Ballybeg 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 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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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.

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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.

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).

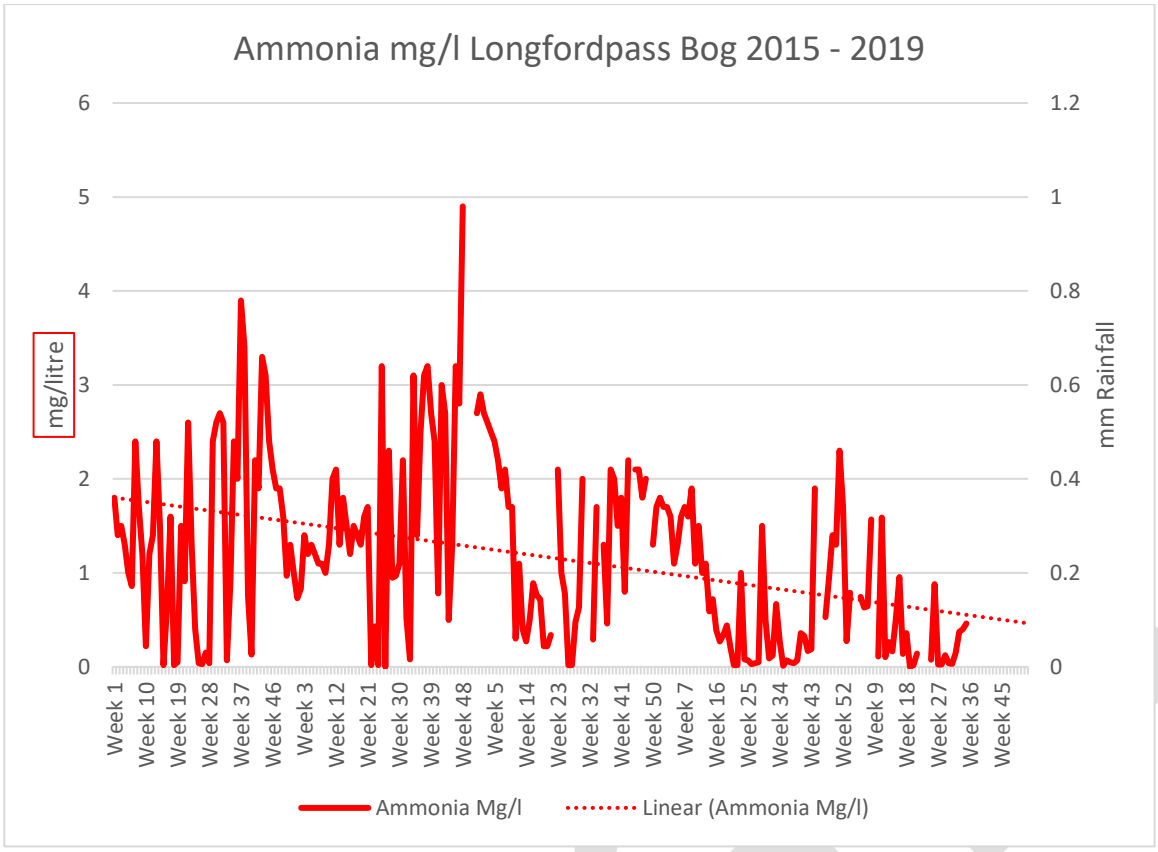
7.1 Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- 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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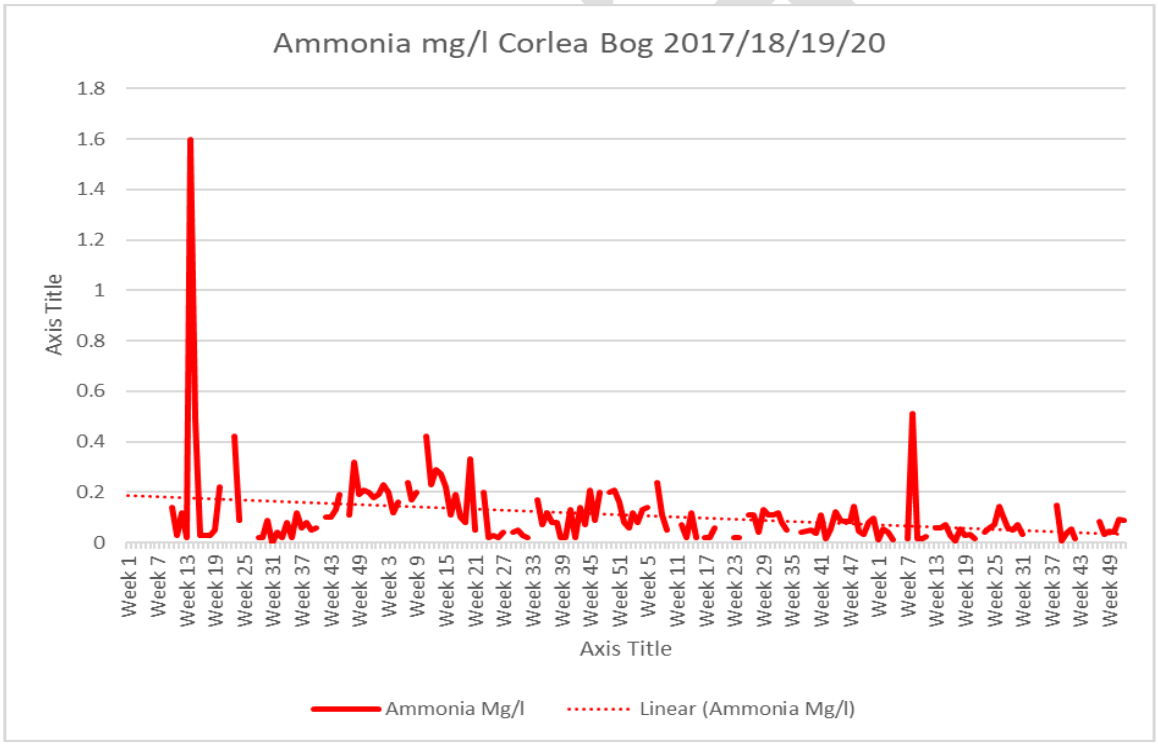


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

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 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.

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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
		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.

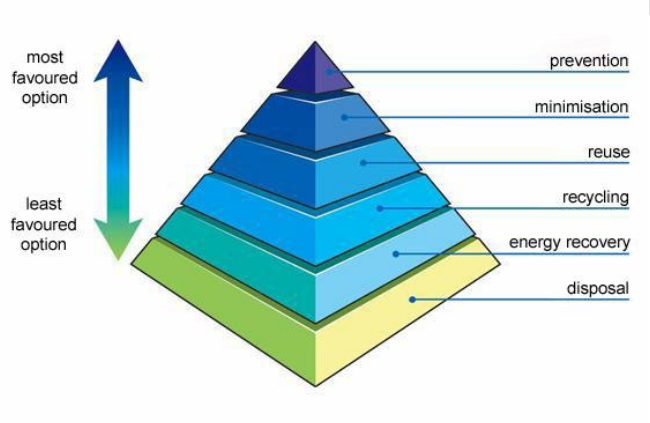
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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.

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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

Ballybeg Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet	
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This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
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Date:			

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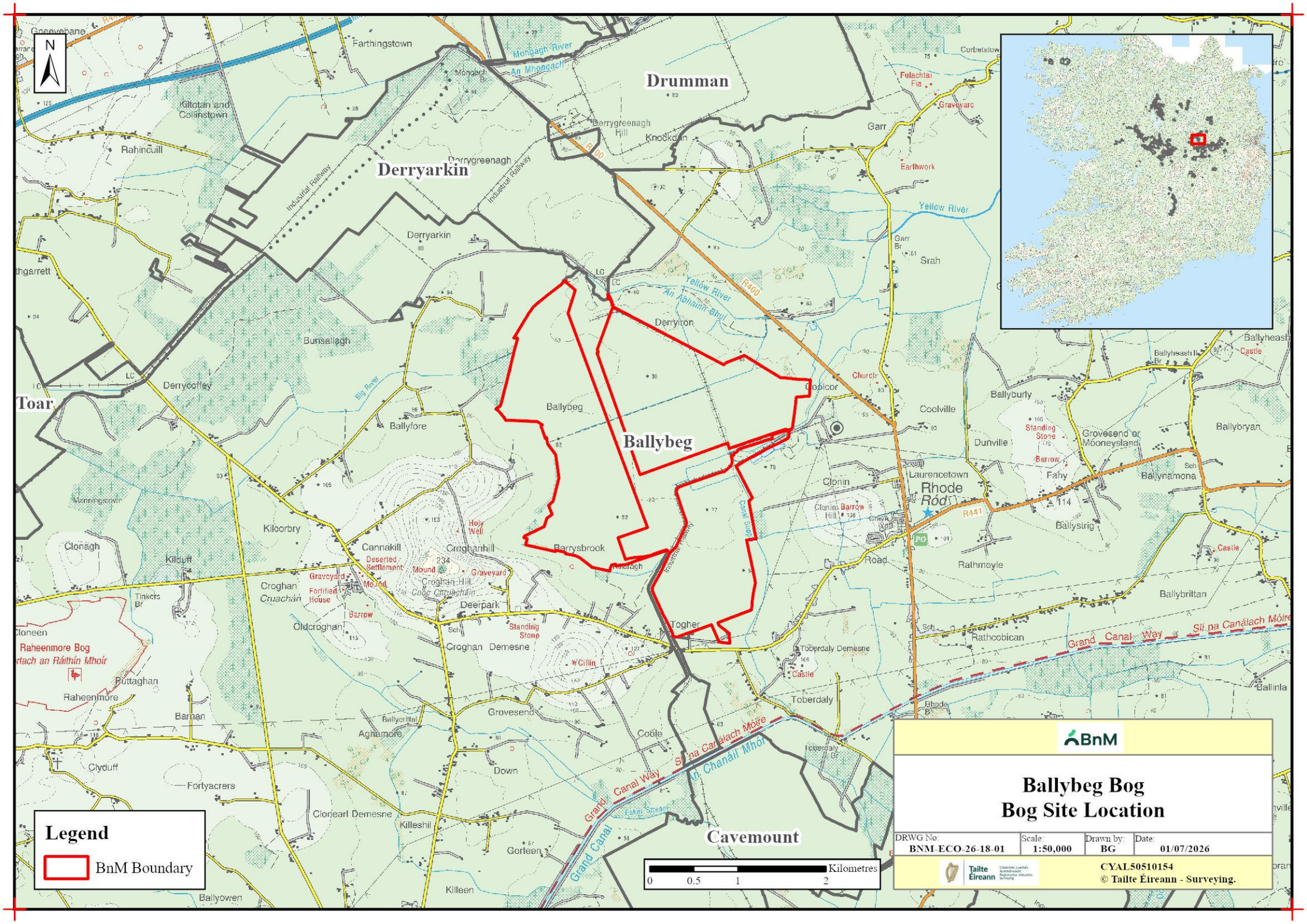
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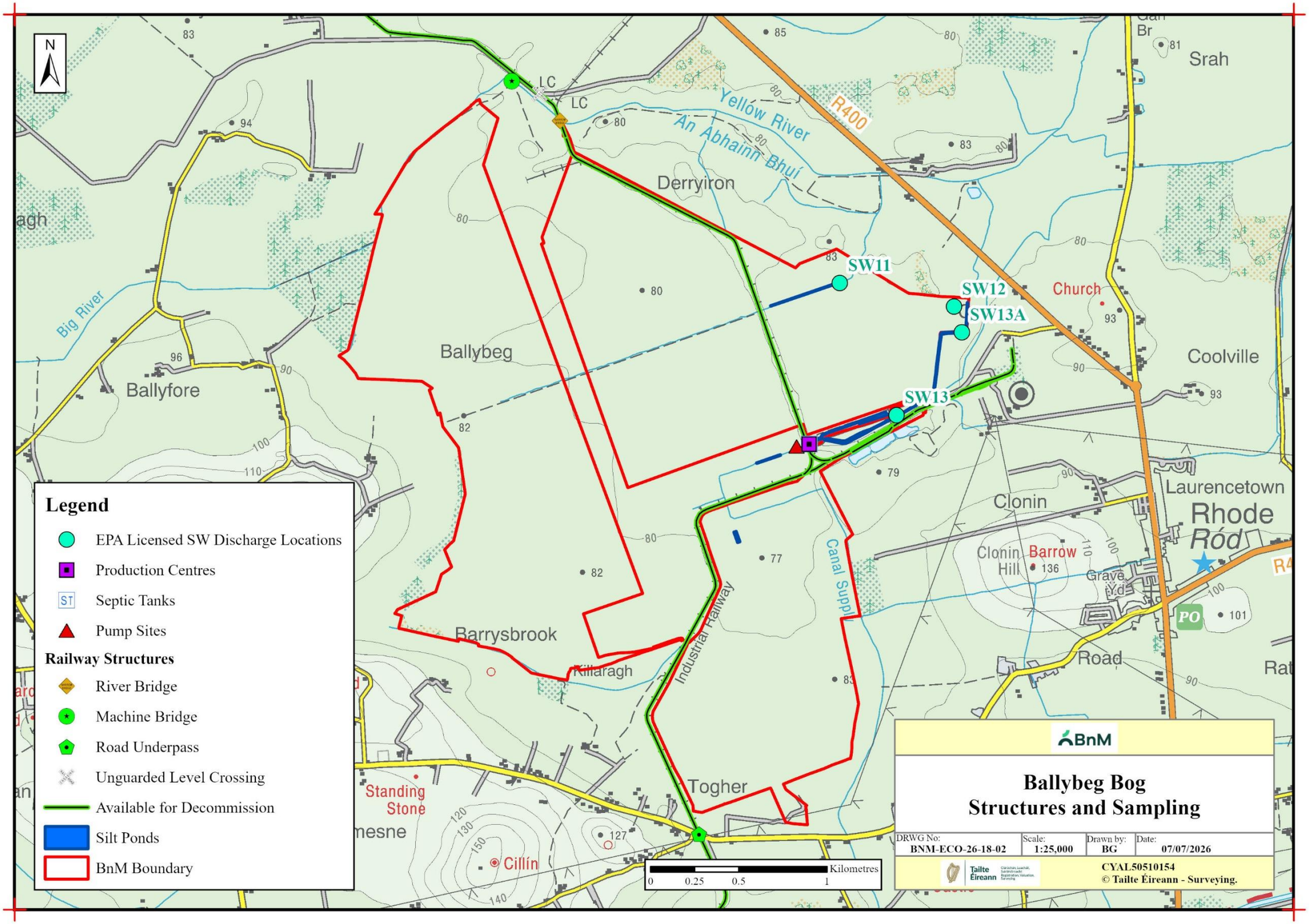
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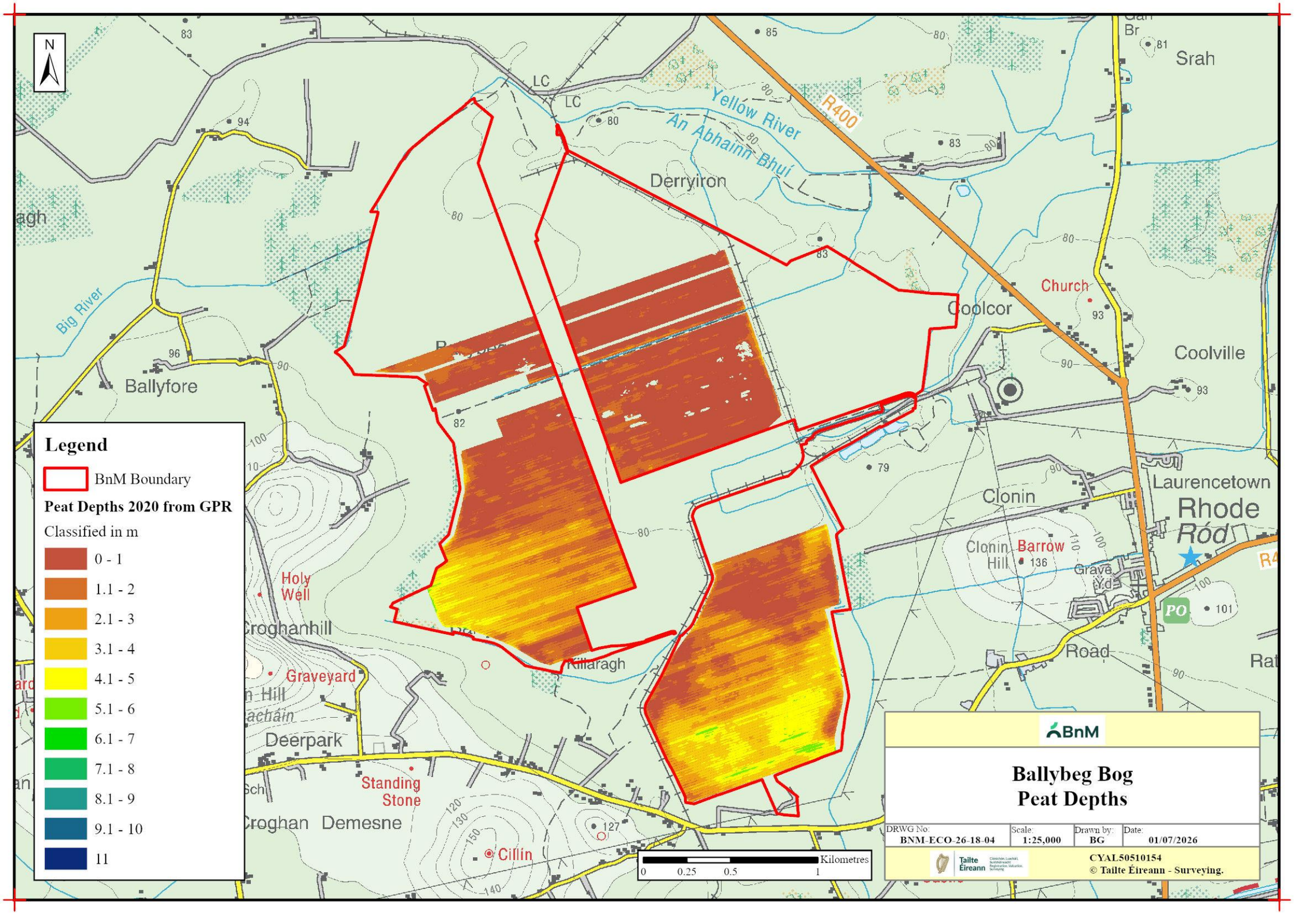
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Road Underpass
Unguarded Level Crossing
Available for Decommission
Silt Ponds
BnM Boundary
Kilometres
0 0.25 0.5 1
BnM
Ballybeg Bog
Structures and Sampling
DRWG No: BNM-ECO-26-18-02
Scale: 1:25,000
Drawn by: BG
Date: 07/07/2026
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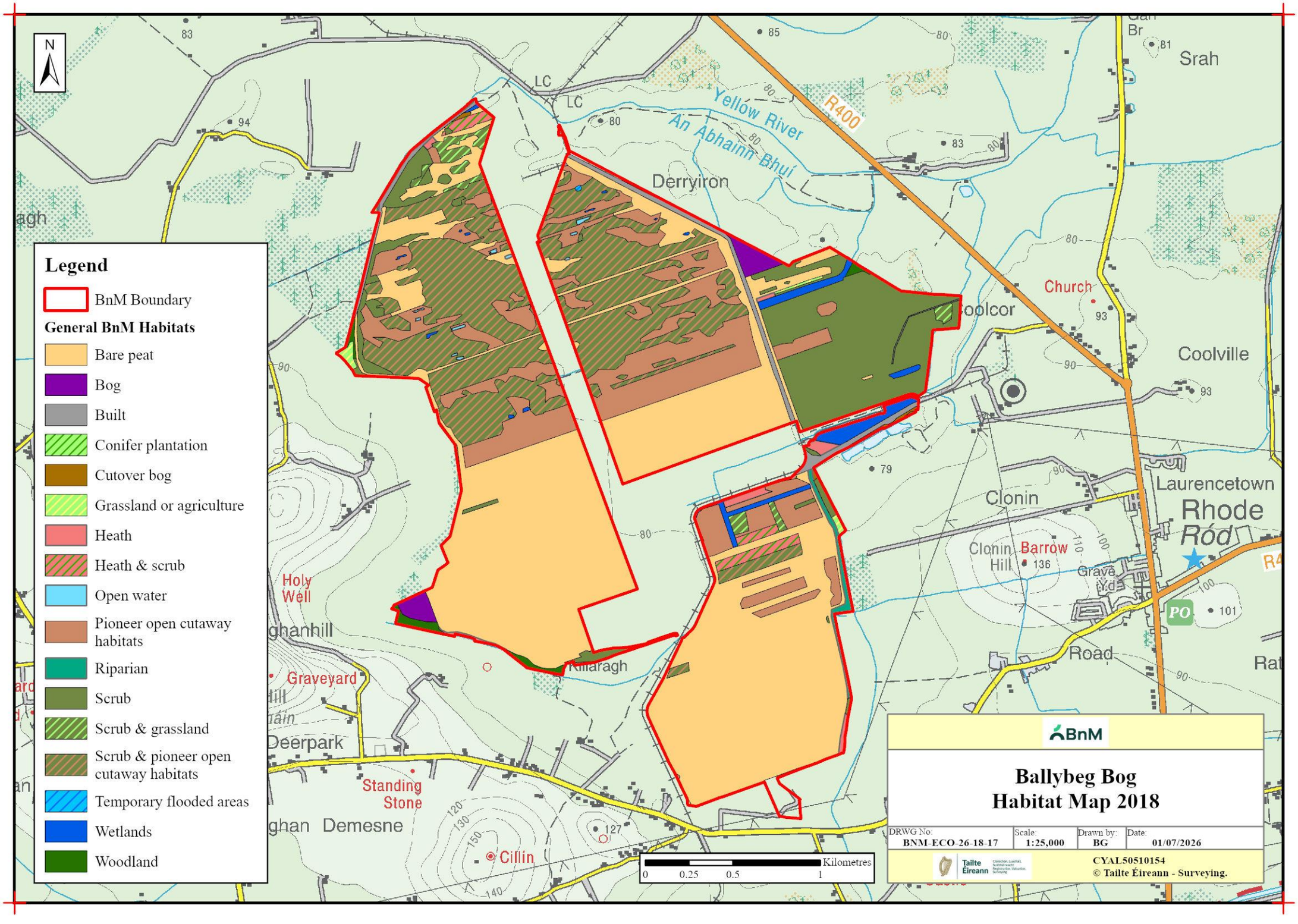
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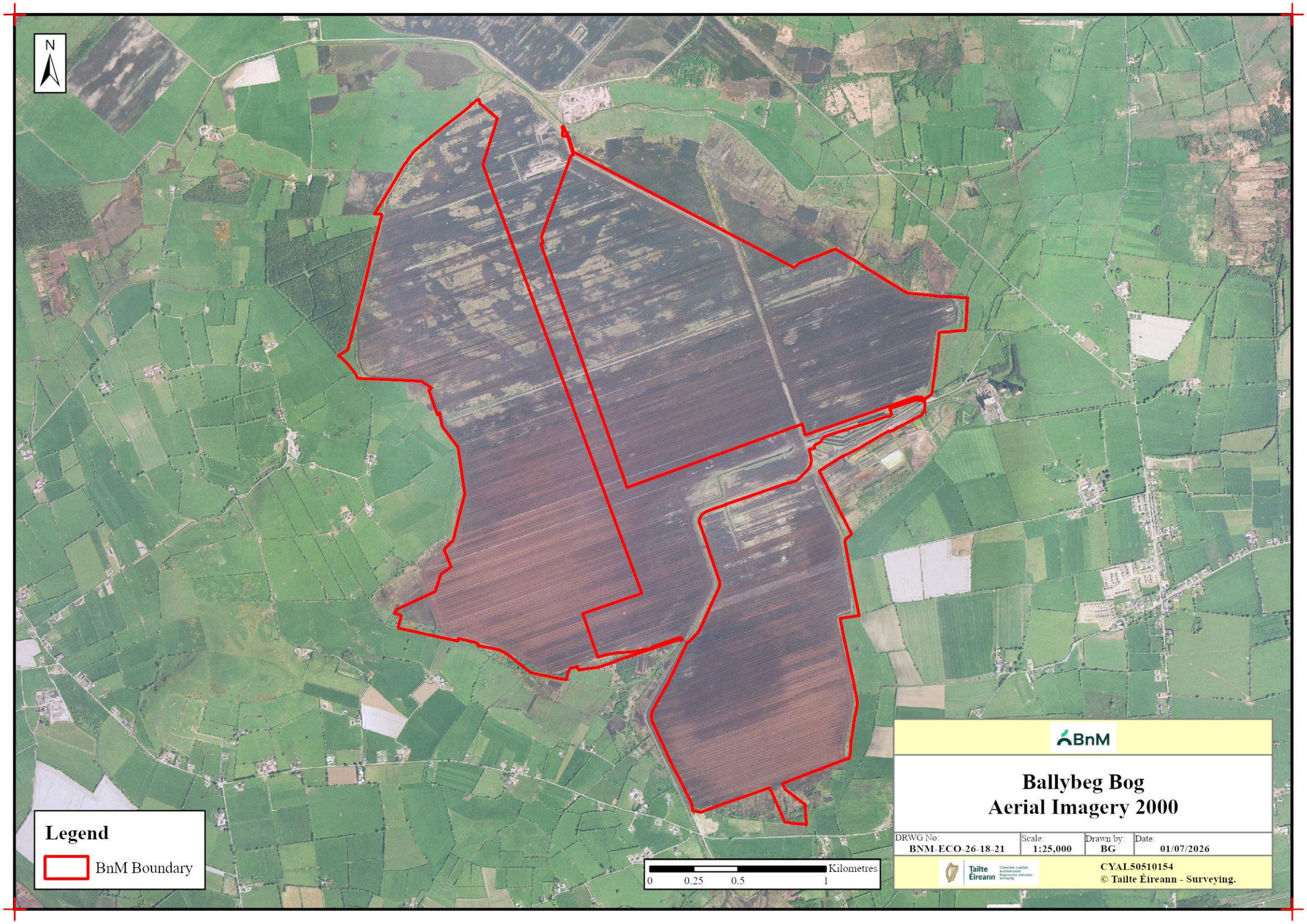
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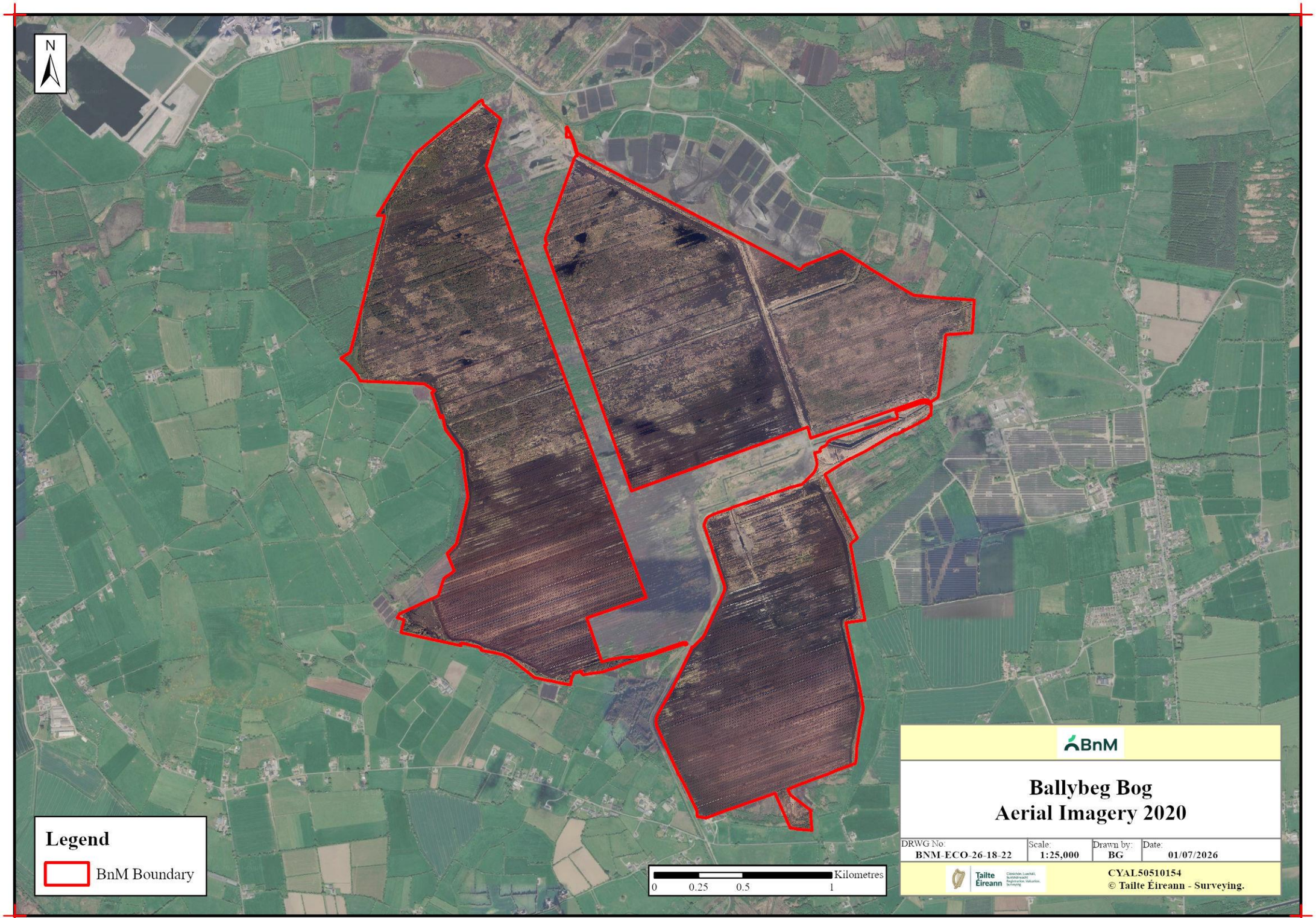
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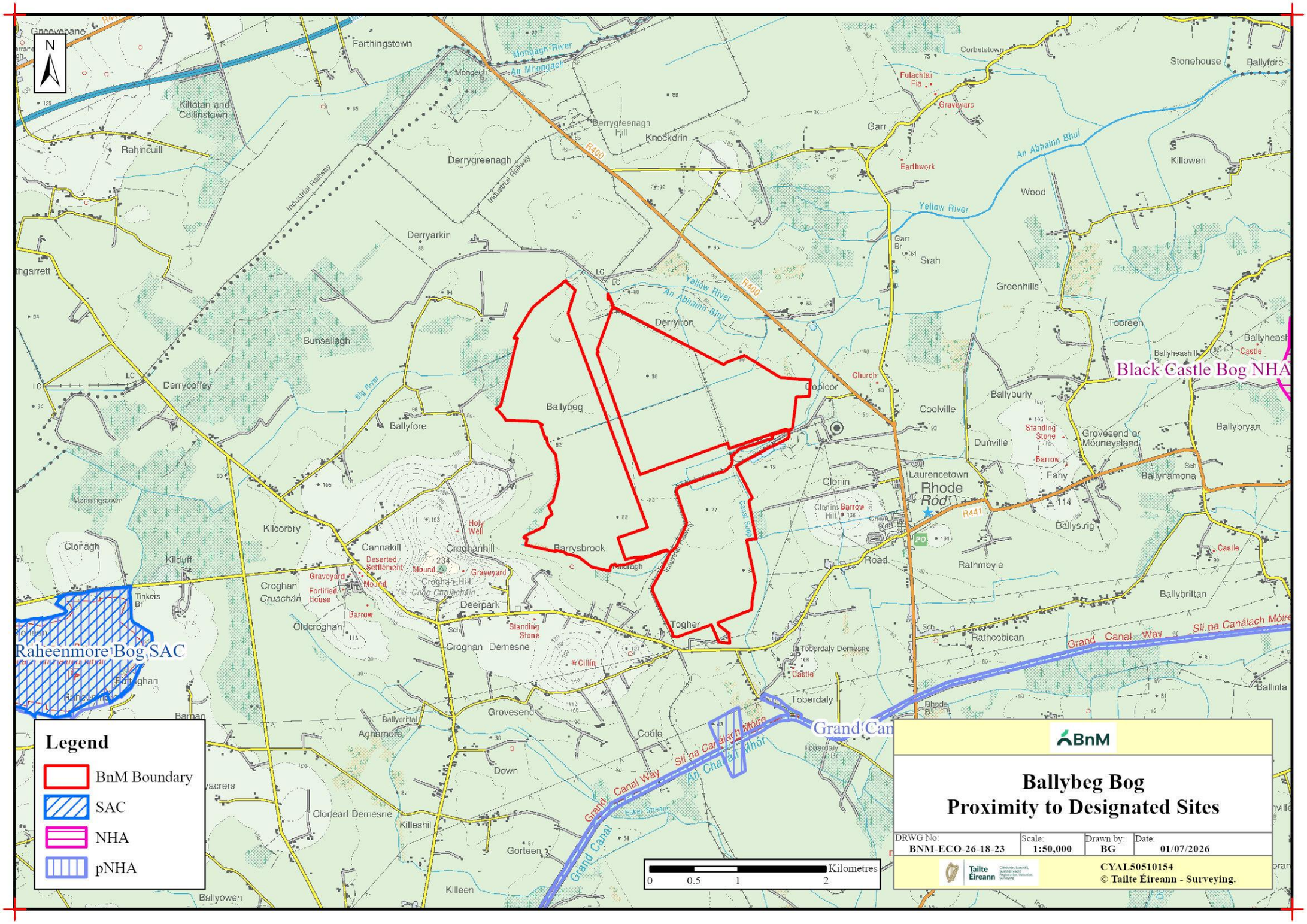
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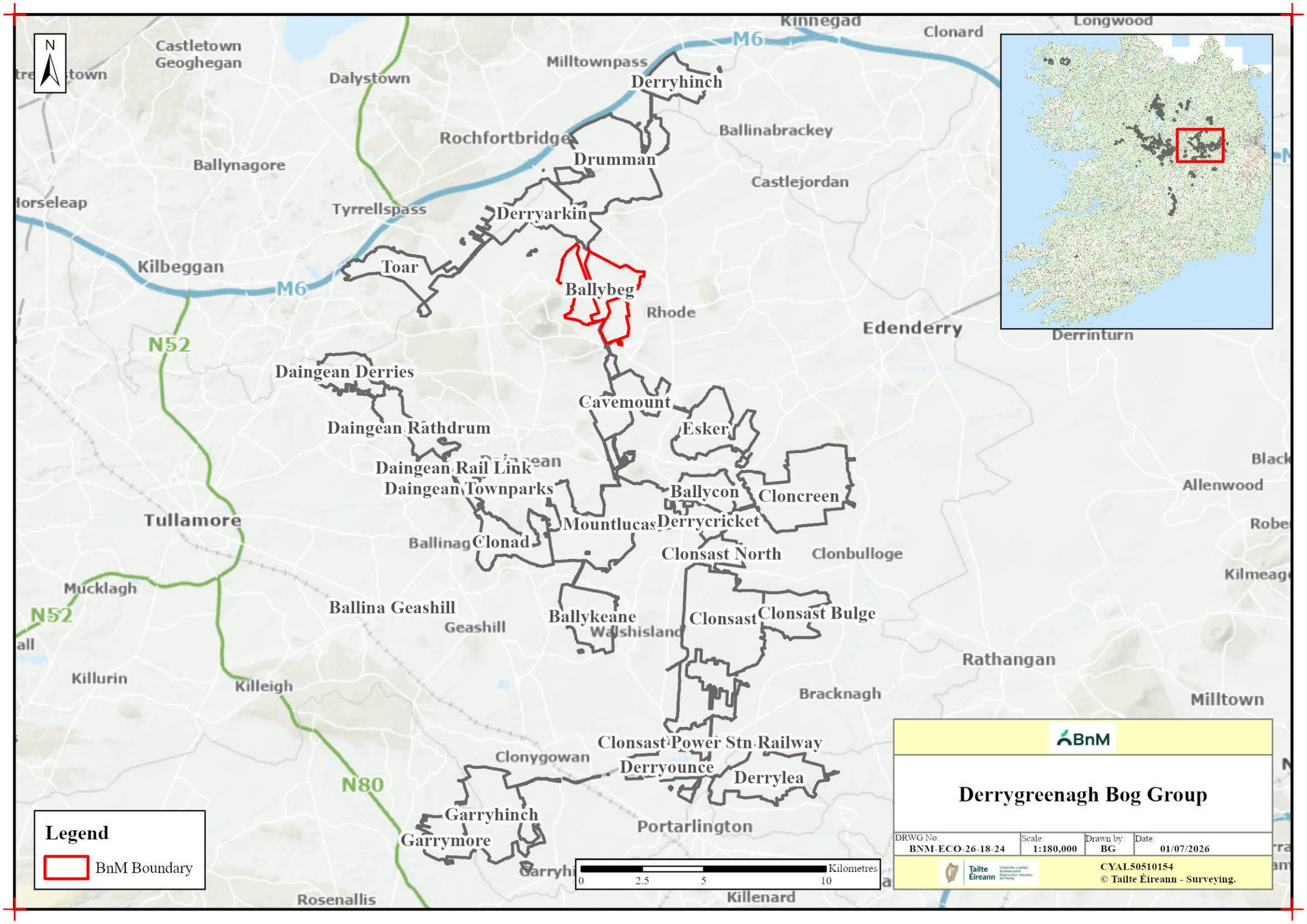
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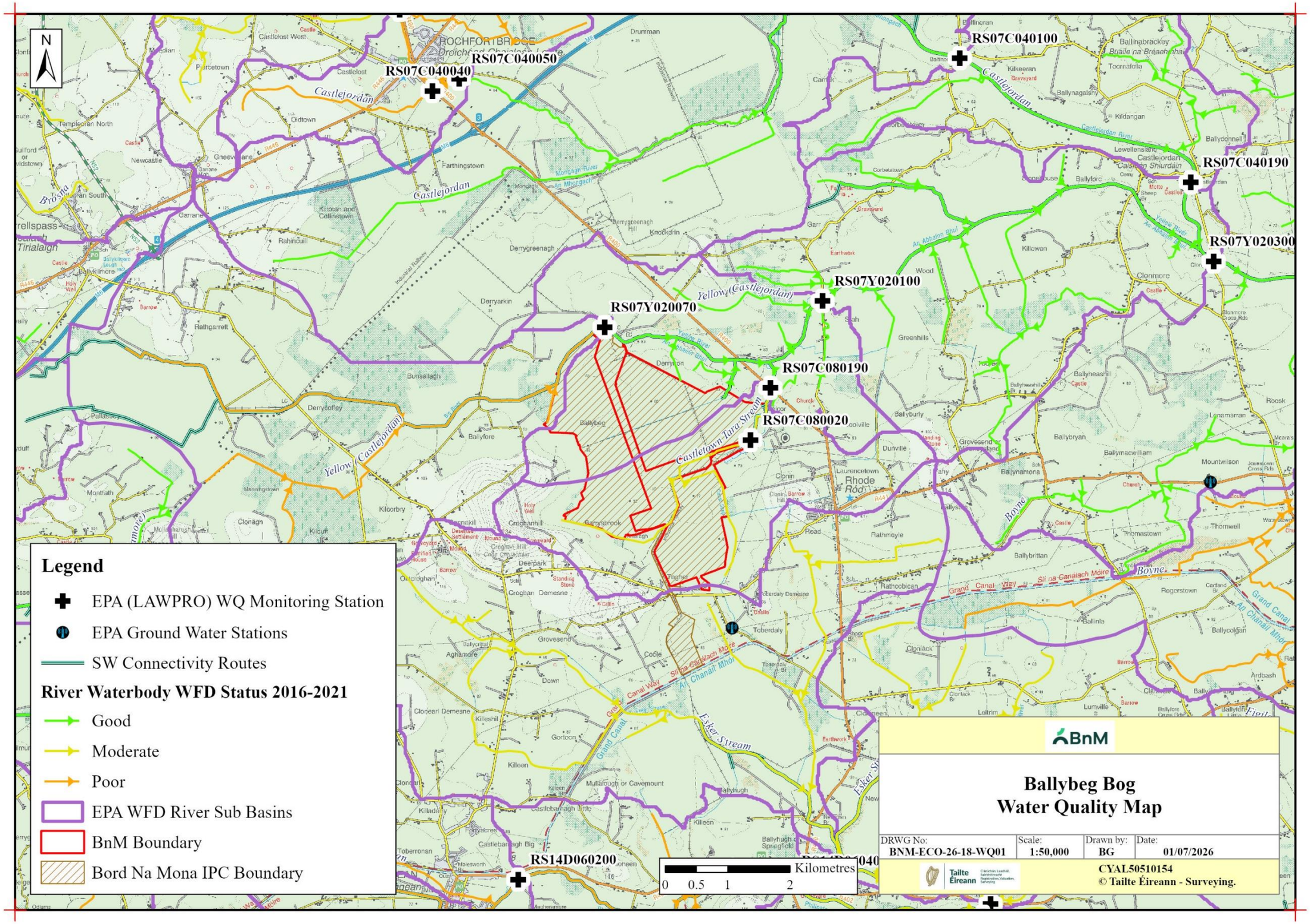
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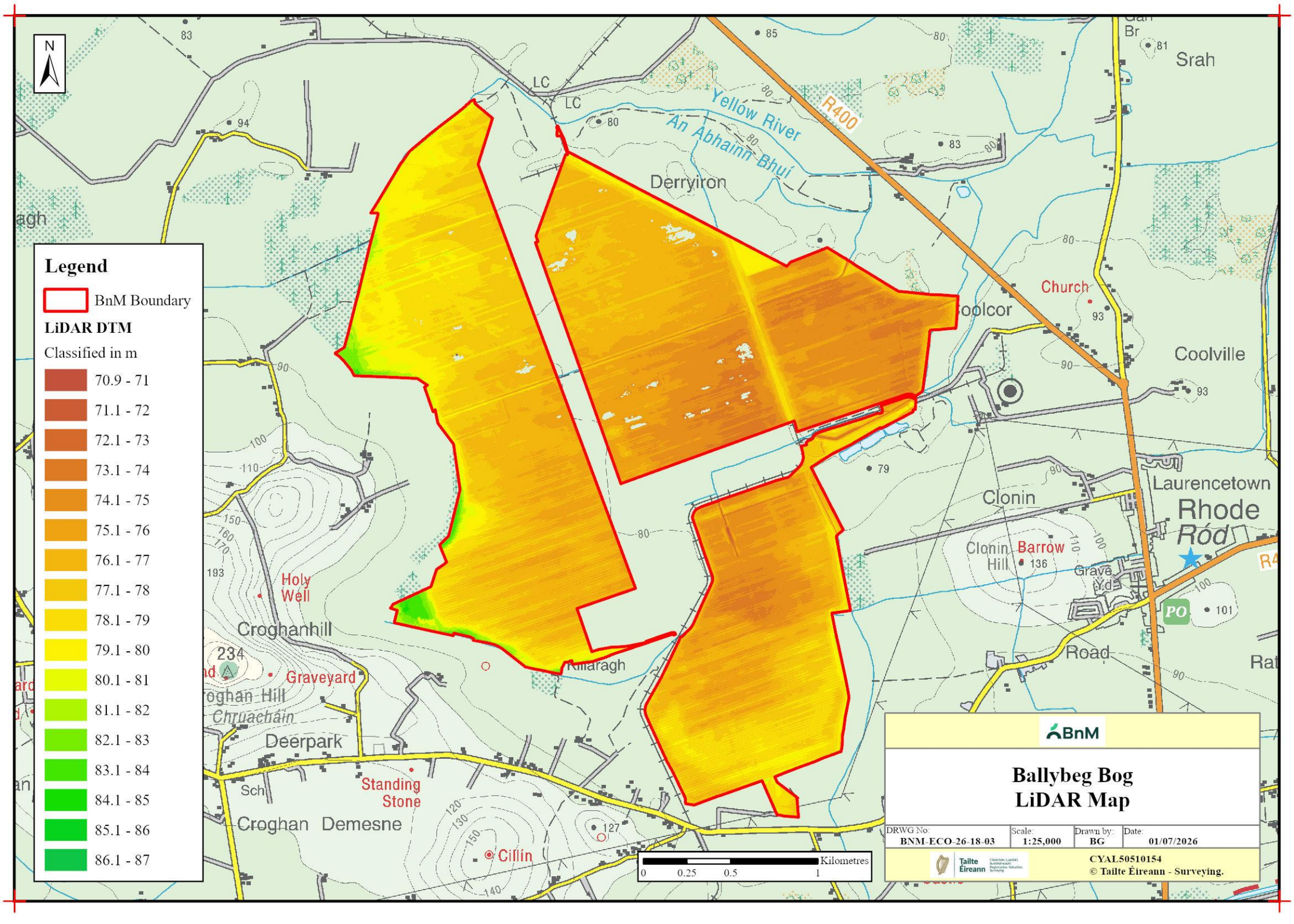
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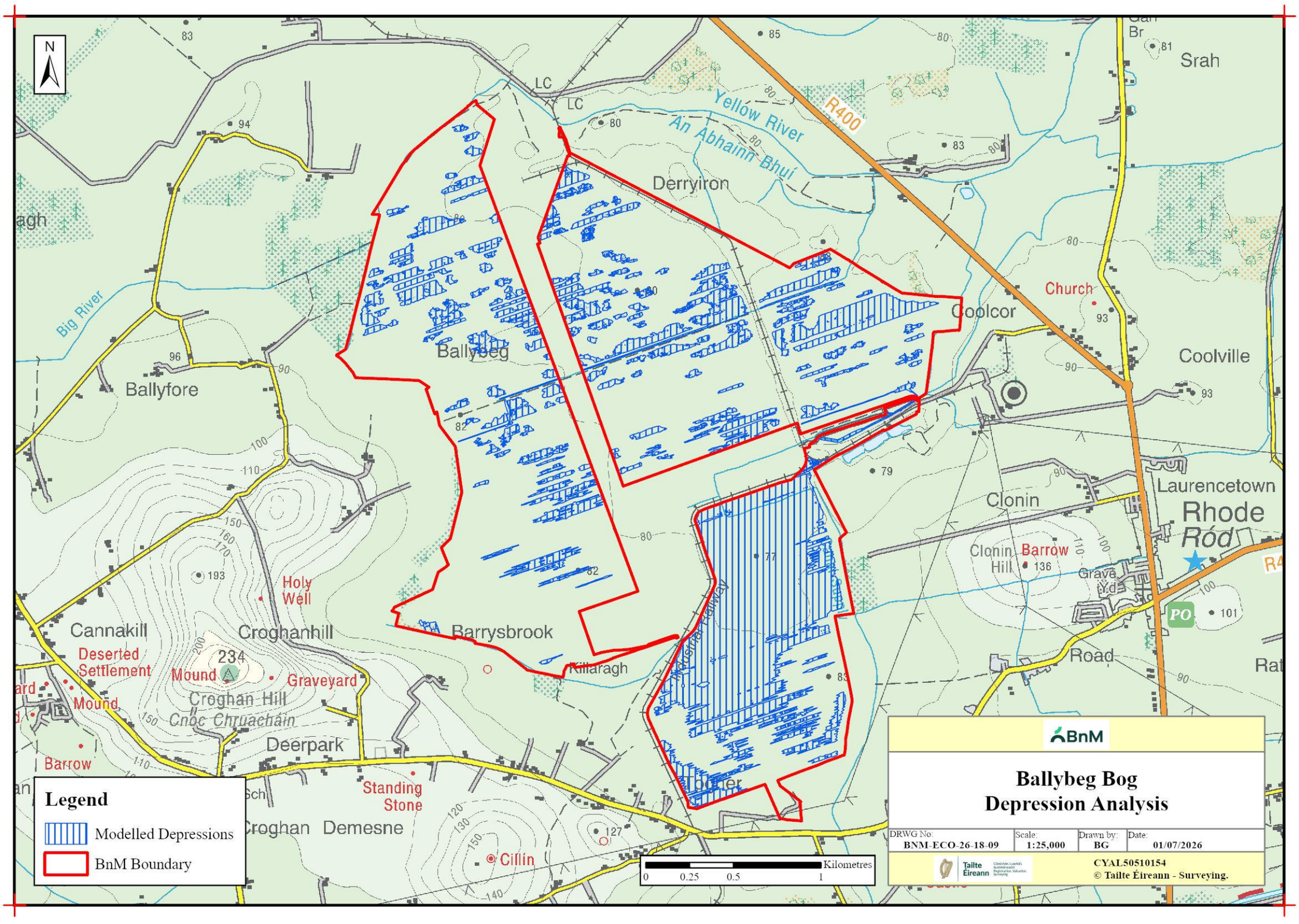
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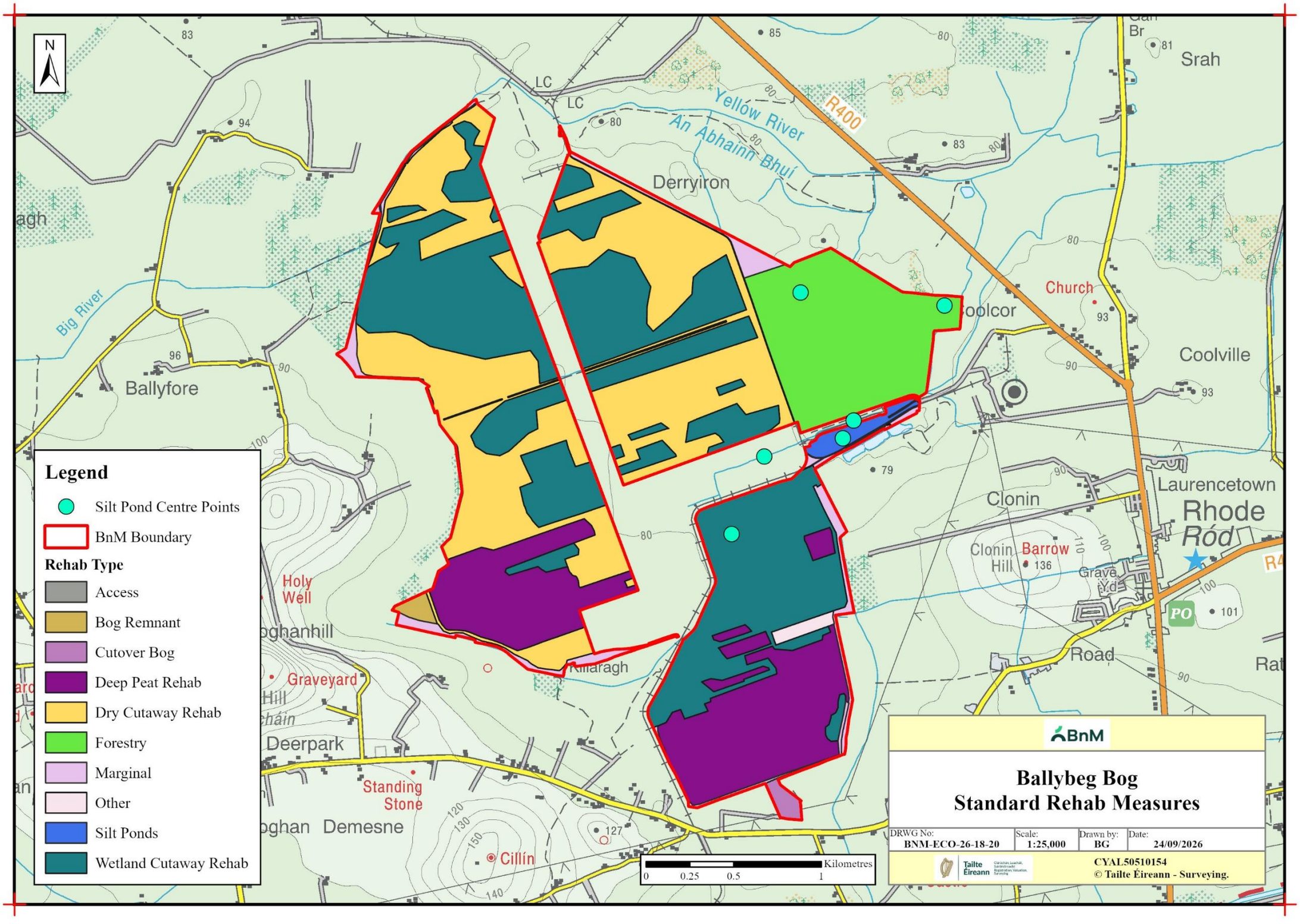



