling sites. Site 12 received a Q3-4 rating, corresponding to Moderate ecological status under the Water Framework Directive (WFD). This rating reflects the limited abundance and diversity of pollution-sensitive macroinvertebrate taxa recorded at the site. Site 6 received a Q2 rating, corresponding to Bad ecological status, and was characterised by a macroinvertebrate assemblage dominated by Group D taxa. All remaining sites achieved a Q3 poor status of moderately polluted water due to the paucity of pollution sensitive taxa, as well as the degree of siltation (considerable) and algal growth (luxuriant). The current survey results indicate that the overall biological water quality in the watercourses draining the application site is poor and moderately polluted. The sampled watercourses do not provide water of a quality adequate to support a range of pollution sensitive mayfly and stonefly larvae, as well as salmonids. Full details of the biological water quality results can be found in Appendix C.

The major groups including Ephemeroptera, Plecoptera and Trichoptera were poorly represented at most locations (larval stage). No stonefly larvae (Plecoptera) were recorded at any kick sampling site.

The mayfly assemblage was dominated by *Baetis rhodani* which is classified as a pollution tolerant (Group C) indicator by the EPA. The other two mayfly species present were *Serratella ignita and Ecdyonurus spp.* These species ranged from 'present' to 'fair numbers' at site where they occurred. These taxa are all classified as pollution sensitive (Group C) by the EPA, with the exception of Ecdyonurus spp. (Group A).

The Trichopterans were well represented group, with two cased (Group B) taxa and five caseless (Group C) taxa recorded. Cased caddisfly larvae had patchy distribution and generally 'scarce' to 'fair numbers' in relative abundance with the exception of *Beraea maura* , present at 5 of the 12 sites ,with an estimate 40 individuals present at Site 12 alone.

Dipteran larvae accounted for a moderate proportion of the macroinvertebrate community at the study sites. The most common true fly larvae were pollution tolerant Simulidae ('present' to 'common'). Beetles in two different families were recorded: Dytiscidae and Elmidae. The most common beetles were *Hygrotus versicolor* (generally 'fair numbers'), a small predatory diving beetle. The crustacean *Gammarus deubeni* and *Asellus aquaticus* of the Order Crustacea were recorded at all sites. Both species were widespread in most sites and its relative abundance was 'dominant'. Gastropoda was represented by Lymnaeidae and Pulmonata. These were present at

one site, Site 13 in generally 'low numbers'. One leech, *Hemiclepsis marginata* was present in Site 11. The only molluscs recorded were *Pisidium* (Site 13) with 'scarce' abundance. The total taxa recorded at each sampling site is shown in **Error! Not a valid bookmark self-reference.** below.

Table 3-6: Biological Water Quality and Interpretations at Study Sites on Watercourses Draining the Proposed Project

Site	Q-value	WFD Ecological Status
1	Q3	Poor status (Moderately Polluted)
4	Q3	Poor status (Moderately Polluted)
6	Q2	Bad status (Seriously Polluted)
11	Q3	Poor status (Moderately Polluted)
9	Q3	Poor status (Moderately Polluted)
8	Q3	Poor status (Moderately Polluted)
2	Q3	Poor status (Moderately Polluted)
12	Q3-4	Moderate status (Slightly Polluted)
13	Q3	Poor status (Moderately Polluted)
10	Q3	Poor status (Moderately Polluted)
7	Q3	Poor status (Moderately Polluted)
14	Q3	Poor status (Moderately Polluted)

3.3.2 White Clawed Crayfish

No white-clawed crayfish were recorded during field surveys at any of the 14 aquatic survey sites. No crayfish were captured in the traps during the survey. No white-clawed crayfish were recorded present at any of the sites, nor were any captured during kick sampling or electrofishing surveys. No evidence of white-clawed crayfish carapace or claw remains were recorded on the riverbanks or bridge ledges in the form of Otter scat or remains from predation.

