

Appendix 9J

Bord na Móna Rehabilitation Plans

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Bord na Móna

Ballybeg Bog

**Draft Cutaway Bog Decommissioning
and Rehabilitation Plan**

2023

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 Bord na Móna 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.

Bord na Móna 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. Bord na Móna 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.

Bord na Móna are planning to develop Derrygreenagh Power Project at Ballybeg Bog as well as the nearby bogs Drumman and Derryarkin. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in the second half of 2023. The development boundary overlaps the Ballybeg Bog rehabilitation boundary. This area has been mapped as a constraint in the rehabilitation plan.

Document Control Sheet

Document Name:	Ballybeg Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2023					
Document File Path:	Z:\EPA draft rehab plans 2017 word docs\Derrygreenagh ref.501 (EPL)\Ballybeg\Ballybeg Sub Con Rehab Renewables					
Document Status:	Draft					
This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	29	4	0	10
Rev.	0.1	Author(s):		Checked By:		Approved By:
	Name(s):	IH		JOS		JOS
	Date:	27/06/2023		06/07/2023		15/07/2023
Rev.	1	Author(s):		Checked By:		Approved By:
	Name(s):	IH		MMC		MMC
	Date:	27/06/2023		26/07/2023		26/07/2023
Rev.	1.1	Author(s):		Checked By:		Approved By:
	Name(s):	JOS		MMC		MMC
	Date:	28/09/2023		29/09/2023		29/09/2023

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Non-technical summary

- 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 the 1950s and supplied milled peat for electricity production.
- Industrial peat extraction is now completely ceased at Ballybeg Bog.
- Part of the site is now vegetated and developing maturing wetland, fen and Birch scrub/woodland habitats. Much of the site is still largely bare peat with pioneer vegetation beginning to colonise.
- 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. There is an existing guyed wind monitoring mast, with instruments, 100m in height, with planning permission for a period of a three years (file reference 22/446), located north of the Ballybeg pumping station.
- The most southern part of the site is adjacent to the Grand Canal pNHA.
- This rehabilitation plan has been prepared by Bord na Móna 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 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 Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will 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 Bord na Móna bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats 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.
- Bord na Móna are planning to develop Derrygreenagh Power Project at Ballybeg Bog, Drumman Bog and Derryarkin Bog. Derrygreenagh Power Project Proposed Development consists of a Power Plant Area with Combined Cycle Gas Turbine (CCGT) and Open Cycle Gas Turbine (OCGT) and associated infrastructure on Drumman Bog and an Electricity Grid Connection on Derryarkin Bog and Ballybeg Bog consisting of 200kV tail substation, hybrid transmission of double circuit 220kV overhead line and underground cable

to allow for power output to the national electricity network via a new loop-in 400kV substation (outside of BNM lands) onto the Oldstreet-Woodland 400kV line. The Overall Project will be facilitated by a Gas Connection Corridor c. 10km to the north of the Power Plant area, this will be through Third Party lands. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in second half 2023. The development planning boundary overlaps Ballybeg Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan.

- This peatland rehabilitation plan does not outline future after-use or development. Bord na Móna 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

Bord na Móna (referred to as ‘Bord na Móna’ or ‘BNM’ 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.

Bord na Móna 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. It has been specifically prepared to address the integration of the proposed Derrygreenagh Power Project at Drumman Bog. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

It has been proposed by the Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the ‘Peatlands Climate Action Scheme’ (PCAS). The Peatlands Climate Action Scheme is expected to operate between 2021-2025. Enhanced rehabilitation measures that have been proposed as part of 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 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 **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 Bord na Móna 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 Bord na Móna. Nevertheless, Bord na Móna 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.

Bord na Móna are planning to develop Derrygreenagh Power Project at Ballybeg Bog, Drumman Bog and Derryarkin Bog. Derrygreenagh Power Project Proposed Development consists of a Power Plant Area with Combined Cycle Gas Turbine (CCGT) and Open Cycle Gas Turbine (OCGT) and associated infrastructure on Drumman Bog and an Electricity Grid Connection on Derryarkin Bog and Ballybeg Bog consisting of 200kV tail substation, hybrid transmission of double circuit 220kV overhead line and underground cable to allow for power output to the national electricity network via a new loop-in 400kV substation (outside of BNM lands) onto the Oldstreet-Woodland 400kV line. The Overall Project will be facilitated by a Gas Connection Corridor c. 10km to the north of the Power Plant area, this will be through Third Party lands. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in second half 2023. The development planning boundary overlaps Ballybeg Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan.

The Power Plant Area is a First Schedule activity under the EPA Act as amended and will require an Industrial Emissions (IE) Licence (per activity class 2.1). The areas within Drumman Bog within the IPC Licence required to facilitate the operational Power Plant Area will thus require decommissioning and closure in advance of an IE Licence determination. The Transmission Service Operator (TSO, EirGrid) and the Transmission Asset Operator (TAO, ESBN) will require full operational control of the 220kV substation area (on Derryarkin Bog) and the line-cable interface compound (Ballybeg Bog) and will thus require advanced decommissioning and closure of these areas.

Ballybeg Bog will be rehabilitated **either** in association with the proposed Derrygreenagh Power Project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the future in the event of an unsuccessful planning application for this project. It is expected that Bord na Móna will revise and update the rehabilitation plan for Ballybeg when a decision is made in relation to planning permission for this project. Bord na Móna remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC Licence. 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 draft rehabilitation plan. If future after-uses are proposed for Ballybeg Bog it is expected that the draft rehabilitation plan would be iterated.

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 Bord na Móna 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);
- 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.
- 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 (2019). Conserving Bogs – Management Handbook.
- 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);
- 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 2018 – 2021;
- Bord na Móna Annual Report 2022.
- 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 Bord na Móna'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

Bord na Móna 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 2014-2019. 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 Bord na Móna 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.

3. SITE DESCRIPTION

Ballybeg is located between Croghan Hill and the town of Rhode in Co. Offaly. Ballybeg is situated in a group of Bord na Móna 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. The northern part of the bog has been out of industrial peat extraction for some time and has established typical cutaway habitats dominated by Birch scrub and woodland. The majority of the southern half of the bog was in industrial peat production until recently and remains are mostly bare peat.

See Drawing number BNM-ECO-23-35-01 titled *Ballybeg Bog: Bog Site Location*, included in the accompanying Mapbook¹, which illustrates the location of Ballybeg Bog in context to the surrounding area.

3.1 Status and Situation

3.1.1 Site history

Industrial peat production commenced at Ballybeg in the 1960s 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. An 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. Approximately 60 ha east of the main railway line was planted with Alder in 2007 as a biomass for energy trial. This trial 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. It is anticipated that this railway will be decommissioned when peat stocks are finally removed from neighbouring bogs.

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

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*

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

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

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

In respect of 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, Bord na Móna 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, volcanoclastic 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 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/habitats² 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).
- Large area of cutaway planted with Alder as a biomass crop (WS2).

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.

- 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 and newer spoil heaps.

A large area of cutaway (about 60 ha) east of the main railway line was planted with Alder as a biomass trial. The southern half of the site was in industrial peat extraction until recently and is dominated by bare peat.

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

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

See Drawing number BNM-ECO-23-35-17 titled **Ballybeg Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Ballybeg Bog.

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*), Pine Marten (*Martes martes*), European Otter (*Lutra lutra*), Red Fox (*Vulpes vulpes*) and Wood mouse (*Apodemus sylvaticus*). The invasive species Mink (*Mustela vison*) has 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 Tortoiseshell (*Aglais urticae*), Speckled Wood (*Pararge aegeria*) and Large white (*Pieris brassicae*) have been recorded at Ballybeg. The Snout moth (*Hypena proboscidalis*) has also been recorded on 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 platyrhynchos*), 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-listed³ bird species of conservation concern recorded in the 10km squares (N43, N53) which Ballybeg intersects include; Barn Owl (*Tyto alba*), Common Kestrel (*Falco tinnunculus*), Common Pochard (*Aythya ferina*), Common Quail (*Coturnix coturnix*), Common Snipe (*Gallinago gallinago*), Common Swift (*Apus apus*), Corn Crake (*Crex crex*), Eurasian Curlew (*Numenius arquata*), Eurasian Woodcock (*Scolopax rusticola*), European Golden Plover (*Pluvialis apricaria*), European Nightjar (*Caprimulgus europaeus*), Grey Partridge (*Perdix perdix*), Northern Lapwing (*Vanellus vanellus*), Northern Wheatear (*Oenanthe oenanthe*), Red Grouse (*Lagopus lagopus*), Whinchat (*Saxicola rubetra*) and Yellowhammer (*Emberiza citrinella*).

A review of the Biodiversity Chapter for the proposed Derrygreenagh Power Project Ecological Impact Assessment Report (EIAR)⁴ was also undertaken. The below paragraphs provide a summary of the species of conservation concern recorded, from Drumman, Ballybeg and Derryarkin during the surveys carried out to inform the EIAR. A full list of bird species recorded within and adjacent to the bog, in the wider study area, is provided in the EIAR. No protected plant species or invasive species were recorded from the study area.

Bat species recorded within the Derrygreenagh Power Project development boundary (including Ballybeg, Drumman and Derryarkin) include Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's Bat (*Nyctalus leisleri*), Daubenton's Bat, *Myotis* sp., Whiskered Bat (*Myotis mystacinus*), Natterer's Bat (*Myotis nattereri*) and Brown Long-Eared Bat (*Plecotus auritus*). Seven bat roosts were confirmed within buildings / structures within / associated with the Power Plant Area. Of these, two Soprano Pipistrelle

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

⁴ AECOM, 2023, Derrygreenagh Power Project Environmental Impact Assessment Report (EIAR), Volume I.

(*Pipistrellus pygmaeus*) maternity roosts and a single Natterer's Bat (*Myotis nattereri*) maternity roost were confirmed. All other roosts are considered to be transitional / occasional roosts or night roosts / feeding perches.

Two badger (*Meles meles*) setts were identified within Drumman bog, and outlier setts were identified in Ballybeg Bog, along with evidence such as trails, latrines, push-throughs, and snuffle holes, with most field evidence found in proximity to the setts. Otter (*Lutra lutra*) spraints were recorded along the Yellow River and the Mongagh River. Irish Hare (*Lepus timidus hibernicus*) and Pine Marten (*Martes martes*) were also recorded. Salmonids and lamprey (*Lampræta* sp.) were recorded from the Mongagh River and the Castlejordan River. A positive eDNA result for white-clawed crayfish was recorded from the Yellow River. Amphibian species recorded within the study area included Frogs and smooth newt. Marsh Fritillary larval webs were recorded at Ballybeg Bog and Drumman Bog.

Birds recorded from the study area (Ballybeg, Drumman and Derryarkin bogs) during the breeding season 2021/2022 included the BOCCI⁵ red listed species Kestrel (*Falco tinnunculus*) and Lapwing (*Vanellus vanellus*), amber listed species Lesser Black-backed Gull (*Larus fuscus*), and green listed species Little Egret (*Egretta garzetta*), Sparrowhawk (*Accipiter nisus*), Buzzard (*Buteo buteo*), and Mute Swan (*Cygnus olor*). Annex I species Peregrine (*Falco peregrinus*) was also recorded.

Wintering bird surveys were carried out at the study area (Ballybeg, Drumman and Derryarkin bogs) between 2021 and 2023. Flocks of wintering Whooper Swan (*Cygnus cygnus*) were recorded at Derryarkin Bog. During the 2022-2023 winter bird survey season, they were recorded in abundances higher than 1% of the national population on one occasion and were recorded in abundances higher than 1% of the county population on 10 of the 28 survey dates.

At Drumman Bog a large flock of Mute Swan (*Cygnus olor*) occurred on through the winter survey season, with a peak population of 80 individuals recorded during the 2021-2022 winter season, and a maximum population of 106 birds in the 2022-2023 season (recorded in October 2022).

A large population of red listed species Golden Plover (*Pluvialis apricaria*) was regularly recorded flying between Drumman Bog and the other Derrygreenagh bogs, with up to 400 individuals recorded at Drumman in 2021-22, and 560 individuals recorded in February 2023. Wintering flocks of red listed species Lapwing (*Vanellus vanellus*) were recorded in 2021-22, with 200 individuals within the largest flock (recorded in late October 2021), increasing to 569 in February 2023. Amber listed species Hen Harrier (*Circus cyaneus*) was also recorded, with two individuals recorded roosting in January and February 2023 on Drumman Bog.

Other species recorded during the wintering bird surveys include the red listed species Kestrel (*Falco tinnunculus*) and snipe (*Gallinago gallinago*), amber listed species Lesser Black-backed Gull (*Larus fuscus*), Merlin (*Falco columbarius*), and green listed species Little Egret (*Egretta garzetta*), Sparrowhawk (*Accipiter nisus*), Buzzard (*Buteo buteo*). The Annex I Peregrine (*Falco peregrinus*) was also recorded.

3.3.3 Invasive species

A broad range of common garden escapes are also occasionally present around the margins of Bord na Móna 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.

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 Ballybeg Bog. The nearest EU 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) – 10.26 km west of Ballybeg
- Lough Ennel SAC (Site Code: 000685) – 11.616km northwest of Ballybeg
- Lough Ennel SPA (Site Code: 004044) – 12km northwest of Ballybeg
- Mount Hevey Bog SAC (Site Code: 002342) – 14km northeast of Ballybeg
- Charleville wood SAC (Site Code: 000571) – 19km southwest of Ballybeg

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

- Grand Canal NHA (NPWS Site Code: 002104), occurs approximately 790m 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 5.4km to the east of Ballybeg.
- Daingean Bog NHA (NPWS Site Code: 002033), occurs approximately 7.3km to the southwest of Ballybeg
- Milltownpass Bog NHA (NPWS Site Code: 002323), occurs approximately 7.9km 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
- Split Hills and Long Hill Esker (NPWS Site Code: 001831), occurs approximately 10.2km northwest of Ballybeg Bog

See drawing *BNM-ECO-23-35-23: Ballybeg Bog 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. 417) and Lough Ennell (Ramsar Site No. 848) which are approximately 4.5km and 11km from the Ballybeg bog boundary respectfully.