N
Srah
Yellow River
An Abhainn Bhuí
R400
Derryiron
Ballybeg
Big River
Ballyfore
Church
Coolcor
Coolville
Laurencetown
Rhode
Ród
Clonin
Clonin Hill
Barrow
Grave Yds
PO
Road
Holy Well
Cannakill
Croghanhill
Deserted Settlement
Mound
Graveyard
Croghan Hill
Cnoc Chruachain
Deerpark
Barrow
Standing Stone
Croghan Demesne
Cillin
Barrysbrook
Killaragh
Tobber
Tullamore Railway
Legend
Modelled Depressions
BnM Boundary
0 0.25 0.5 1 Kilometres
BnM
Ballybeg Bog
Depression Analysis
DRWG No: BNM-ECO-26-18-09
Scale: 1:25,000
Drawn by: BG
Date: 01/07/2026
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Rehabilitation Maps

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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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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.

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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.

Draft

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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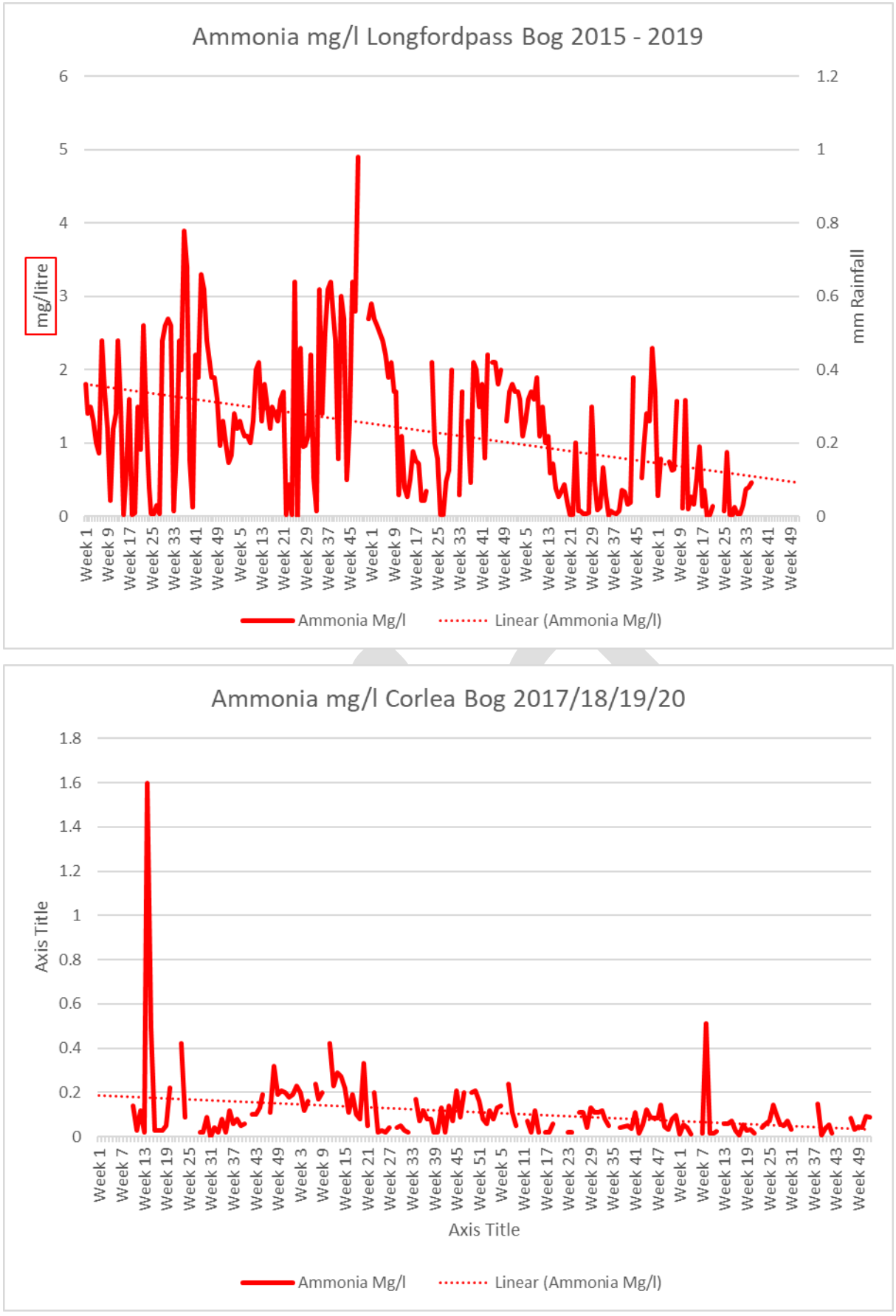


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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.

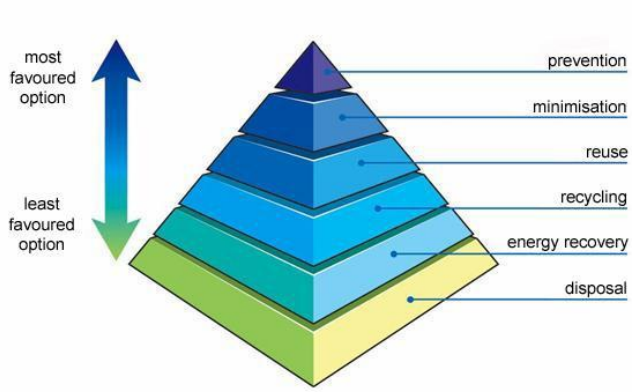
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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.

---

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

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Document Status:	**Draft v0.2**

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Date:			

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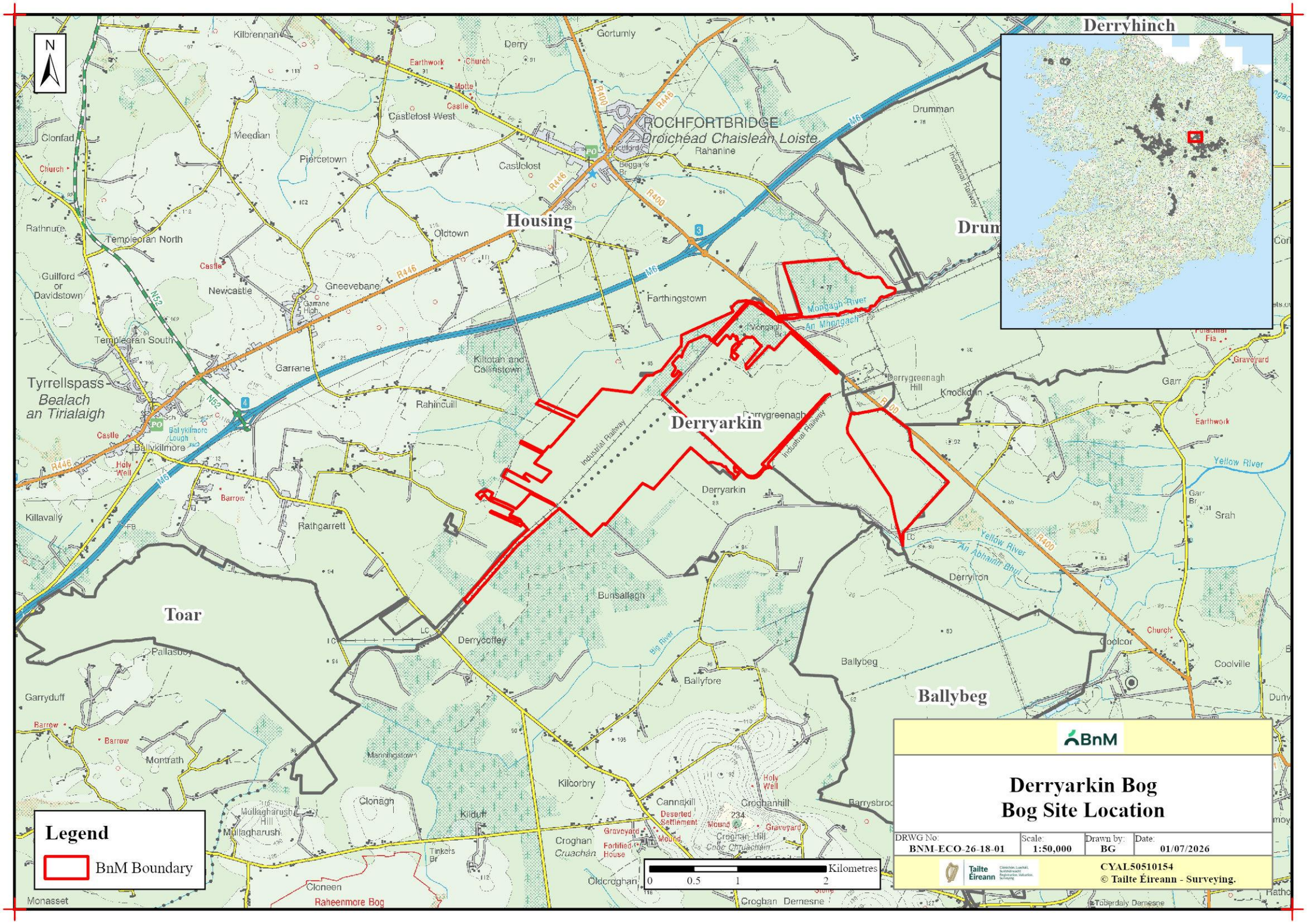
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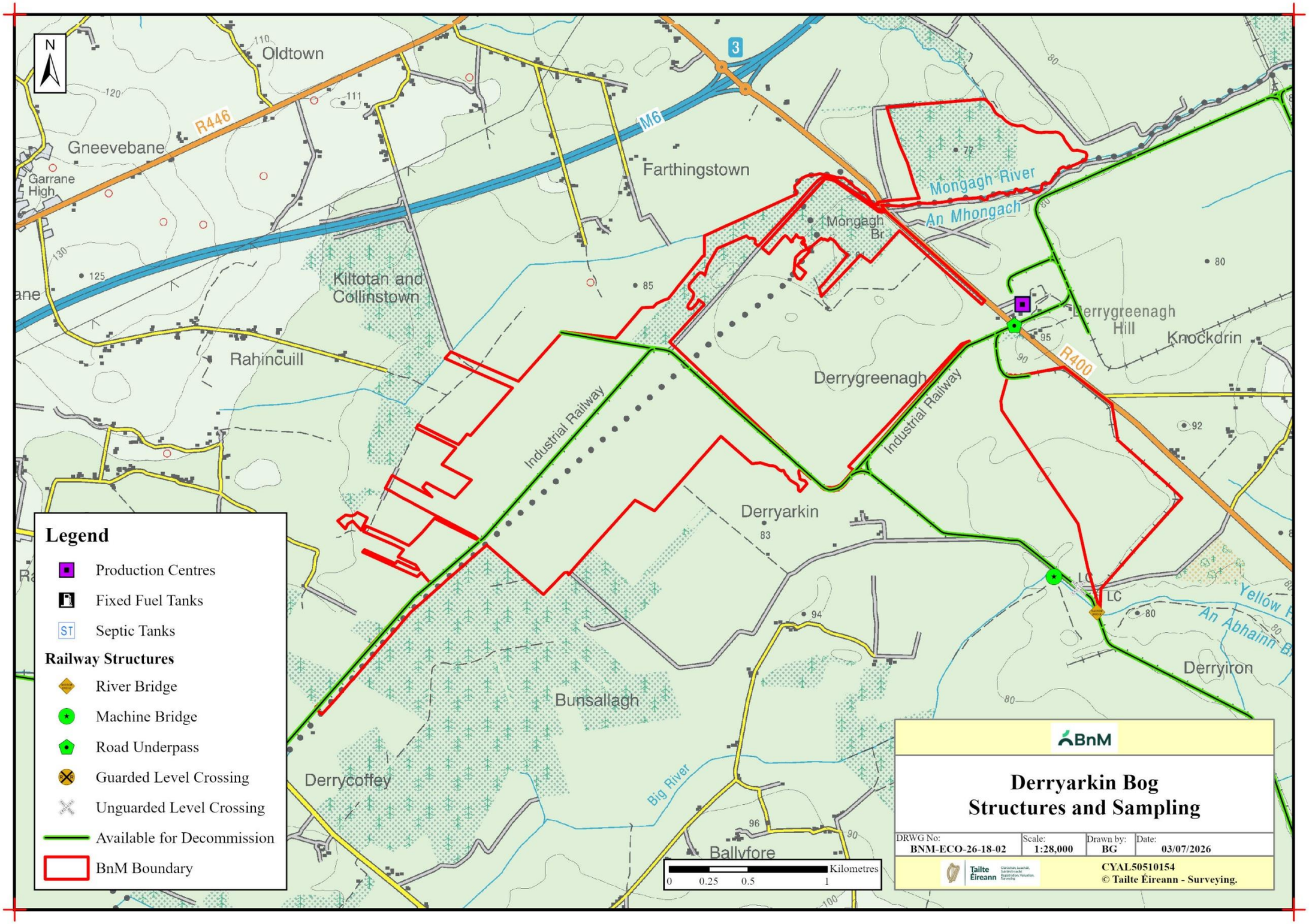
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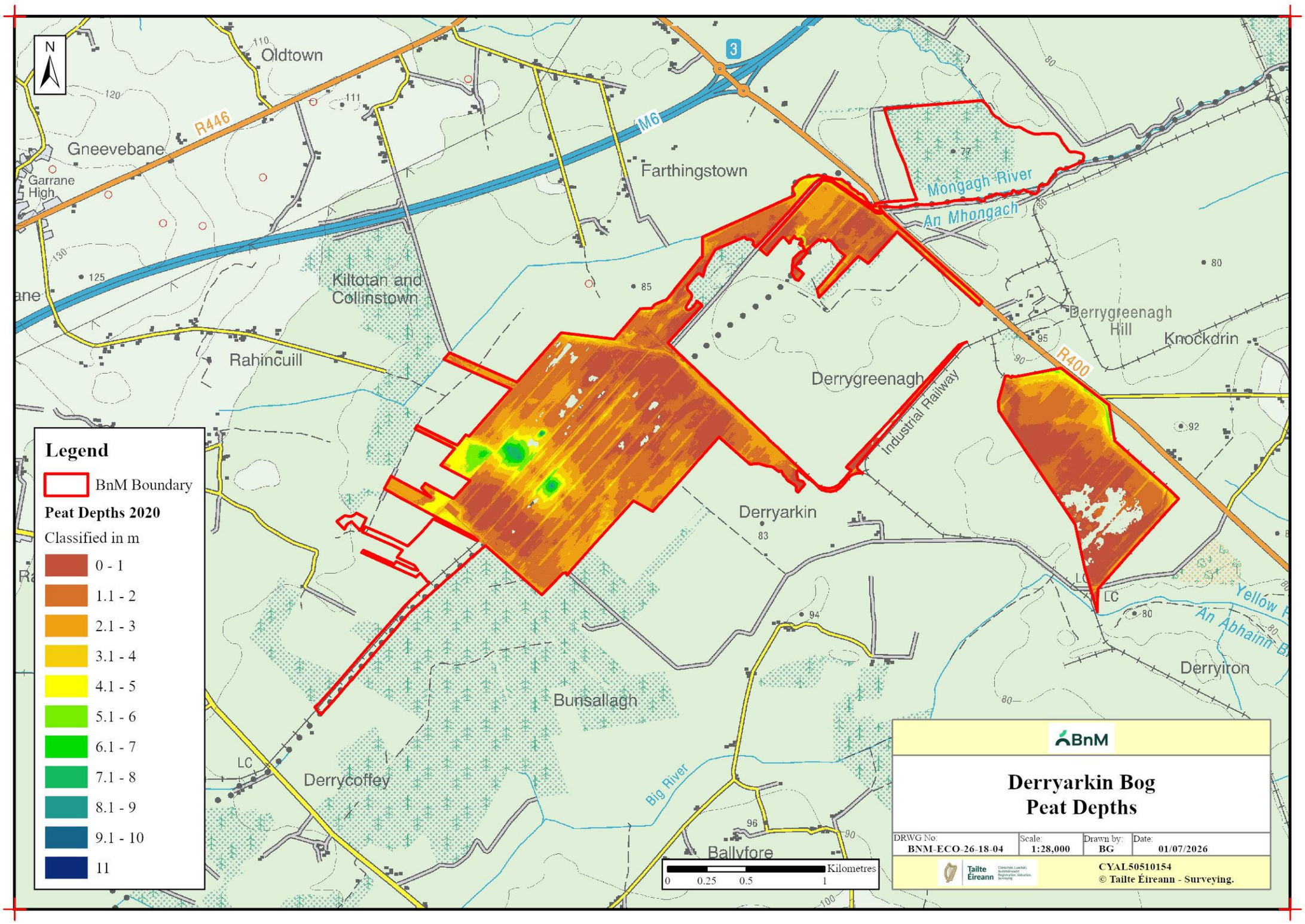
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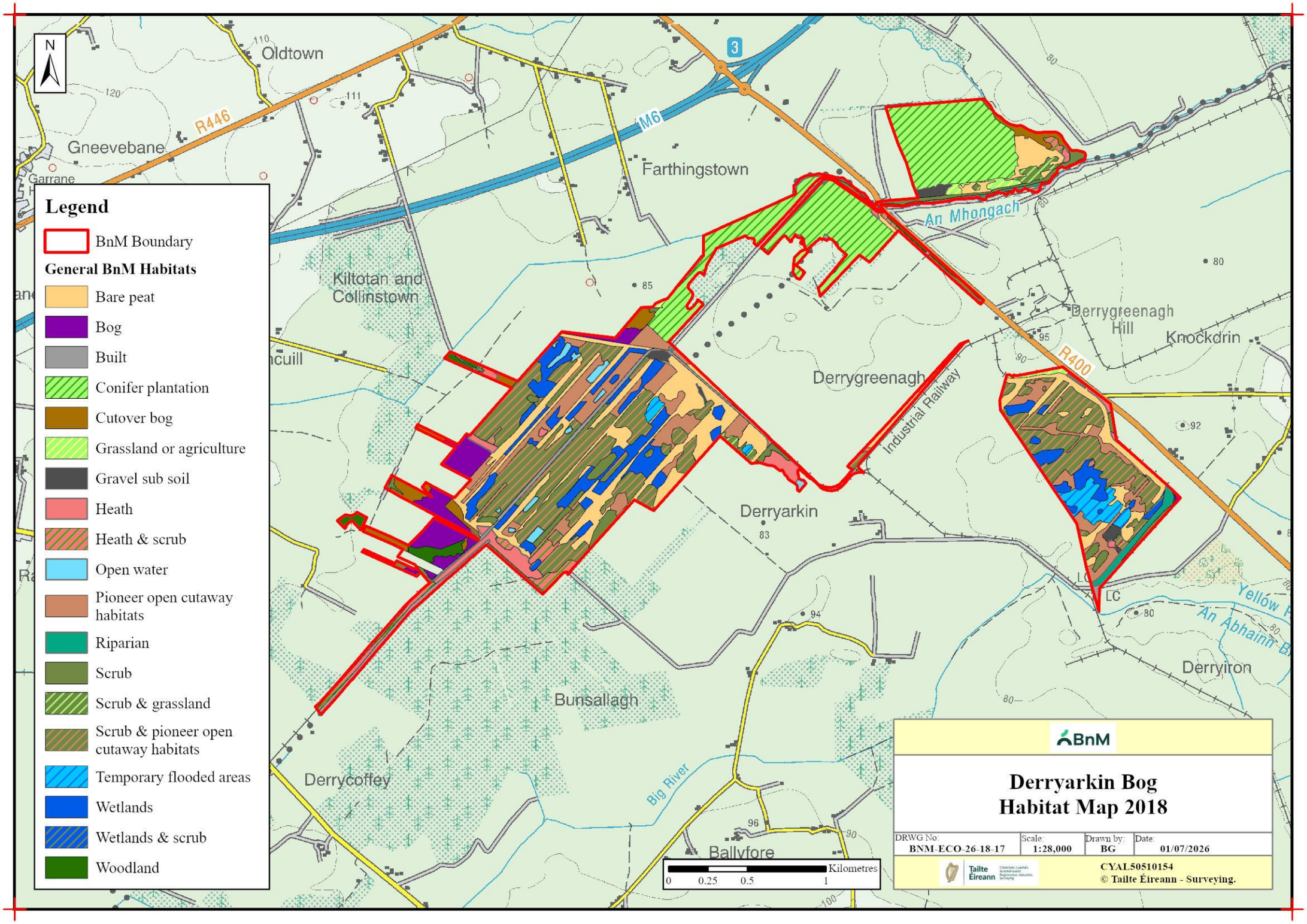