Although habitat suitability for White-clawed Crayfish was assessed as moderate at several sites, particularly where suitable refugia and calcareous influences were present. The absence of direct observations was attributed to factors including significant siltation, hydromorphological modification and sub-optimal ecological conditions across the surveyed watercourses. White-clawed Crayfish require moderate to good water quality, with conditions such as oxygen saturation above 50% and BOD below 3 ppm (Reynolds, 1998; Demers *et al.*, 2003). This protected species also needs relatively hard water, with a pH of 7 or above, and calcium concentrations of at least 5mg/l, as sufficient calcium is necessary to harden their exoskeletons after moulting (Gallagher *et al.,* 2006). Additionally, firm substrates and moderate productivity levels are important for crayfish habitats (Reynolds, 1998). White-clawed Crayfish hatchlings require a presence of gravels (Reynolds, 1998; Reynolds *et al.*, 2010), and typically shelter in vegetation, gravel, and fine tree roots, and smaller crayfish are often found among weeds and debris in shallow water. Larger juveniles are more commonly found among cobbles and detritus, such as leaf litter (Reynolds and O'Keeffe, 2005). Larger crayfish need stones to

hide under or earthen banks for burrowing (Demers et al., 2003). Table 3-7 summarises the results of the habitat assessments and capture surveys.

Table 3-7: Summary Data of White Clawed Crayfish Habitat Assessment and Captures

Site No	Water Clarity	Suitable Refugia	Crayfish Presence	Hand Picking	Trapping	Total	CPUE	Population Abundance Grade
1	Poor	No	No	0	0	0	0	N/A
2	Moderate	No	No	0	0	0	0	N/A
3	Moderate	No	No	0	0	0	0	N/A
4	Good	Yes	No	0	0	0	0	N/A
5	Good	No	No	0	0	0	0	N/A
6	Poor	Yes	No	0	0	0	0	N/A
7	Poor	No	No	0	0	0	0	N/A
8	Good	Yes	No	0	0	0	0	N/A
9	Moderate	Yes	No	0	0	0	0	N/A
10	Good	Yes	No	0	0	0	0	N/A
11	Moderate	Yes	No	0	0	0	0	N/A
12	Good	Yes	No	0	0	0	0	N/A
13	Moderate	No	No	0	0	0	0	N/A
14	Good	Yes	No	0	0	0	0	N/A
Total Crayfish				**0**	**0**	**0**	**0**	

3.3.1 Aquatic Invasive Species

There was no invasive aquatic macrophytes recorded at any of the sampling sites. One invasive fauna species, the American mink, was visually recorded as present.

4. DISCUSSION

4.1 FISHERIES

The watercourses in the vicinity of the Application Site were typically small, modified, lowland depositing channels draining areas of cutover bog. Historical drainage pressures (straightening & deepening) and siltation have significantly reduced the quality and heterogeneity of aquatic habitats in the vicinity of the proposed development.

Salmonids

The majority of the watercourses within the study area of the proposed development offer limited habitats for spawning and nursery for the early life stages of Salmonids due to this modification which has resulted in an absence or limited about of riffle features and poor water quality.

The watercourse reaches examined and considered in this report are largely sub-optimal for holding large salmonids due to their size. In general, adult salmon are deemed to enter these areas only during the salmonid spawning season, as pools are insufficiently deep.

The presence of migration obstacles such as artificial structures like bridge plinths may affect the migration of fish species upwards on some rivers within the study area. The modification and diversion of channels for land drainage and convenance purposes change the morphological conditions and decrease the habitat value for fish. The majority of the channels surveyed within and downstream of the study site have had some form of modification.

The electrofishing survey conducted at various locations on the Yellow River, Milltownpass River, Castlejordan River, Kinnegad and Esker River, were found to support salmonid populations and or lamprey (Lampetra sp.) and provided some quality fisheries habitats however salmon was only recorded present in the Yellow River in moderate densities while brown trout was recorded present in the remaining watercourses invariably in low densities.

All watercourses surveyed in the vicinity of the proposed project have been historical modified and the majority were exposed to considerable siltation pressures. Historical straightening and deepening of watercourses damages habitat and hydromorphological heterogeneity, encourages sediment deposition and invariably results in an irreparable reduction in fisheries potential, particularly for salmonids (O'Grady, 2006).