3.5 Hydrology and Hydrogeology

Ballybeg bog is located in part of the Boyne Catchment (Catchment ID: 07) as defined by the EPA under the Water Framework Directive (WFD). The bog lies within the Yellow [Castlejordan]_SC_010 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) downstream. The Derryron Stream (EPA Code: 07D21) rises with the northeast of the site and flows east then north to the Yellow (Castlejordan) River. The Coolcor Stream (EPA code: 07C08) watercourse arises to the west of the site and enters the southern section of the site before running northeast towards the Yellow (Castlejordan) River. The Road stream (EPA Code: 14R53) rises to the east of the site and flows south. 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 m³/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 m³/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. These data indicate 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.

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

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 regular basis by Bord na Móna 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 treated 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 Stream, which flows through the site and discharges to the Yellow River. This stream (Coolcor Stream) 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-23-35-02 titled *Ballybeg Bog: Structures and Sampling*, along with Drawing number BNM-ECO-23-35-WQ01 titled *Ballybeg Bog: 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.*, 20017). 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) 2018-2021 (DHPCLG, 2017) 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 Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP 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 P0501-01) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.

This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.

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 CO₂-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 CO₂-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 CO₂-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 CO₂ emissions from drained peatlands or increased methane (CH₄) 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 CO₂ emissions (Gunther et al. 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO₂ 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. Wetlands 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 after re-wetting.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

A large part of the site can be rated as having a low local ecological value (E) as it is in milled peat production. The large area of cutaway has a higher local ecological value (D). 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).

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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 Bord na Móna 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.
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).

There has been ongoing public consultation about the proposed Derrygreenagh Power Project, rehabilitation, biodiversity and other general issues at Ballybeg Bog in relation to the proposed project (<https://bnmenergypark.ie/derrygreenagh-power/>) and with relevant statutory and non-statutory stakeholders as part of the EIA process. Specific consultation relating to the project is not listed here, although there has been detailed consultation with stakeholders in relation to these issues and their overlap with rehabilitation and biodiversity.

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 Bord na Móna response to issues raised during consultation

N/A Yet as consultation has not commenced.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what Bord na Móna 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) and the proposed future land-use (Derrygreenagh Power). 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 Bord na Móna.

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 dependent 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.

- 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 contributory sources of impacts (private peat extraction and Bord na Móna). 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 Bord na Móna).
- Bord na Móna 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 Bord na Móna. Bord na Móna have defined the key goal and outcome of rehabilitation at Ballybeg Bog as **environmental stabilisation**, 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 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) and future proposed land-use (Derrygreenagh Power).
- Rehabilitation of Ballybeg Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as 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 is 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 raising the water-level. The pumping regime will be reassessed, and pumping stopped/reduced, and outfalls adjusted if this is desired and has no significant external impact or impacts on current or proposed future land-uses.
- Ballybeg has some deeper residual peat present. This would have the potential to develop *Sphagnum*-rich cutaway vegetation if the hydrology can be stabilised.

- **Potential land-use.** Bord na Móna are planning to develop Derrygreenagh Power Project at Ballybeg Bog, Drumman Bog and Derryarkin Bog. Derrygreenagh Power Project is a gas-fired Power Plant Area with a total electricity generation capacity of c. 710MW MW including Electricity Grid Connection for power output onto the 400kV Oldstreet-Woodland line. The majority of the Proposed Development will be on Bord na Móna lands (with the exception of 400kV substation and sections of underground cable). The Gas Connection Corridor will be entirely through third party lands.
- The proposed Derrygreenagh Power Project consists of the following elements: the Power Plant Area and associated infrastructure, Electricity Grid Connection infrastructure, temporary construction compounds to facilitate the works. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in the second half of 2023. The development planning boundary overlaps Ballybeg Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan. There is expected to be Electricity Grid Connection infrastructure including double circuit 220kV Overhead Line (OHL) c. 12 pylons and 2 no new access roads from an upgraded machine pass onto the OHL corridor, a line-cable interface compound facilitating transmission via 220kV double circuit underground cable (UGC) c. 3 km along the existing railway and associated infrastructure in Ballybeg Bog, as part of this proposed development project. The UGC will enter a proposed 400kV loop-in substation on third party land at the Oldstreet-Woodland 400kV line. Several replanting areas have been incorporated into the Proposed Development to compensate for any tree loss across the Proposed Development footprint of Derrygreenagh Power Project.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna 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.
- **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 Bord na Móna 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 Bord na Móna 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 Bord na Móna 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 Bord na Móna 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 Bord na Móna 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 past 3 years post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

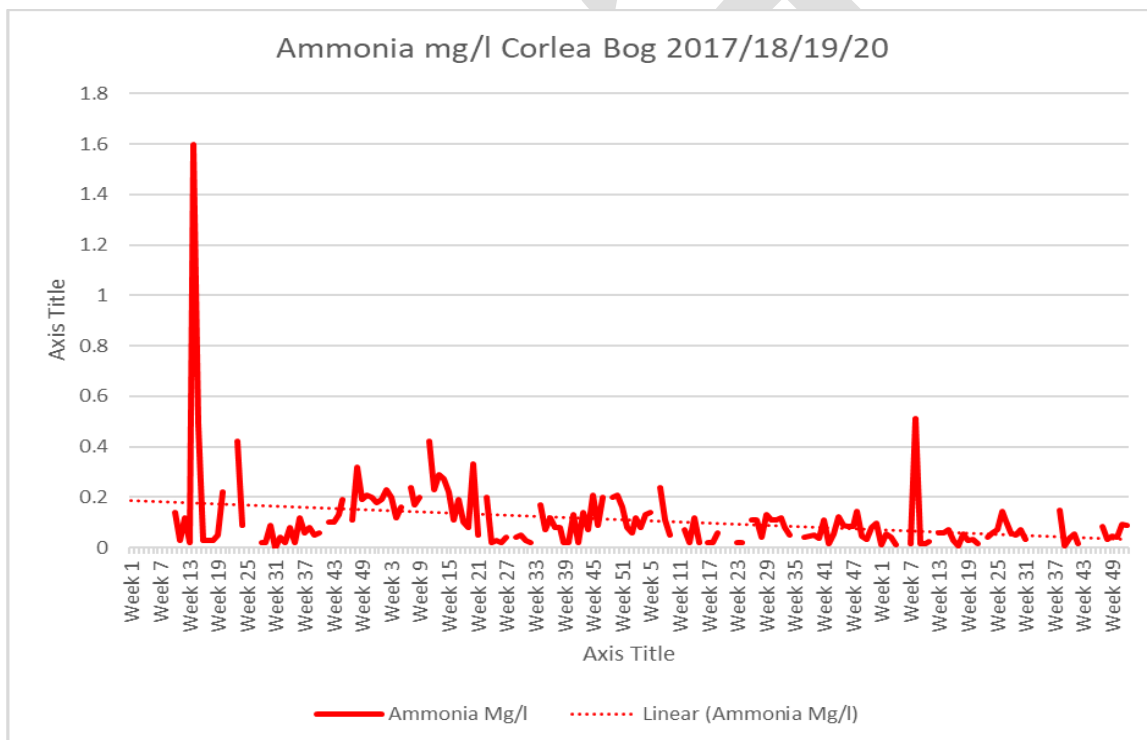
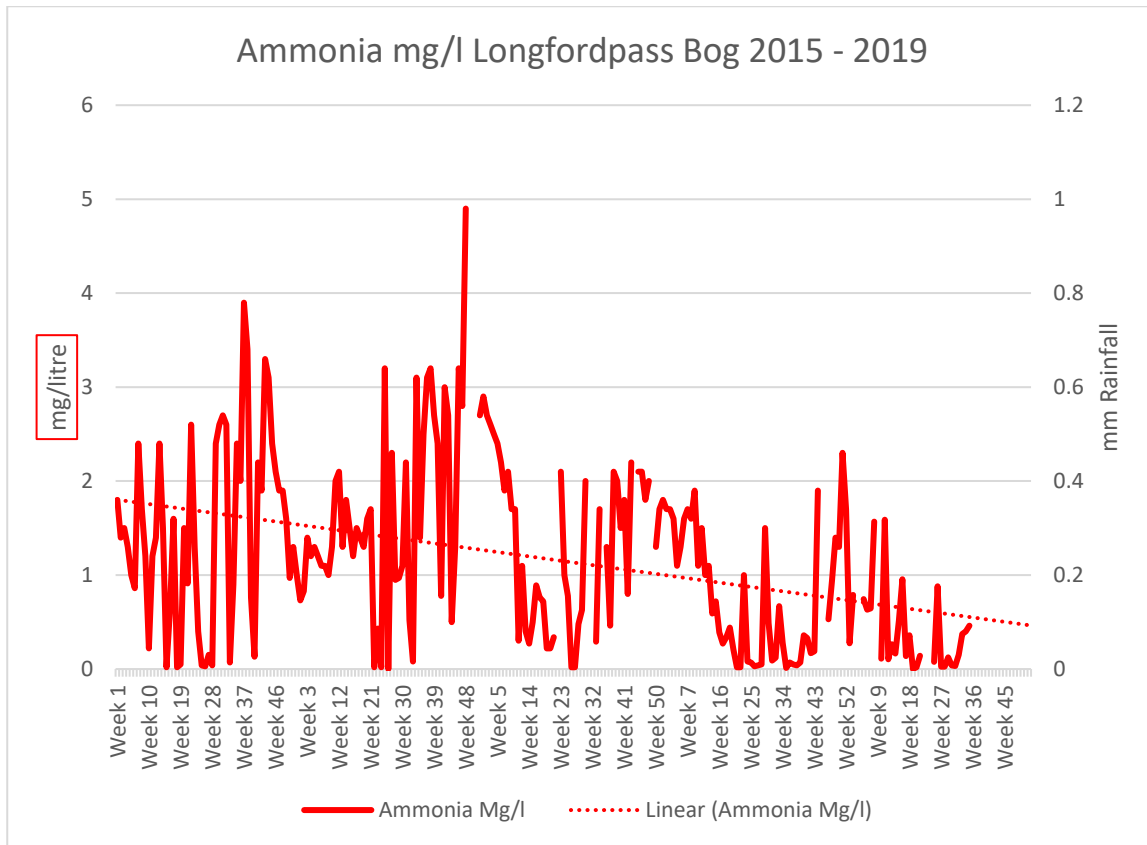


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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

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 (Bord na Móna).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna 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. Bord na Móna 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 Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna 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 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. Bord na Móna 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 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.

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 characteristics. 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-23-35-22 titled ***Ballybeg Bog: Aerial Imagery2020***

BNM-ECO-23-35-04 titled ***Ballybeg Bog: Peat Depths***

BNM-ECO-23-35-03 titled ***Ballybeg Bog: LiDAR Map***

The restoration and rehabilitation measures are provisionally outlined in drawing titled BNM-ECO-23-35-20 ***Ballybeg Bog: 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 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 would develop a mosaic of wetland habitats with some permanent deeper water if pumping was reduced/stopped. 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.
- 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).

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.

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	128.2
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	361.0
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	65.4
Marginal land	MLT1	No work required	27.3
Constraint	Constraint	Renewable energy development & other constraints (access, turf cutting, watercourses)	252.8
Silt Pond	Silt Pond	Silt Pond	1.6
Total Area			836.33

8.1 Completed and Ongoing

- Parts 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.
- 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.
- 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 Licence is surrendered.

8.5 Timeframe (to be adjusted when finalised)

- **2023 - 2025:** Short-term planning actions.
- **2025:** Short-term practical actions
- **>2025:** Decommission silt-ponds, if necessary

8.6 Budget and costing

Bord na Móna 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 Bord na Móna Annual Report (Bord na Móna, 2022). Bord na Móna 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.

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, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This monthly 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 Bord na Móna 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.

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 Counties 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. There is still some historical energy peat stock remaining on some bogs and these peat stock will be transferred via the BNM rail network to Edenderry Power Station up to 2024 when the power station is expected to have ceased using peat as fuel.

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 Lislogher 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.

Lislogher 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. Lislogher 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 Bord na Móna (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. Bord na Móna 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 conifer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

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 motocross 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.

During the 1980's/1990's 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.

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 Bord na Móna 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 started at Carrenstown in 2022.

Intensive decommissioning and rehabilitation for the Derrygreenagh Bog Group started in 2021 at a number of individual bogs.

Bord na Móna is currently developing a wind energy project called Ballivor Windfarm ([Bord na Móna Wind Farm | Ballivor Wind Farm](#)). This proposed project is in the pre-planning stage. The proposed location extends across parts of Bracklin, Lislogher East, Carrenstown and Ballivor Bogs. It is expected to be submitted to planning in 2023.

Bord na Móna is also currently developing a thermal power plant at Derrygreenagh. It is expected this power plant will be fuelled by natural gas. This project was consented in 2010. This project is applying for consents to facilitate connection of the development to the national gas and electrical grid infrastructure [Bord na Móna Energy Park - Bord Na Mona \(BNMenergypark.ie\)](#).

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC Licence Ref. P0501-01 is outlined in Table Ap-2.

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.	2020	Draft 2022

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			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.		
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 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. Part of Bracklin is being assessed for PCAS in 2023.	2020	Draft 2022 Bracklin West (sub-site) rehabilitation is ongoing in 2023
Carranstown	306	Industrial peat production commenced at Carranstown in the 1980s. The majority of the site has relatively deep peat.	Carrenstown 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 Rehab started in 2022
Lislogher East	486	Industrial peat production commenced at Lislogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lislogher 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 2022
Lislogher West	239	Lislogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lislogher West was drained but never fully developed for industrial peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	N/A	Rehab plan finalised in 2023. Rehab to start 2023
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 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.		
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. Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.	2015	Draft 2023
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.	2020	Draft 2023
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). Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.	2020	Draft 2023
Toar	445	Industrial peat production commenced at Toar in the 1980s. 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). Part of the east of the site is being considered for a gravel extraction project.	2020	Draft 2023

See Drawing number BNM-ECO-23-35-24 titled **Derrygreenagh Bog Group**, included in the accompanying Mapbook which illustrates the location of Ballybeg bog and the Derrygreenagh Bog Group in context to the surrounding area.