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Derryiron
Bunsallagh
Derrycoffey
Big River
Ballyfore
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Fixed Fuel Tanks
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Guarded Level Crossing
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Structures and Sampling
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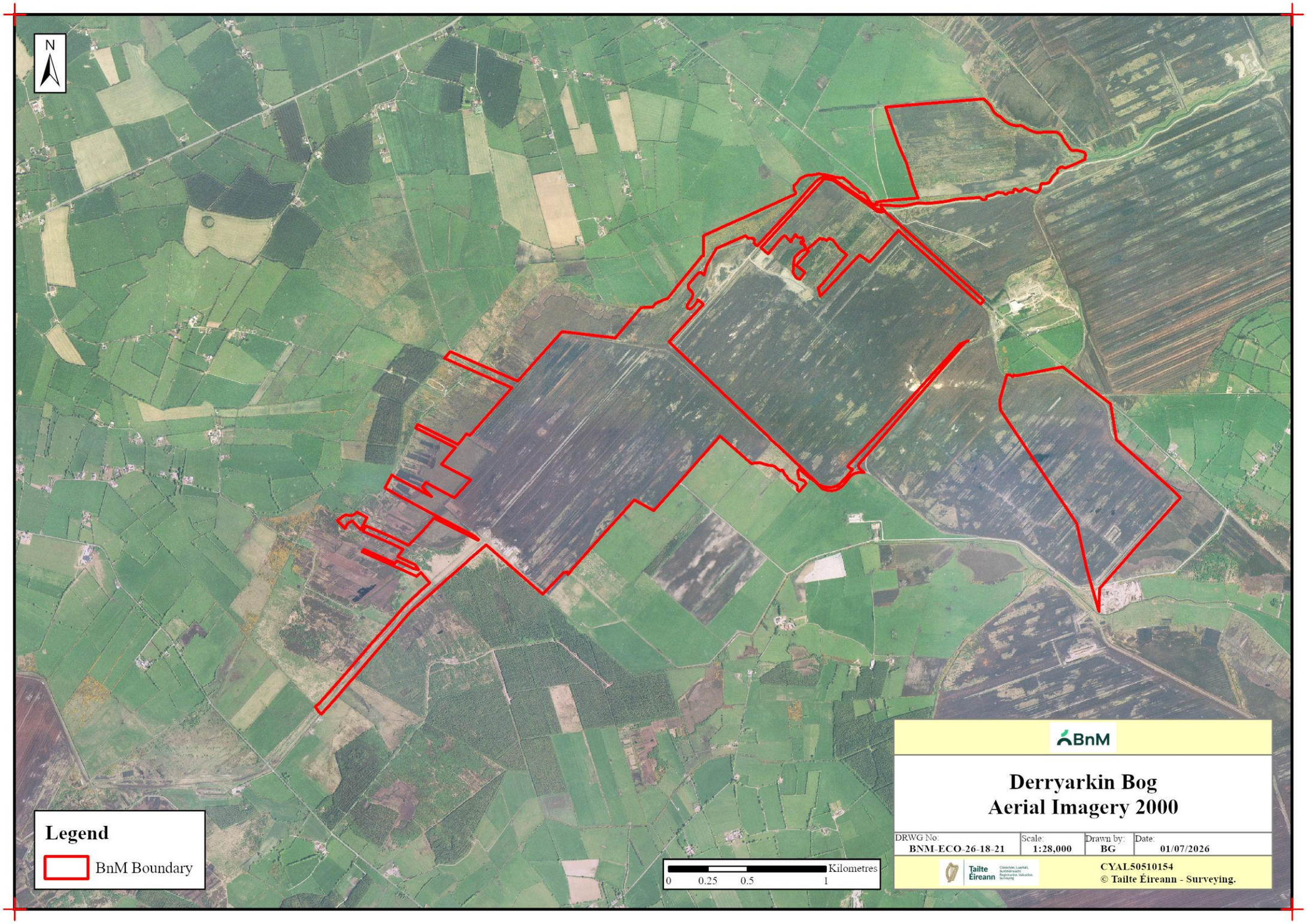
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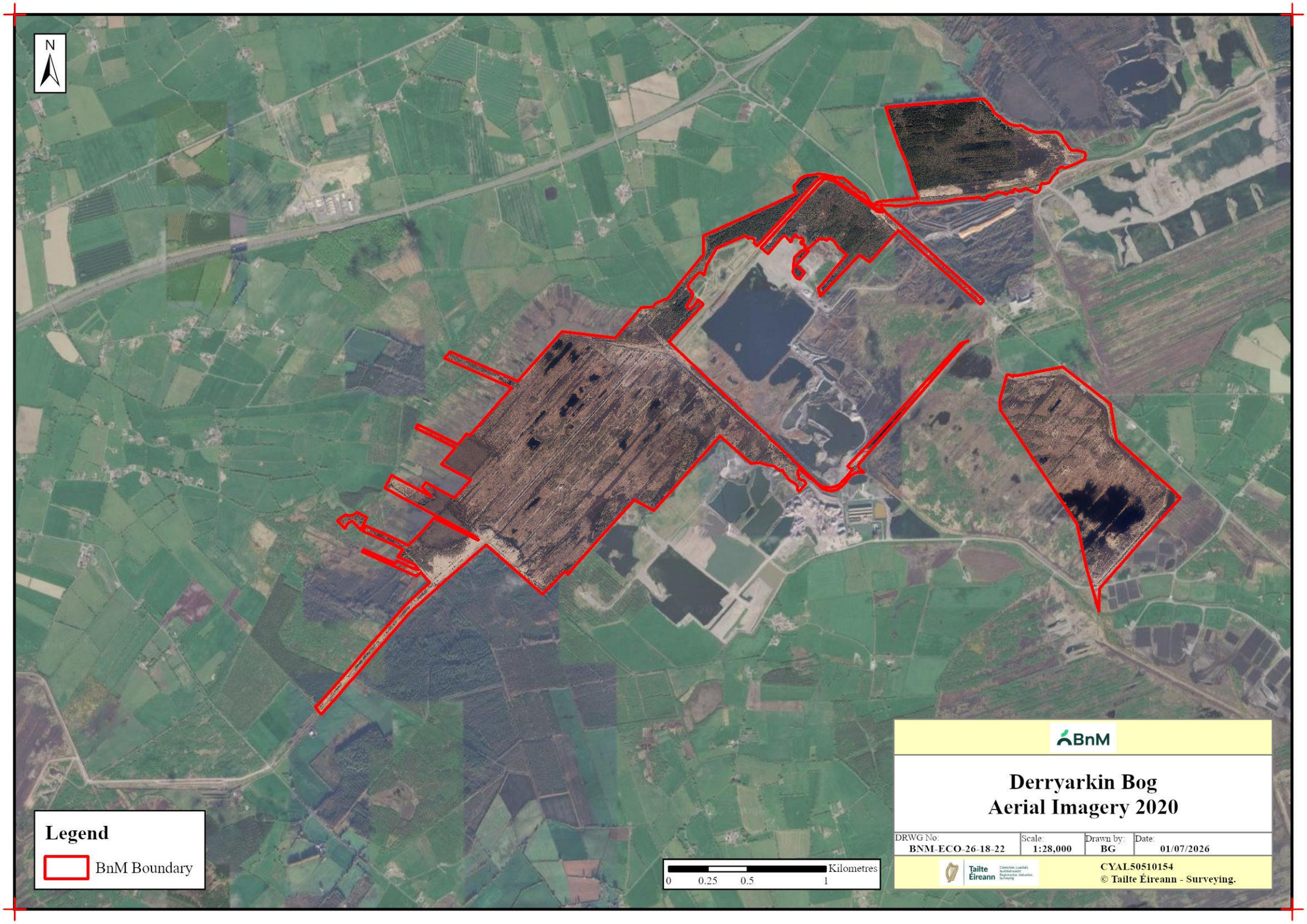
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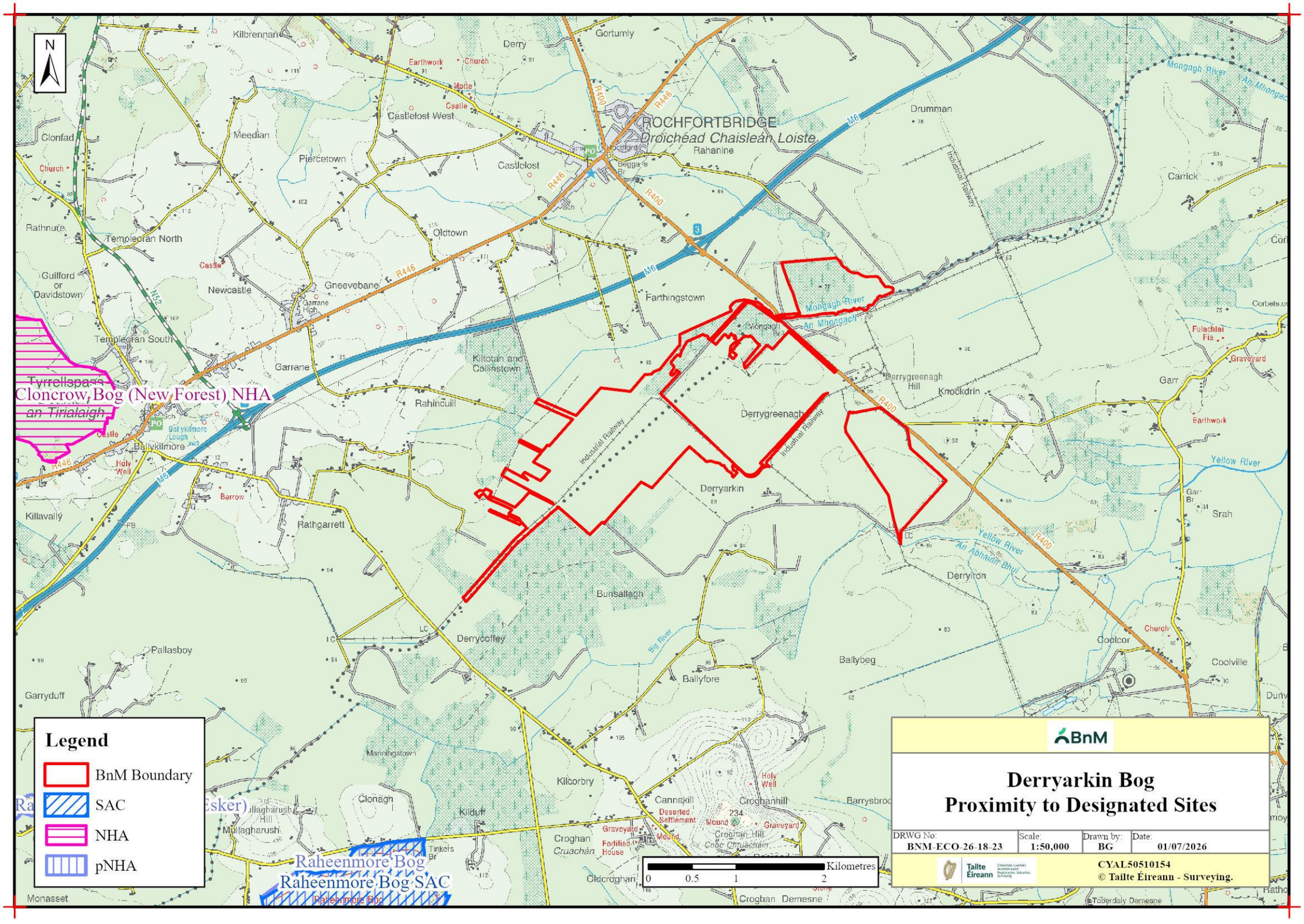
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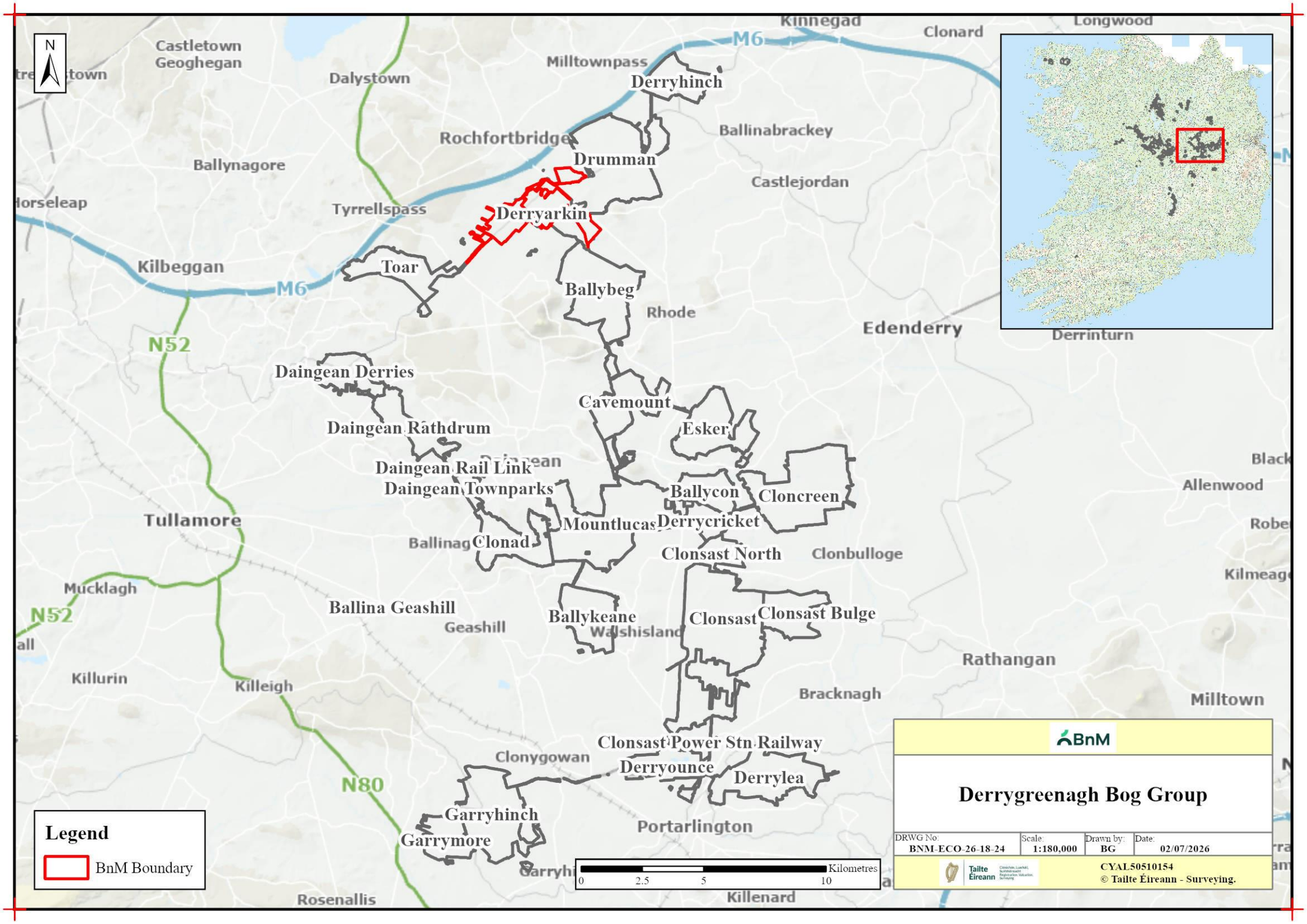
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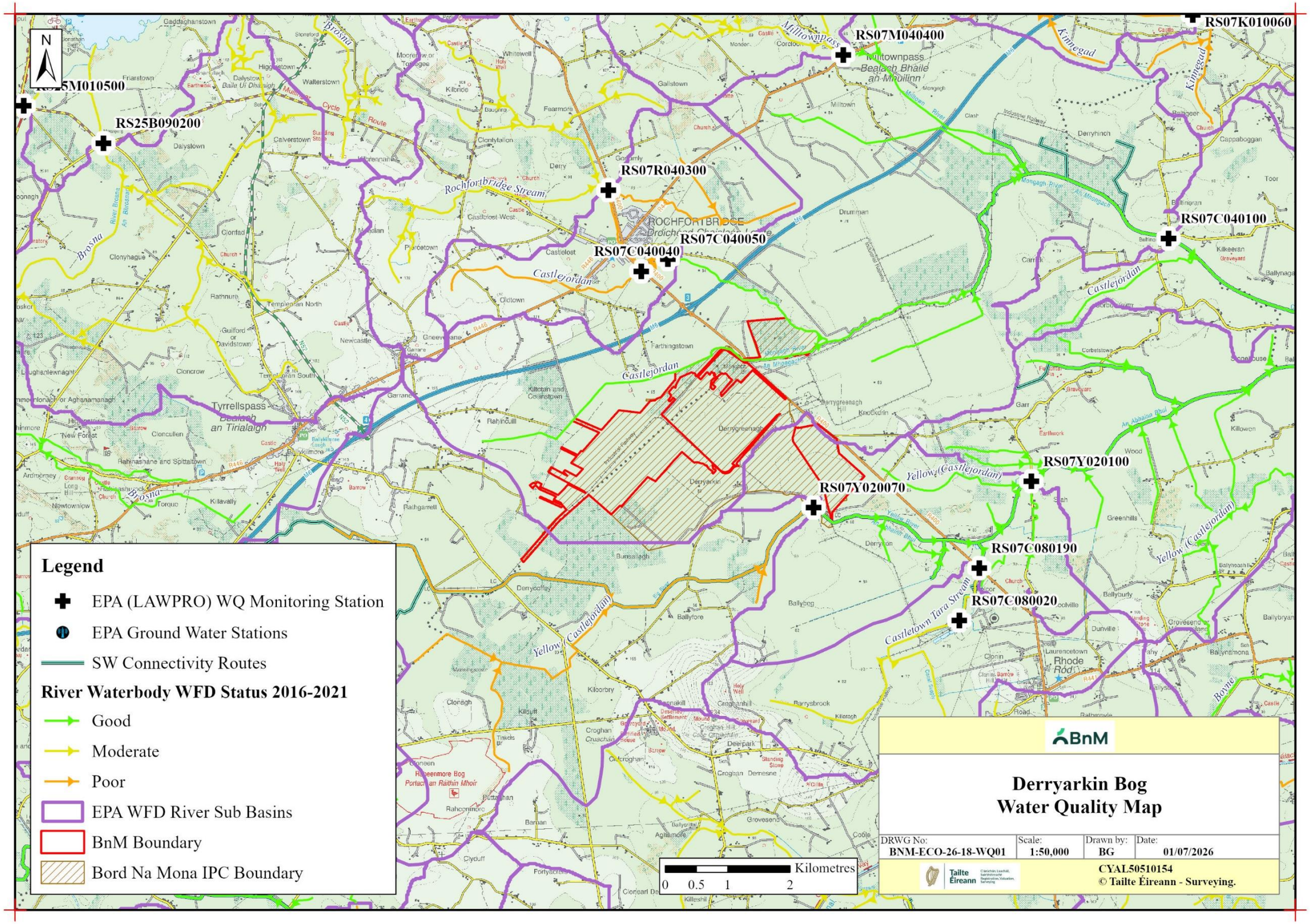
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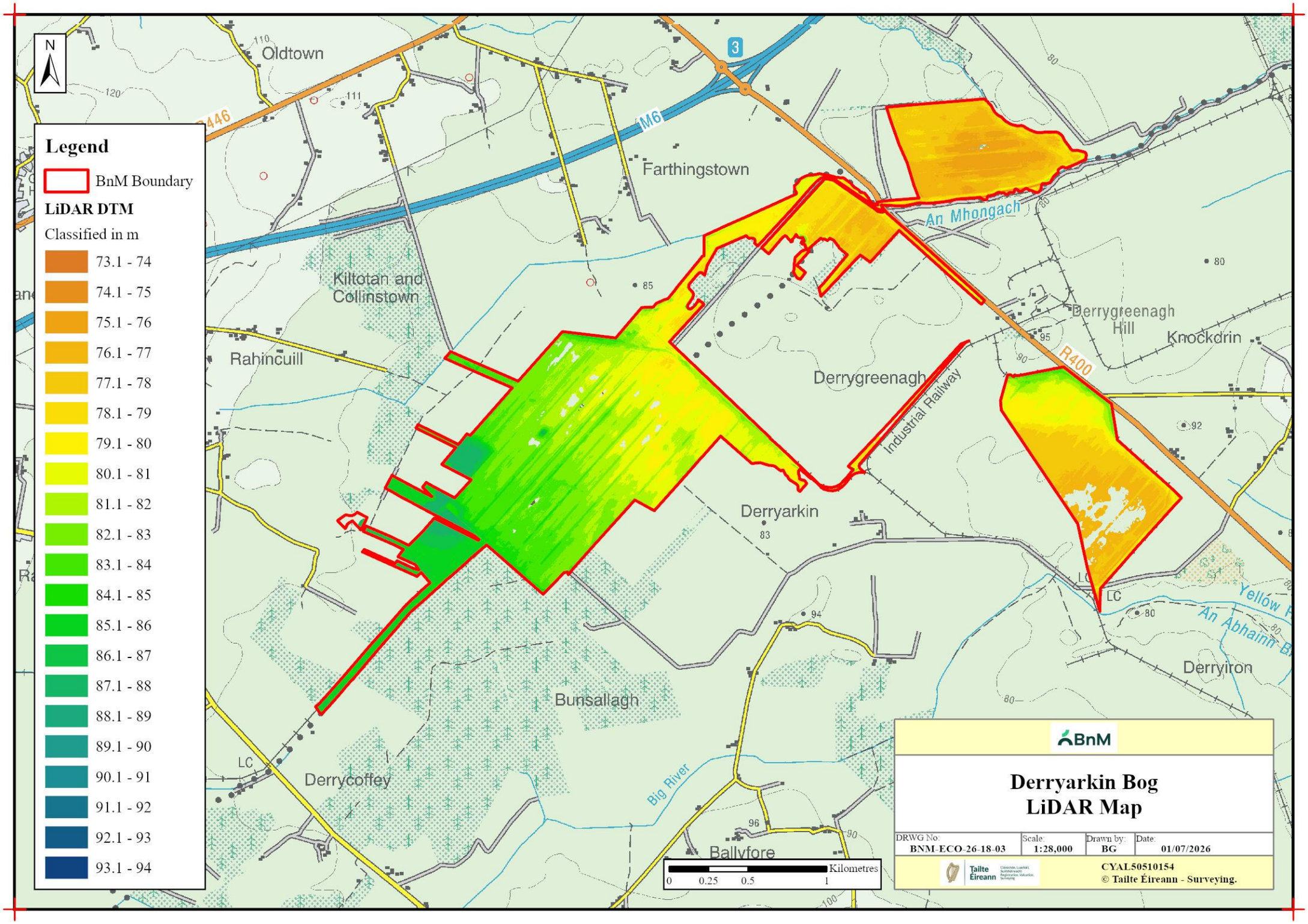
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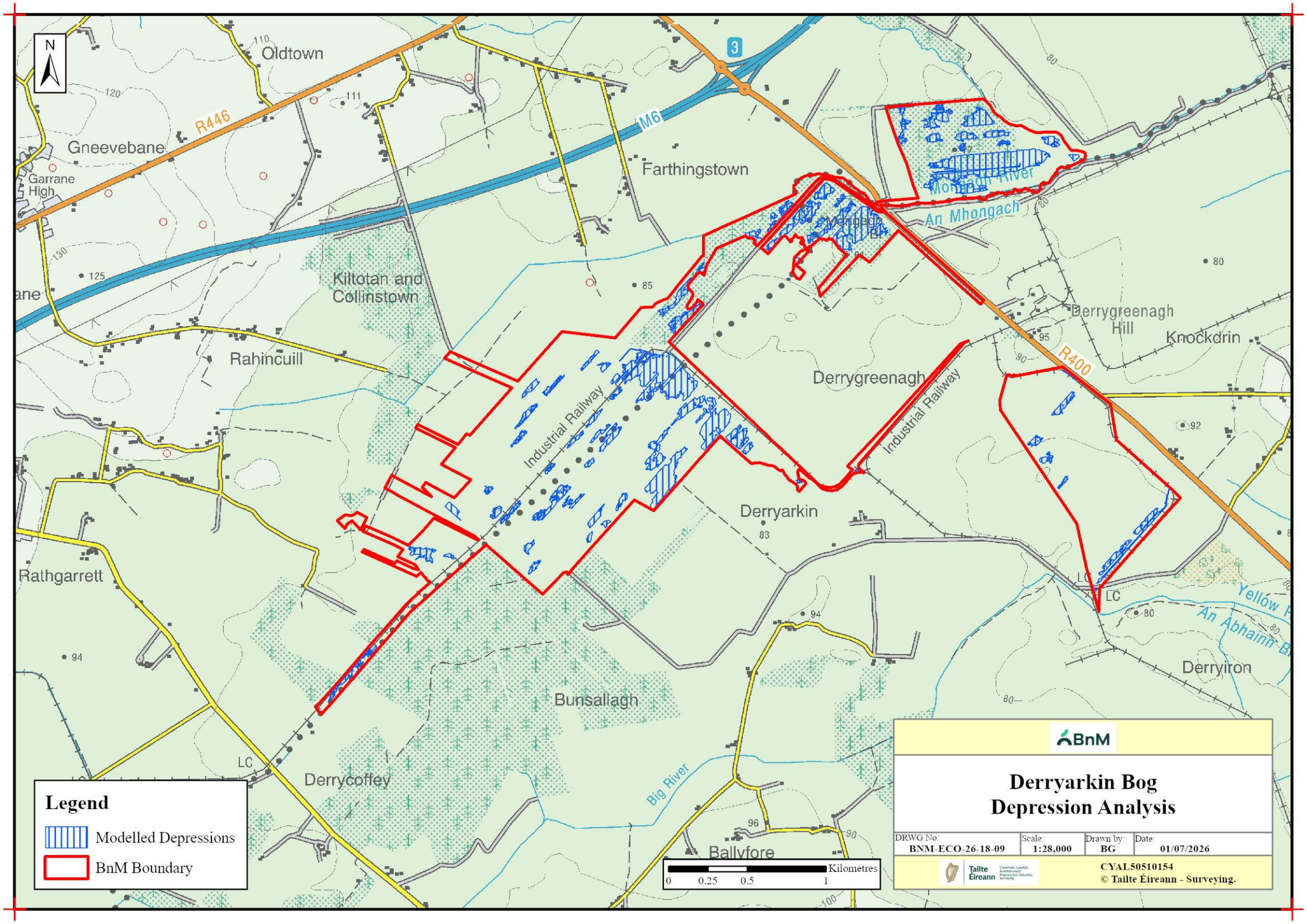
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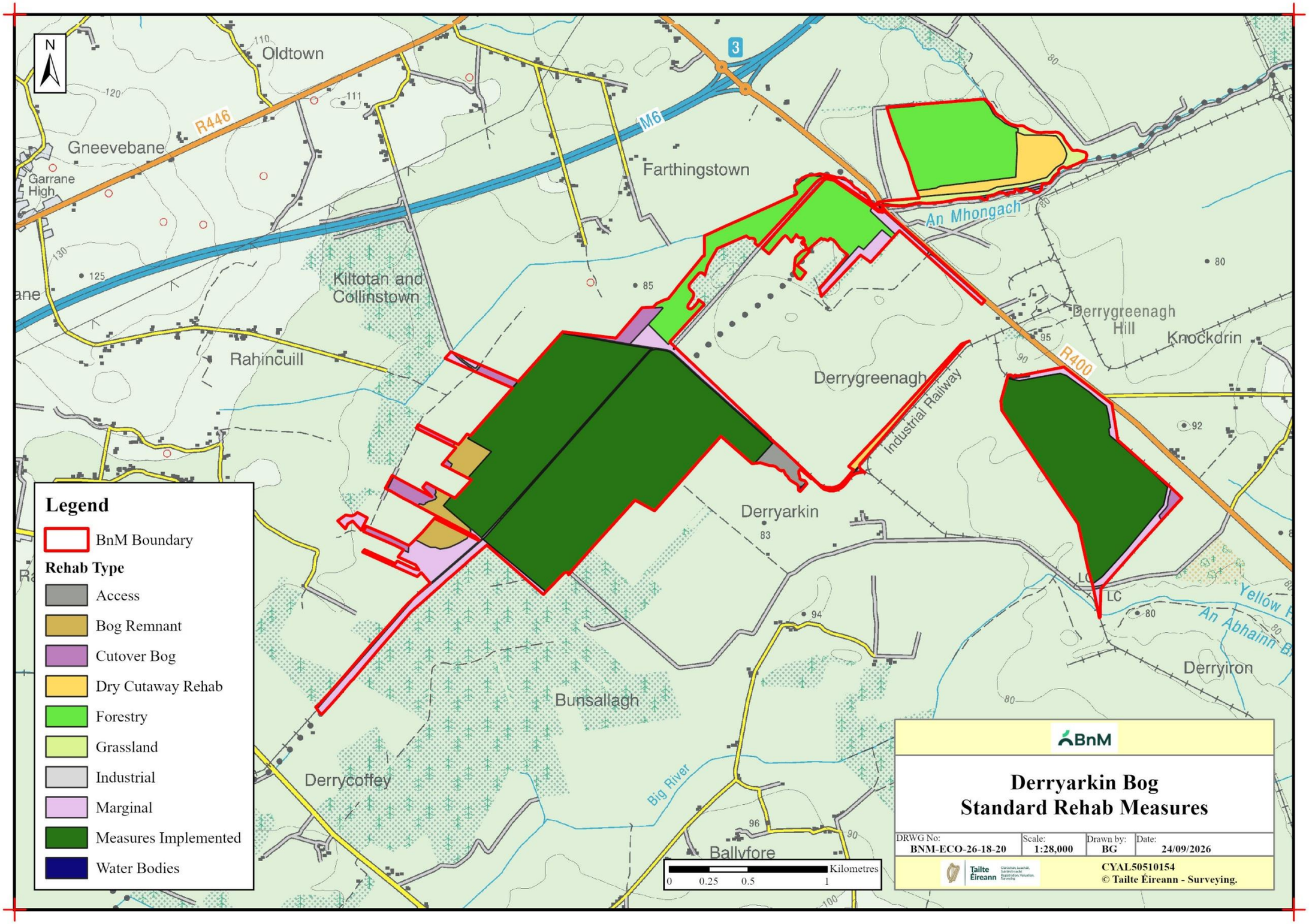