The majority of the watercourses within the Application Site development flow over peat bog and agricultural lands. Diffuse siltation is one of the major threats to salmonid populations, particularly in peat and agricultural catchments. Sediment particles can settle under the low flow conditions causing a phenomenon known as external colmation, this can lead to the clogging of the top layer of channel sediments. This smother substrata with fine particles that ingress into the coarse sediment and limits oxygen supply to salmonid eggs (required for healthy embryonic development & successful hatching) thus reducing available spawning habitat and impact macro-invertebrate communities on which salmonids feed (Kelly-Quinn *et al.*, 2020; Davis *et al.*, 2018; Conroy *et al.*, 2016). Gravel compaction from sedimentation reduces the spawning capacity of a channel and it has been shown that eggs laid in clean gravels which have subsequently been silted over by peat have failed to hatch (Crisp, 2000).

Lamprey

Lamprey were recorded at three locations within the study area on the Yellow river and the Boyne River. Lamprey ammocoetes (Lampetra sp., likely L. planeri given the location in the upper reaches of the respective catchments) were also recorded during the electrofishing surveys from four sites on the Rochfortbridge Stream, Castlejordan River, Milltownpass River and the Yellow River. Lamprey were present at low densities in the survey areas containing the species with the exception of the Milltownpass River which supported a medium density of ammocoetes. O'Connor (2006) reported who found a widespread distribution of lamprey in the Castlejordan/Yellow sub-catchment, similar to teg findings from the electrofishing survey.

Overall, lamprey habitat was generally poor across the survey area. There was a general lack of sand/silt deposits, a requirement for lamprey larvae. The only suitable sediment recorded at five of the survey sites and their presence recorded in three of those., Lamprey ammocoetes require the deposition of fine, organic-rich sediment ≥5cm in depth in which to burrow and mature (Goodwin *et al.*, 2008; Aronsuu & Virkkala, 2014). Peat-dominated substrata (i.e., humic deposits), such as those typically found in the vicinity of the proposed development, do not provide suitable burial/burrowing habitat complexity or structure for ammocoetes.

Lamprey have similar habitat requirements for spawning trout. They require clean, fine gravels in which to dig their redds (Lasne *et al.*, 2010; Rooney *et al.*, 2013; Dawson *et al.*, 2015) although areas may also include fractions of sand, larger gravels, and cobble (Nika & Virbickas, 2010).

There is limited lamprey spawning habitat in the watercourses draining the proposed development, which was of poor quality due to (peat) siltation pressures (as outlined above).

European eel

European eel were only recorded (single individual) from a one site on the Yellow River during the electrofishing survey. The European eel is a Red-listed species in Ireland (King et al., 2011) and are classed as 'critically endangered' on a global scale (Pike et al., 2020). However numerous sites provided some good physical suitability for the species, which the presence of boulders and vegetation for refugee.

Other Fish Species

No other fish species of particular conservation significance were recorded during the fisheries surveys undertaken within the study area. Fish communities were generally species-poor and dominated by salmonids where suitable habitat occurred. This is consistent with the nature of the receiving environment, which comprises predominantly small, historically modified watercourses draining peatland and agricultural catchments.

The physical condition of many of the surveyed channels, including historical straightening, deepening, and ongoing siltation pressures, has reduced habitat diversity and limited the availability of suitable instream habitats required by a wider range of fish species. Habitat features such as well-developed riffle-pool sequences, submerged macrophyte beds, undercut banks and clean gravels were generally limited or absent across much of the survey area.

While some reaches, particularly within the Yellow River, Castlejordan River, Milltownpass River and Kinnegad River systems, provided moderate habitat quality and supported fish populations, the overall fisheries value of the watercourses within and adjoining the Application

Site is constrained by historical hydromorphological modification and sedimentation pressures. Consequently, the fish assemblages recorded are considered typical of small, modified lowland watercourses within peatland catchments. The presence of salmonids, lamprey and European eel nevertheless confirms the ecological importance of these watercourses and highlights the need to maintain water quality and protect aquatic habitats within the receiving environment.