APPENDIX II. ECOLOGICAL SURVEY REPORT

Ecological Survey Report			
<i>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.</i>			
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:			
<ul style="list-style-type: none"> • 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:			
<ul style="list-style-type: none"> • 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 Bord na Móna 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			

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 (pEng) 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 Bord na Móna. 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 Bord na Mona. 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 Bord na Móna 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)

The Grand Canal pNHA 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 gravelly 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

Bord na Moña 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 <i>Sphagnum</i> and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer <i>Campylopus</i> -dominated community	pCamp	PF2
		Pioneer <i>Juncus effusus</i> -dominated community (Soft Rush)	pJeff	PF2
		Pioneer <i>Eriophorum angustifolium</i> -dominated community (Bog Cotton)	pEang	PF2
		Pioneer <i>Juncus bulbosus</i> -dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer <i>Triglochin palustris</i> -dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with <i>Cladium</i> (rich fen)	pCladium	PF1
	Emergent communities	Pioneer <i>Carex rostrata</i> -dominated community (Bottle Sedge)	pRos	FS1
		Pioneer <i>Phragmites australis</i> -dominated community (Common Reed)	pPhrag	FS1
		Pioneer <i>Typha latifolia</i> -dominated community (Reedmace)	pTyp	FS1
		Pioneer <i>Schoenoplectus lacustris</i> -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 <i>Betula/Salix</i> -dominated community (A) (Birch/Willow)	eBir	WS1
		Open <i>Betula/Salix</i> -dominated community (B) (Birch/Willow)	oBir	WS1
		Closed <i>Betula/Salix</i> -scrub community (C) (Birch/Willow)	cBir	WS1
		<i>Ulex europaeus</i> -dominated community (Gorse)	eGor	WS1
		<i>Betula/Salix</i> -dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry <i>Calluna vulgaris</i> -dominated community (Heather)	dHeath	HH1
		Dense <i>Pteridium aquilinum</i> (Bracken)	dPter	HD1
	Grassland	Pioneer dry calcareous and neutral grassland (Centaureo-Cynosuretum)	gCal	GS1
		<i>Dactylis-Anthoxanthum</i> -dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2
		<i>Anthoxanthum-Holcus-Equisetum</i> community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		<i>Molinia caerulea</i> -dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (<i>Filipendulion ulmariae</i>)	Mar	GM1
	Disturbed	<i>Tussilago farfara</i> -dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		<i>Epilobium</i> -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.

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 Bord na Móna staff and updated as required.

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 Bord na Móna ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below, should any invasive species be introduced:

- 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 plague⁶ 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 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, Bord na Móna 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 Bord na Móna 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.

Bord na Móna 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 Bord na Móna. 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 Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor-Derrygreenagh Bog Group (Ref. P0-501-01). 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. The bog is part of the Ballivor-Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 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.

Bord na Móna 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.

3 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 Bord na Móna.

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.

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna 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 Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna 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 Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the proposed future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse 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 Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna 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.

4 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)

The National River Basin Management Plan (Department of Housing, Planning, Community and Local Government 2017) 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 2018-2021 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part of the WFD (2018-2021) programme of measures. The NRBMP 2018-2021 takes account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (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 2018-2021 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Peatland Climate Action Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 2018-2021 deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The draft NWBMP 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 hydromorphological condition of rivers.

The draft NWBMP 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 are 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 Bord na Móna 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 NWBMP 2022-2027.

5 National Biodiversity Action Plan 2016-2021

The National Biodiversity Action Plan 2016-2021 has a vision that biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally. Ireland's 2nd National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BNM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

Rehabilitation of Ballybeg Bog is expected to significantly contribute in the future to actions and targets of the National Biodiversity Action Plan 2016-2021, particularly in relation to peatland restoration and creation of new habitats such as wetlands and woodlands.

6 National conservation designations

Bord na Móna 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, cNHAs) and National Nature Reserves). Bord na Móna 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.

7 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.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. The Peatland Climate action scheme (PCAS), which includes enhanced rehabilitation measures, is expected to restore several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna 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. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

8 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 Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

9 Land-use planning policies

As Bord na Móna 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. Bord na Móna 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 Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

10 National Archaeology Code of Practice

Bord na Móna 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>)

The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna 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 Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

11 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 Bord na Móna 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 Bord na Móna'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 EU's 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 policies.

12 Bord na Móna commitments

Bord na Móna 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.

The company announced that industrial peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Rehabilitation measures would 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 Climate Action Plan 2019, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. To date, 15,000 hectares of cutaway and cutover bog have been rehabilitated using this approach with 5,000 hectares in active rehabilitation.

In line with Bord na Móna'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.

The above commitments have now been followed by the decision by the company to cease industrial peat extraction and rehabilitate a target of 33,000 ha between 2021-2025.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. 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.

13 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020 (Draft)

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how Bord na Móna's cutover peatland estate is complex in nature with great variability in terms of peat depths, peat types, drainage, subsoil condition and environmental value. Thus, future options require consideration on a site-specific basis, also bearing in mind the considerable internal variation within bogs. The development of the land-bank will also take account of national needs, while also taking account of the various national legislation, policies and plans related to the management of peatlands. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of these sites, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

Any consideration of other future after-uses for Bord na Móna land such as development or other mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this peatland rehabilitation plan.

Draft

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 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	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.

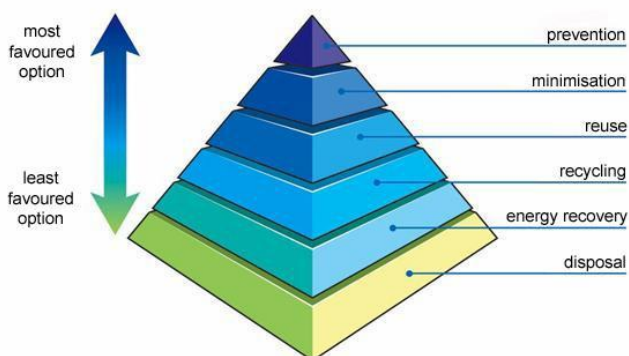
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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, Bord na Móna will utilize the appropriate waste hierarchy to identify waste that can be 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 Bord na Móna 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 turbarry).

Rehabilitation: Rehabilitation is defined in general by Bord na Móna 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, Bord na Móna 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 Bord na Móna sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping is 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.

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 IPPC 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 IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or 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 than 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 bog timbers. Schedule 3 (ii) of the IPPC 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 IPPC 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 IPPC 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 31st 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.

IPPC 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 to 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 IPPC 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 our 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 IPPC 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.

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 IPPC 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 IPPC 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 IPPC 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 their 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 IPPC Licence P0501-01.

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.



<h1>Bord na Móna</h1>	Procedure: ENV017	Rev: 1
Title: Archaeological Findings	Approved: EM	Date:

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

2) Procedure

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1			
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Bord na Móna

Ballybeg Bog Rehab Plan GIS Map Book 2023

Document Control Sheet

Document Name:	Ballybeg Bog Rehab Plan GIS Map Book 2023
Document File Path:	
Document Status:	Draft v1.0