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Derryhinch Bog

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 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.

Draft

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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.

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 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):

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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.

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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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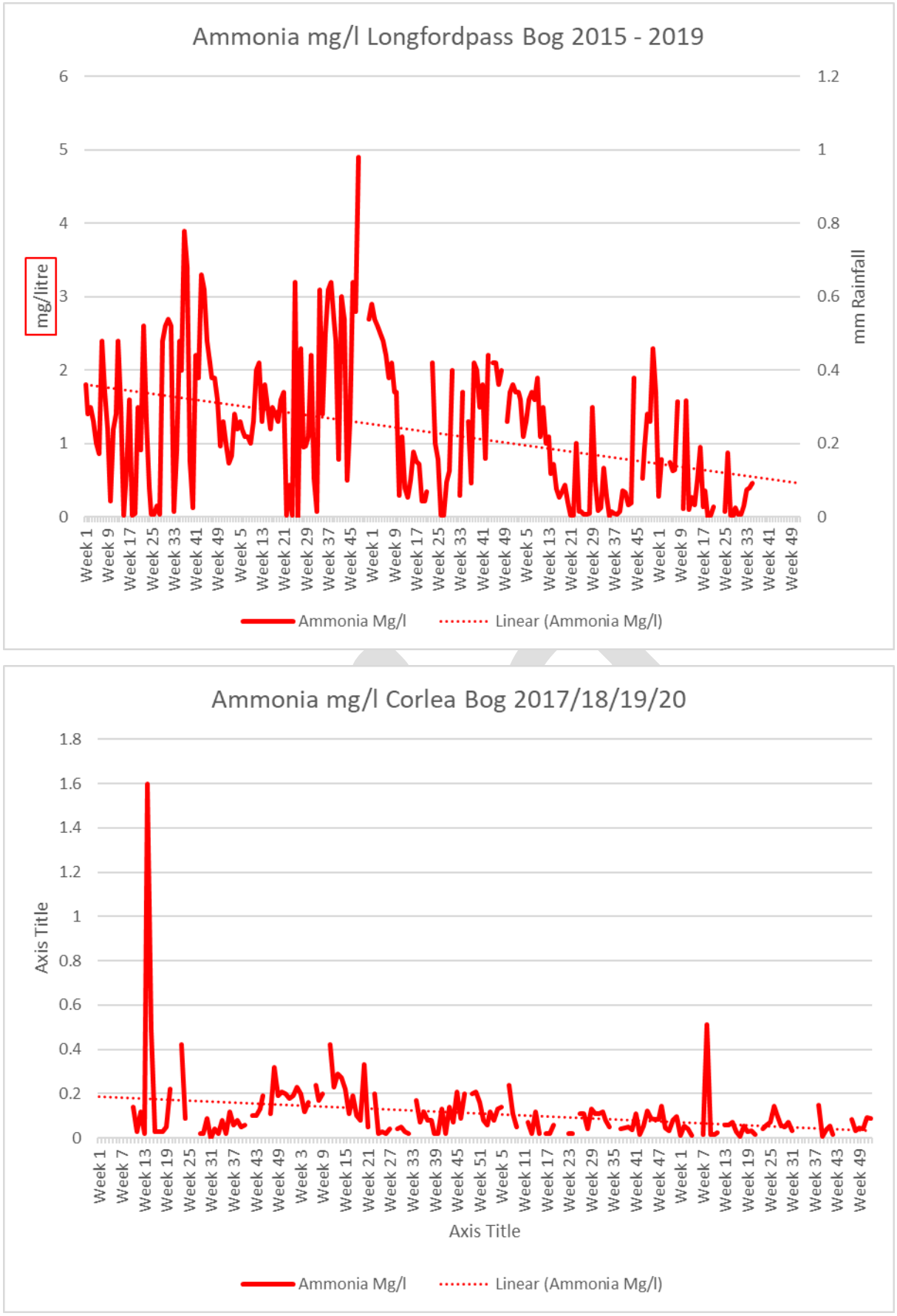


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

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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 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.

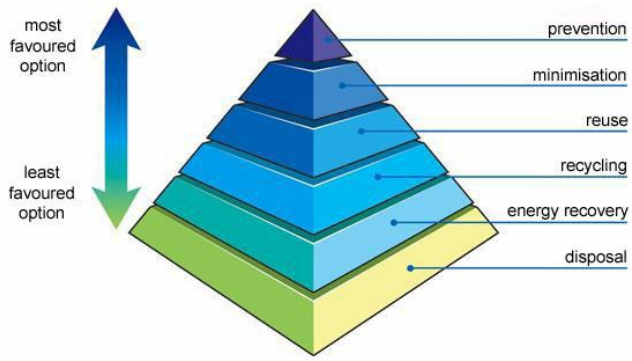
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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.

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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

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:
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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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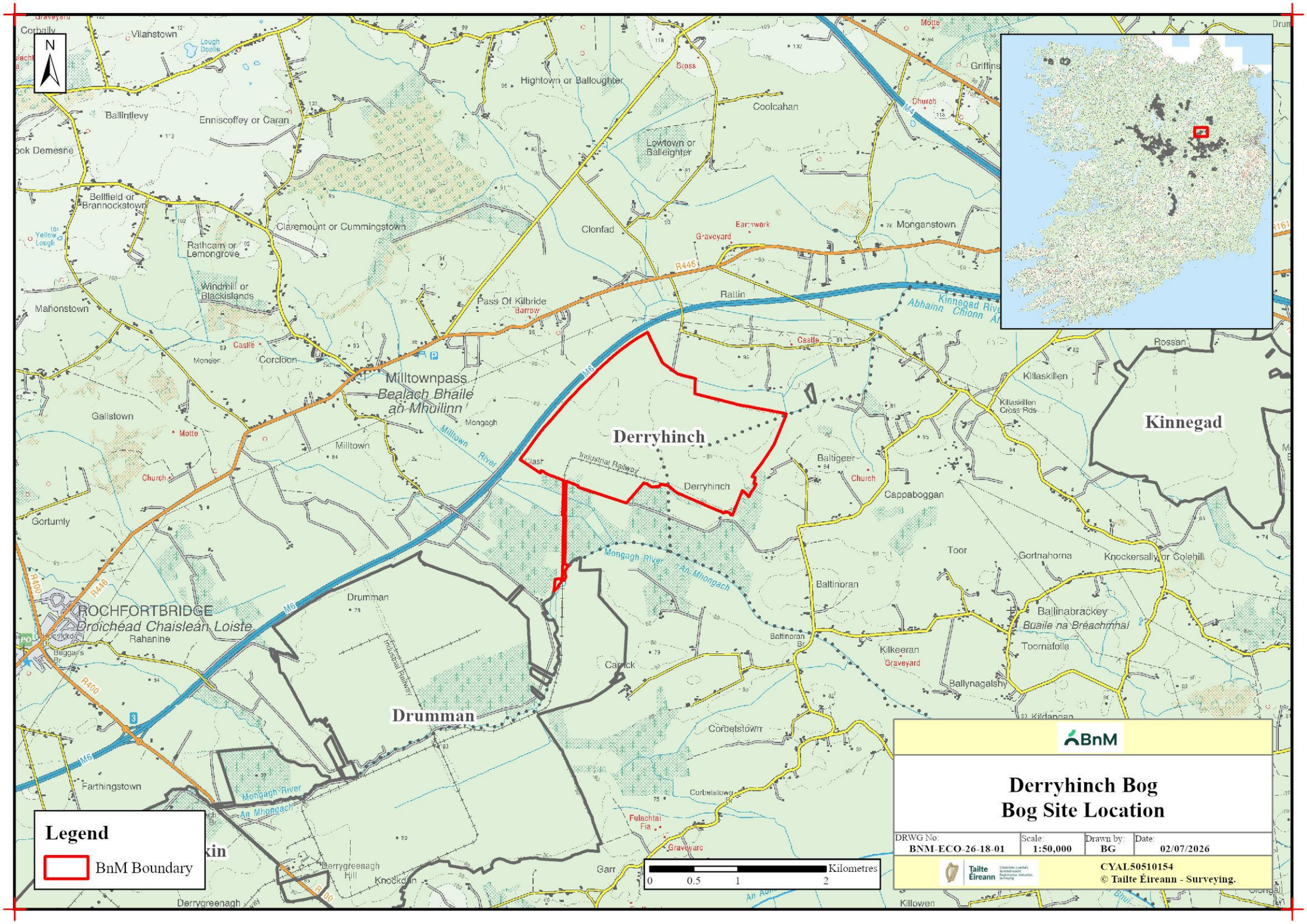
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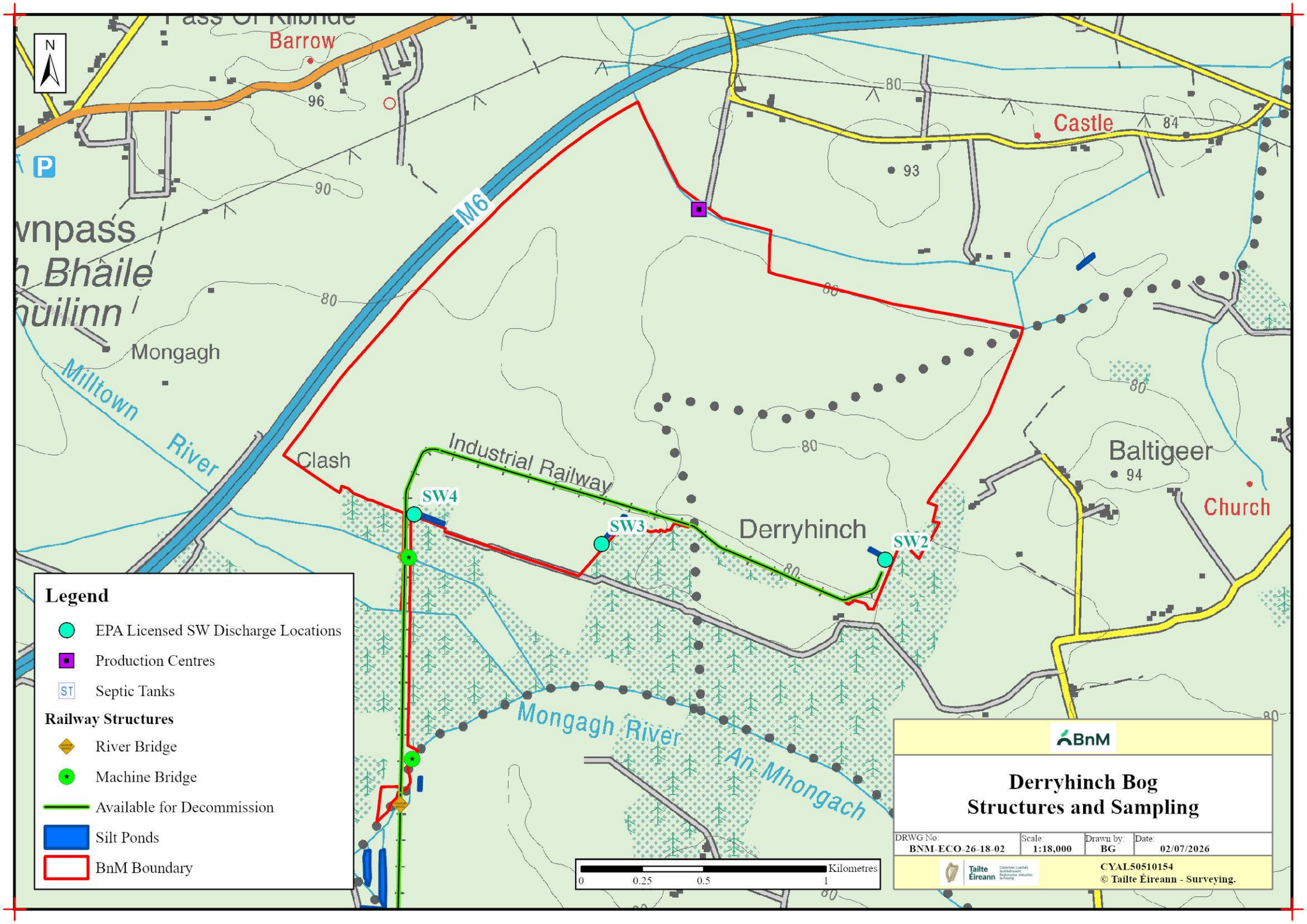
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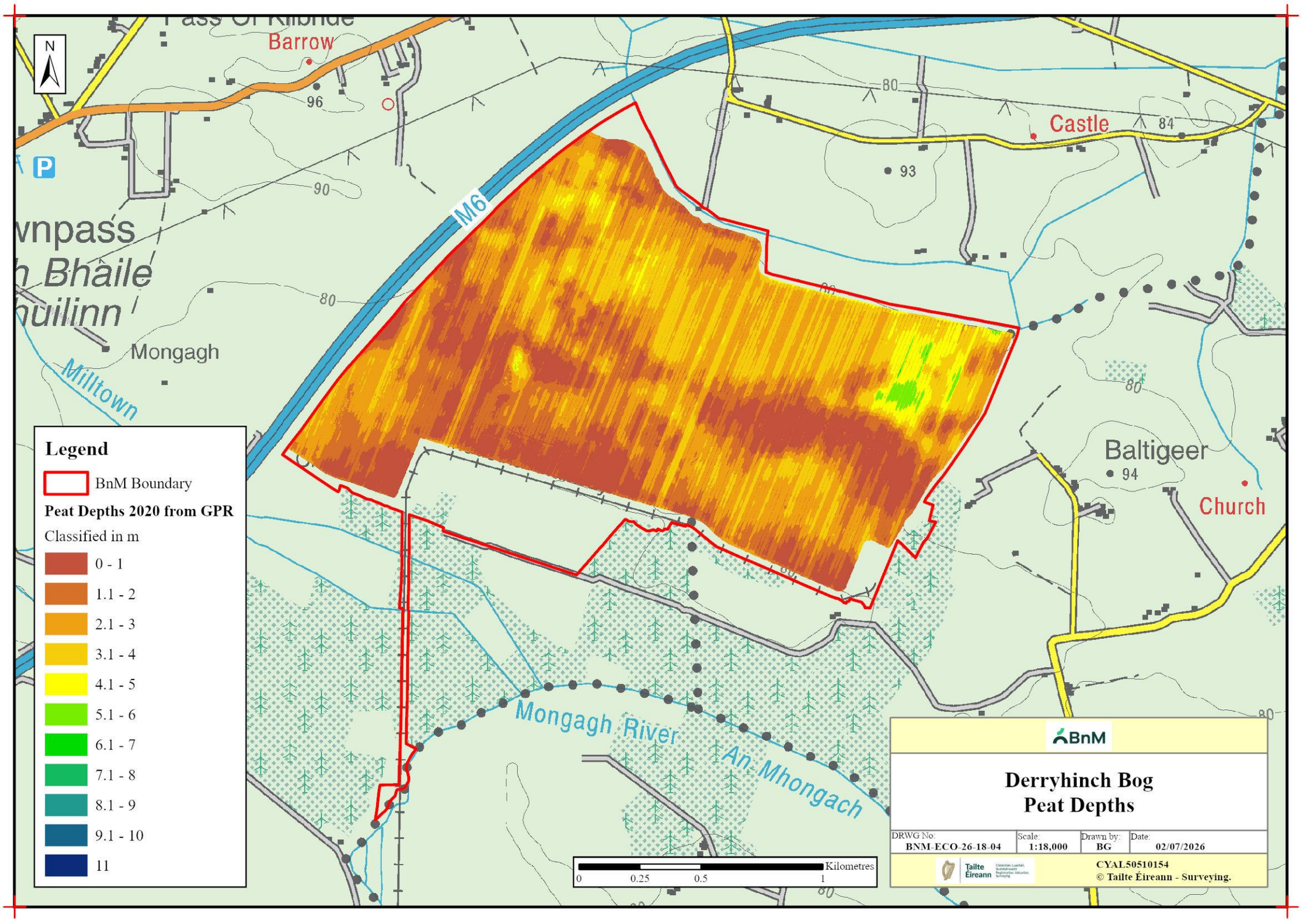
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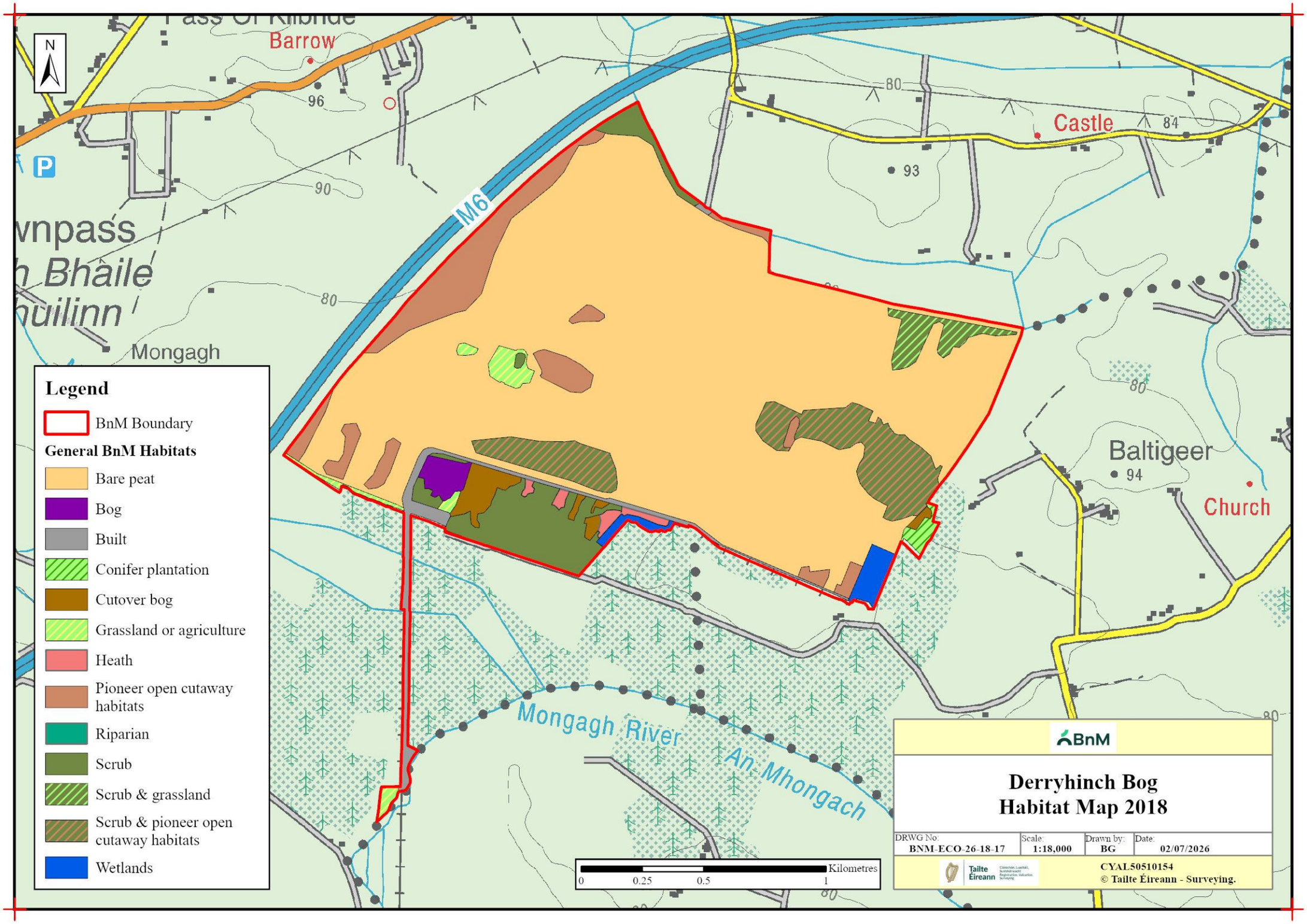



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Mongagh
Milltown
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Industrial Railway
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Baltigeer
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EPA Licensed SW Discharge Locations
Production Centres
ST
Septic Tanks
Railway Structures
River Bridge
Machine Bridge
Available for Decommission
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Structures and Sampling
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Scale: 1:18,000
Drawn by: BG
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Tailte Éireann
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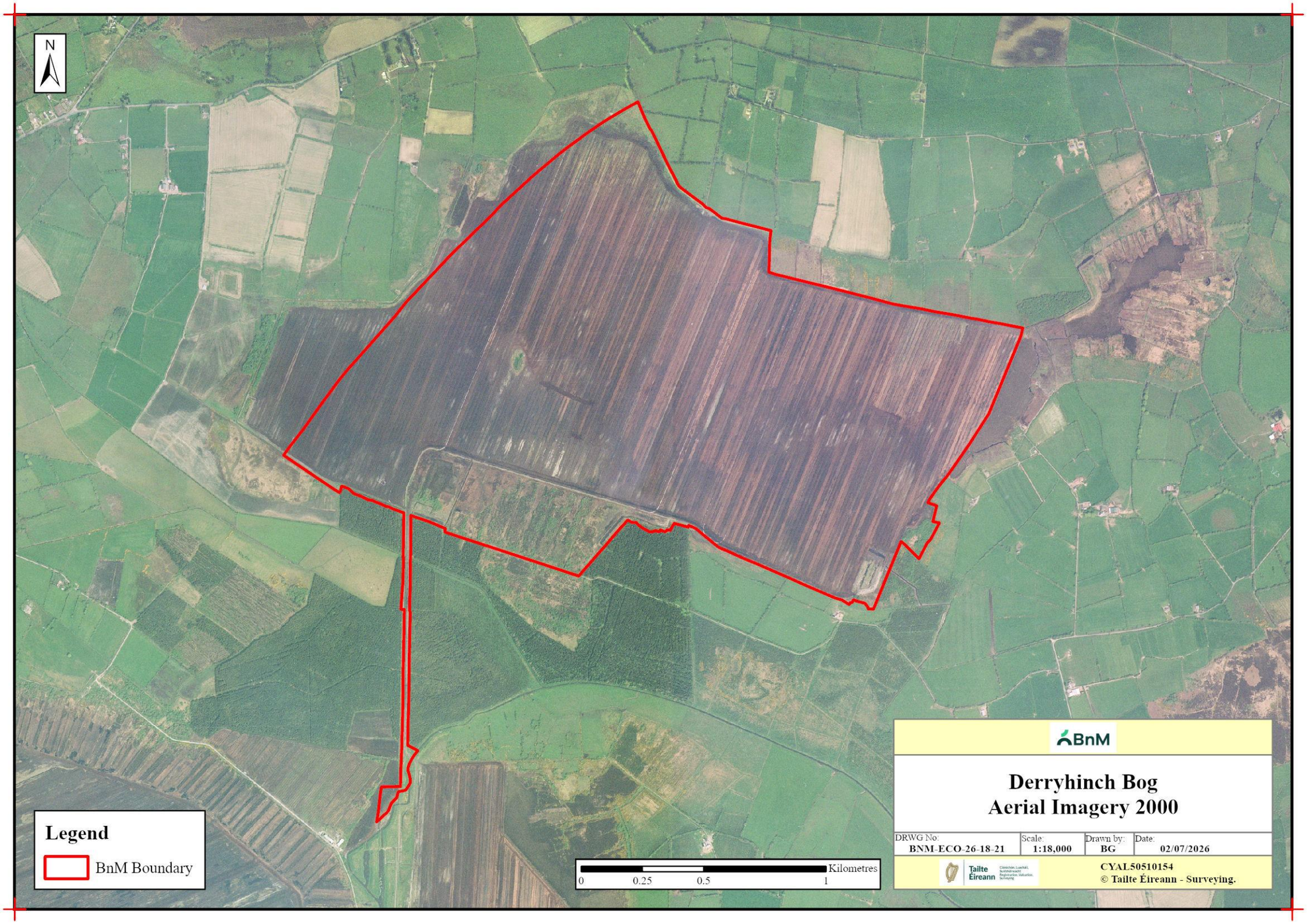
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Legend
BnM Boundary
General BnM Habitats
Bare peat
Bog
Built
Conifer plantation
Cutover bog
Grassland or agriculture
Heath
Pioneer open cutaway habitats
Riparian
Scrub
Scrub & grassland
Scrub & pioneer open cutaway habitats
Wetlands
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BnM
Derryhinch Bog
Habitat Map 2018
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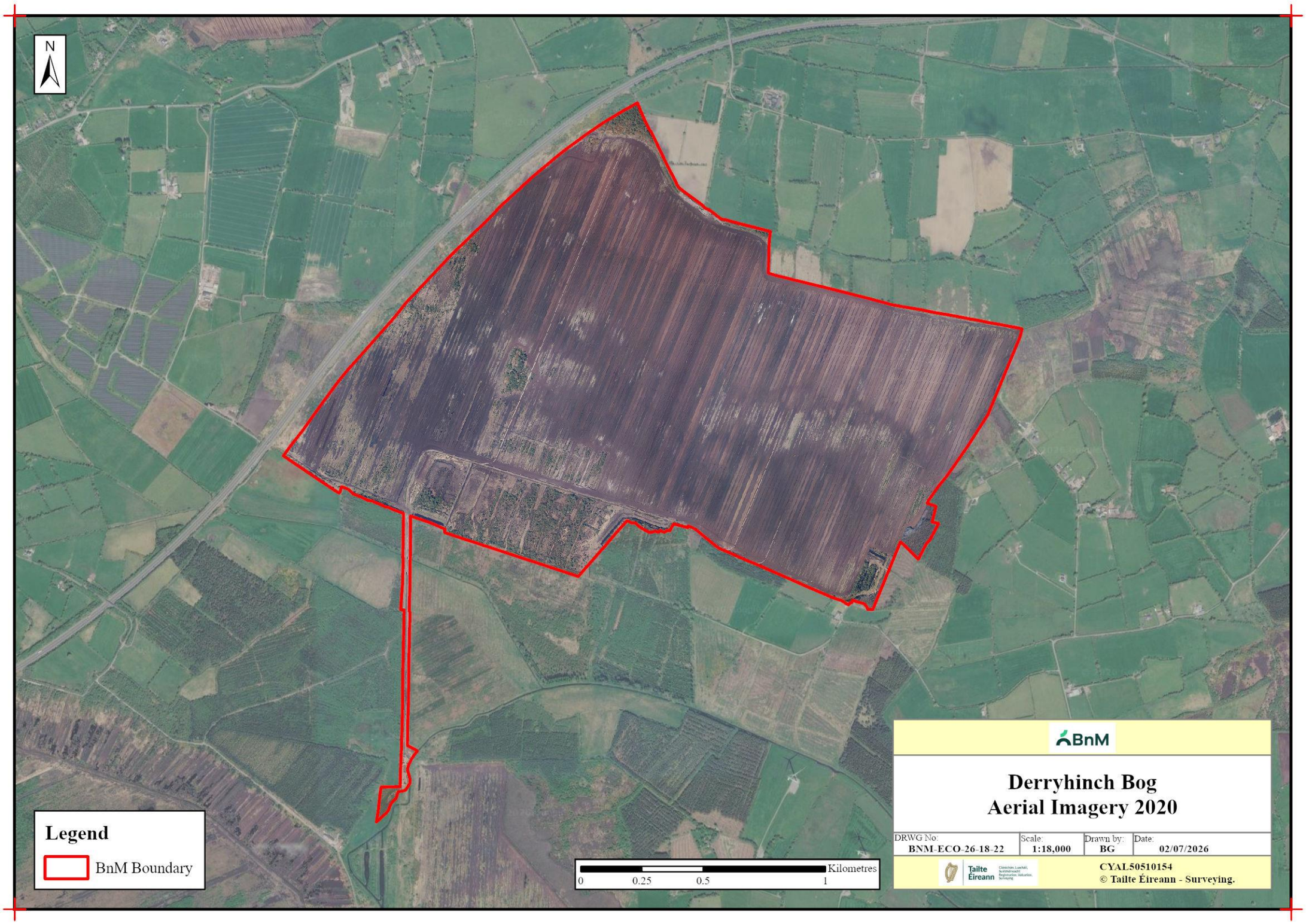
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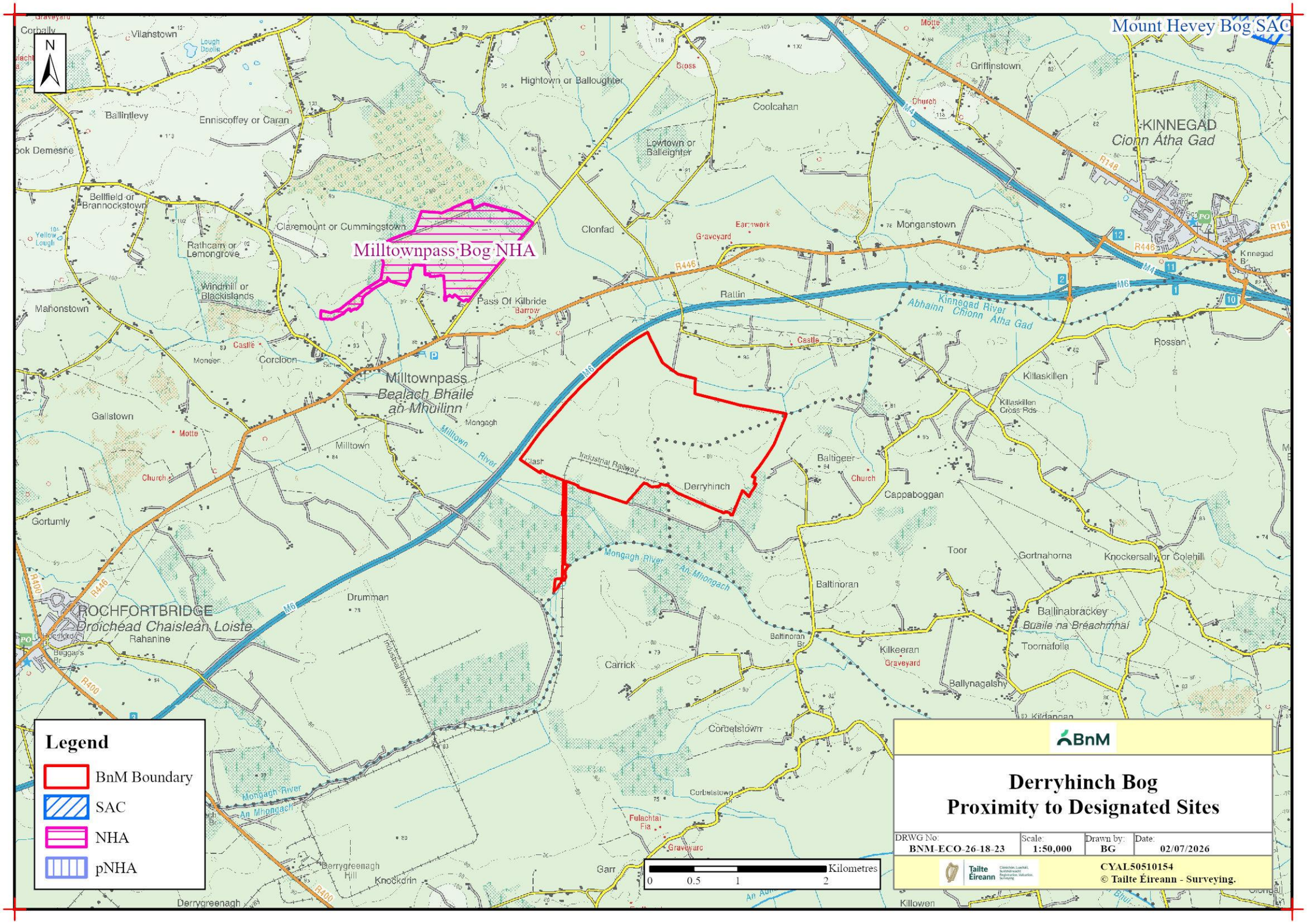
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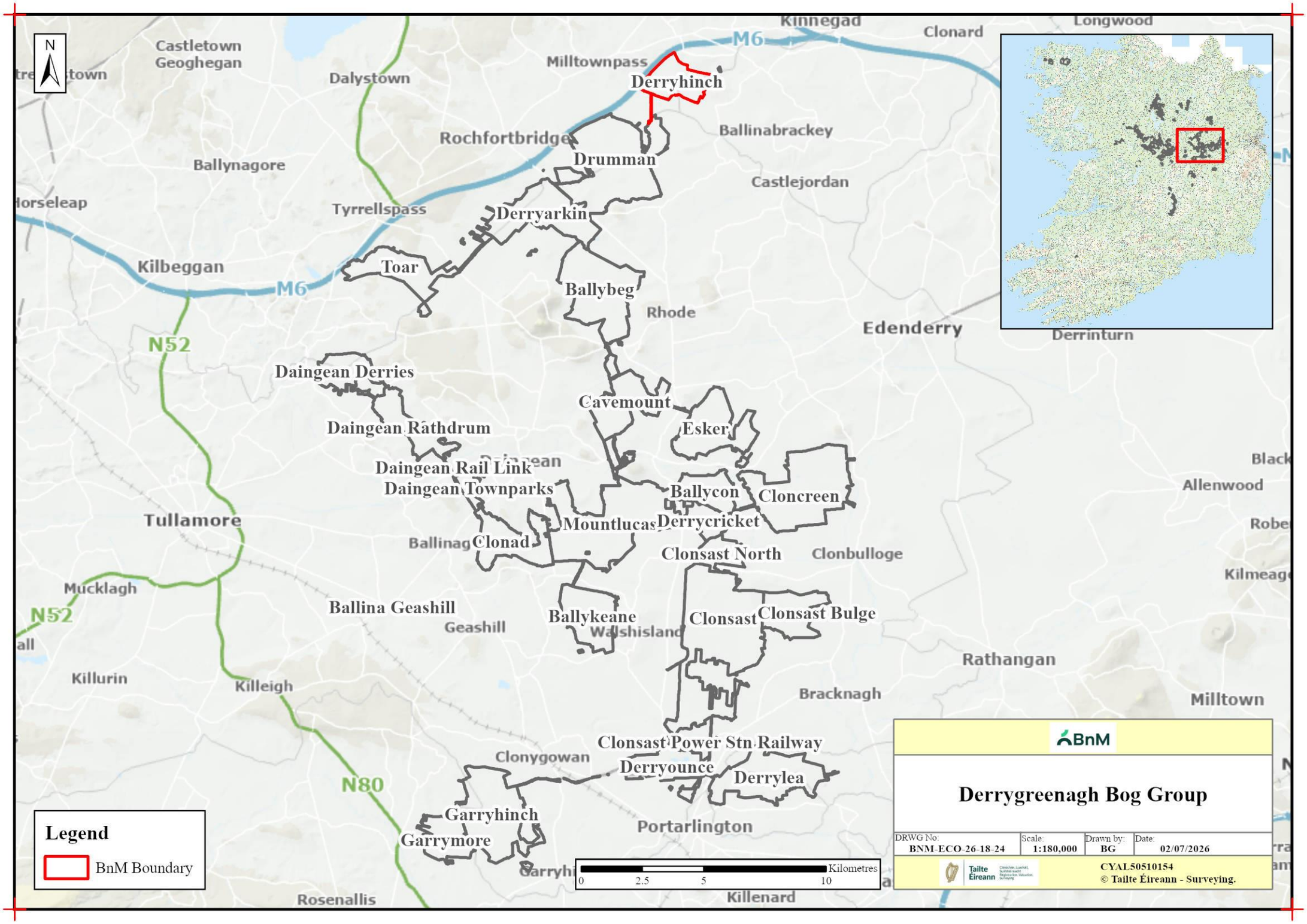
BNM-ECO-26-18-23: Proximity to Designated Sites