4.2 INVERTEBRATES

4.2.1 Macroinvertebrates

Based on the relative low abundance or absence of macroinvertebrates that specialize in shredding (Ephemeroptera) (Plecoptera) and collecting (Trichoptera) as a feeding strategy, it is concluded that the aquatic ecosystems at the study sites are driven primarily by energy sources derived within the aquatic zone. The macroinvertebrate compositions are indicative of watercourses that have supply of organic matter for biological sustenance. As mentioned above, the negative impacts of high and persistent sediment loads affect invertebrate assemblages and abundances, with Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa exhibiting the greatest negative response to increased sediment[7].

The naturally low nutrient concentrations of surface waters in the study area, coupled in some instances with their peaty nature mean that benthic life and therefore higher organisms are highly dependent on terrestrial energy sources for survival, rather than primary production instream. Low Crustacean diversity and abundance reflects the siliceous nature of the study area.

High ranking threats to rivers include 'modification of hydrographic functioning', 'diffuse pollution to surface waters due to agricultural and forestry activities and 'restructuring agricultural landholding. During the current field surveys, these threats were noted. For example, drainage of a reaches of all the rivers within the proposed development has taken place in the past, with evidence of land drainage, including instream modifications. This represents an interference with hydrographic functioning. Current biological water quality degradation is likely attributable at least in part, to agricultural, forestry and peat activities.

The latest EPA biological monitoring of watercourses in the study area, show water quality to be generally good as indicated by the latest EPA Q4 rating, however it is noted that there is a decline in water quality outside of the study area. The EPA also recorded the Little Brosna_040 River to be 'At Risk' of failing to meet 'Good' ecological status as required under the WFD.

The biotic indices derived at the survey sites also indicate that the water quality of the watercourses within and downstream of the Proposed Project is achieving Q values that range from Q2, Q3 and Q3-4. These ratings indicate a range from unpolluted to moderately polluted water quality and range from 'Poor to Moderate' ecological status.

As such the majority of the sites have moderate status, with none achieving the target Q4 'Good' status water quality required under the WFD. These sampling sites are all located adjacent to

[7] https://www.salmon-trout.org/wp-content/uploads/2017/09/STC-The-impact-of-excess-fine-sediment-on-invertebrates-and-fish-in-riverine-systems.pdf

agricultural fields and bogs, and within proximity to Sitka spruce plantations. All of these habitats have been heavily drained and flow into the Little Brosna_040 River.

It is likely that diffuse agricultural and forestry enrichment are contributing to the localised declines in water quality. Macroinvertebrate diversity corresponded with habitat suitability, with greater diversity recorded in areas of better habitat. In the Irish context, biological water quality in the study area is considered moderate, considering the range of pressures on surface waters at a national level, such as nutrient, organic, chemical, and sediment pollution.

4.2.2 White-clawed Crayfish

The aquatic habitats within the surveyed sites of the Boyne catchment was considered to be suitable to support any White-clawed Crayfish given the suitable substrate and instream vegetation and refuge. The remaining sites, Site 13, 15 and 18, did not have potential of White-clawed Crayfish due to the low energy of the channel and unsuitable habitat, especially lacking gravels for White-clawed Crayfish hatchlings. There was also a lack of suitable burrowing habitat required for White-clawed crayfish at these sites four sites. As such there is no suitable availability of refuges for this species.

This species requires moderate to good water quality (Demers *et al.*, 2003). Giving the biological water quality results obtained from these surveys,

White-clawed Crayfish typically require hard, mineral rich waters flowing over (high calcium) calcareous substrates, preferably with alkalinity levels of >100mg CaCO3 (Lucey & MacGarrigle, 1987; Holdich, 2003; Gallagher *et al.*, 2006). Consequentially, crayfish distribution follows many of Ireland's carboniferous limestone belts and occurs mostly throughout the limestone-rich midlands.

Whilst the Energy Park Wind farm drains peatlands, these areas are underlain by carboniferous limestone and mudstones (Waulsortian limestones, GSI, 2024). Therefore, the watercourses are physiochemically capable of supporting white-clawed crayfish.

Siltation is known to negatively impact respiratory function of crayfish (Rosewarne *et al.*, 2014) and the high levels of peat-derived, flocculent sediments in the majority of survey sites 13, 15 and 18, have resulted in sub-optimal crayfish habitat, despite some suitable physiochemical and physical habitat parameters.