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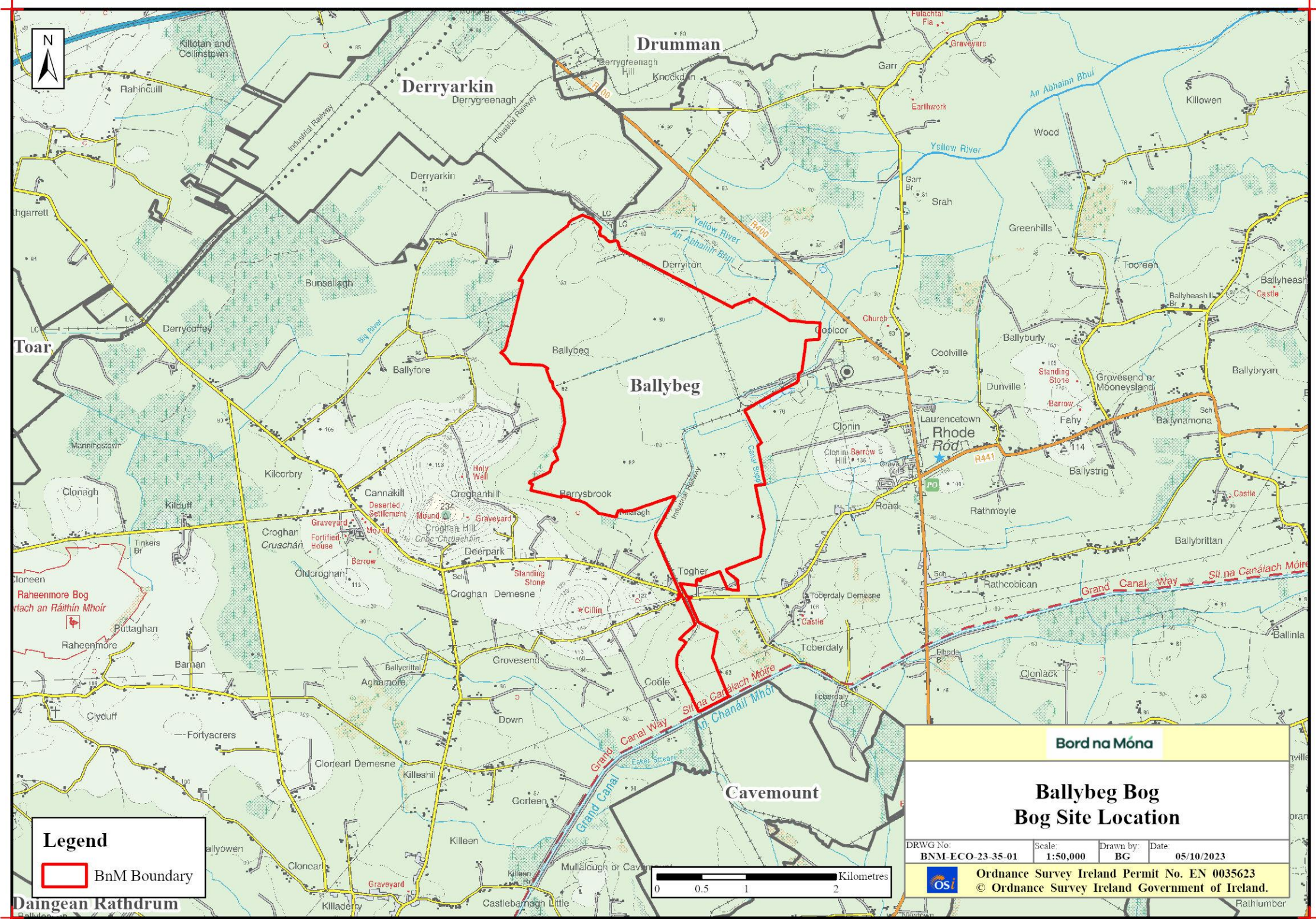
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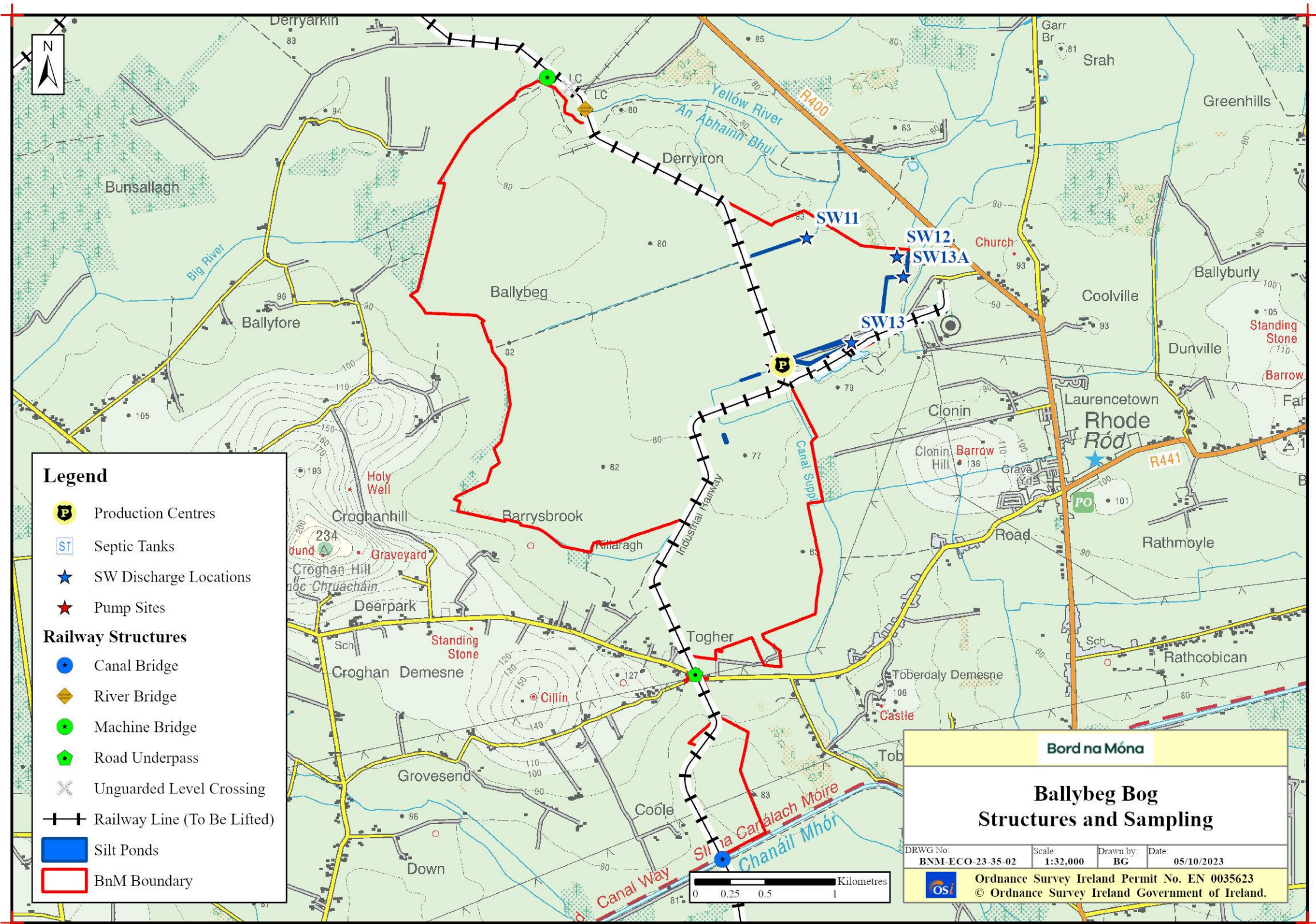
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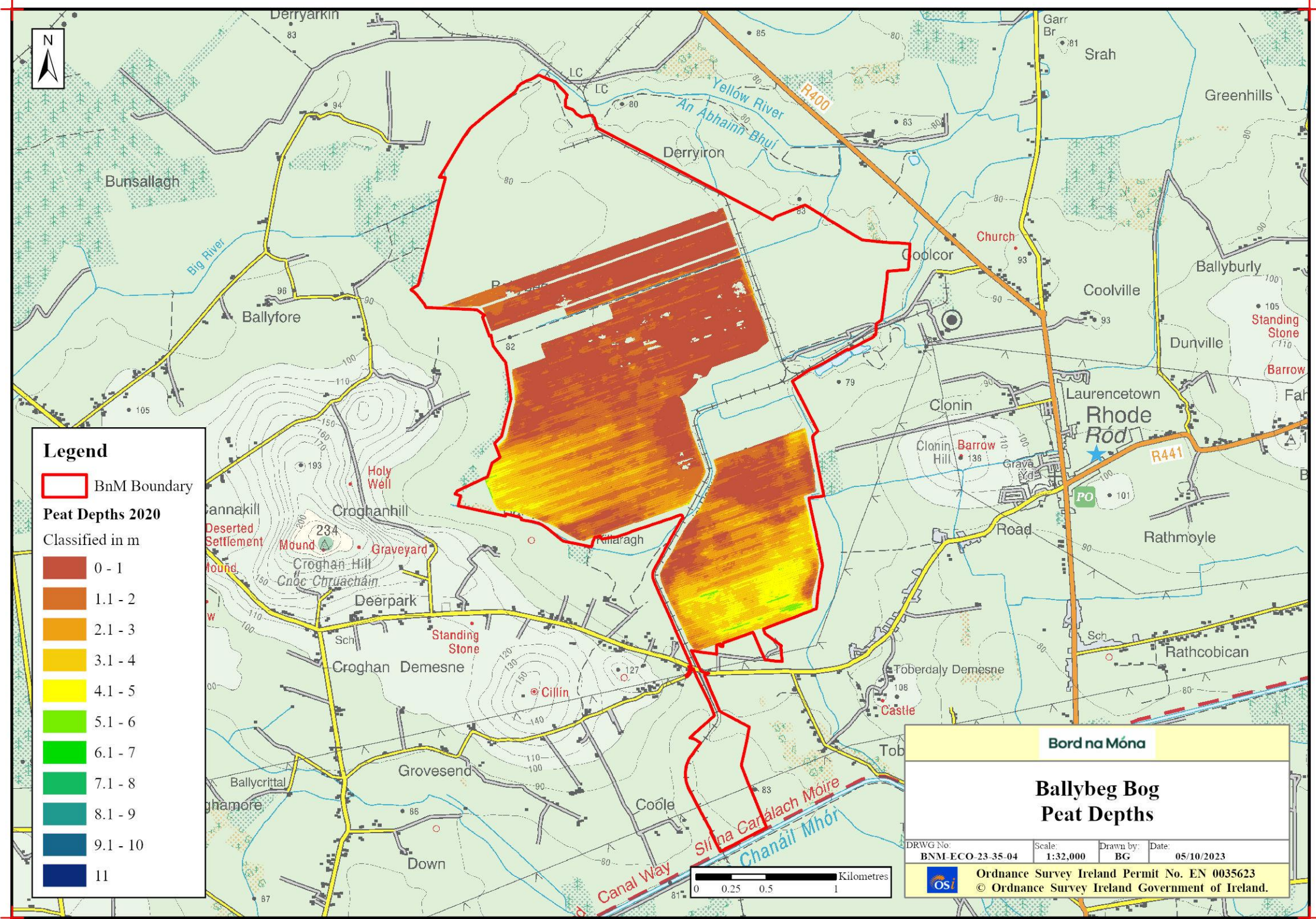
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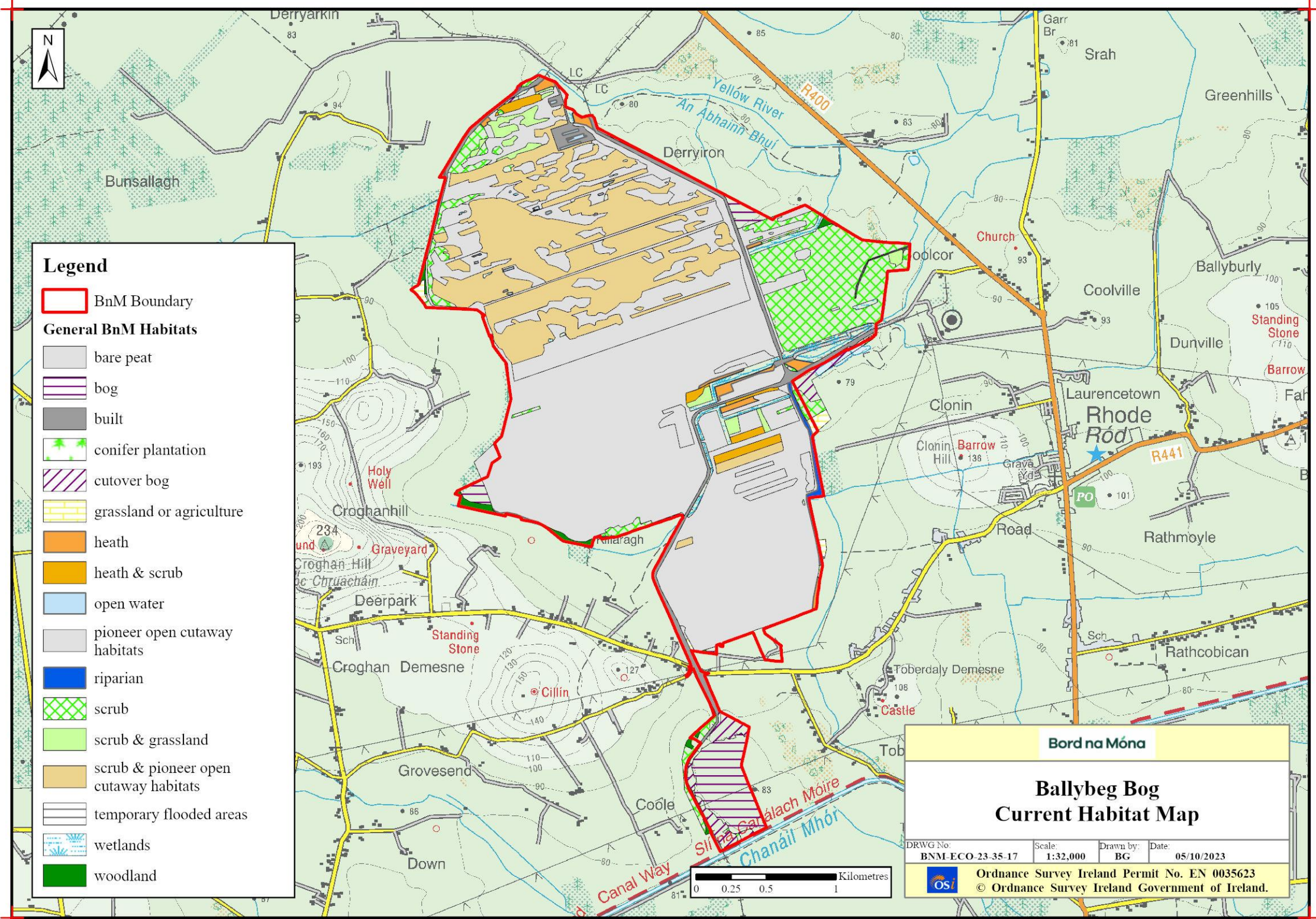
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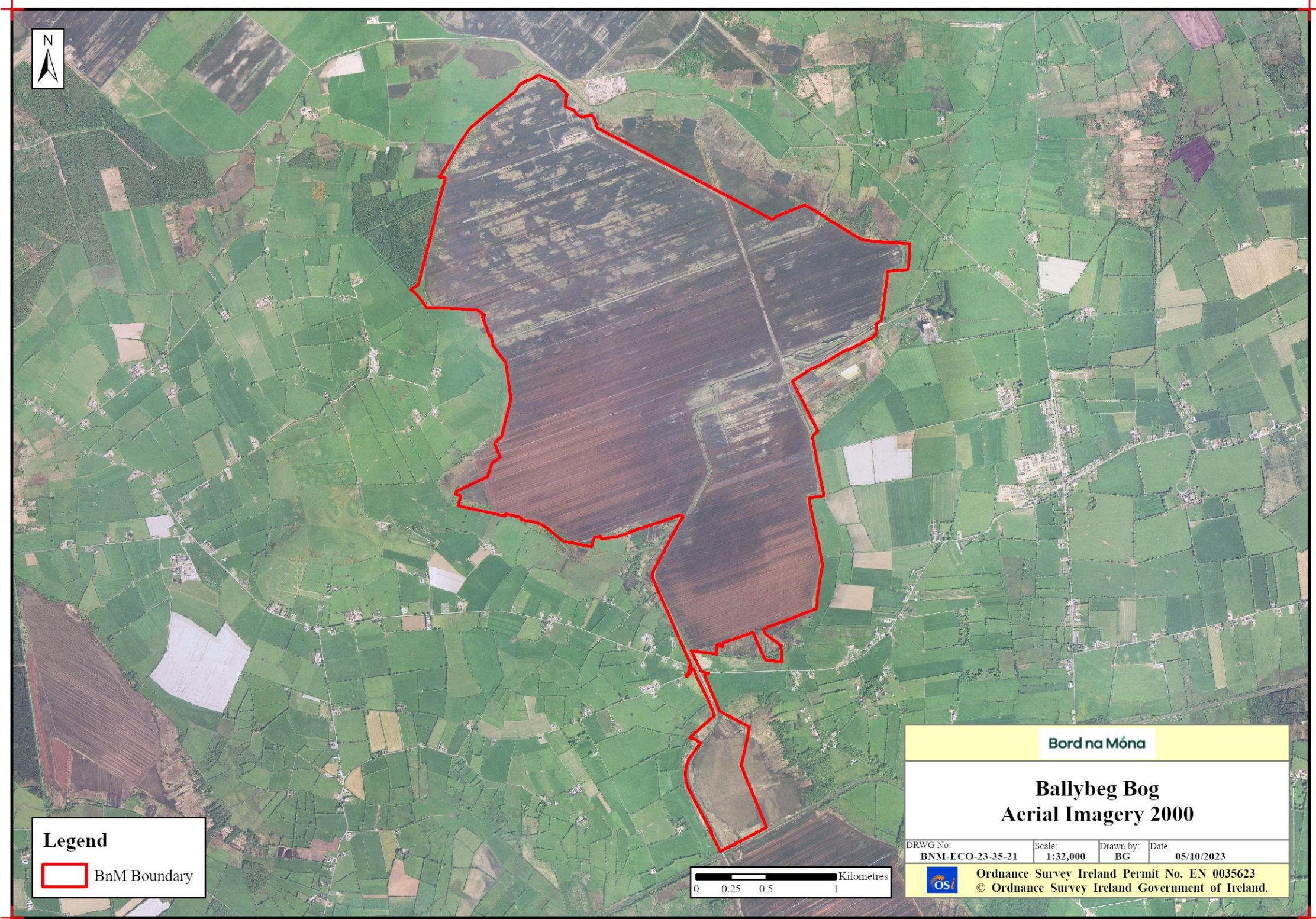