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BNM-ECO-26-18-24: Bog Group Map

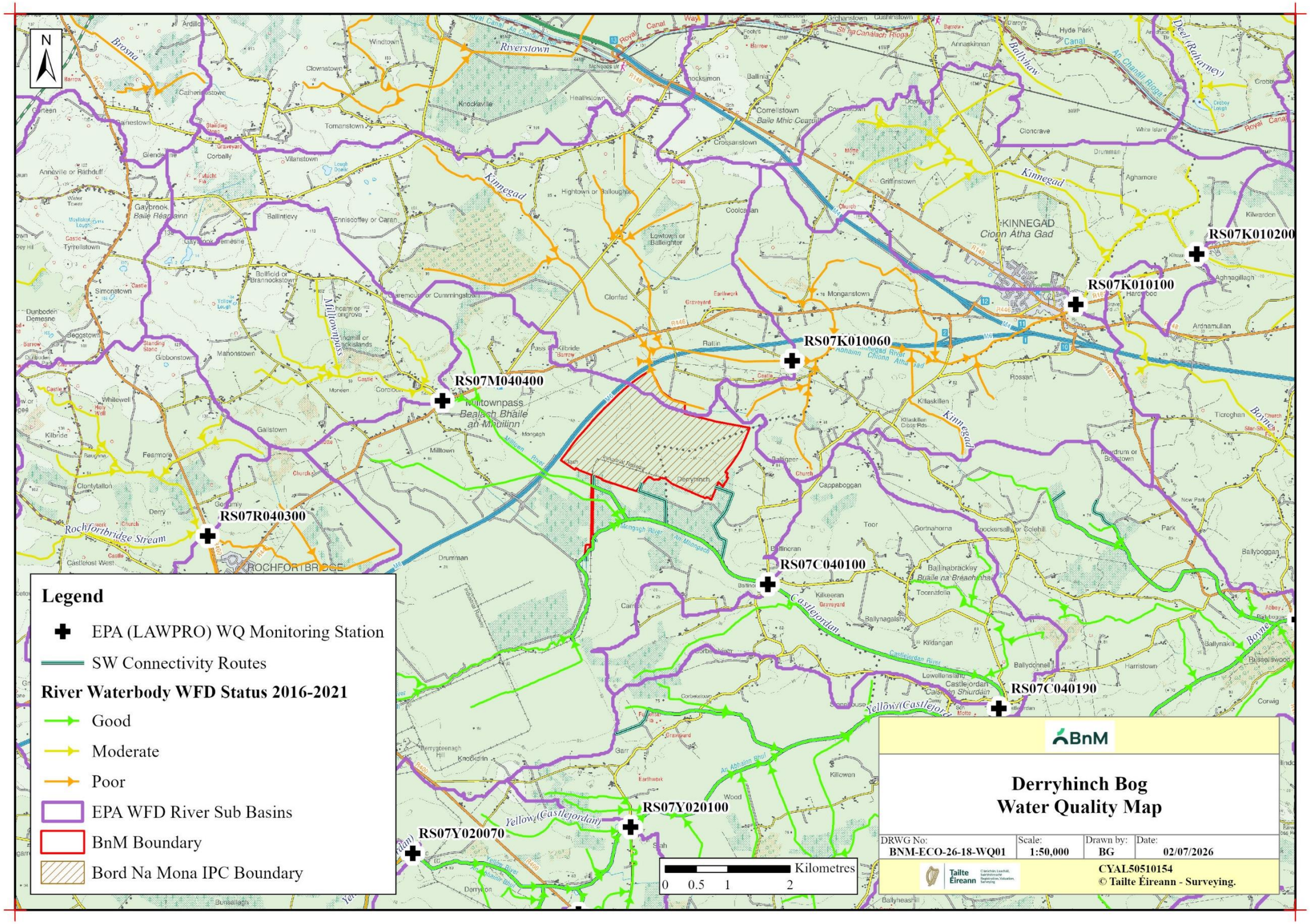
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Hydrology / Topography Maps

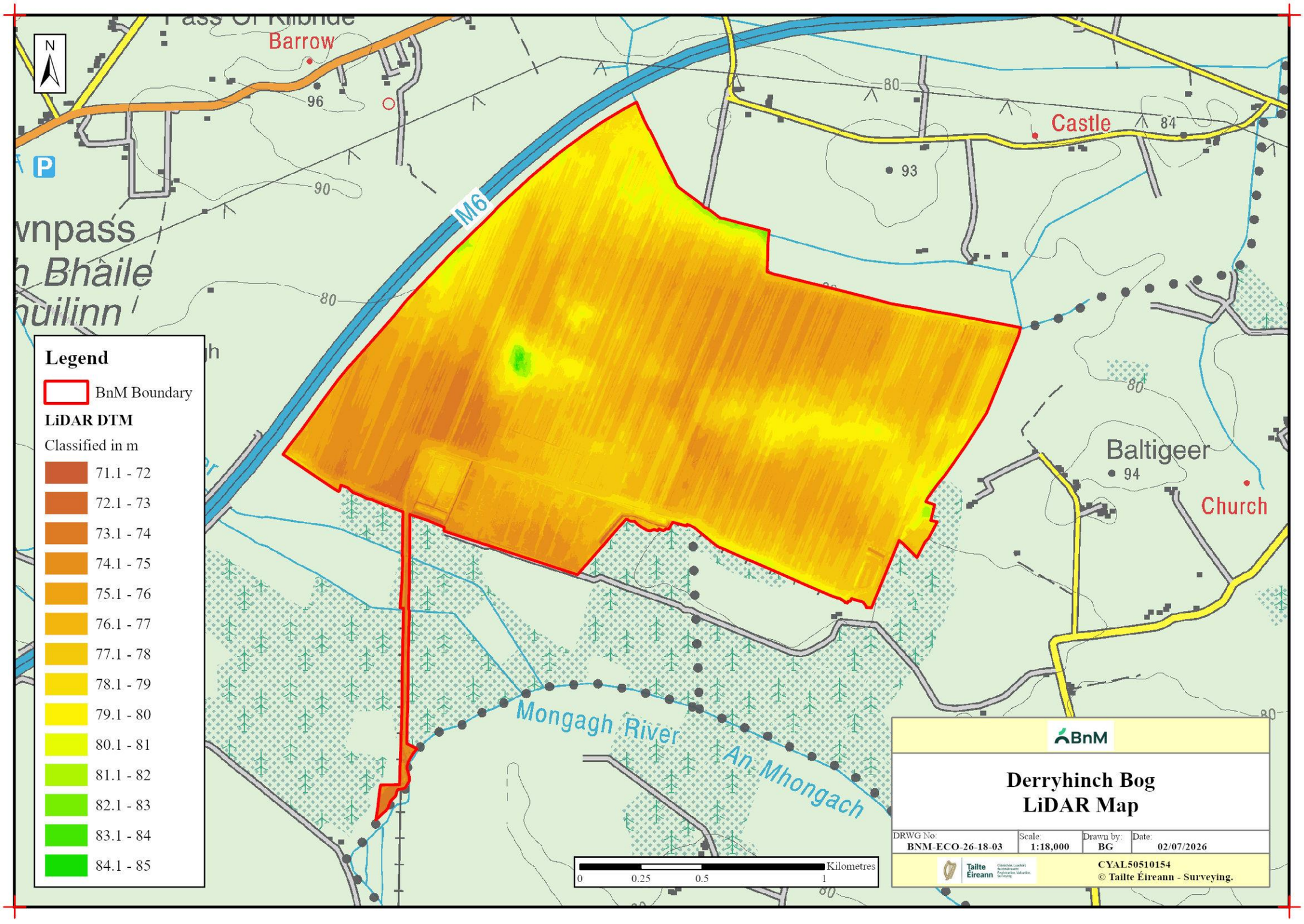
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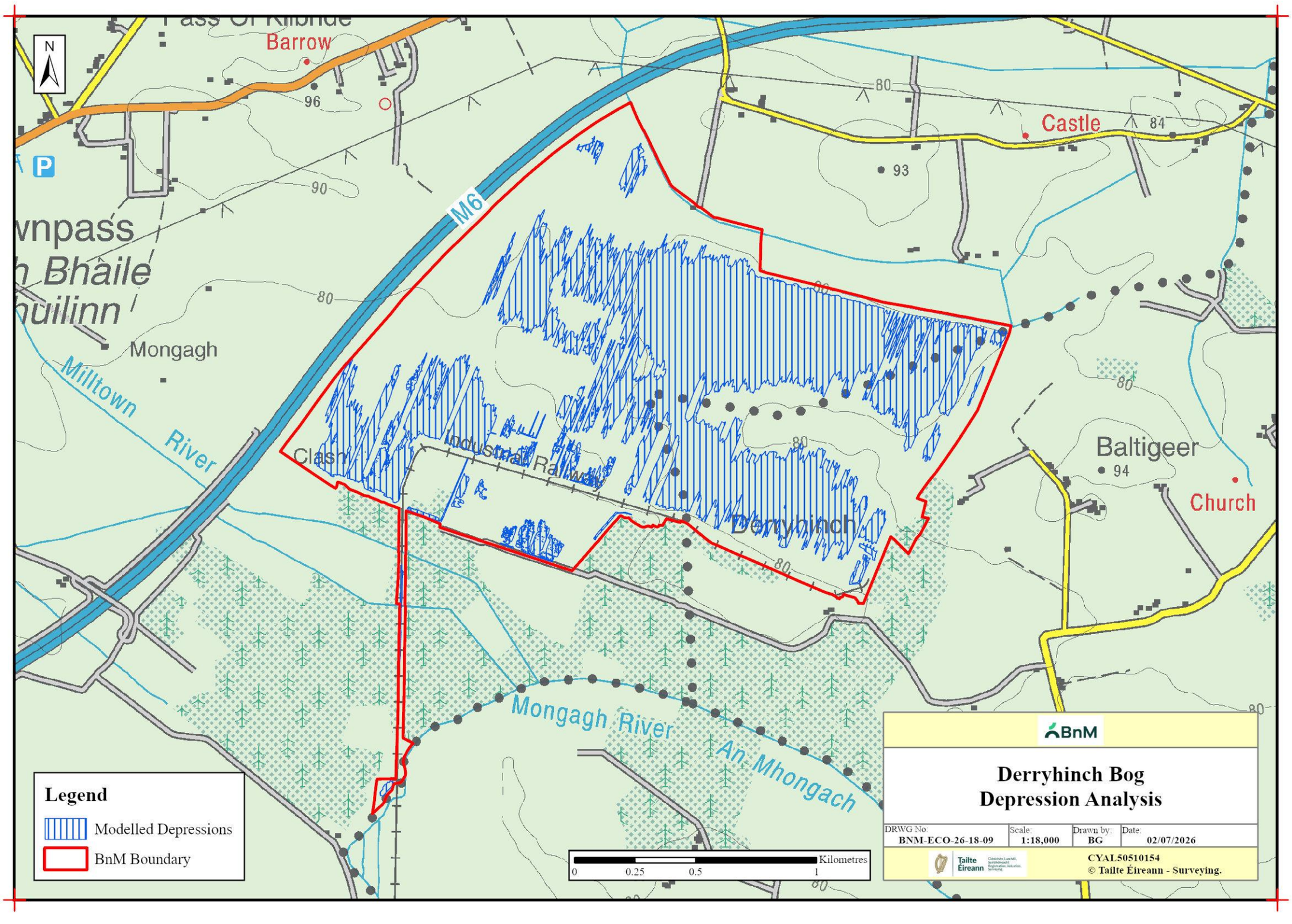
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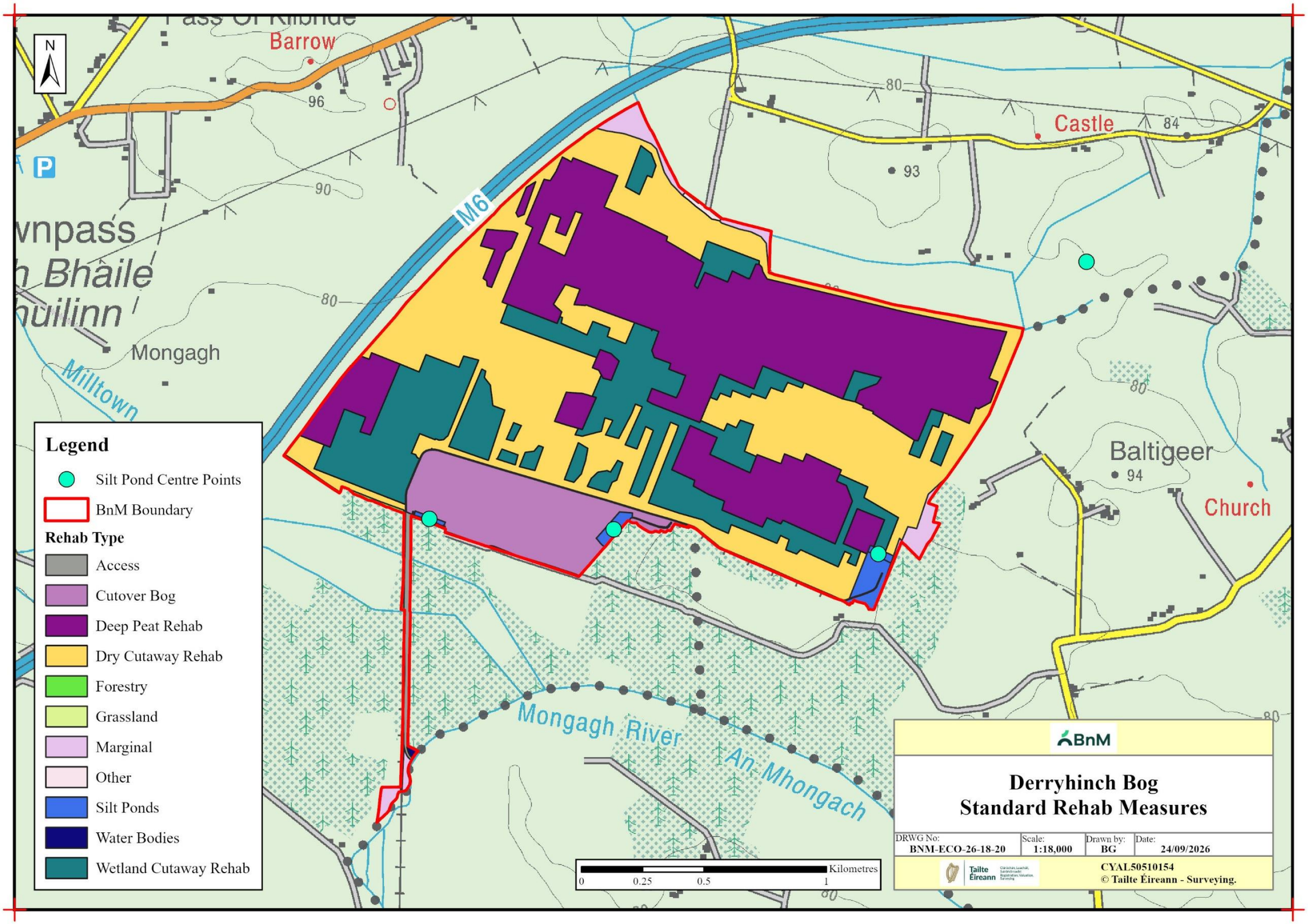
BNM-ECO-26-18-03: LiDAR Map

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N
Barrow
96
90
80
M6
Castle
84
93
Mongagh
Milltown River
Clash
Industrial Railway
Derryhinch
Baltigeer
94
Church
Mongagh River
An Mhongach
Legend
Modelled Depressions
BnM Boundary
0
0.25
0.5
1
Kilometres
BnM
Derryhinch Bog
Depression Analysis
DRWG No: BNM-ECO-26-18-09
Scale: 1:18,000
Drawn by: BG
Date: 02/07/2026
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Rehabilitation Maps


N
Barrow
96
90
80
M6
Castle
84
93
Mongagh
Milltown
Baltigeer
94
Church
Mongagh River
An Mhongach
Legend
Silt Pond Centre Points
BnM Boundary
Rehab Type
Access
Cutover Bog
Deep Peat Rehab
Dry Cutaway Rehab
Forestry
Grassland
Marginal
Other
Silt Ponds
Water Bodies
Wetland Cutaway Rehab
0
0.25
0.5
1
Kilometres
BnM
Derryhinch Bog
Standard Rehab Measures
DRWG No: BNM-ECO-26-18-20
Scale: 1:18,000
Drawn by: BG
Date: 24/09/2026
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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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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.

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 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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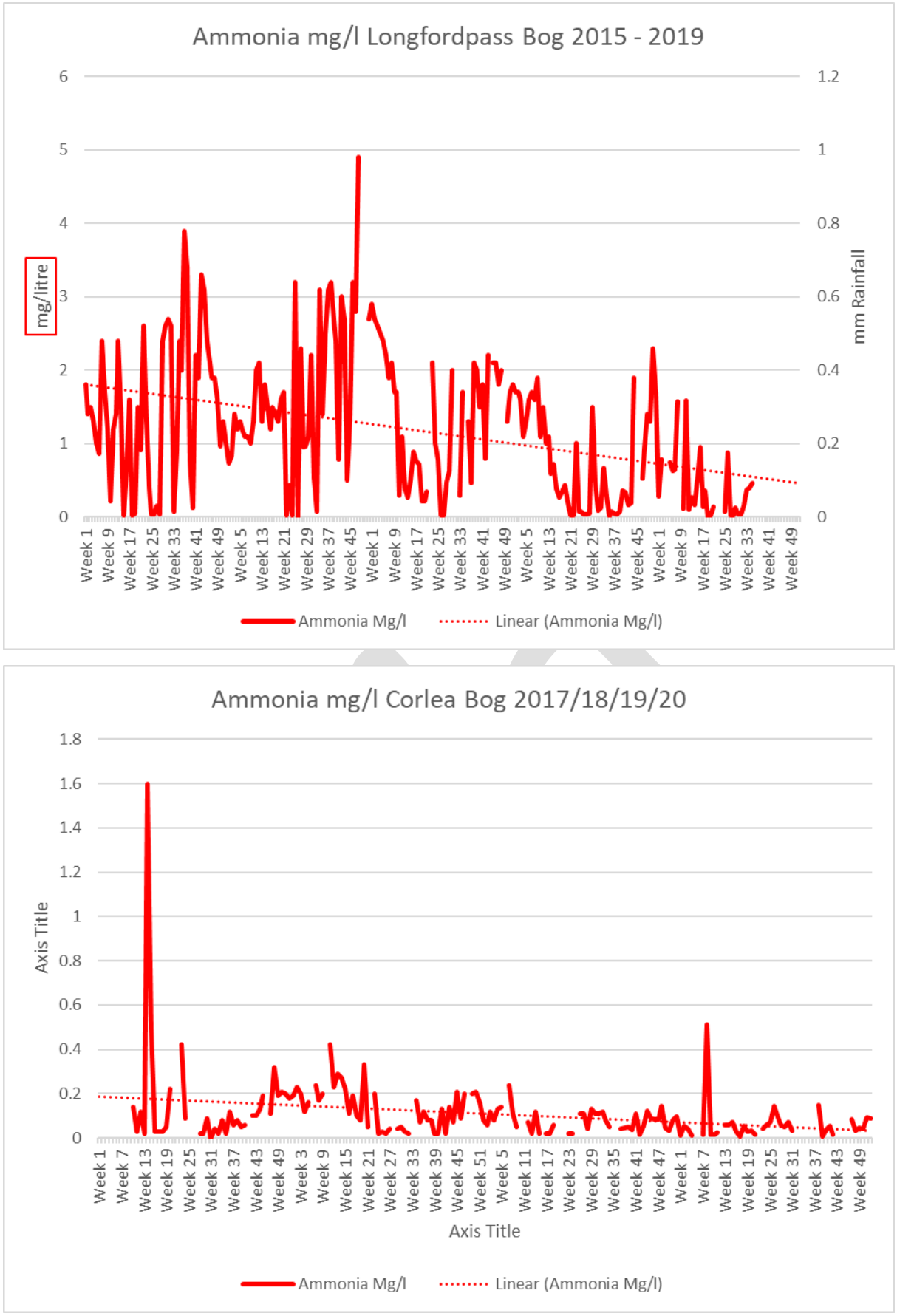


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longford Pass and Corlea.

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

Draft

	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

Draft

	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

Draft

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.

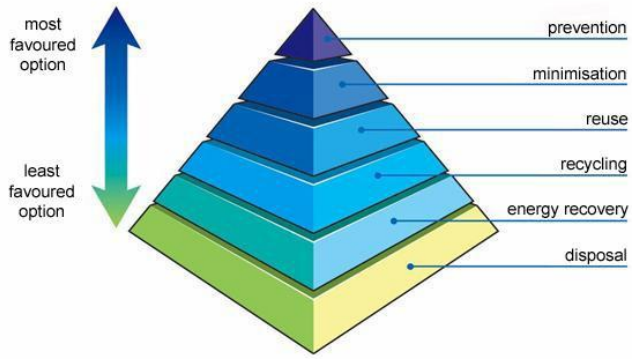
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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.