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Appendix A PHYSICAL CHARACTERISTICS OF THE STUDY SITES

Site	Bank Height (m)	Bank Width (m)	Wetted Width (m)	Mean Dept (cm)	Riffle (%)	Glide (%)	Pool (%)	Shade (%)	Boulder (%)	Cobble (%)	Gravel (%)	Sand (%)	Silt (%)	Velocity	Macrophyte	Algae (%)
1	5	4	2	9.4	0	100	0	25	0	0	0	10	90	Very Slow	Fools watercress 95%, water mint 2%	0
2	11	19	12	57.8	0	100	0	25	3	12	25	25	35	Slow	Sparganium 90%, water plantain 1%, Potamogeton 8%	0
3	5	12	7	150	0	100	0	25	N/A	N/A	N/A	N/A	N/A	Slow	Potamogeton 25%, sparganium 15%, bur reed 5%	55
4	3	7	2	4.2	70	0	30	50	25	35	25	10	5	Slow	Fools watercress 50%, water mint 5%	0
5	4	10	7	150	0	100	0	25	10	25	25	10	30	Slow	Potamogeton 55%, Sparganium 20%, water mint 3%	0
6	2.5	6	1	2.8	0	100	0	75	20	25	25	10	20	Very slow	0	0
7	2.5	8	4	11.2	0	90	10	25	5	45	35	15	0	Very slow	Sparganium 10%, water mint 1%,	0
8	3	9	7	53	0	80	20	50	5	20	60	10	10	Slow	Sparganium 30%, Potamogeton 3%, fools watercress 10%, water mint 5%	0

Site	Bank Height (m)	Bank Width (m)	Wetted Width (m)	Mean Dept (cm)	Riffle (%)	Glide (%)	Pool (%)	Shade (%)	Boulder (%)	Cobble (%)	Gravel (%)	Sand (%)	Silt (%)	Velocity	Macrophyte	Algae (%)
9	4	8	4	26	0	100	0	50	20	25	35	5	5	Slow	Sparganium 20%, fools watercress, 5%	15%,
10	1.5	5	3	15.8	10	90	0	25	2	5	20	33	40	Slow	Lemna 5%, sparganium 25%, fools water cress 1%, water mint 1%	5
11	5	3.5	1	10	0	100	0	50	2	15	20	3	65	Very slow	Fools watercress 80% flag iris 5%, Watermint 5%,	0
12	1	9	7	12.4	75	20	5	50	8	35	45	2	10	Very Slow	fools watercress 5%	35
13	5	4	3.5	30.8	0	100	0	25	0	0	10	40	50	Vey Slow	Water plantain 3%, Potamogeten 10%, sparganium 20%, lemna 5%, water mint 5%	45
14	2	8	2.5	24	45	45	10	25	15	25	45	15	10	Moderate	Fools watercress 10%	40

Appendix B ELECTROFISHING SITE CHARACTERISTICS AT SURVEY SITES EXAMINED FOR THE PROPOSED PROJECT

Site	Length Fished (m)	Width Fished (m)	Area Fished (M^2)	Time Fished (mins)	Mean Depth (cm)	Max Depth (cm)	Voltage	Current (Amp)	Pulse (Hz)	Temp (C°)	Conductivity (µ/s)	pH
1	25	2	50	10	9.4	20	185	.3	50	13.3	738	8.2
2	8	12	96	10	57.8	95	185	.2	50	14.5	748	7.6
3	n/a - too											
4	30	2	60	10	4.2	6	185	.4	50	15.8	793	8
5	N/A -Too deep											
6	N/A– Dried Out											
8	15	7	95	10	53	70	264	.2	50	19.3	720	8.3
9	20	4	80	10	26	45	150	.8	50	18	719	8.1
10	30	3	90	10	15.8	23	185	.9	50	18.3	737	8.3
11	8	1	8	10	5	7	188	.4	50	16.9	747	8
12	30	6	180	10	12.4	16	185	.8	50	18.5	747	8.2
13	15	3.5	52.5	10	30.8	55	185	1	50	18.2	714	7.8
14	40	4.5	180	10	24	30	165	.7	50	14.9	732	8
17	40	4	160	10	11.2	25	149	.7	50	16.1	686	8