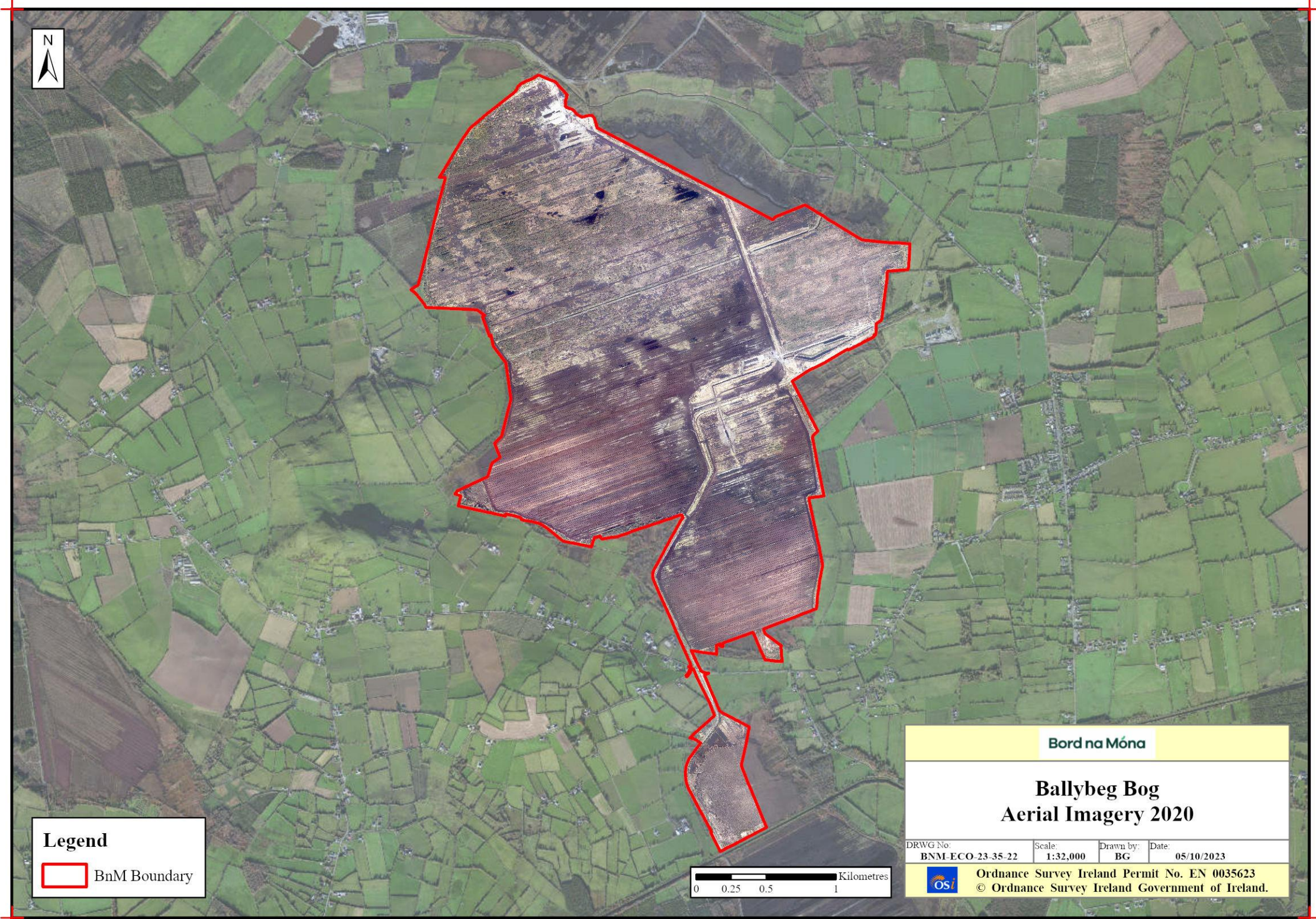
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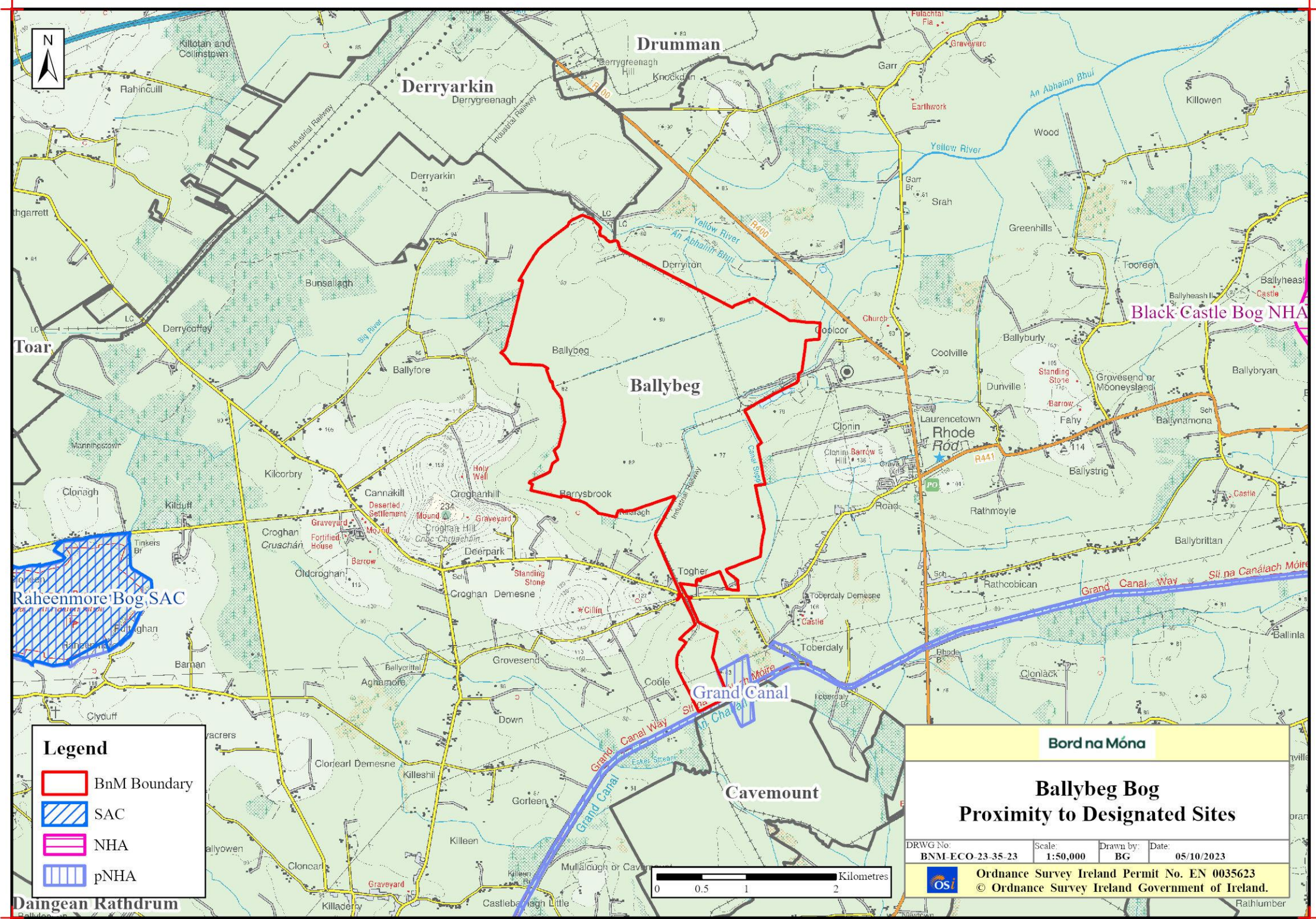


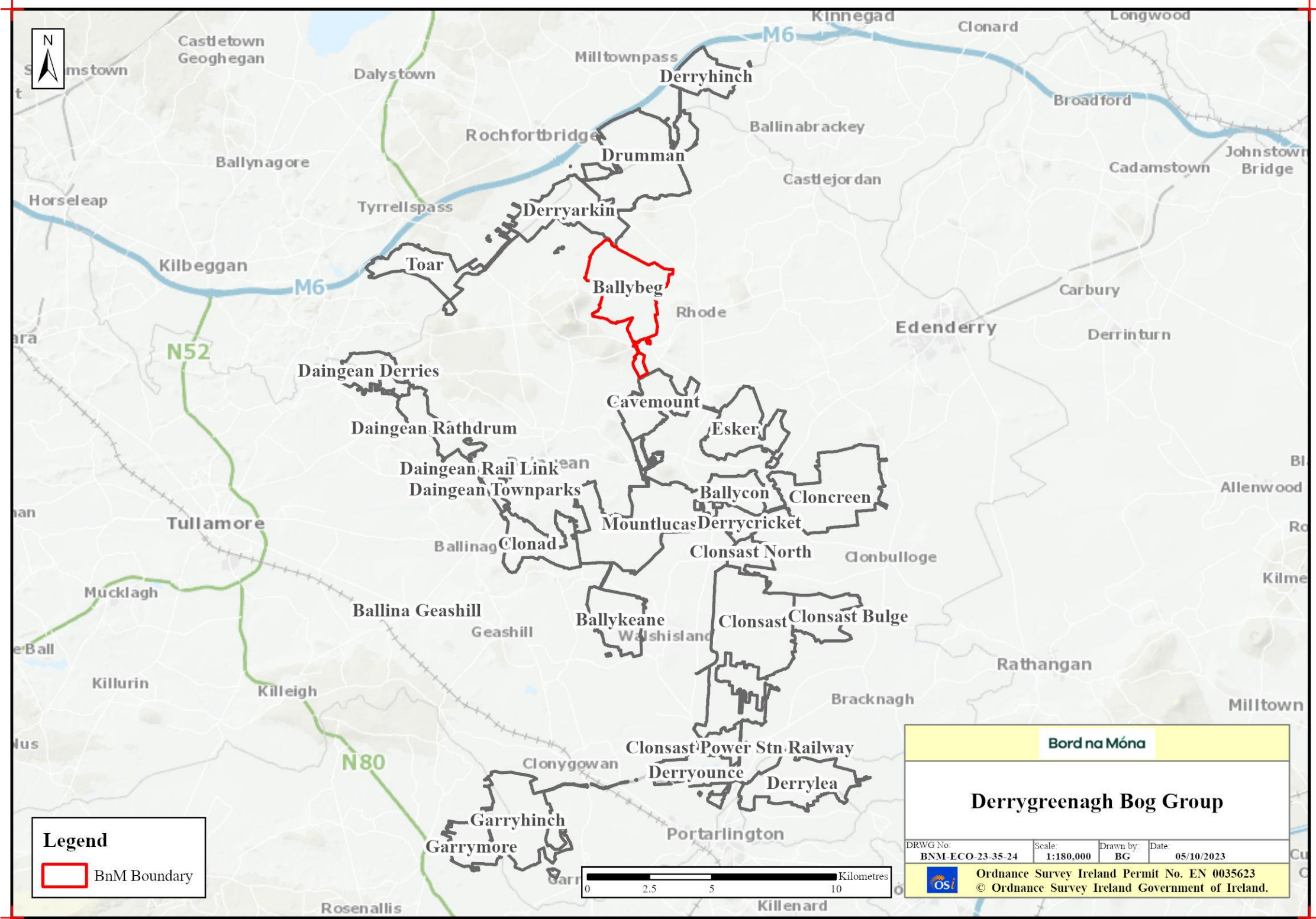












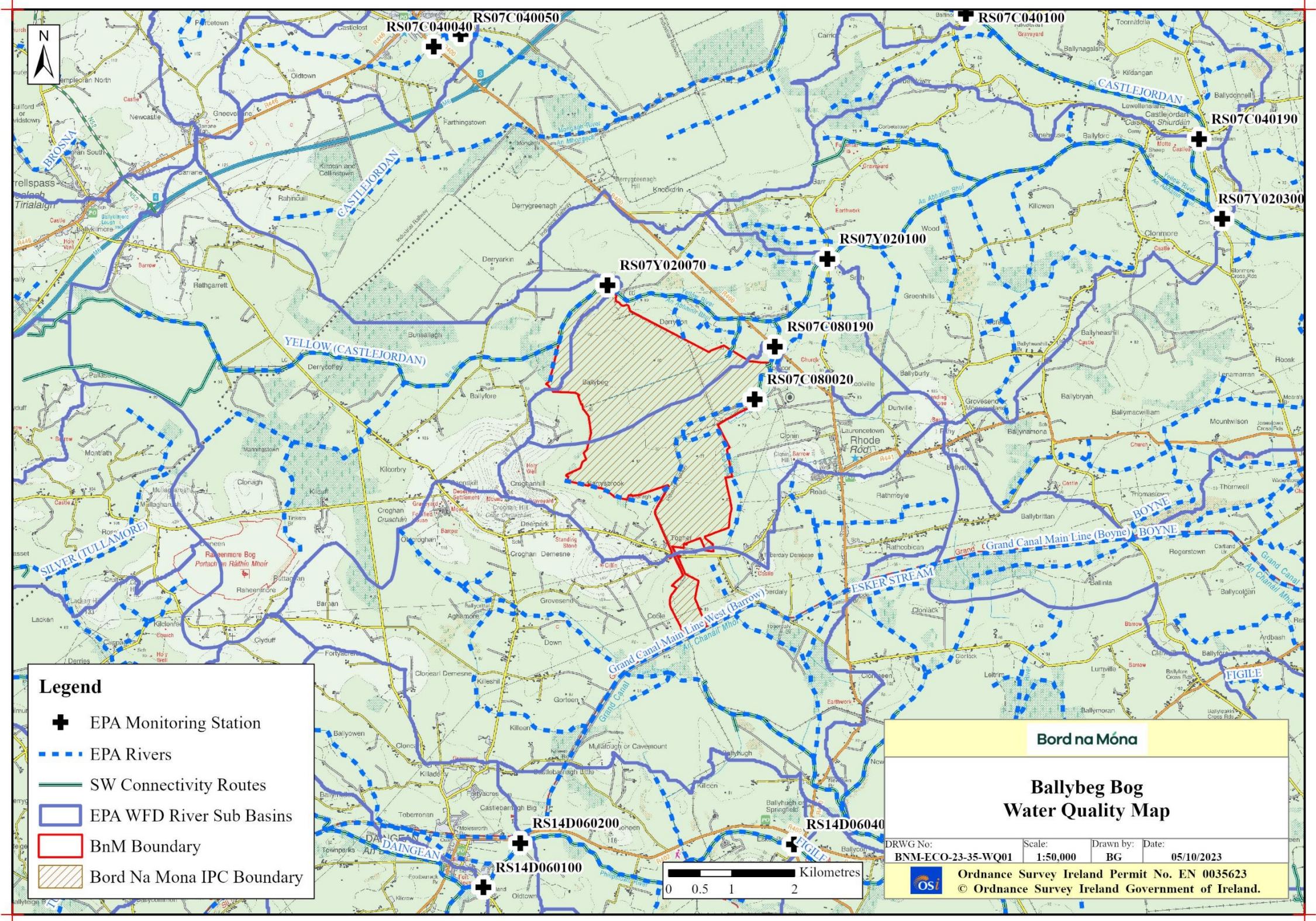
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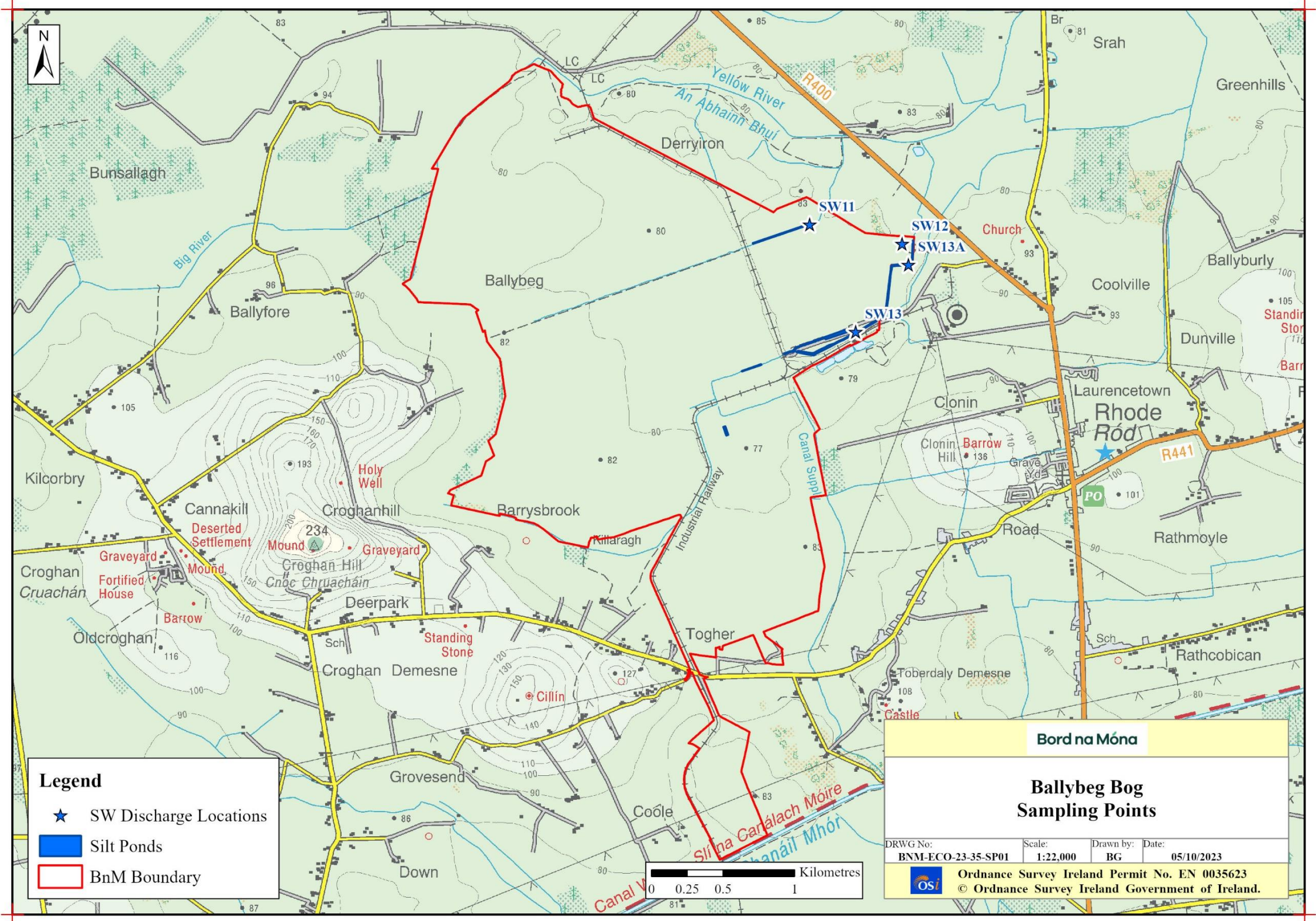
Derrygreenagh Bog Group