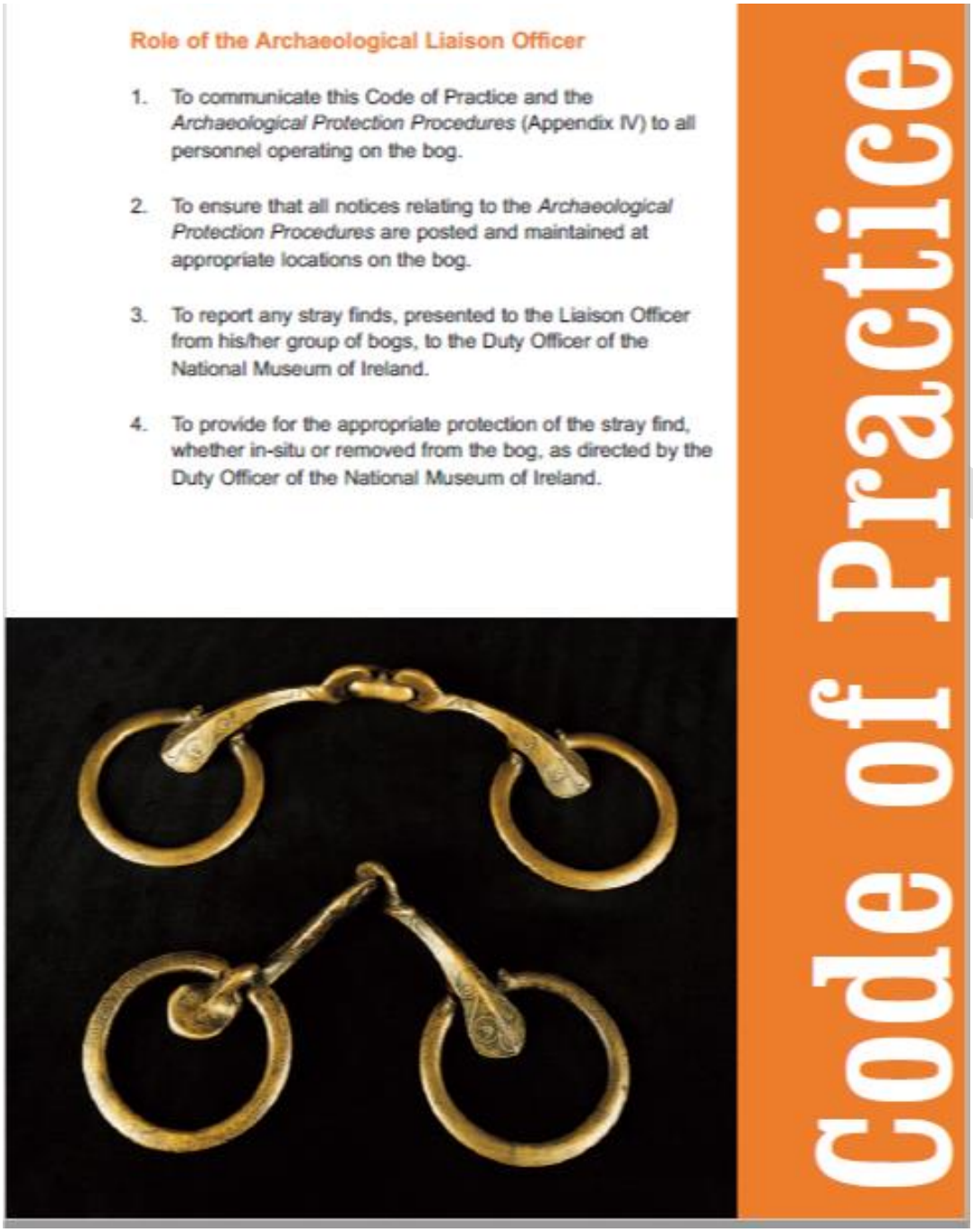
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APPENDIX IX. MITIGATION MEASURES FOR THE APPLICATION OF FERTILISER

- 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



22

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

Drumman Bog
Rehab Plan
GIS Map Book
2026

Document Control Sheet

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Document Status:	**Draft v0.2**

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Date:			

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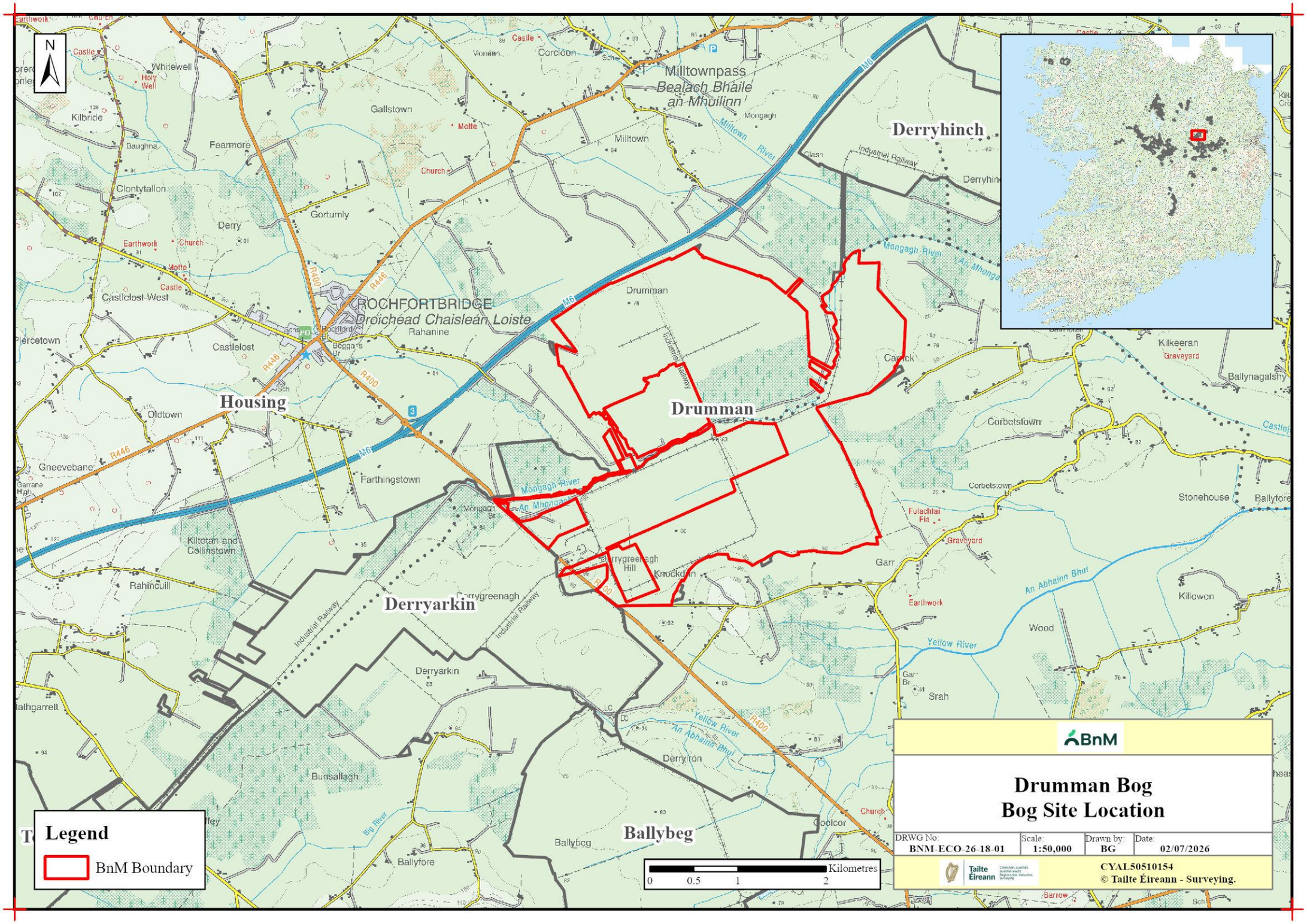
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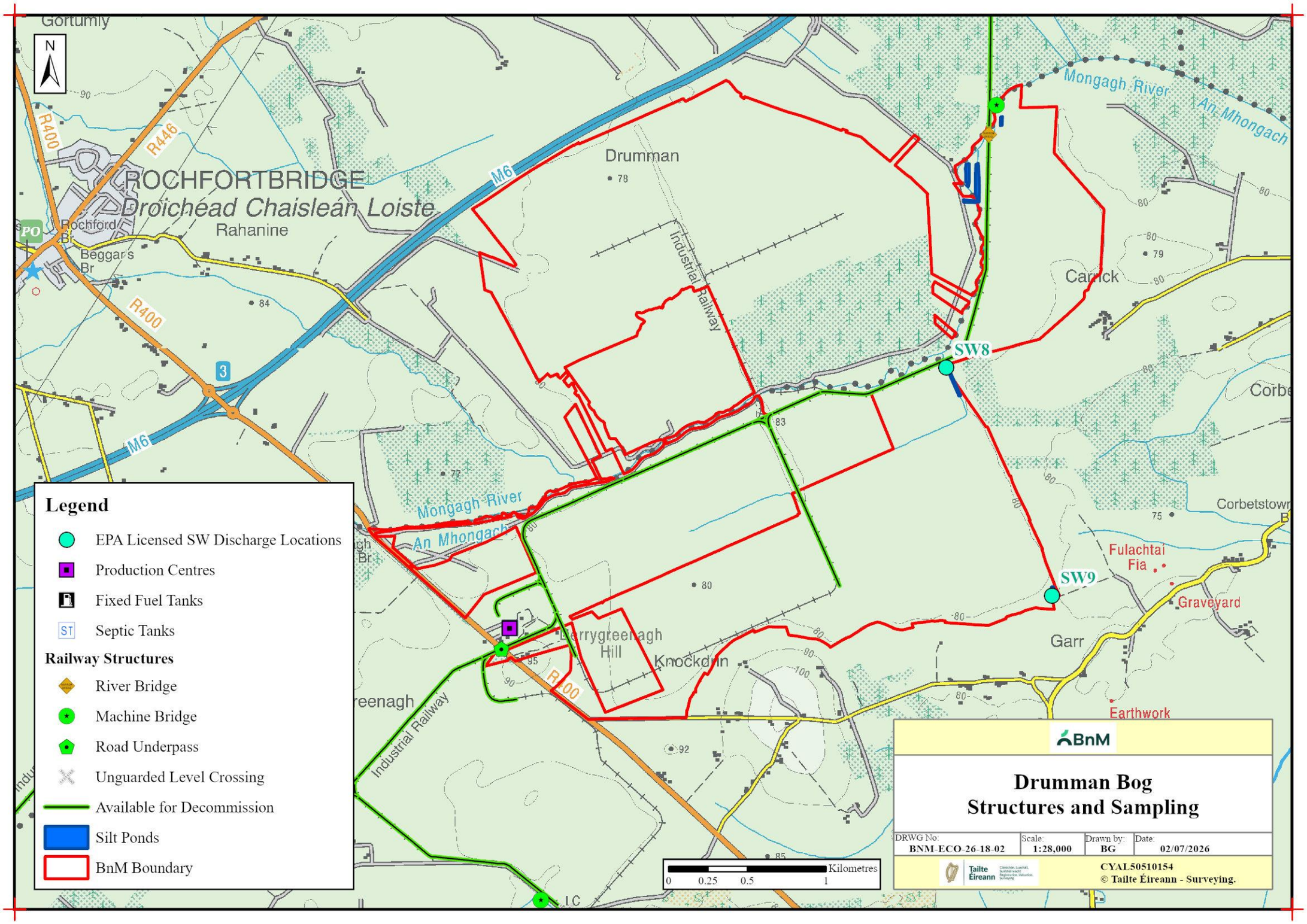
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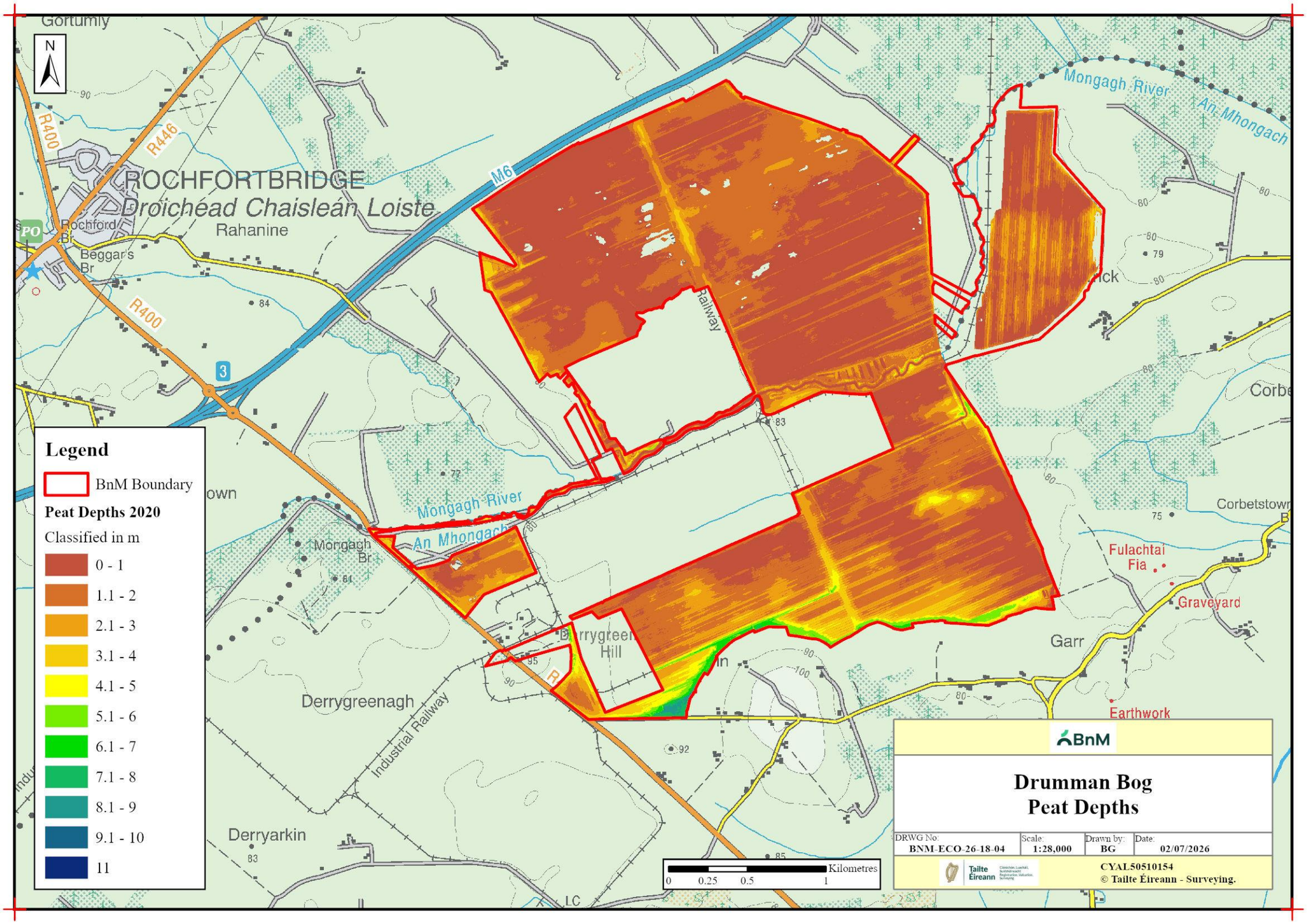
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ROCHFORTBRIDGE
Droichead Chaisleán Loiste
Rahanine
Rochford Br
Beggar's Br
PO
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Drumman
Industrial Railway
Mongagh River
An Mhongach
Carrick
SW8
SW9
Fulachtai Fia
Graveyard
Earthwork
Garr
Corbetstown
Derrygreenagh Hill
Knockdrin
Derrygreenagh
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LC
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EPA Licensed SW Discharge Locations
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Septic Tanks
Railway Structures
River Bridge
Machine Bridge
Road Underpass
Unguarded Level Crossing
Available for Decommission
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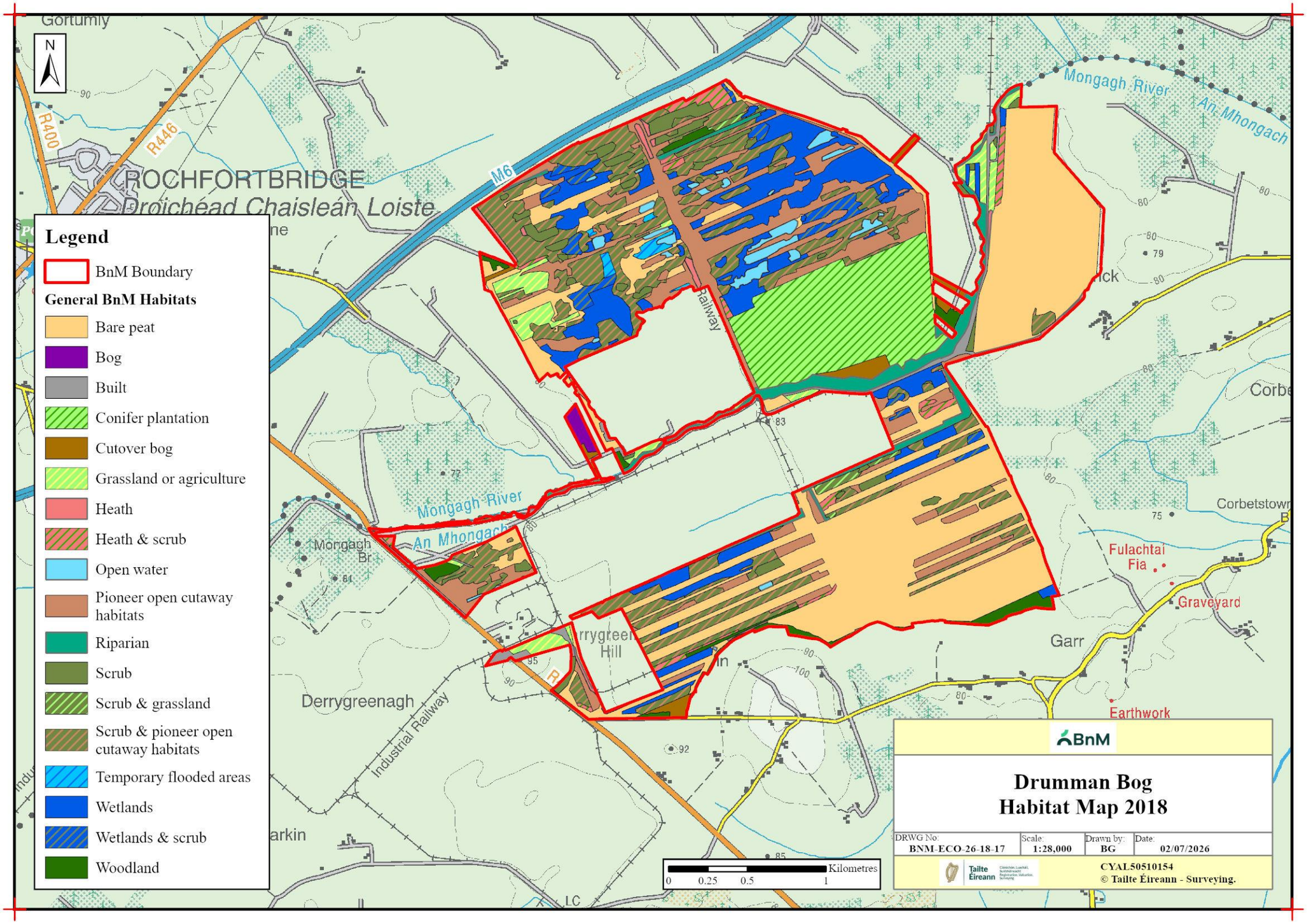
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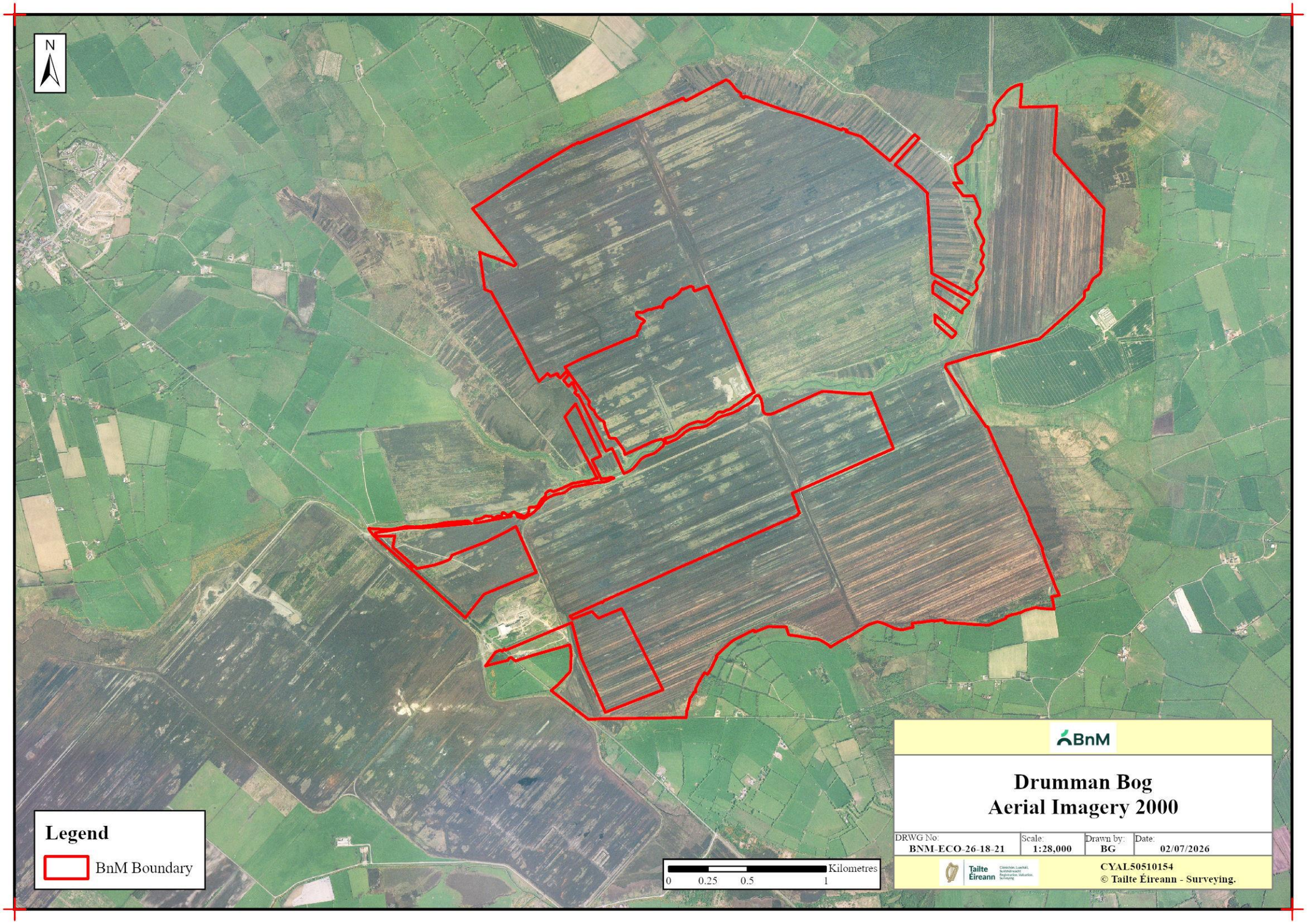
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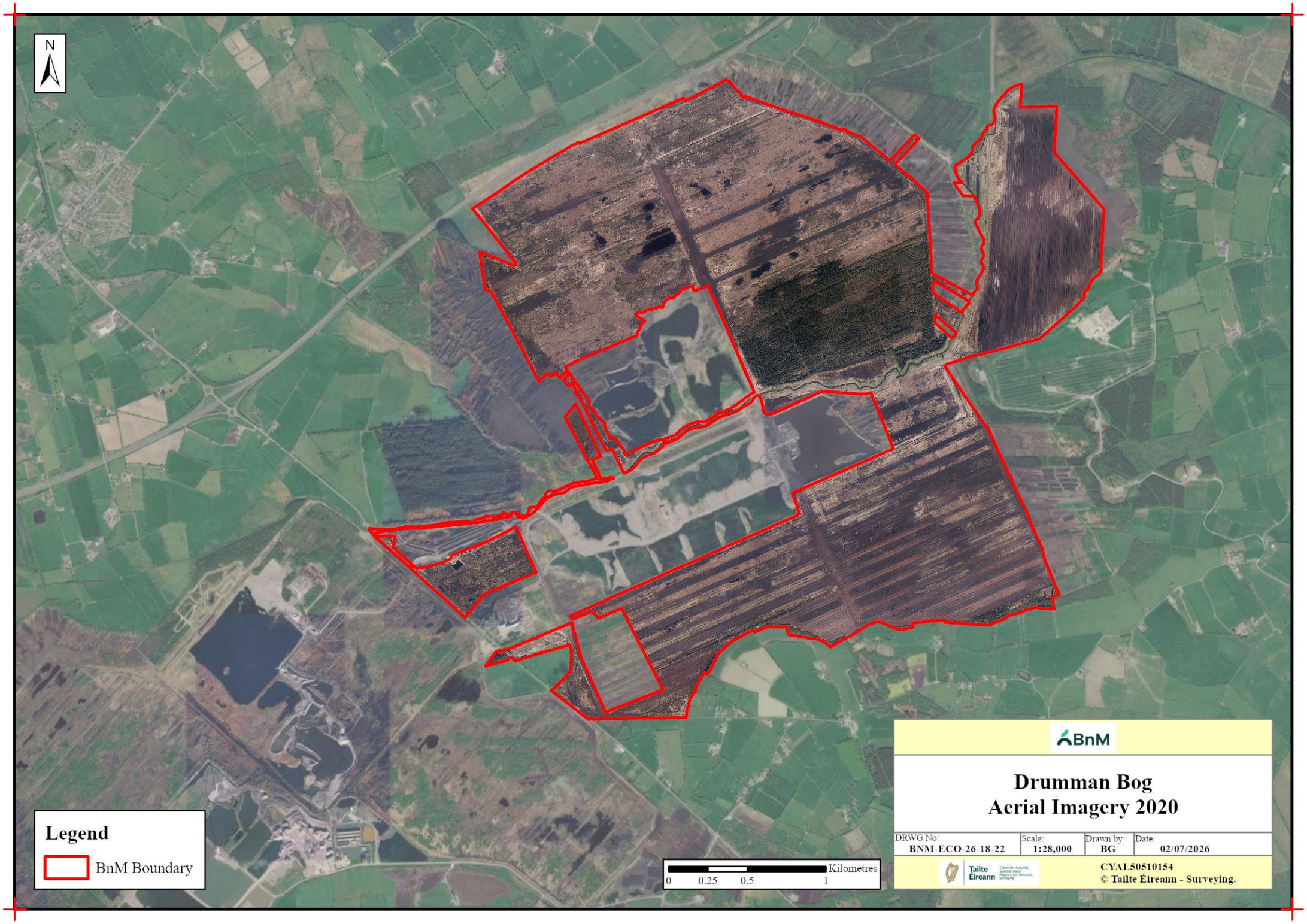
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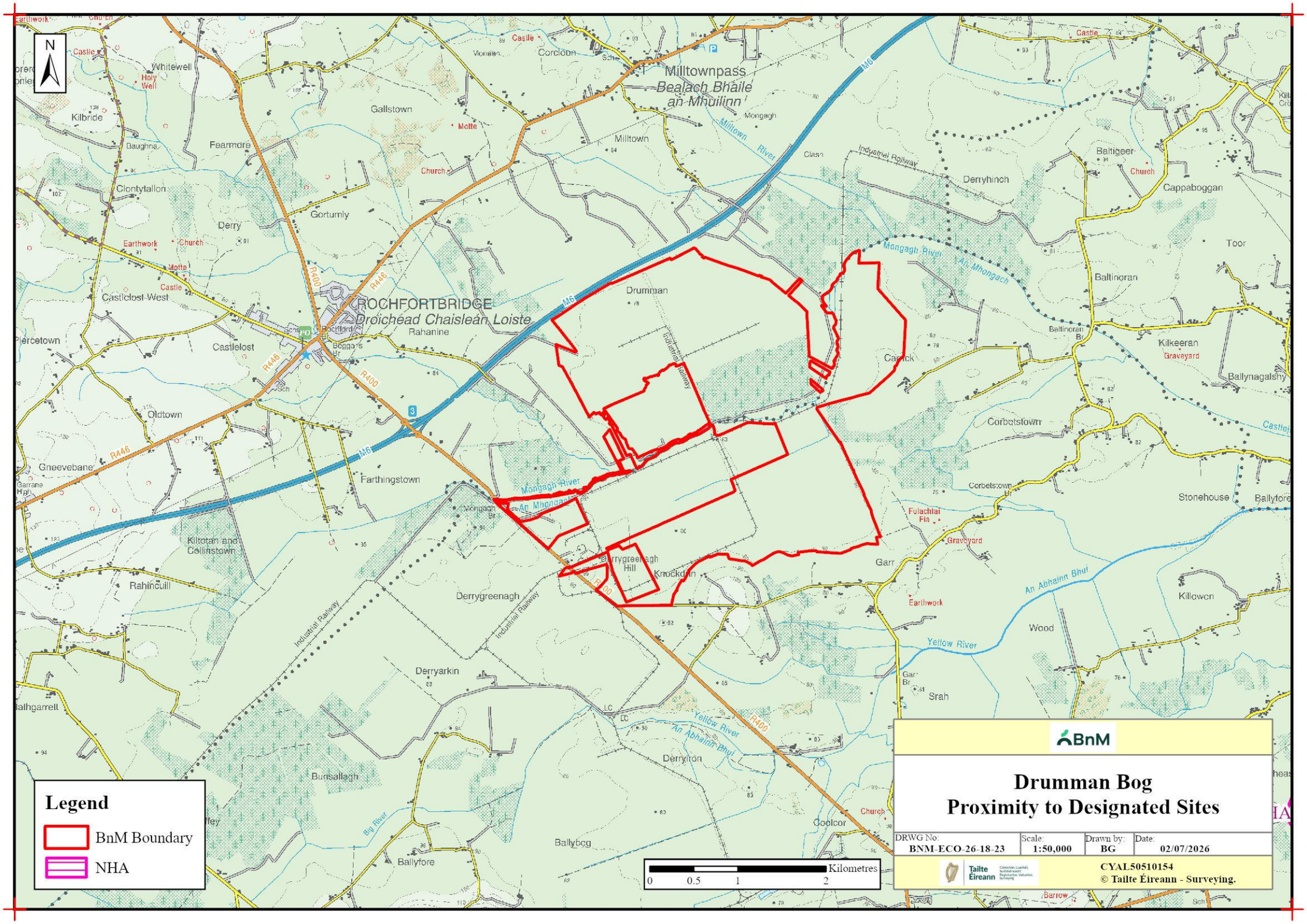
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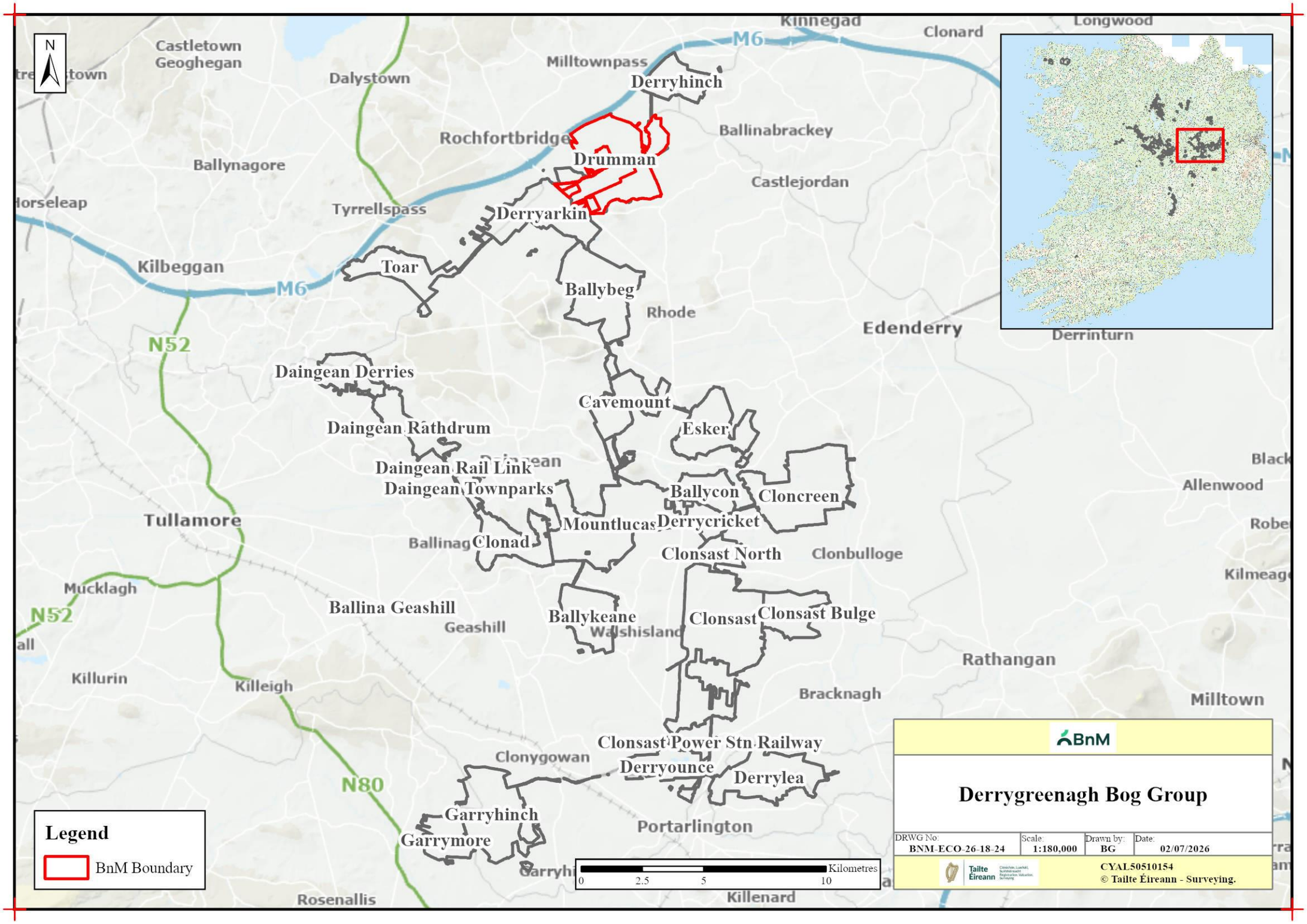
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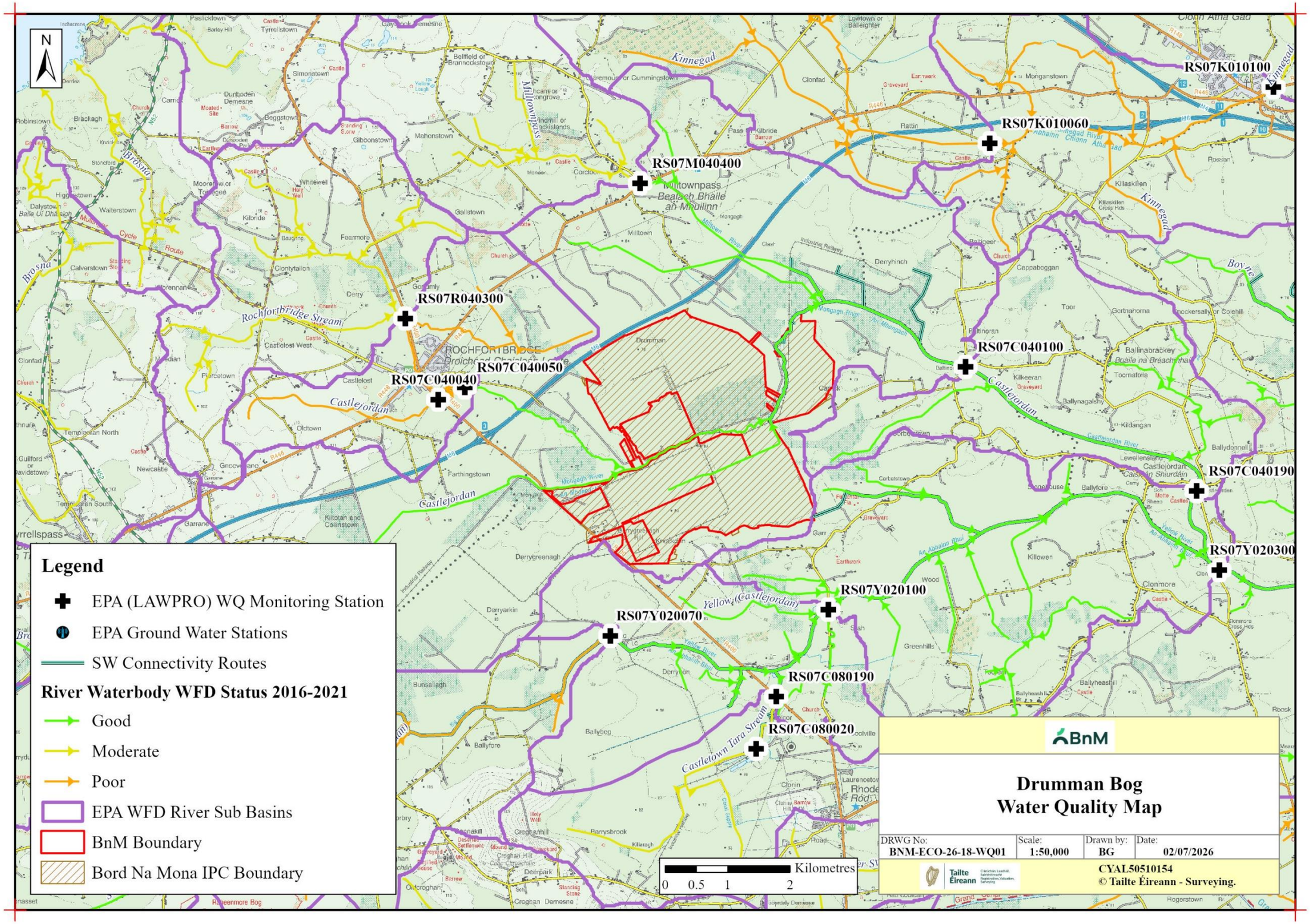
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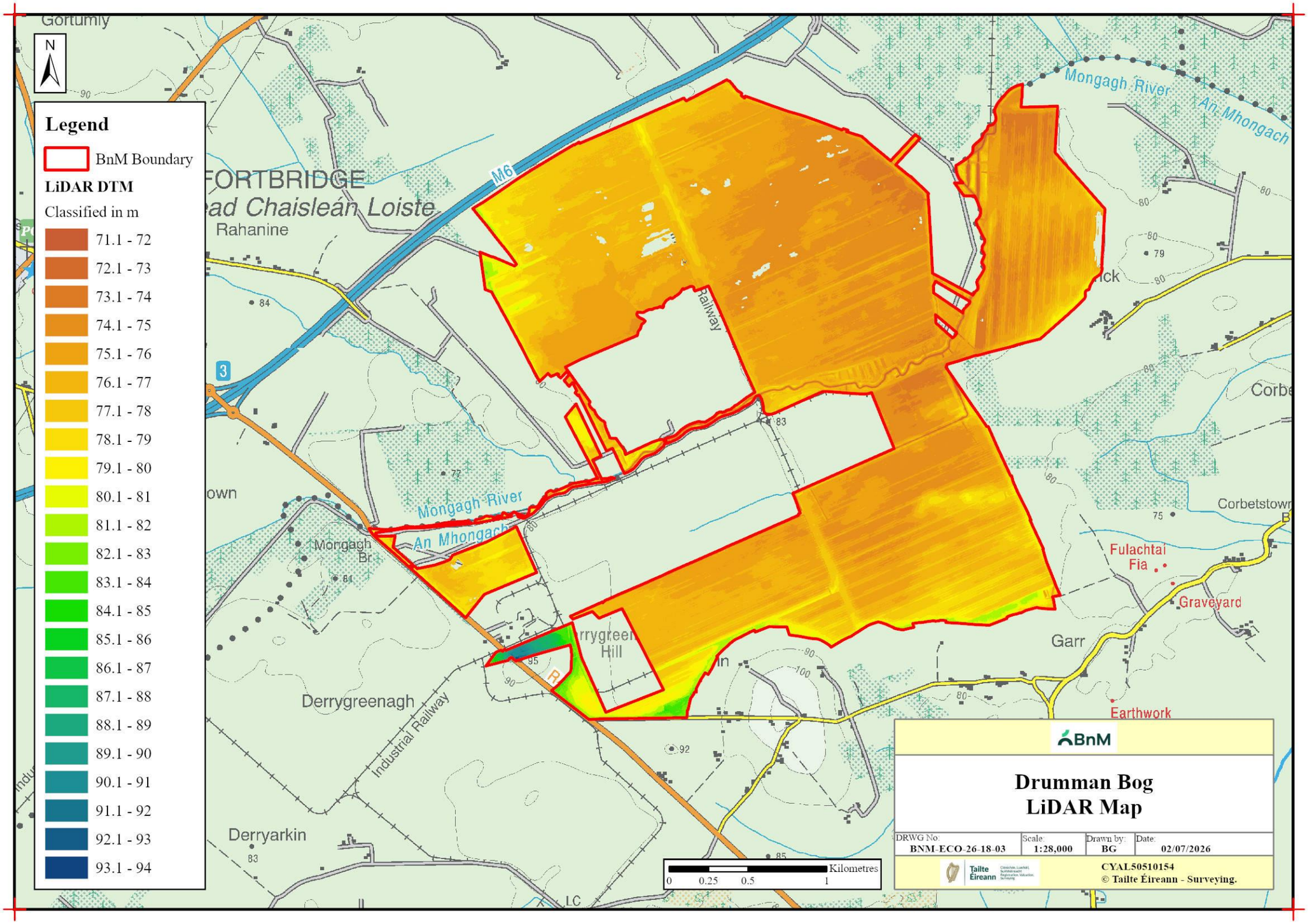
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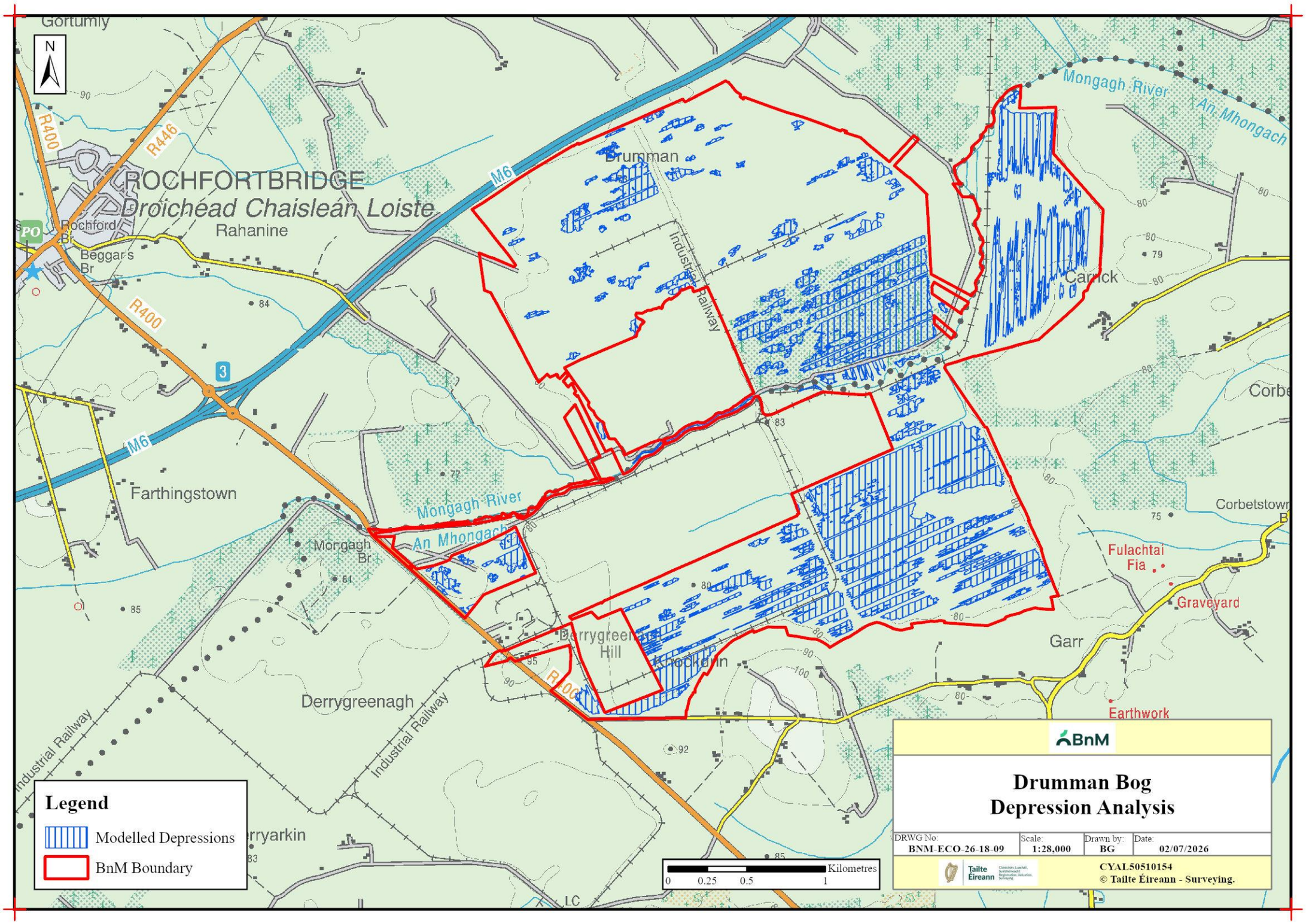
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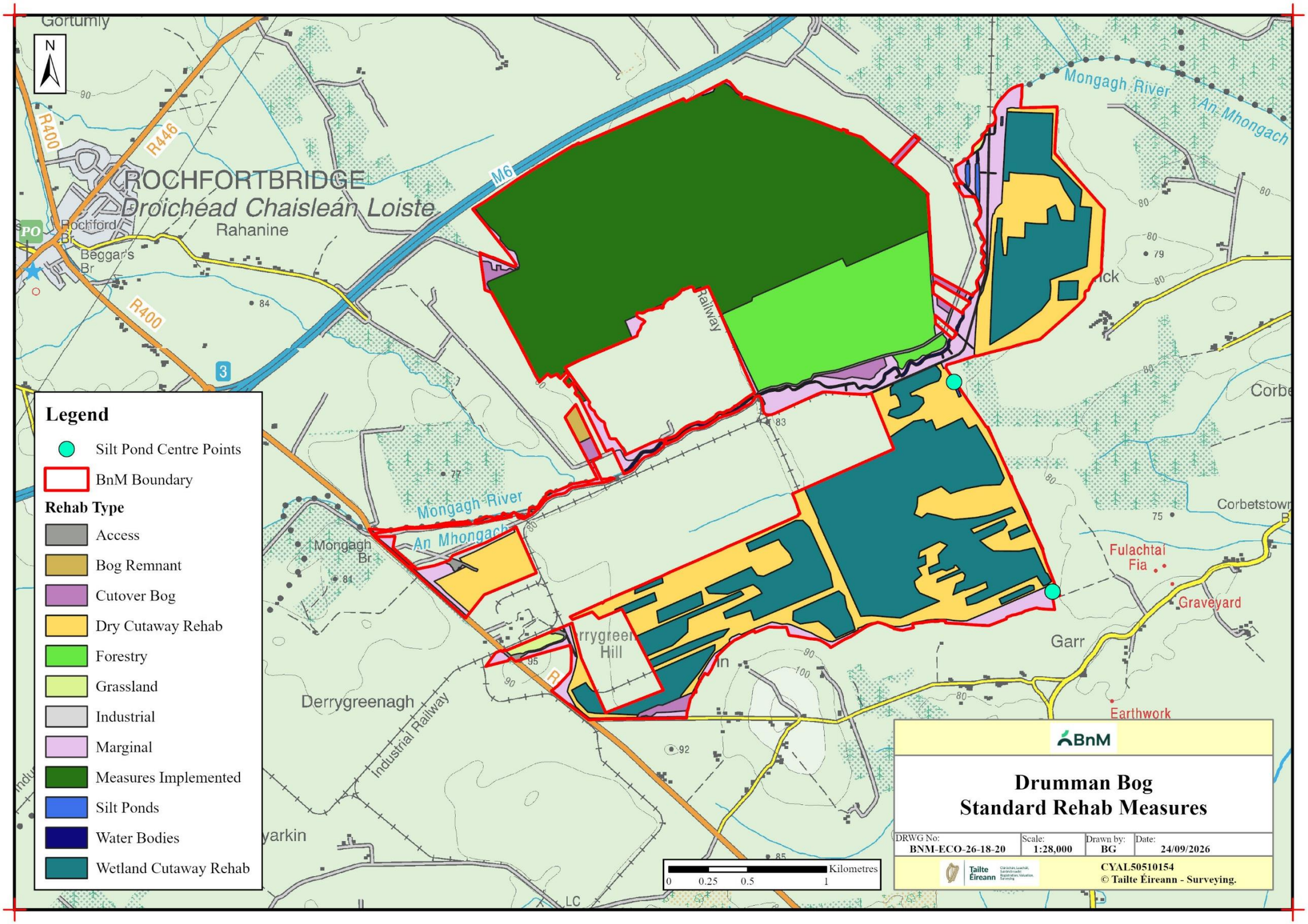
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Beggar's Br
PO
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Brummon
Industrial Railway
Mongagh River
An Mhongach
Carrick
Corbe
Farthingstown
Mongagh Br
Corbetstown
Fulachtai Fia
Graveyard
Garr
Derrygreenagh Hill
Knockdrin
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Earthwork
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Rehabilitation Maps