Appendix C Macroinvertebrates Recorded During Biological Sampling on Watercourses Within the Study Area of the Proposed Project

Group/Organism	1	4	6	11	9	8	2	12	13	10	7	14	EPA Class Pollution sensitivity group
Mayfly (Ephemeroptera)													
Baetidae													
Baetis rhodani				5	70	10		20				200	**C**
Ephemerelliidae													
Serratella ignita		4		2	40	7		10	10			75	**C**
Heptageniidae													
Ecdyonurus spp.								1					**A**
Cased Caddisflies (Tricoptera)													
Limnephilidae													
Glyphotaelius pellucidus			1										**B**
Beraeidae													
Beraea maura					6	8		40	12	1			**B**
Rhyacophila sp.													
Rhyacophila dorsalis				1	12								**C**

Polycentropodidae													
Polycentropus flavomaculata		3											**C**
Hydropsychidae													
Hydropsyche peducidula											2		**C**
Phliopotamidae													
Philopotamus montanus	3												
leptoceridae													
Mystacides azurea										3			
Beetle (Coleoptera)													
Elmidae													
Potamonectes depressus													**C**
Elmis		20		2	1			1	1				
Dytiscidae													
Dytiscus marginalis		1	1	2					3				**C**
Hygrotus versicolor									100				
Two Winged Flies (Diptera)													
Chironomidae													

Chironomus sp.				15		3	10		1	15	8		C
Simulidae													
Simulium spp.					15			10					C
Damselfly and Dragonfly nymphs (Odonata)													
Corduliidae													
Cordulia aenea				5									
Crustaceans													
Gammaridae													
Gammerus deubeni	80	150		250	65	50	50	100	20	50		30	C
Asellidae													
Asellus aquaticus	50	100	250	75			10	5	20	20	1		D
Leeches (Hirudinea)													
Glossiphoniidae													
Hemiclepsis marginata				1									D
Snails and Limpets (Gastropoda)													
Lymnaeidae													
Lymnaea stagnalis									3				C
Pulmonata													

Physella fontinalis									1				C
Bivalves													
Pisidium									50				
Sphaerium spp.													

Appendix D Fish Species and Lengths Recorded During Electrofishing Surveys On Watercourses Within The Study Area Of The Proposed Project

Site No	River Name	Species	Length (Cm)
1	Castlejordan_020	Brown Trout	4.5
1	Castlejordan_020	Brown Trout	4.3
1	Castlejordan_020	Three Spine Stickleback	4.0
4	Castlejordan_020	Brown Trout	5.5
4	Castlejordan_020	Brown Trout	5.4
4	Castlejordan_020	Brown Trout	6.7
4	Castlejordan_020	Brown Trout	5.9
4	Castlejordan_020	Brown Trout	6.4
11	Yellow (Castlejordan)_030	European Eel	26.0
11	Yellow (Castlejordan)_030	Three Spine Stickleback	4.3
11	Yellow (Castlejordan)_030	Three Spine Stickleback	4.6
11	Yellow (Castlejordan)_030	Three Spine Stickleback	3.8
11	Yellow (Castlejordan)_030	Lamprey sp.	15.0
11	Yellow (Castlejordan)_030	Lamprey sp.	13.7
11	Yellow (Castlejordan)_030	Lamprey sp.	9.4
11	Yellow (Castlejordan)_030	Lamprey sp.	12.6
11	Yellow (Castlejordan)_030	Lamprey sp.	8.2
11	Yellow (Castlejordan)_030	Lamprey sp.	11.3
11	Yellow (Castlejordan)_030	Lamprey sp.	13.3
11	Yellow (Castlejordan)_030	Lamprey sp.	12.8
11	Yellow (Castlejordan)_030	Lamprey sp.	10.0
11	Yellow (Castlejordan)_030	Lamprey sp.	10.5
11	Yellow (Castlejordan)_030	Lamprey sp.	7.9