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Hydrology / Topography Maps





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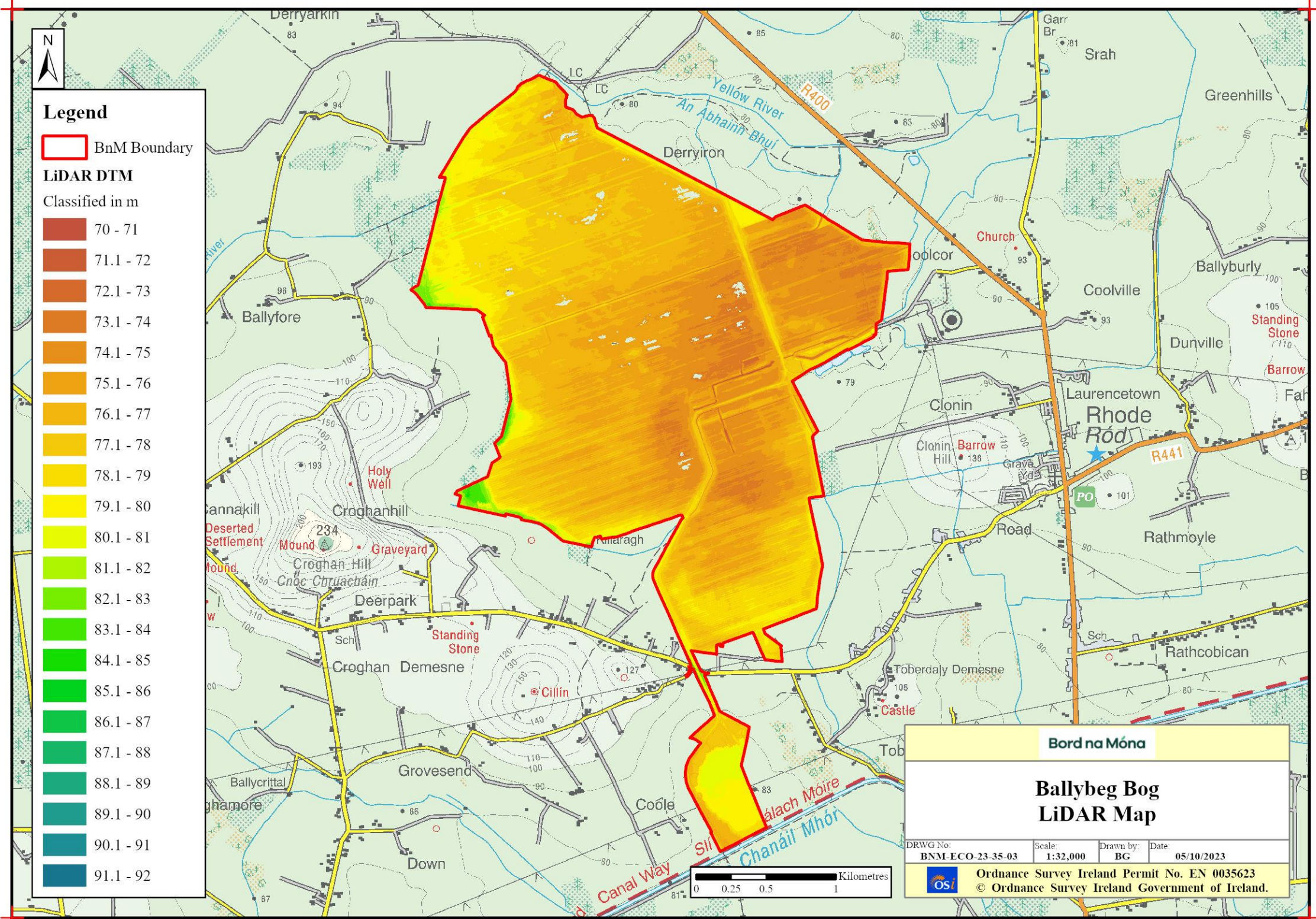
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- BnM Boundary

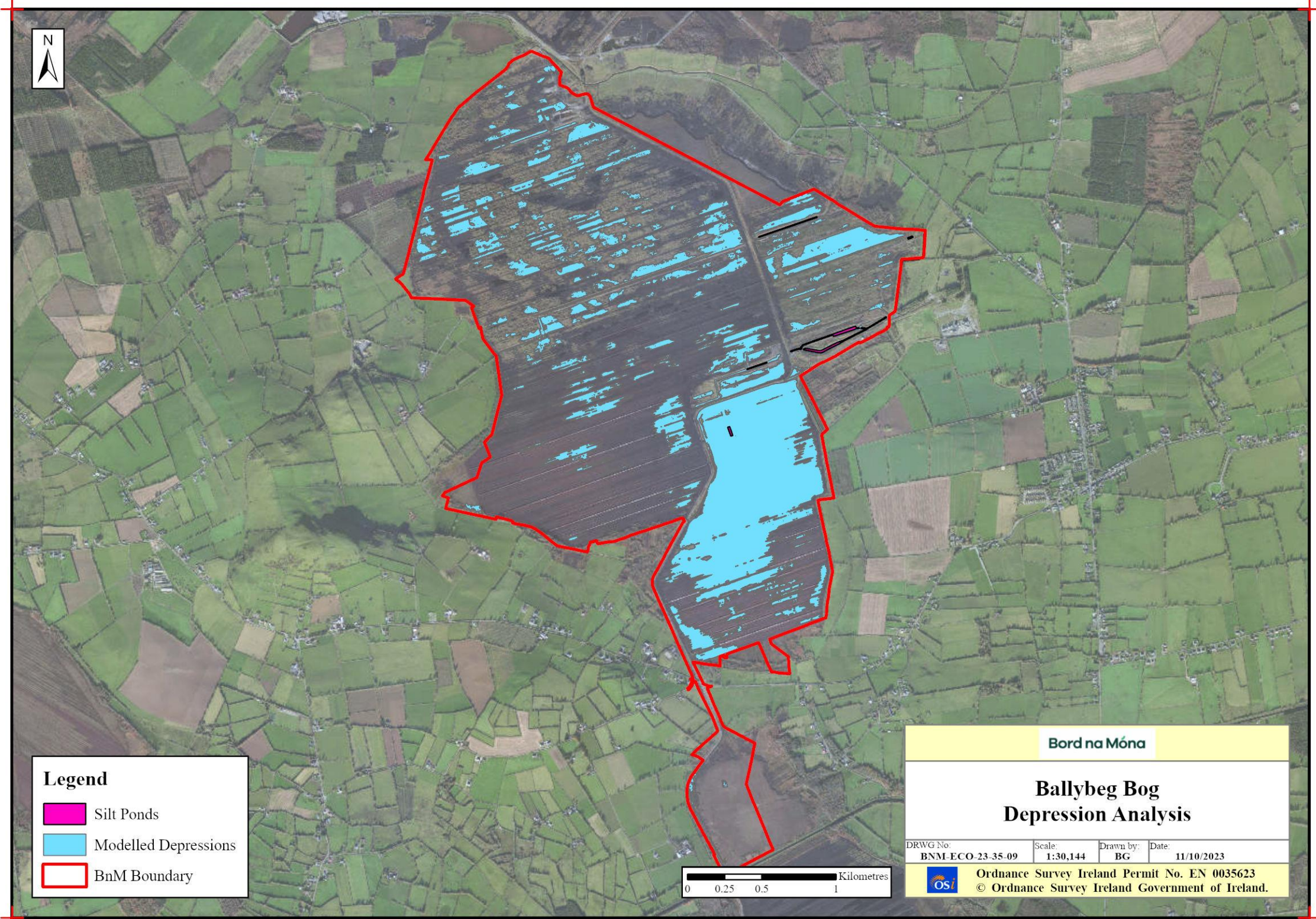
Bord na Móna

**Ballybeg Bog
Sampling Points**

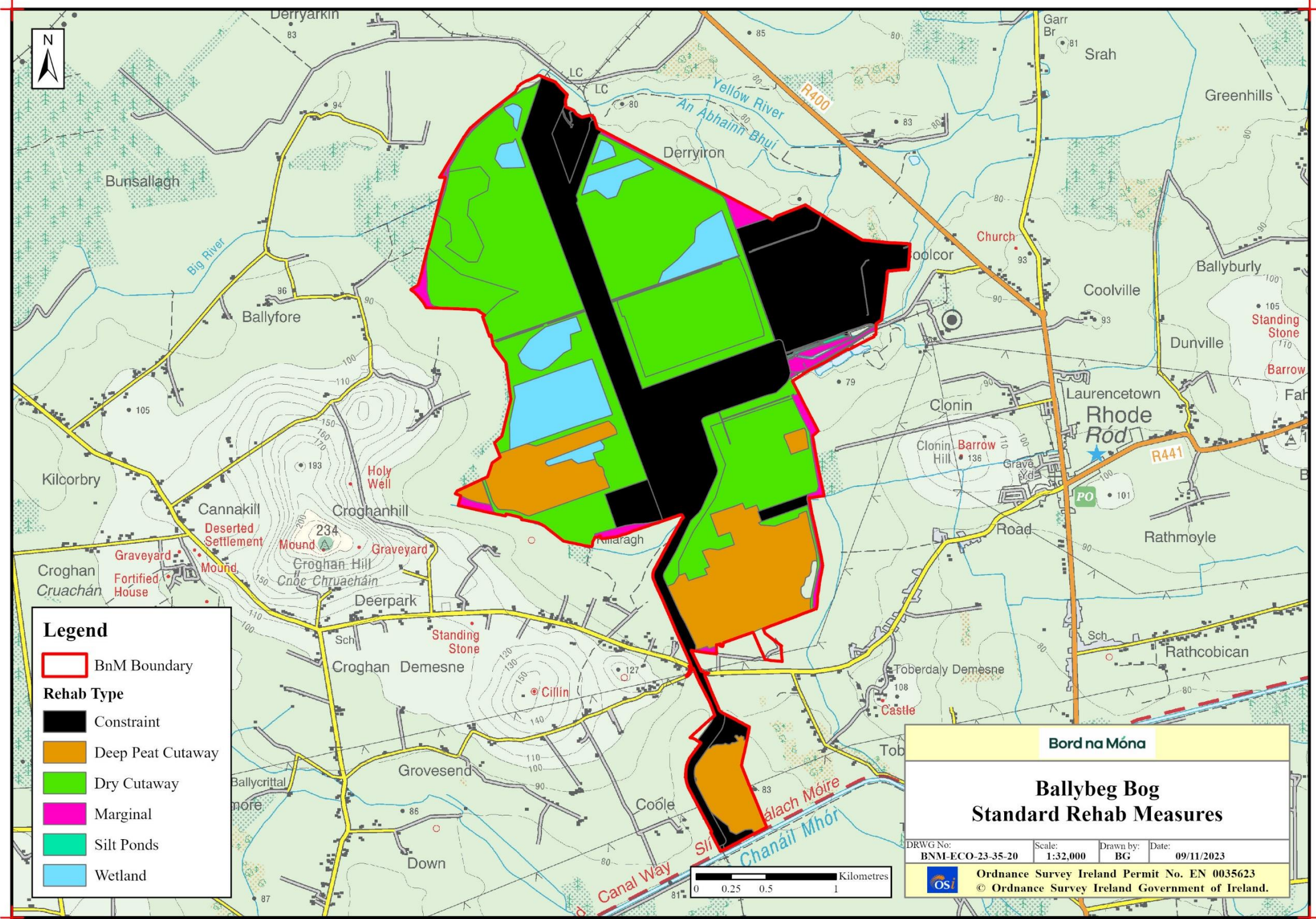
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Rehabilitation Maps



Bord na Móna

Derryarkin Bog

**Draft Cutaway Bog Decommissioning
and Rehabilitation Plan**

2023

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 Bord na Móna agree with the EPA the measures that will provide for rehabilitation, i.e. stabilisation of Derryarkin 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 Derryarkin Bog.

Bord na Móna 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. Bord na Móna 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.

Bord na Móna are planning to develop Derrygreenagh Power Project at Deryarkin Bog as well as the nearby bogs Drumman and Ballybeg. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in the second half of 2023. The development boundary overlaps the Derryarkin Bog rehabilitation boundary. This area has been mapped as a constraint in the rehabilitation plan.