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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
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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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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.
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- 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.
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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.

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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).

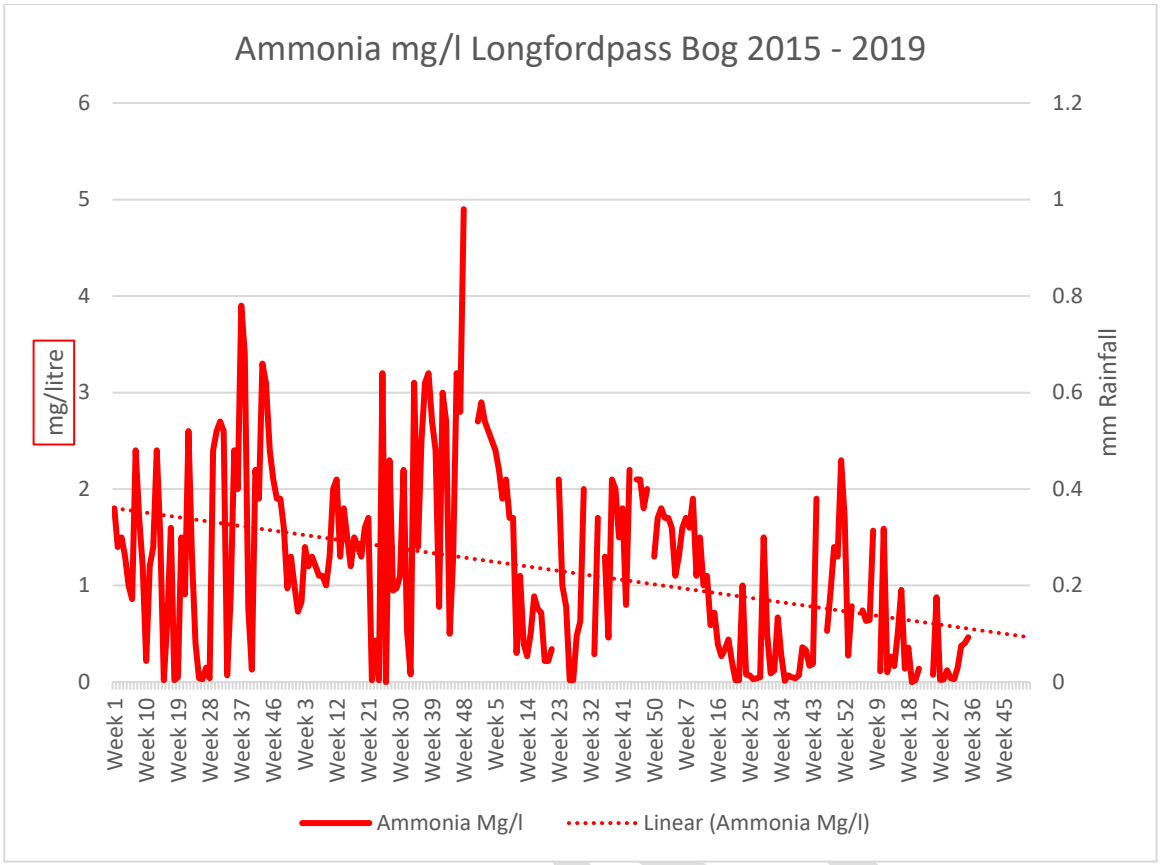
7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- 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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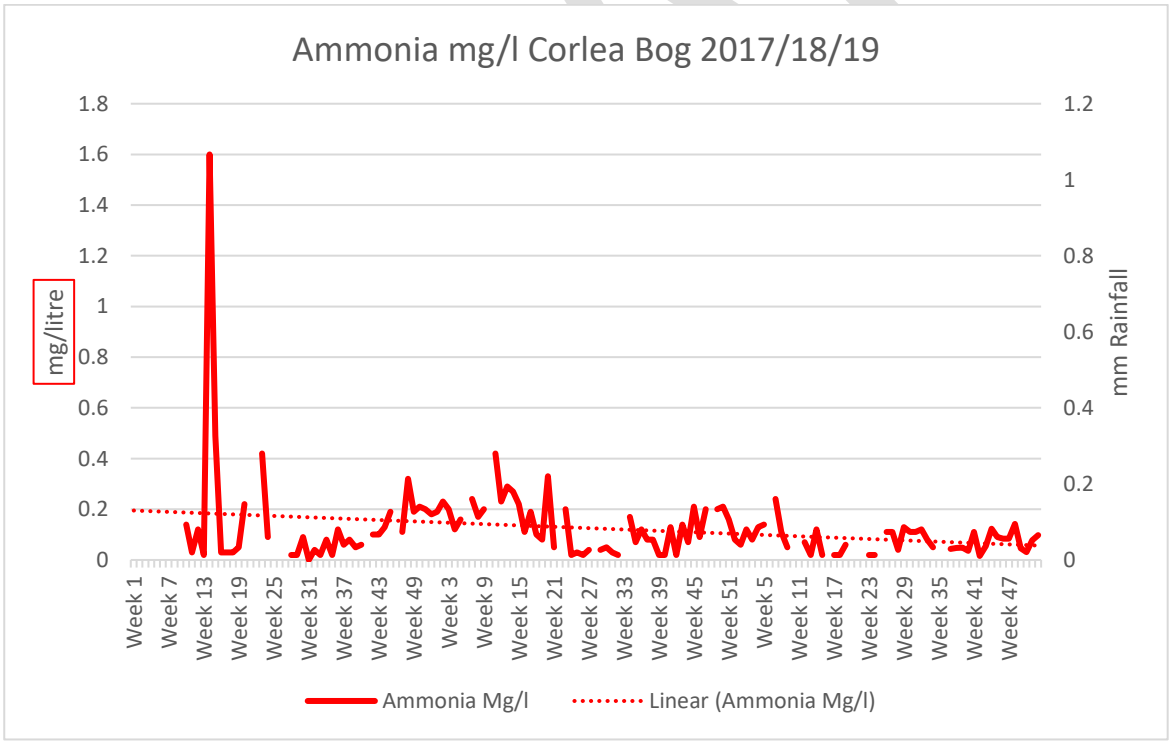


Figure 7.1. Ammonia levels over the period 2015-2019 at Longford Pass and Corlea.

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.

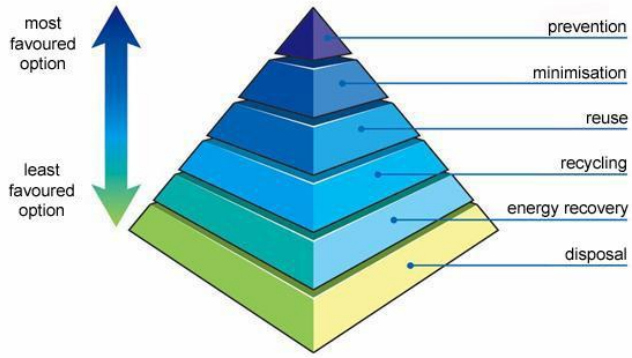
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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
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Date:	10/07/2026	10/07/2026	10/07/2026
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Name(s):	BG	CS	MMcC
Date:	24/09/2026	24/09/2026	24/09/2026

Rev. 1.0	Author(s):	Checked By:	Approved By:
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Date:			