Site No	River Name	Species	Length (Cm)
11	Yellow (Castlejordan)_030	Lamprey sp.	5.0
11	Yellow (Castlejordan)_030	Lamprey sp.	4.5
9	Yellow (Castlejordan)_020	Lamprey sp.	5.0
9	Yellow (Castlejordan)_020	Lamprey sp.	7.5
9	Yellow (Castlejordan)_020	Stone Loach	9.7
9	Yellow (Castlejordan)_020	Brown Trout	17.3
9	Yellow (Castlejordan)_020	Brown Trout	18.5
9	Yellow (Castlejordan)_020	Brown Trout	10.0
9	Yellow (Castlejordan)_020	Brown Trout	14.7
9	Yellow (Castlejordan)_020	Brown Trout	15.0
9	Yellow (Castlejordan)_020	Brown Trout	11.0
9	Yellow (Castlejordan)_020	Brown Trout	13.1
9	Yellow (Castlejordan)_020	Brown Trout	5.5
9	Yellow (Castlejordan)_020	Brown Trout	5.8
9	Yellow (Castlejordan)_020	Brown Trout	5.0
9	Yellow (Castlejordan)_020	Brown Trout	5.7
9	Yellow (Castlejordan)_020	Brown Trout	5.5
9	Yellow (Castlejordan)_020	Brown Trout	6.2
8	Yellow (Castlejordan)_010	Pike	44.3
12	Kinnegad_010	Brown Trout	19.3
12	Kinnegad_010	Brown Trout	15.9
12	Kinnegad_010	Brown Trout	14.4
12	Kinnegad_010	Brown Trout	13.0
12	Kinnegad_010	Brown Trout	14.6
12	Kinnegad_010	Brown Trout	14.8
12	Kinnegad_010	Brown Trout	14.5

Site No	River Name	Species	Length (Cm)
12	Kinnegad_010	Brown Trout	14.0
12	Kinnegad_010	Brown Trout	14.6
12	Kinnegad_010	European Eel	14.5
12	Kinnegad_010	Lamprey sp.	11.0
12	Kinnegad_010	Three Spine Stickleback	4.3
13	Castletown Tara Stream_010	Perch	17.0
10	Yellow (Castlejordan)_020	Brown Trout	13.6
10	Yellow (Castlejordan)_020	Brown Trout	16
10	Yellow (Castlejordan)_020	Brown Trout	6.1
10	Yellow (Castlejordan)_020	Brown Trout	5.9
10	Yellow (Castlejordan)_020	Lamprey sp.	10.0
10	Yellow (Castlejordan)_020	Lamprey sp.	11.0
10	Yellow (Castlejordan)_020	Stone Loach	7.5
10	Yellow (Castlejordan)_020	Three Spine Stickleback	5.2
10	Yellow (Castlejordan)_020	Three Spine Stickleback	2.2
10	Yellow (Castlejordan)_020	Minnow	5.5
10	Yellow (Castlejordan)_020	Minnow	4.3
7	Yellow (Castlejordan)_010	Brown Trout	26.4
7	Yellow (Castlejordan)_010	Three Spine Stickleback	4.0
14	Milltownpass_010	Brown Trout	5.8
14	Milltownpass_010	Brown Trout	15.4
14	Milltownpass_010	Brown Trout	16.3
14	Milltownpass_010	Brown Trout	20.4
14	Milltownpass_010	Brown Trout	20.4
14	Milltownpass_010	Brown Trout	14.0
14	Milltownpass_010	Brown Trout	22.0

Site No	River Name	Species	Length (Cm)
14	Milltownpass_010	Brown Trout	20.7
14	Milltownpass_010	Brown Trout	18.5
14	Milltownpass_010	Brown Trout	17.5
14	Milltownpass_010	Brown Trout	14.9
14	Milltownpass_010	Brown Trout	15.5
14	Milltownpass_010	Brown Trout	16.4
14	Milltownpass_010	Brown Trout	15.1
14	Milltownpass_010	Brown Trout	15.1
14	Milltownpass_010	Brown Trout	16.5
14	Milltownpass_010	Brown Trout	17.1
14	Milltownpass_010	Brown Trout	16.6
14	Milltownpass_010	Brown Trout	13.4
14	Milltownpass_010	Brown Trout	14.7
14	Milltownpass_010	Brown Trout	15.1
14	Milltownpass_010	Brown Trout	13.6
14	Milltownpass_010	Brown Trout	6.8
14	Milltownpass_010	Brown Trout	6.2
14	Milltownpass_010	Brown Trout	5.1
14	Milltownpass_010	Brown Trout	5.4
14	Milltownpass_010	Salmon	13.5
14	Milltownpass_010	Lamprey sp.	8.0
14	Milltownpass_010	Lamprey sp.	6.5
14	Milltownpass_010	Lamprey sp.	11.0
14	Milltownpass_010	Lamprey sp.	2.5
14	Milltownpass_010	Lamprey sp.	2.5
14	Milltownpass_010	Lamprey sp.	9.0