Document Control Sheet

Document Name:	Derryarkin Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2023					
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Derrygreenagh ref. 501 (EPL)\Derryarkin Sub Con 2023					
Document Status:	Draft					
This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	28	4	0	10
Rev.	0.1	Author(s):		Checked By:		Approved By:
	Name(s):	LC		MMC		MMC
	Date:	10/07/2023		26/07/2023		26/7/2023
Rev.	1	Author(s):		Checked By:		Approved By:
	Name(s):	JOS		MMC		MMC
	Date:	28/09/2023		29/09/2023		29/09/2023
Rev.	1.1	Author(s):		Checked By:		Approved By:
	Name(s):					
	Date:					

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Non-technical Summary

- 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 Bord na Móna offices at Derrygreenagh Works, and close to several other bogs in Derrygreenagh including Drumman Bog and Ballybeg Bog.
- Industrial peat production commenced in Derryarkin Bog in the 1950s and formally ceased in the 1990s.
- There is an industrial railway through the site that is part of the greater Derrygreenagh industrial rail network.
- 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 Bord na Móna (Derryarkin Sand & Gravel Ltd).
- There is an existing guyed wind monitoring mast, with instruments, 100m in height, with planning permission for a period of six years (file reference 19/176), located south of the railway line and west of the R400 road
- The remainder of Derryarkin Bog has developed as cutaway bog. This cutaway bog contains a range of pioneer habitats including pioneer poor fen, small scattered patches of open water and Birch scrub forming many small wetland complexes.
- There have been several phased pilot rehabilitation measures at Derryarkin Bog and much of the site has been rehabilitated.
- This draft rehabilitation plan has been prepared by Bord na Móna 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.
- Much of the site has already developed pioneer vegetation and establishing habitats. It will take some time for more established habitats to fully develop at Derryarkin, and a peatland ecosystem to be restored.
- Rehab measures have included 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.
- These rehabilitation measures will be planned by a team consisting of expert ecologists, hydrologists and engineers. It is a guiding principle of Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will 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 Bord na Móna bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats 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.
- Bord na Móna are planning to develop Derrygreenagh Power Project at Drumman Bog, Derryarkin Bog and Ballybeg Bog. Derrygreenagh Power Project Proposed Development consists of a Power Plant Area with Combined Cycle Gas Turbine (CCGT) and Open Cycle Gas Turbine (OCGT) and associated infrastructure on Drumman Bog and an Electricity Grid Connection on Derryarkin Bog and Ballybeg Bog consisting of 200kV tail substation, hybrid transmission of double circuit 220kV overhead line and underground cable to allow for power output to the national electricity network via a new loop-in 400kV substation (outside of BNM lands) onto the Oldstreet-Woodland 400kV line. The Overall Project will be facilitated by a Gas Connection Corridor c. 10km to the north of the Power Plant area, this will be through Third Party lands. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in second half 2023. The development planning boundary overlaps Derryarkin Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan. It is expected that there will be electricity grid connection infrastructure and associated infrastructure in Derryarkin Bog.
- This peatland rehabilitation plan does not outline future after-use or development. Bord na Móna 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.

1. INTRODUCTION

Bord na Móna (referred to as ‘Bord na Móna’ or ‘BNM’ 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.

Bord na Móna 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. It has been specifically prepared to address the integration of the proposed Derrygreenagh Power Project at Derryarkin Bog. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

It has been proposed by the Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the ‘Peatlands Climate Action Scheme’ (PCAS). The Peatlands Climate Action Scheme is expected to operate between 2021-2025. Enhanced rehabilitation measures that have been proposed as part of 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 around the margins of the high bog to the west of the site both inside and outside the ownership of Bord na Móna. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address private turf cutting issues on Derryarkin Bog. Nevertheless, Bord na Móna 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 Bord na Móna 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.

Bord na Móna are planning to develop Derrygreenagh Power Project at Drumman Bog, Derryarkin Bog and Ballybeg Bog. Derrygreenagh Power Project Proposed Development consists of a Power Plant Area with Combined Cycle Gas Turbine (CCGT) and Open Cycle Gas Turbine (OCGT) and associated infrastructure on Drumman Bog and an Electricity Grid Connection on Derryarkin Bog and Ballybeg Bog consisting of 200kV tail substation, hybrid transmission of double circuit 220kV overhead line and underground cable to allow for power output to the national electricity network via a new loop-in 400kV substation (outside of BNM lands) onto the Oldstreet-Woodland 400kV line. The Overall Project will be facilitated by a Gas Connection Corridor c. 10km to the north of the Power Plant area, this will be through Third Party lands. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in second half 2023. The development planning boundary overlaps Derryarkin Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan.

The Power Plant Area which is predominantly in Drumman Bog (with the exception of a process water discharge corridor in Derrarkin Bog) is a First Schedule activity under the EPA Act as amended and will require an Industrial Emissions (IE) Licence (per activity class 2.1). The areas within Drumman Bog within the IPC Licence required to facilitate the operational Power Plant Area will thus require decommissioning and closure in advance of an IE Licence determination. The Transmission Service Operator (TSO, EirGrid) and the Transmission Asset Operator (TAO, ESBN) will require full operational control of the 220kV substation area (on Derryarkin Bog) and the line-cable interface compound (Ballybeg Bog) and will thus require advanced decommissioning and closure of these areas.

Derryarkin Bog will be rehabilitated **either** in association with the proposed Derrygreenagh Power Project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the future in the event of an unsuccessful planning application for this project. It is expected that Bord na Móna will revise and update the rehabilitation plan for Derryarkin when a decision is made in relation to planning permission for this project. Bord na Móna remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC Licence. 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 draft rehabilitation plan. If future after-uses are proposed for Derryarkin Bog it is expected that the draft rehabilitation plan would be iterated.

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 Bord na Móna 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);
- 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.
- 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.
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- Pschenyckj *et al.*, 2021, Optimising Water Quality Returns from Peatland Management while Delivering Co-Benefits for Climate and Biodiversity. An Fóram Uisce.
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- 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 (2019). Conserving Bogs – Management Handbook.
- 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);
- 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
- Bord na Móna Annual Report 2023.
- 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 Bord na Móna'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

Bord na Móna 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 2011-2017, 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 Bord na Móna 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.

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 Bord na Móna Bogs in Derrygreenagh including Drumman and Ballybeg and is also located adjacent to the Bord na Móna 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. Industrial milled-peat production began in the 1950s and ceased in the 1990s. The majority of the site is cutaway bog and has now developed pioneer vegetation and establishing habitats. Bare peat cover has reduced significantly. There is still an industrial railway through 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-23-35-01: Bog Site Location, included in the accompanying Mapbook¹, 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 the 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.

Bord na Móna 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 in the 1990's.

¹ Cutaway Bog Decommissioning and Rehabilitation Plan – Derryarkin Bog Map Book

Bord na Móna, 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 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.

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, 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 DAMX Ltd for the development of an off-road motocross track at Derryarkin. Planning permission for the construction of a motocross circuit was sought by DAMX Ltd. in August 2010 (Westmeath Reg. Ref. 104078). Permission for a duration of 10 years was granted in June 2011. This planning permission subsequently expired in 2021. No applications were made to extend the duration of this planning permission, nor have any new planning application related to the site been submitted.

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. It is anticipated that this railway will be decommissioned when peat stocks are finally removed from neighbouring bogs and industrial use ceases.

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 Bord na Móna. Turbary is ongoing on an area of drained raised bog to the northwest of the site.

3.1.3. *Socio-Economic conditions*

Bord na Móna has historically been a vital employer for the rural community of the Midlands of Ireland. Bord na Móna compiled a report on the role of peat extraction in the midlands historically in which they report that in 1986, by the end of Bord na Móna'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 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, Bord na Móna 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 geology² at Derryarkin Bog comprises Lucan Formation, dark limestone and shale, with some sections of Agglomerate, volcanoclastic agglomerate, to the north and south-west of the site. Quaternary sediment maps indicate that Derryarkin is primarily underlain by peat, with till derived from limestones located north outside the site. The site is underlain with peat subsoils. 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 current main land-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

² <https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx>

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 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*). There is a nationally significant flock of Whooper Swans that uses this site in addition to the surrounding grassland and adjacent bogs such as Cavemount and Ballycon. 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) 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.

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/ habitats³ 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 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-23-35-17 titled **Derryarkin Bog: Current Habitat Map**, 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 Pine Marten (*Martes martes*), Badger (*Meles meles*), Red Fox (*Vulpes vulpes*) and Irish Hare (*Lepus timidus subsp. hibernicus*), Rabbit (*Oryctolagus cuniculus*) and Deer.

Several bird species have been noted during BNM ecological surveys at Derryarkin including, Snipe (*Gallinago gallinago*), Lapwing (*Vanellus vanellus*), Wren (*Troglodytes troglodytes*), Meadow Pipit (*Anthus pratensis*), Hooded Crow (*Corvus cornix*), Heron (*Ardea cinerea*), Mallard (*Anas platyrhynchos*), Meadow Pipit (*Anthus pratensis*), Thrush (*Turdus philomelos*), Blackbird (*Turdus merula*), Reed Bunting (*Emberiza schoeniclus*), Goldfinch (*Carduelis carduelis*), Lesser Black-backed Gull (*Larus fuscus*), Black-headed Gull (*Larus ridibundus*), Mute Swan (*Cygnus olor*) and Curlew (*Numenius arquata*).

NBDC records for red-listed⁴ 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*), Black-headed Gull (*Larus ridibundus*), Curlew (*Numenius arquata*), European Nightjar (*Caprimulgus europaeus*), Golden Plover (*Pluvialis apricaria*),

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

Lapwing (*Vanellus vanellus*), Yellowhammer (*Emberiza citrinella*) and Grey Partridge (*Perdix perdix*), Red Grouse (*Lagopus lagopus*) and Common Quail (*Coturnix coturnix*).

A review of the Biodiversity Chapter for the proposed Derrygreenagh Power Project Ecological Impact Assessment Report (EIAR)⁵ was also undertaken. The below paragraphs provide a summary of the species of conservation concern recorded, from Drumman, Ballybeg and Derryarkin during the surveys carried out to inform the EIAR. A full list of bird species recorded within and adjacent to the bog, in the wider study area, is provided in the EIAR. No protected plant species or invasive species were recorded from the study area.

Bat species recorded within the Derrygreenagh Power Project development boundary (including Ballybeg, Drumman and Derryarkin) include Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's Bat (*Nyctalus leisleri*), Daubenton's Bat, *Myotis* sp., Whiskered Bat (*Myotis mystacinus*), Natterer's Bat (*Myotis nattereri*) and Brown Long-Eared Bat (*Plecotus auritus*). Seven bat roosts were confirmed within buildings / structures within / associated with the Power Plant Area. Of these, two Soprano Pipistrelle (*Pipistrellus pygmaeus*) maternity roosts and a single Natterer's Bat (*Myotis nattereri*) maternity roost were confirmed. All other roosts are considered to be transitional / occasional roosts or night roosts / feeding perches.

Two badger (*Meles meles*) setts were identified within Drumman bog, and outlier setts were identified in Ballybeg Bog, along with evidence such as trails, latrines, push-throughs, and snuffle holes, with most field evidence found in proximity to the setts. Otter (*Lutra lutra*) spraints were recorded along the Yellow River and the Mongagh River. Irish Hare (*Lepus timidus hibernicus*) and Pine Marten (*Martes martes*) were also recorded. Salmonids and lamprey (*Lampreta* sp.) were recorded from the Mongagh River and the Castlejordan River. A positive eDNA result for white-clawed crayfish was recorded from the Yellow River. Amphibian species recorded within the study area included Frogs and smooth newt. Marsh Fritillary larval webs were recorded at Ballybeg Bog and Drumman Bog.

Birds recorded from the study area (Ballybeg, Drumman and Derryarkin bogs) during the breeding season 2021/2022 included the BOCCI⁶ red listed species Kestrel (*Falco tinnunculus*) and Lapwing (*Vanellus vanellus*), amber listed species Lesser Black-backed Gull (*Larus fuscus*), and green listed species Little Egret (*Egretta garzetta*), Sparrowhawk (*Accipiter nisus*), Buzzard (*Buteo buteo*), and Mute Swan (*Cygnus olor*). Annex I species Peregrine (*Falco peregrinus*) was also recorded.

Wintering bird surveys were carried out at the study area (Ballybeg, Drumman and Derryarkin bogs) between 2021 and 2023. Flocks of wintering Whooper Swan (*Cygnus cygnus*) were recorded at Derryarkin Bog. During the 2022-2023 winter bird survey season, they were recorded in abundances higher than 1% of the national population on one occasion and were recorded in abundances higher than 1% of the county population on 10 of the 28 survey dates.

At Drumman Bog a large flock of Mute Swan (*Cygnus olor*) occurred on through the winter survey season, with a peak population of 80 individuals recorded during the 2021-2022 winter season, and a maximum population of 106 birds in the 2022-2023 season (recorded in October 2022).

A large population of red listed species Golden Plover (*Pluvialis apricaria*) was regularly recorded flying between Drumman Bog and the other Derrygreenagh bogs, with up to 400 individuals recorded at Drumman in 2021-22, and 560 individuals recorded in February 2023. Wintering flocks of red listed species Lapwing (*Vanellus vanellus*) were recorded in 2021-22, with 200 individuals within the largest flock (recorded in late October 2021), increasing

⁵ AECOM, 2023, Derrygreenagh Power Project Environmental Impact Assessment Report (EIAR), Volume I.

⁶ Gilbert G, Stanbury A and Lewis L (2021), "Birds of Conservation Concern in Ireland 2020 –2026". Irish Birds 9: 523–544

to 569 in February 2023. Amber listed species Hen Harrier (*Circus cyaneus*) was also recorded, with two individuals recorded roosting in January and February 2023 on Drumman Bog.

Other species recorded during the wintering bird surveys include the red listed species Kestrel (*Falco tinnunculus*) and snipe (*Gallinago gallinago*), amber listed species Lesser Black-backed Gull (*Larus fuscus*), Merlin (*Falco columbarius*), and green listed species Little Egret (*Egretta garzetta*), Sparrowhawk (*Accipiter nisus*), Buzzard (*Buteo buteo*). The Annex I Peregrine (*Falco peregrinus*) was also recorded.