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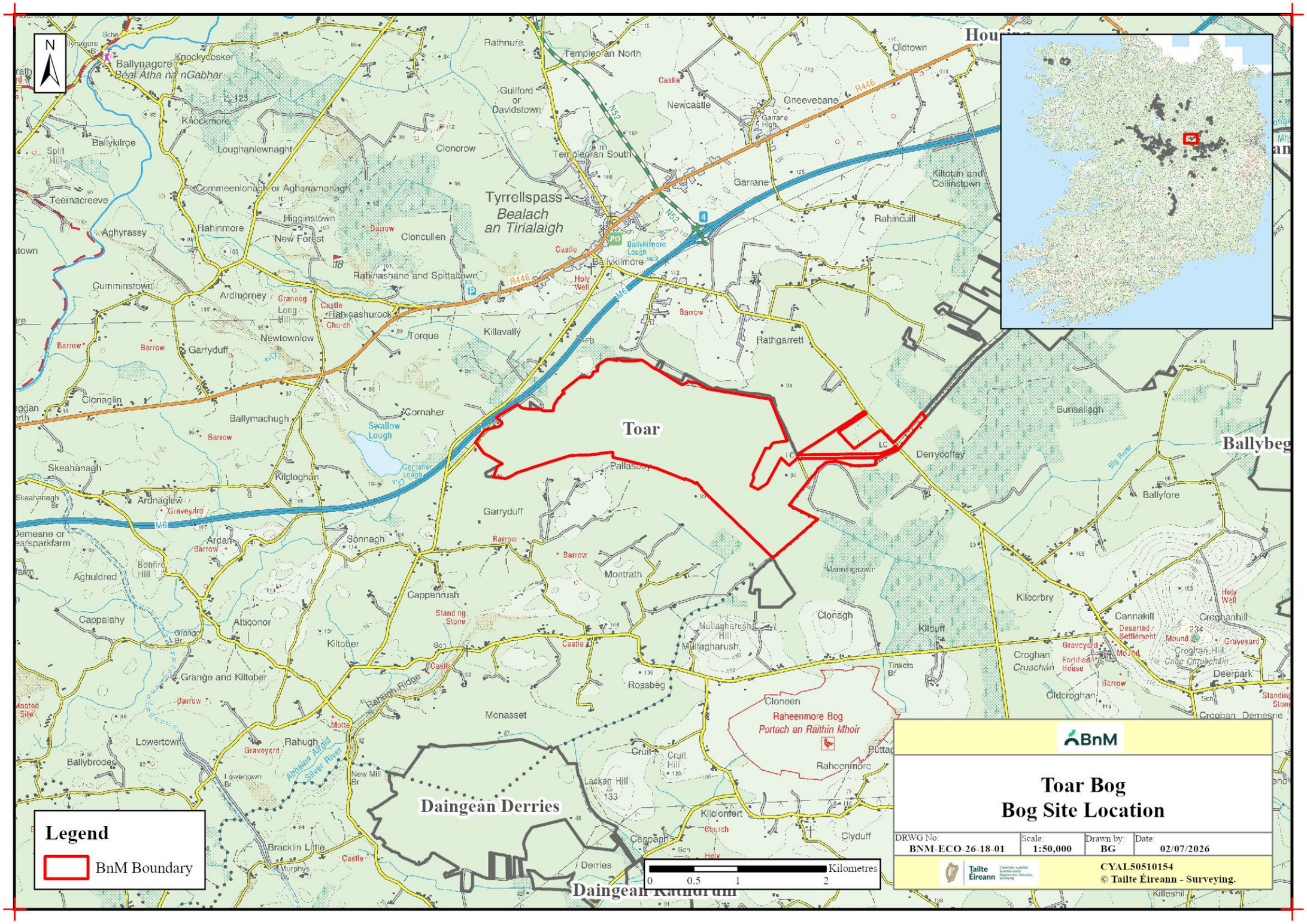
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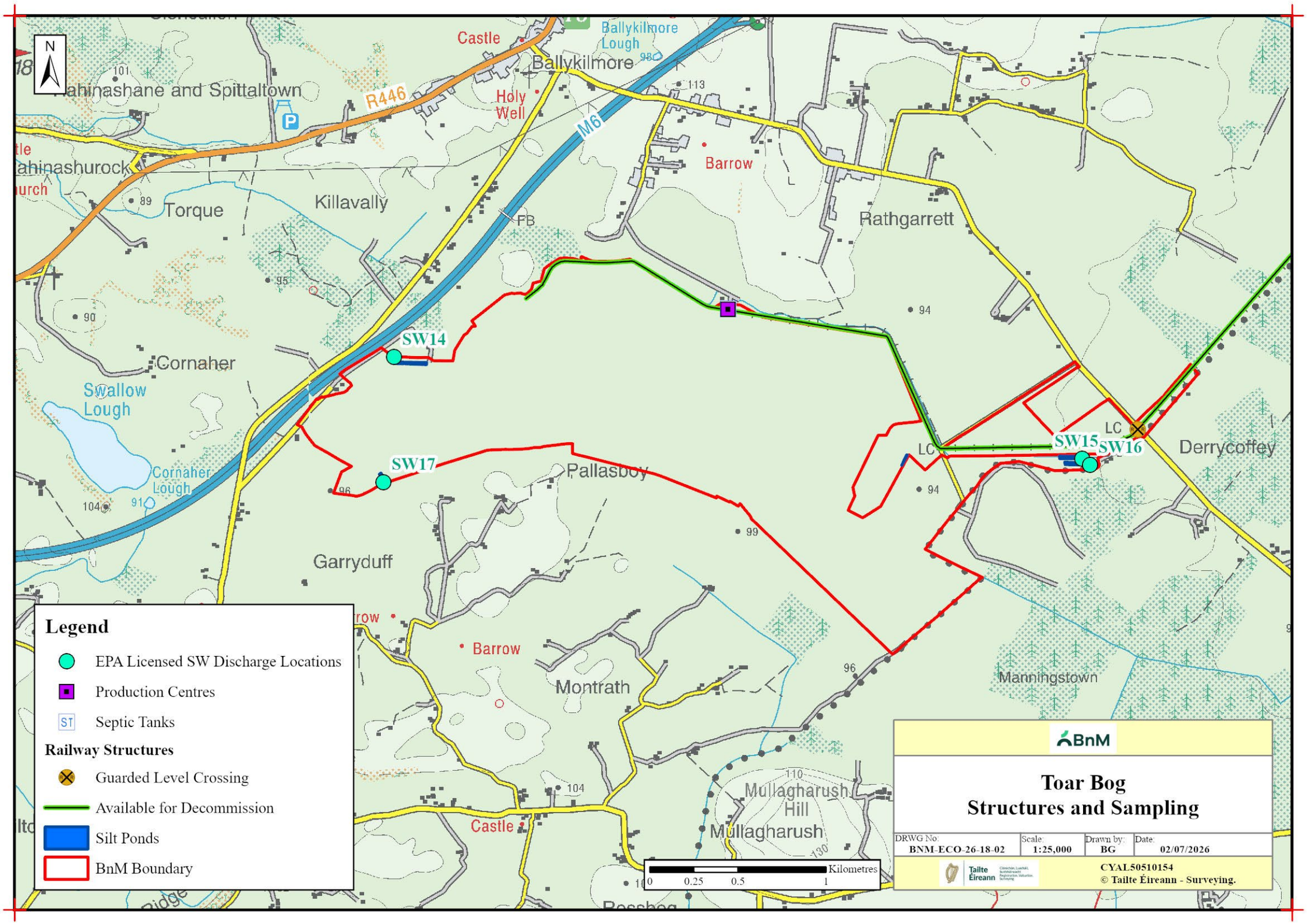
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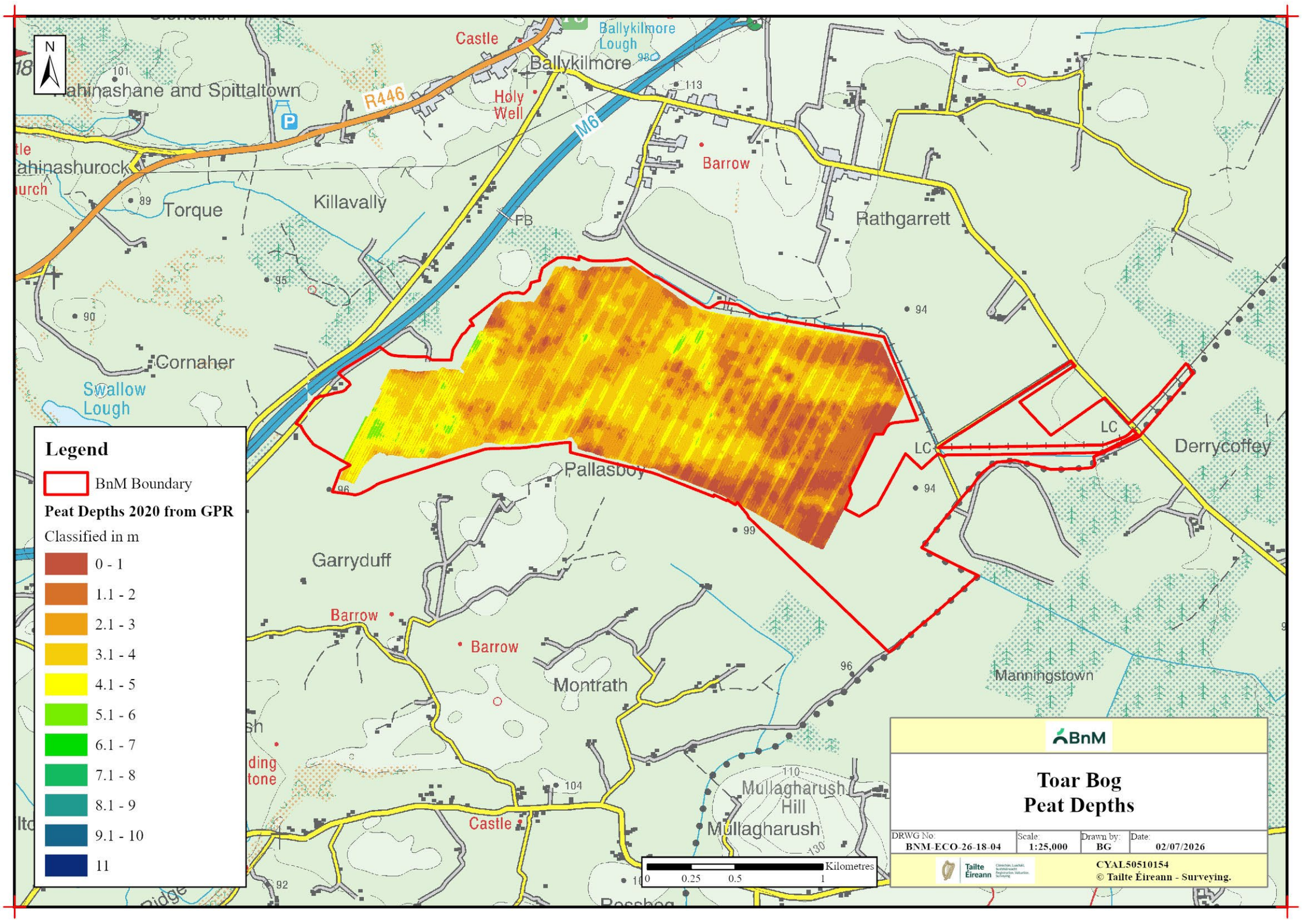
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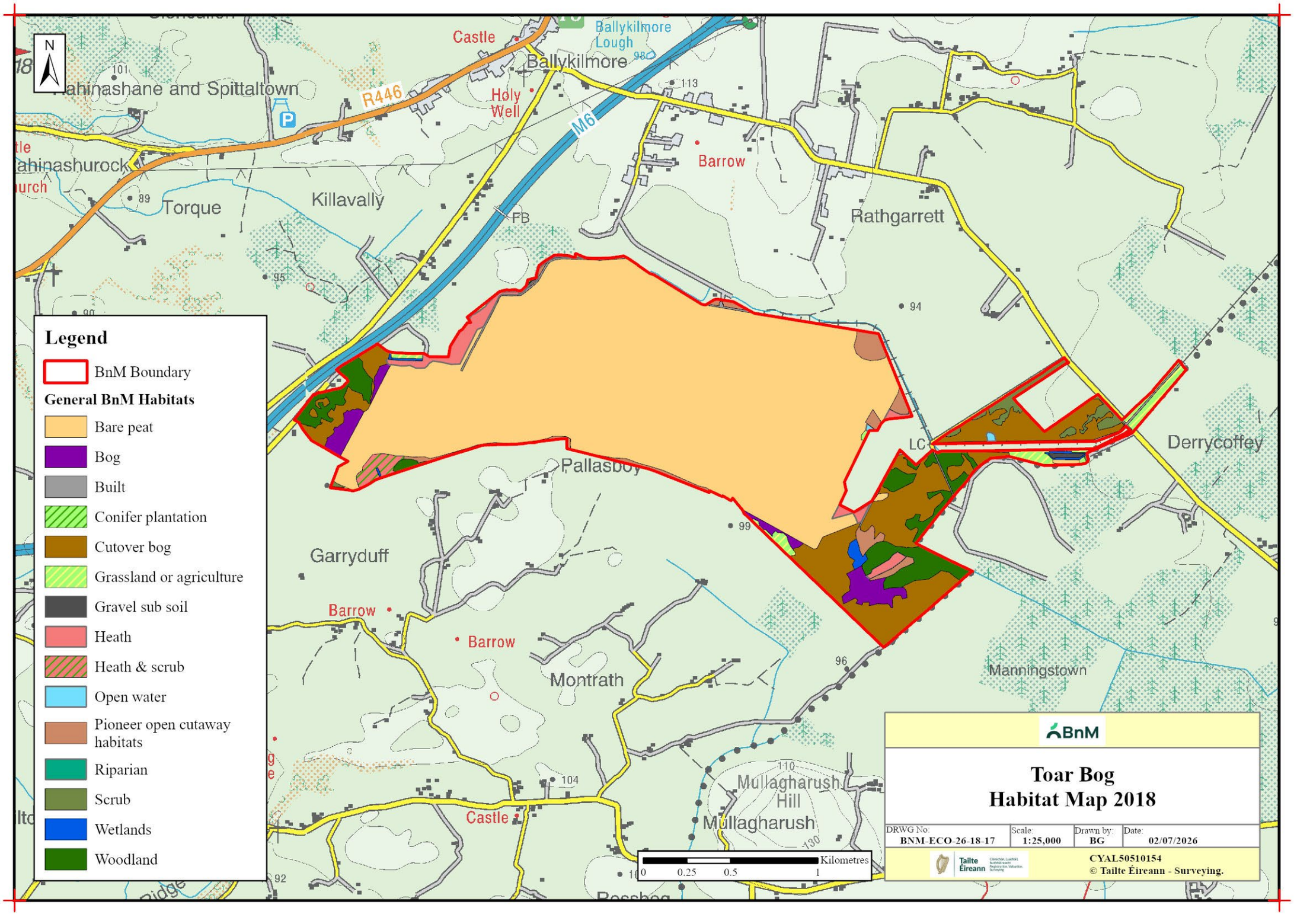
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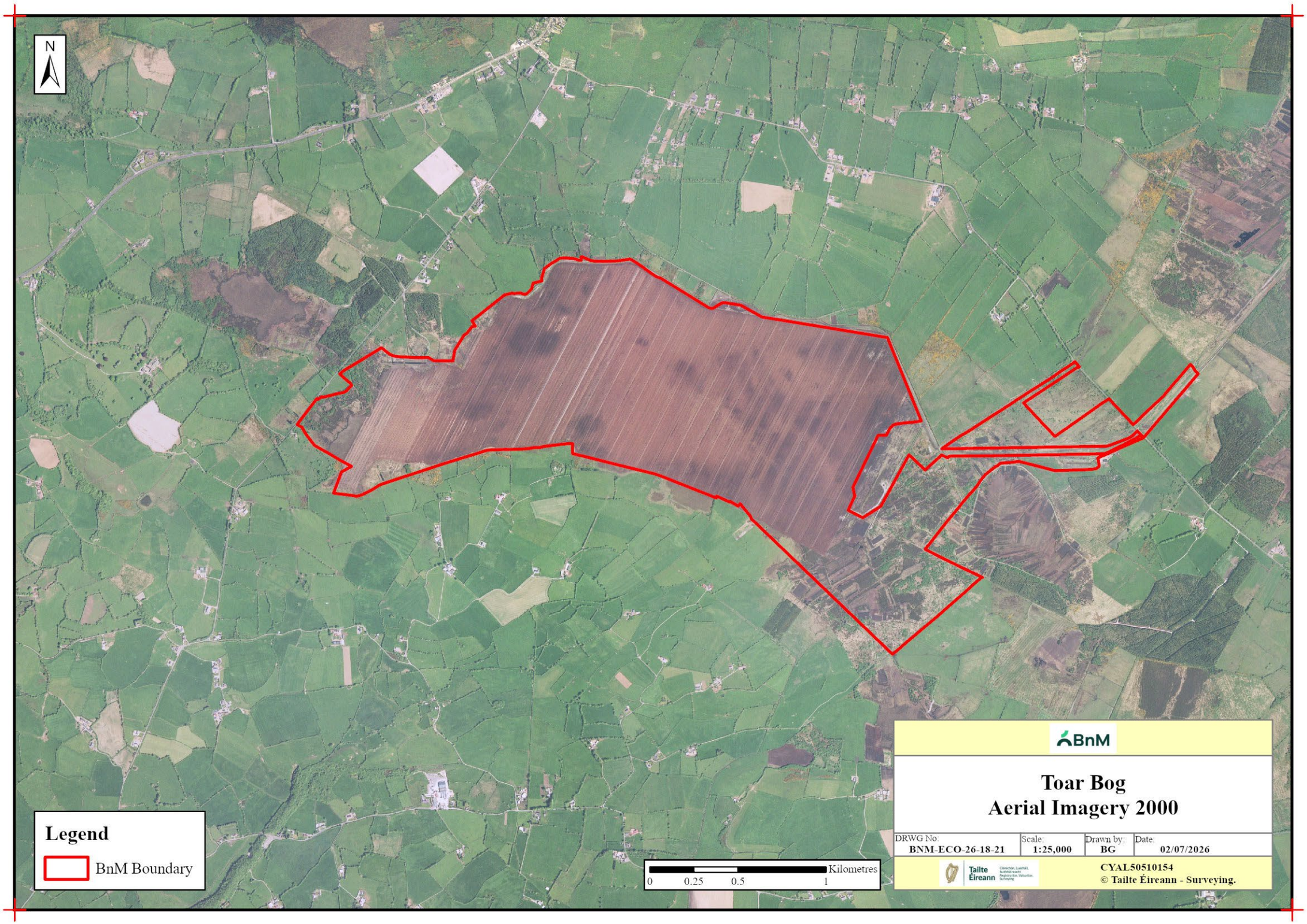
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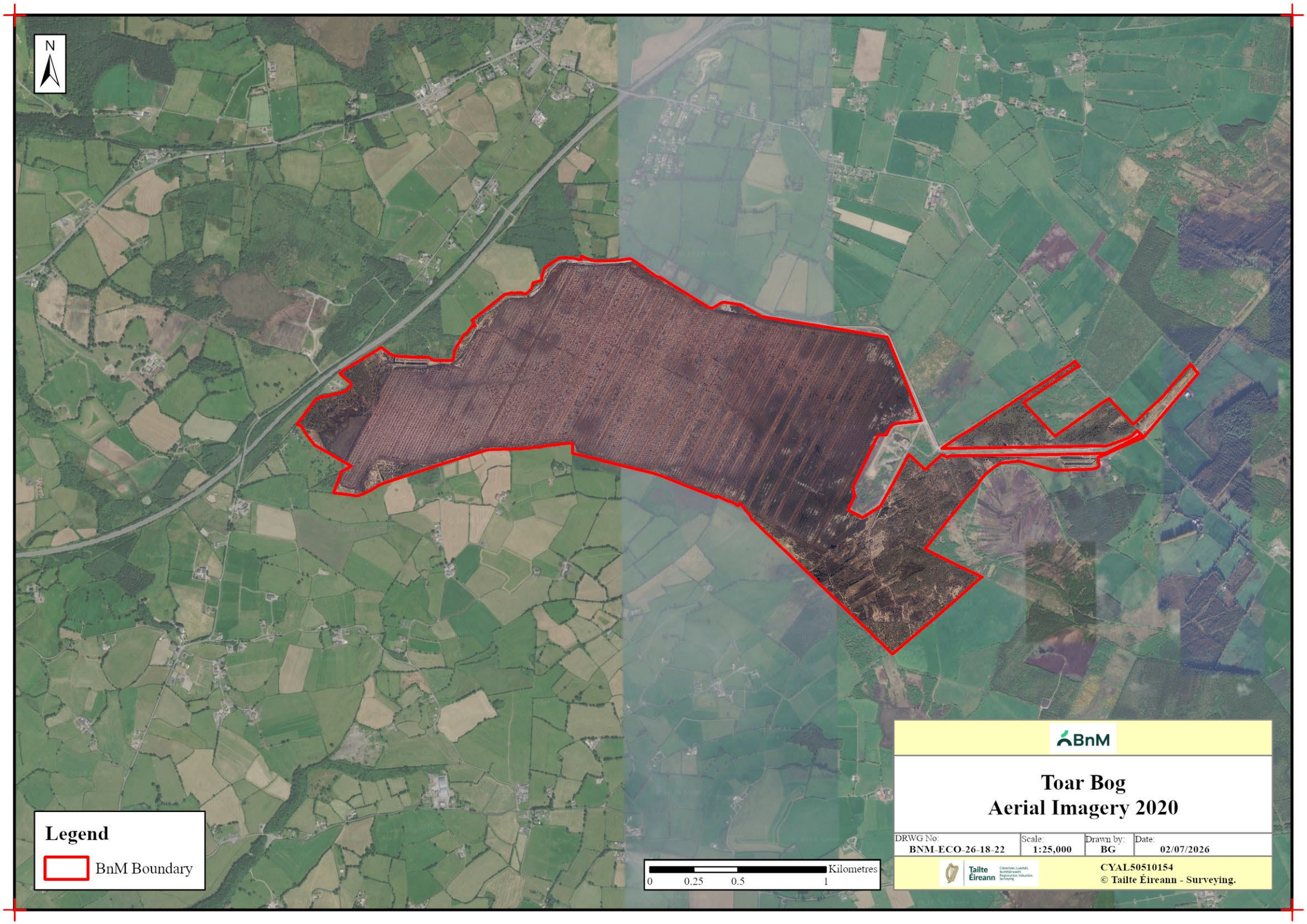
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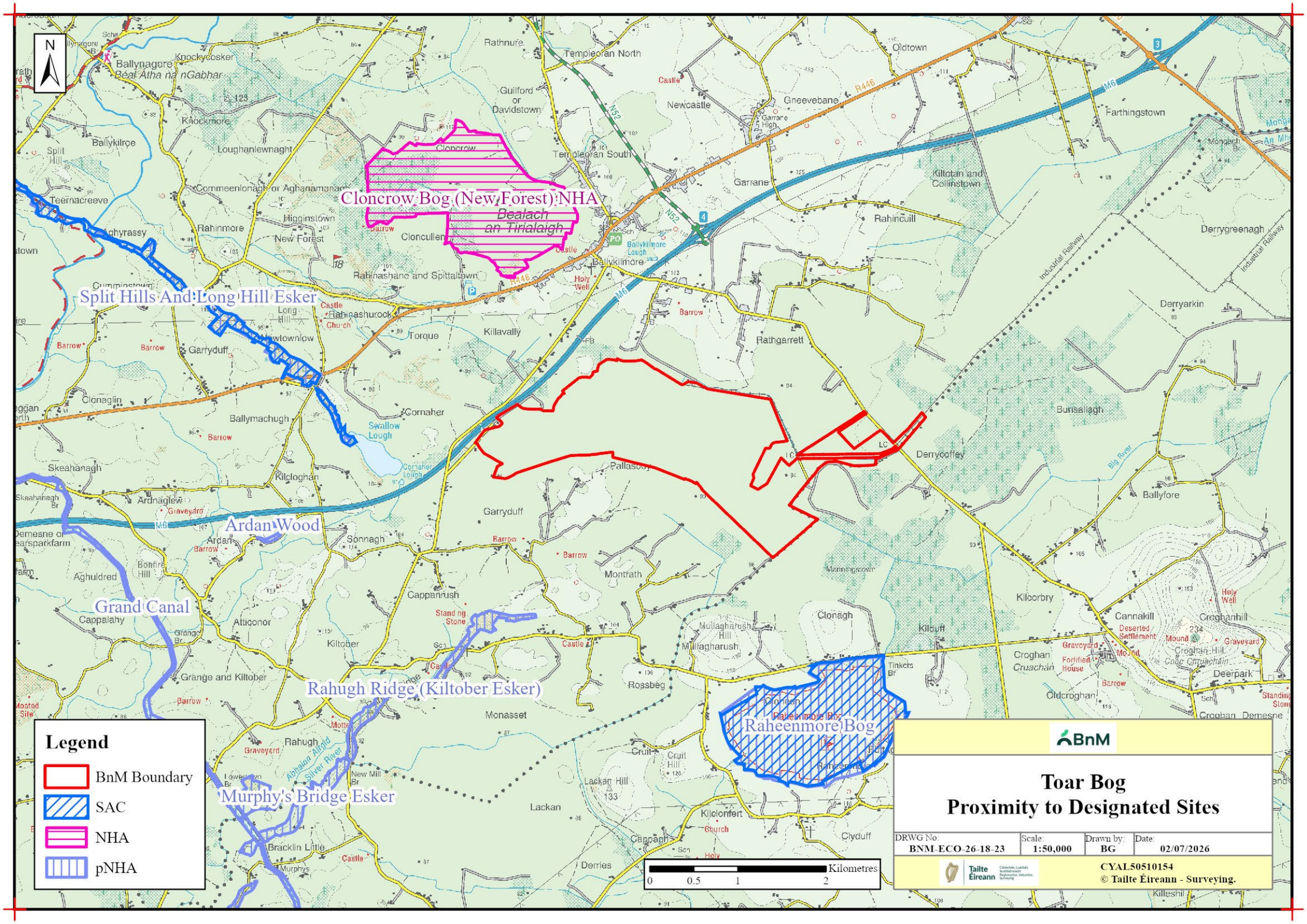
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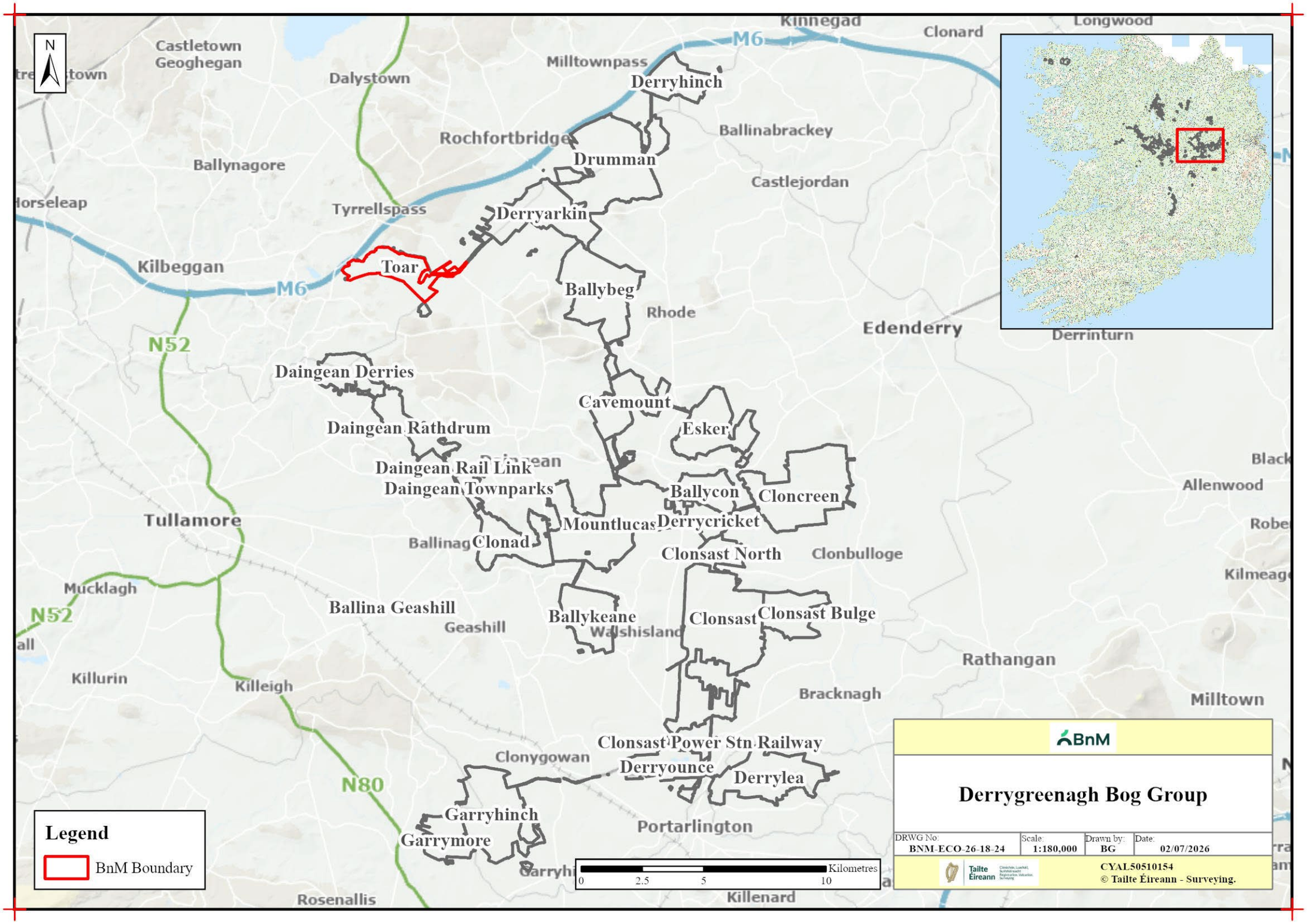
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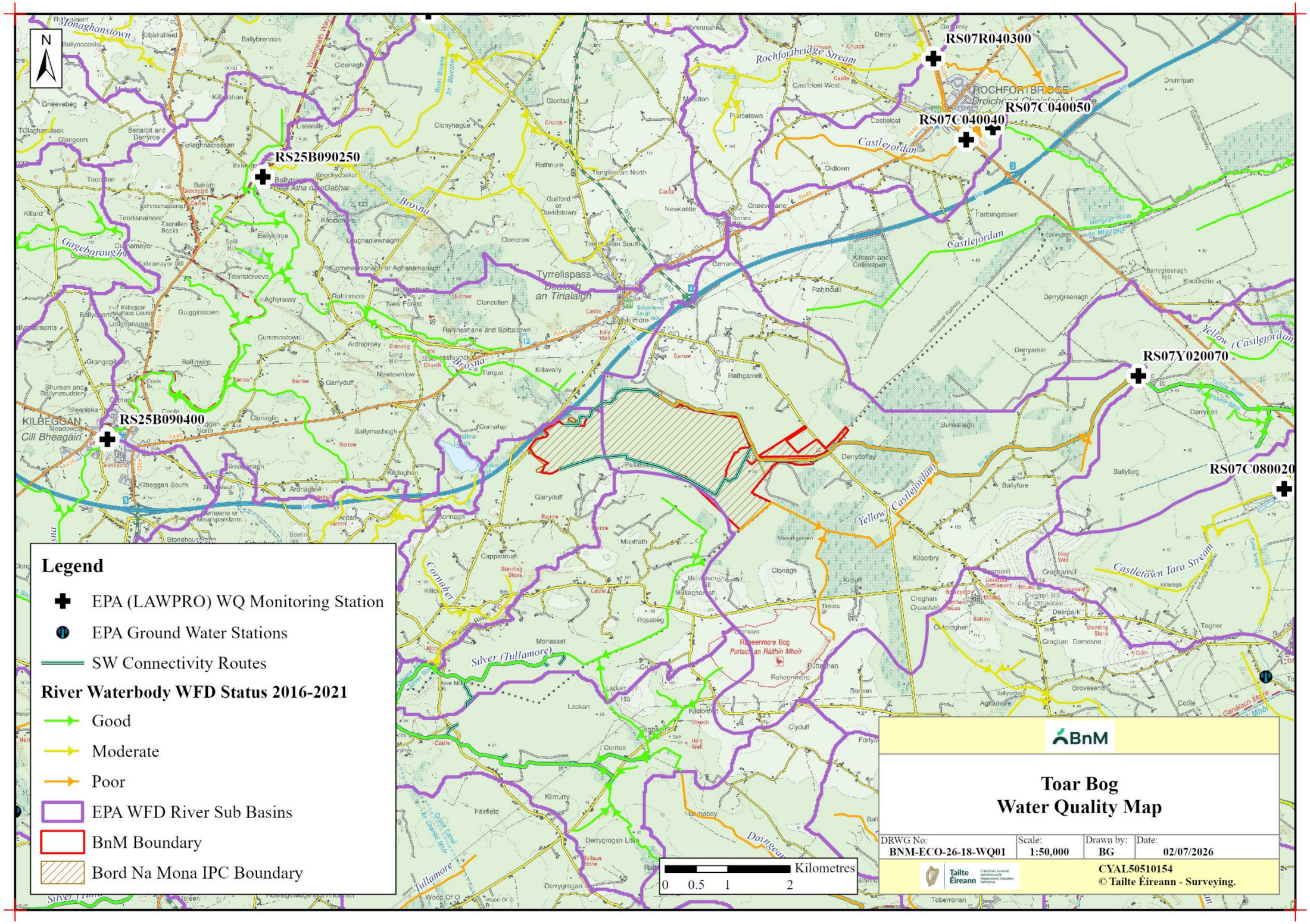
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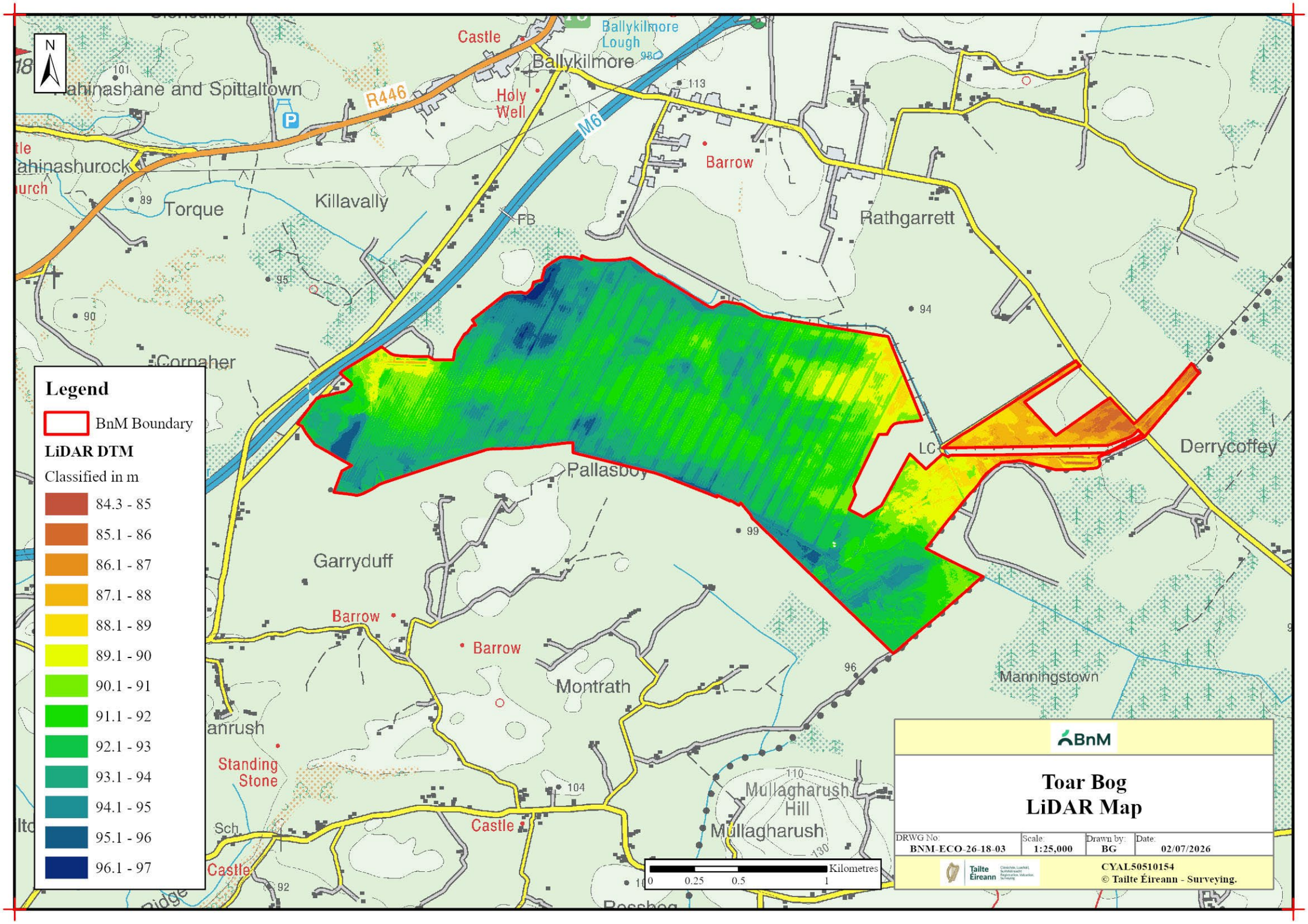
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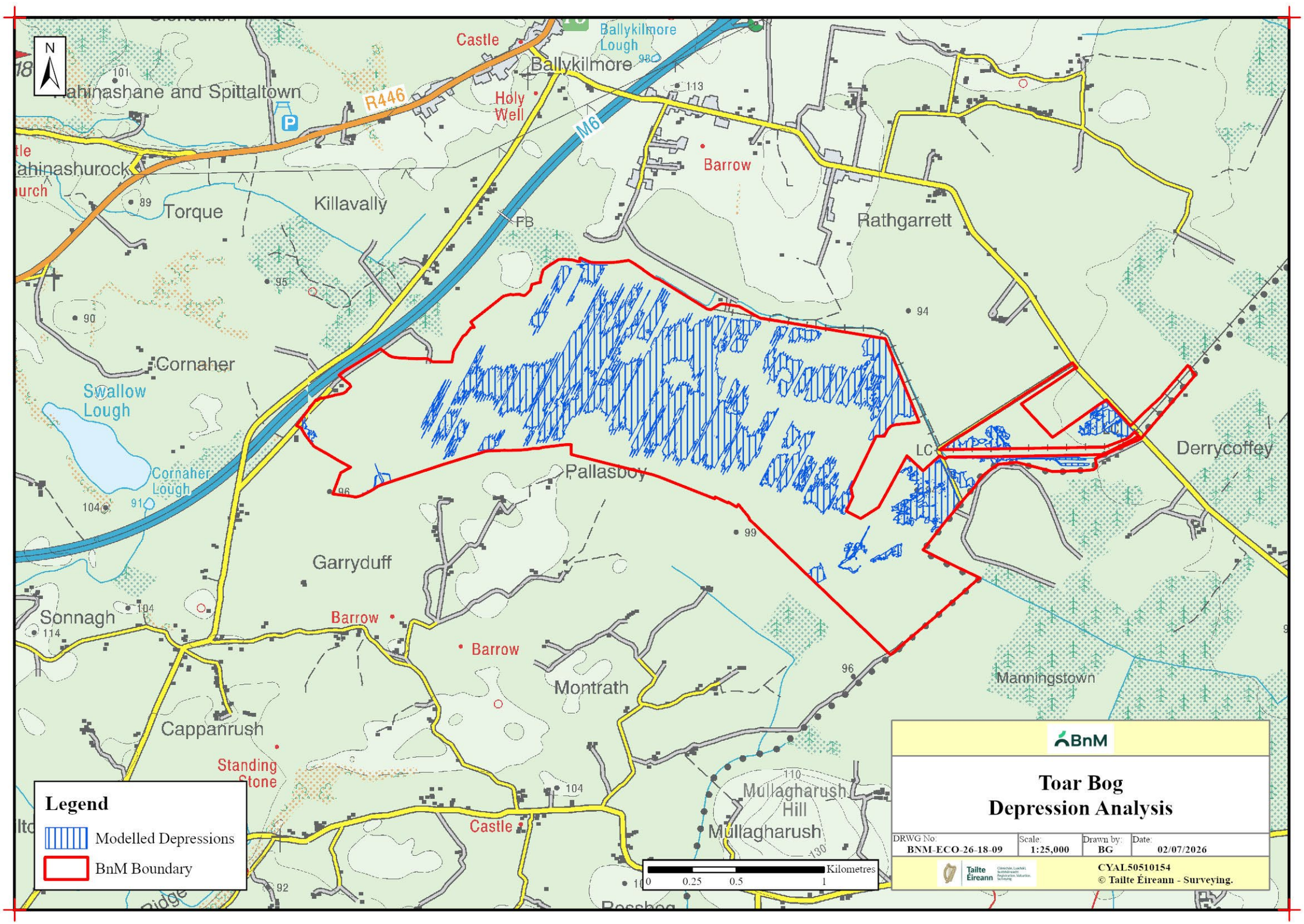
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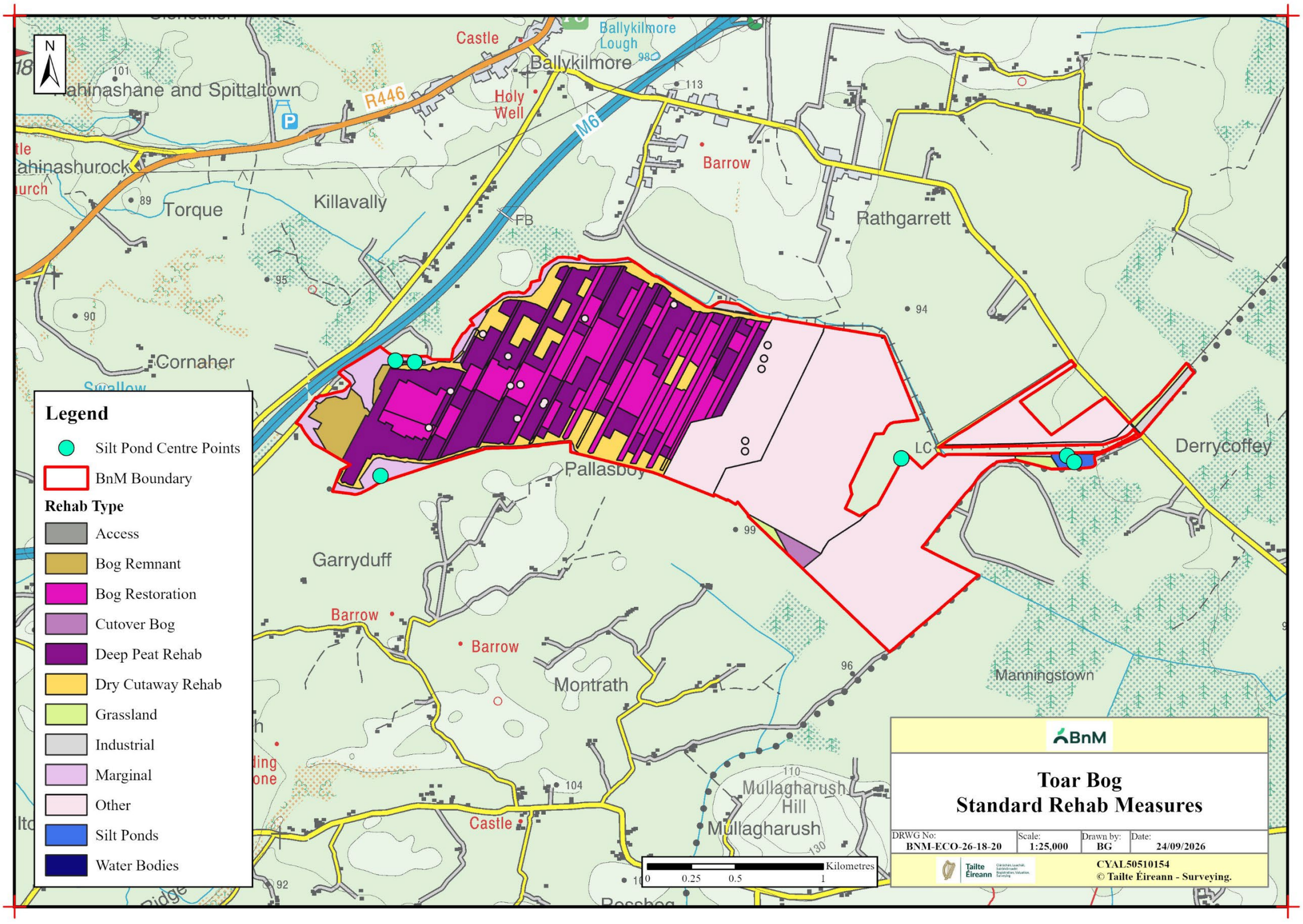
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Montrath
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