Appendix E E-DNA REPORT

Folio No:	2713-2026
Purchase Order:	POP002259
Contact:	Tobin Consulting Engineers
Issue Date:	09.07.2026
Received Date:	18.06.2026

eDNA Report

Technical Report

SureScreen Scientifics

Folio No: 2713-2026
Purchase Order: POP002259
Contact: Tobin Consulting Engineers
Issue Date: 09.07.2026
Received Date: 18.06.2026

SureScreen Scientifics

eDNA Analysis

Summary

When aquatic organisms inhabit a waterbody such as a pond, lake or river they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm the presence or absence of the target species within the waterbody.

Results

Lab ID	Site Name	OS Reference	Target Species	Sample Integrity Check	Result	Positive Replicates
FK3452	Site 7		Atlantic salmon (Salmo salar)	Pass	Negative	0
			Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Negative	0
			Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0
FK3453	Site 5		Atlantic salmon (Salmo salar)	Pass	Positive	3
			Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Positive	12
			Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0

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SureScreen Scientifics

FK3454	Site 11	Atlantic salmon (Salmo salar)	Pass	Positive	2
		Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Positive	12
		Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0
FK3456	Site 12	Atlantic salmon (Salmo salar)	Pass	Negative	0
		Brook/River lamprey (Lampetra planeri/ Lampetra fluviatilis)	Pass	Positive	12
		Freshwater pearl mussel (Margaritifera margaritifera)	Pass	Negative	0

Matters affecting result: none

Reported by:Chelsea Warner

Approved by: Consuela Sopronyi

Folio No:	2713-2026
Purchase Order:	POP002259
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Methodology

Samples have been analyzed for the presence of target species eDNA following readily available and scientifically published eDNA assays and protocols.

The analysis is conducted in two phases. The sample first goes through an extraction process where the filter is incubated in order to obtain any DNA within the sample. The extracted sample is then tested via real-time PCR (also called q-PCR) for each of the selected target species. This process uses species-specific molecular markers (known as primers) to amplify a select part of the DNA, allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines amplification and detection of target DNA into a single step. With qPCR, fluorescent dyes specific to the target sequence are used to label targeted PCR products during thermal cycling. The accumulation of fluorescent signals during this reaction is measured for fast and objective data analysis. The primers used in this process are specific to a part of mitochondrial DNA only found in each individual species. Separate primers are used for each of the species, ensuring no DNA from any other species present in the water is amplified. If target species DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If target DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent the risk of false positive and false negative results. True positive controls, negative controls, and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared. Stages of the analysis are also conducted in different buildings at our premises for added security. SureScreen Scientifics Ltd is ISO9001 accredited and participates in Natural England's proficiency testing scheme for GCN eDNA testing.

Interpretation of Results

Sample Integrity Check:

Laboratory Arrival:

When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results. Any samples which fail this test are rejected and eliminated before analysis.

Degradation and Inhibition check:

Analysis of the spiked DNA marker to see if there has been degradation or inhibition of the kit or sample, between the date it was made to the date of analysis. Degradation of the spiked DNA marker may indicate a risk of false negative results. If inhibition is detected, samples are purified and re-analyzed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

Result:

Presence of eDNA (Positive/Negative/Inconclusive)

Positive: DNA was identified within the sample, indicative of species presence within the sampling location at the time the sample was taken or within the recent past.

Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for species presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. Even a score as low as 1/12 is declared positive. 0/12 indicates negative species presence.

Negative: eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of species absence, however, does not exclude the potential for species presence below the limit of detection.

Inconclusive: Controls indicate inhibition or degradation of the sample, resulting in the inability to provide conclusive evidence for species presence or absence.



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