3.3.3 Invasive species

A broad range of common garden escapes are also occasionally present around the margins of Bord na Móna 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) – 3.7 km southwest of Derryarkin
- Split Hills and Long Hill Esker SAC (Site code: 001831) – 6.4 km west of Derryarkin
- Lough Ennell SAC (Site code: 000685) – 8.4 km northwest of Derryarkin
- Lough Ennell SPA (Site code: 004044) – 9.4 km northwest of Derryarkin
- Mount Hevey Bog SAC (Site Code: 002342) – 14.5 km east of Derryarkin
- The Long Derries, Edenderry SAC (Site Code: 000925) – 16.8 km south-east of Derryarkin

A number of NHA's (Natural Heritage Areas) and pNHA's (Proposed Natural Heritage Areas) also occur within 5km of Derryarkin Bog including:

- Raheenmore Bog NHA (Site code: 000582) - 3.7 km southwest of Derryarkin
- The Long Derries, Edenderry pNHA (Site Code: 000925) – 4.5 km south-east of Derryarkin
- Grand Canal NHA (Site code: 002104) – 5 km south of Derryarkin
- Milltownpass Bog NHA (Site code: 002323) – 5.6km northeast of Derryarkin
- Split Hills and Long Hill Esker NHA (Site code: 001831) – 6.4 km west of Derryarkin
- Black Castle Bog NHA (Site code: 000570) - 7.3km southeast of Derryarkin
- Rahugh Ridge (Kiltober Esker) (Site code: 000918) -
- Lough Ennell pNHA (000685) – 8.6km north-west of Derryarkin
- Nure Bog NHA (Site code: 001725) – 10km 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 3.7km south-west and 8.6km north-west respectively.

See drawing BNM-ECO-03-23: Derryarkin Bog 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).

There are two main watercourses which flow along the boundaries of Derryarkin Bog. The Mongagh River referred to on the EPA website as Kiltotan_and_Collinstown (EPA code: 07K04) flows along the northern boundary. Yellow River (Yellow [Castlejordan], EPA code 07Y02) flows in close proximity to the south eastern section of the site. Both rivers flow east providing connectivity with the River Boyne_30 (EPA code 07B04). This river is not listed as being under pressure from peat extraction in the second cycle of the River Basin Management Plan for Ireland and is indicated as remaining so in the third cycle.

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.

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.

Geological Survey of Ireland (GSI) mapping identifies the nearest karst features (a spring) located approximately 5km south of the bog.

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.

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 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 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 in silt ponds is excavated on a regular basis by Bord na Móna 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.

Derryarkin Bog has two treated surface water outlets to the River Boyne (07) catchment and the Yellow (CastleJordan) sub-catchment. Water discharges from the site to the Yellow River (CastleJordan) and the Kiltootan and Collinstown and from these rivers to the River Boyne. The Kiltootan and Collinstown 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 not under pressure in the third cycle.

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-23-35-02: Structures and Sampling, along with Drawing number BNM-ECO-23-35-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) 2018-2021 (DHPCLG, 2017) 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 Bord na Móna 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-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 monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.

This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.

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 CO₂-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 CO₂-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 CO₂-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 CO₂ emissions from drained peatlands or increased methane (CH₄) 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 CO₂ emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO₂ 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. The majority of this bog is expected to develop as regenerating shallow cutaway peat vegetation on in shallow peat areas. Areas of shallower residual peat will develop wetland 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)

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.

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 Bord na Móna 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.
- 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).

There has been ongoing public consultation about the proposed Derrygreenagh Power Project, rehabilitation, biodiversity and other general issues at Derryarkin Bog in relation to the proposed project (<https://bnmenergypark.ie/derrygreenagh-power/>) and with relevant statutory and non-statutory stakeholders as part of the EIA process. Specific consultation relating to the project is not listed here, although there has been detailed consultation with stakeholders in relation to these issues and their overlap with rehabilitation and biodiversity.

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 Bord na Móna response to issues raised during consultation

N/A - consultation has not yet commenced.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what Bord na Móna 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) and future proposed land-use (Derrygreenagh Power). 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 Bord na Móna.

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 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 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.

- 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 contributory sources of impacts (private peat extraction and Bord na Móna). 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 Bord na Móna).
- Bord na Móna 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.

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.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Derryarkin Bog as **environmental stabilisation** 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) and future proposed land-use (Derrygreenagh Power).
- Current land-use includes amenity, gravel extraction, conifer forestry, where drainage will be maintained. These areas will be treated as constraints.
- Rehabilitation of Derryarkin Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such as 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.
- **Potential land-use.** Bord na Móna are planning to develop Derrygreenagh Power Project at Derryarkin Bog, Drumman Bog and Ballybeg Bog. Derrygreenagh Power Project is a gas-fired Power Plant Area with a total electricity generation capacity of c. 710 MW including Electricity Grid Connection for power output onto the 400kV Oldstreet-Woodland line. The majority of the Proposed Development will be on Bord na

Móna lands (with the exception of 400kV substation and sections of underground cable). The Gas Connection Corridor will be entirely through third party lands.

- The proposed Derrygreenagh Power Project consists of the following elements: the Power Plant Area and associated infrastructure, Electricity Grid Connection infrastructure, temporary construction compounds to facilitate the works. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in the second half of 2023. The development planning boundary overlaps Derryarkin Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan. There is expected to be Electricity Grid Connection infrastructure including a 220kV tail substation and double circuit Overhead Line (OHL) c. 7 no pylons and 2 no new access roads from an upgraded machine pass onto the OHL corridor and associated infrastructure in Derryarkin Bog. The process water discharge pipe corridor will also pass through Derryarkin, generally along the existing railway line before discharging into the Yellow River. There will be a peat deposition area west of the 220kV substation to facilitate movement of peat generated from the construction phase of that area. Several replanting areas have been incorporated into the Proposed Development to compensate for any tree loss across the Proposed Development footprint of Derrygreenagh Power Project.
- **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 is 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.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna 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 Bord na Móna 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 Bord na Móna 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 west of Derryarkin Bog.

6.2 Key Assumptions

- It is assumed that Bord na Móna 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 Bord na Móna 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 Bord na Móna 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 Bord na Móna 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 yrs., 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 past 3 yrs. post cessation of peat extraction with ongoing rehabilitation, indicate downward trends.

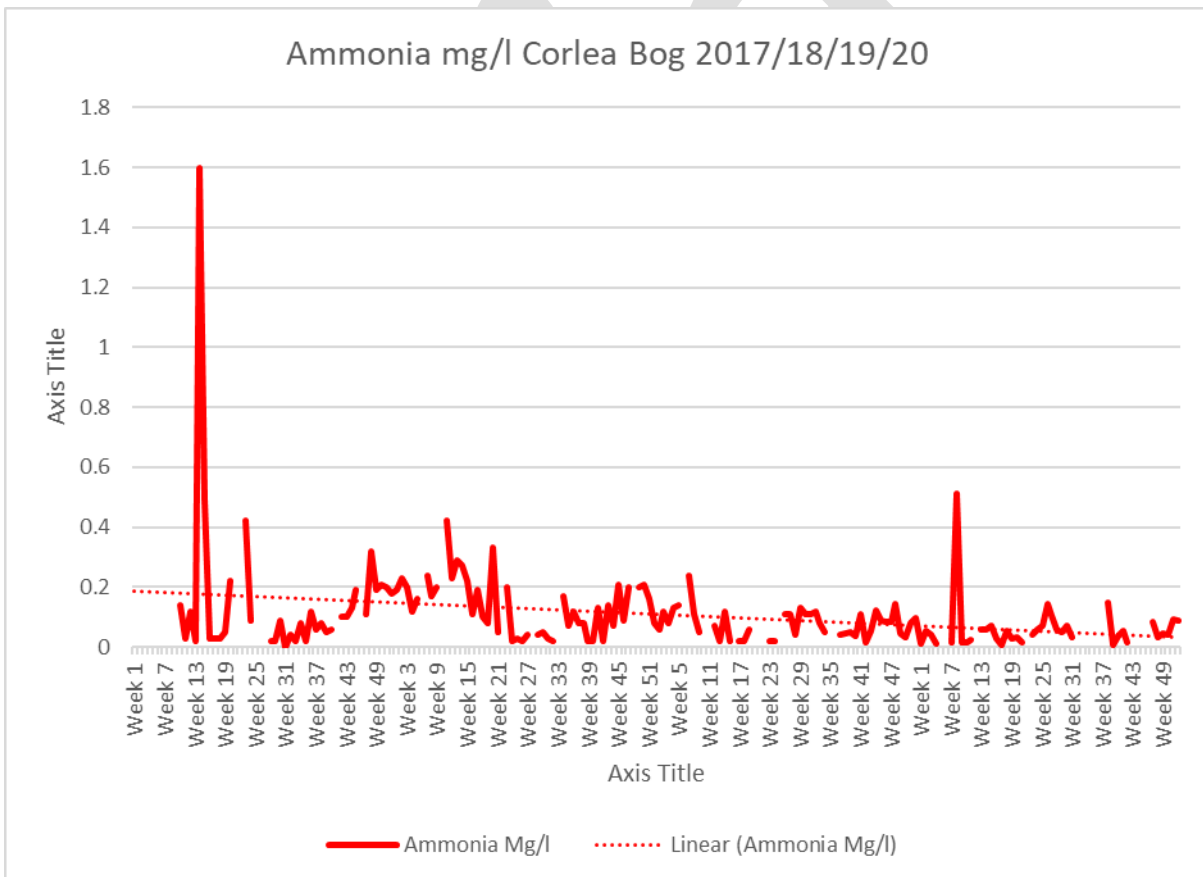
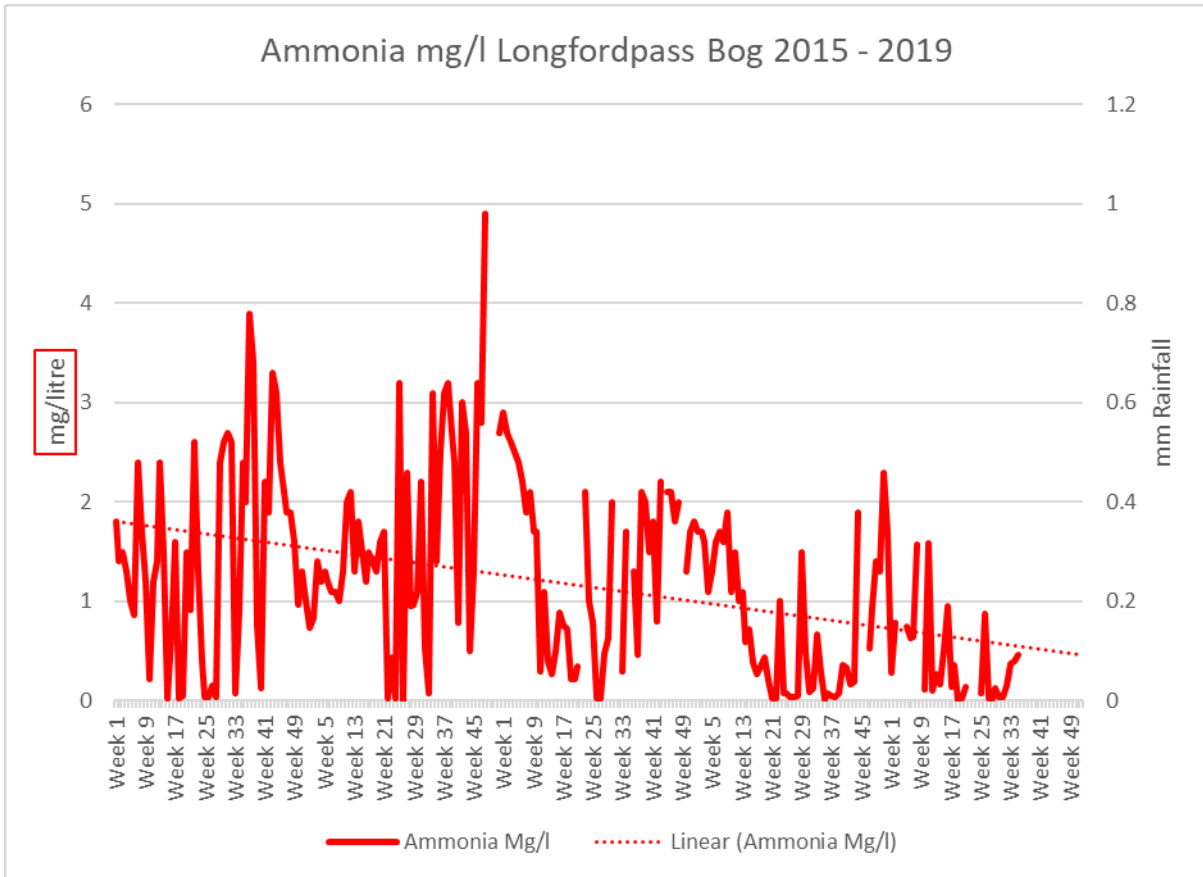


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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

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 (Bord na Móna).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna 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. Bord na Móna 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 Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna 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 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. Bord na Móna 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 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.

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-23-35-22 titled Derryarkin Bog: Aerial Imagery2020

BNM-ECO-23-35-04 titled Derryarkin Bog: Peat Depths

BNM-ECO-23-35-03 titled Derryarkin Bog: LiDAR Map

BNM-ECO-23-35-09 titled Derryarkin Bog: Depression Analysis

The restoration and rehabilitation measures are provisionally outlined in drawing titled BNM-ECO-23-35-20 Derryarkin Bog: 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.
- 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 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	61.7
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	14.8
Marginal land	MLT1	No work required	50.4
Completed rehab	Completed rehab	Completed rehab	327.8
Constraint	Constraint	Renewable Energy Infrastructure, access, amenity, watercourses, turf cutting, industrial, agriculture	255.5
Total Area			710.3

8.1 Completed 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 implementation 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 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 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 finalised)

- **2023 - 2025:** Short-term planning actions.
- **2025:** Short-term practical actions
- **>2025:** Decommission silt-ponds, if necessary

8.6 Budget and costing

Bord na Móna 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 Bord na Móna Annual Report (Bord na Móna 2023). Bord na Móna 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 monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This monthly 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 Bord na Móna 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.

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. There is still some historical energy peat stock remaining on some bogs and these peat stock will be transferred via the BNM rail network to Edenderry Power Station up to 2024 when the power station is expected to have ceased using peat as fuel.

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 Lislogher 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.

Lislogher 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. Lislogher 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 Bord na Móna (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. Bord na Móna 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 conifer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

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 motocross 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.

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.

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 Bord na Móna 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 started at Carrenstown in 2022.

Intensive decommissioning and rehabilitation for the Derrygreenagh Bog Group started in 2021 at a number of individual bogs.

Bord na Móna is currently developing a wind energy project called Ballivor Windfarm ([Bord na Móna Wind Farm | Ballivor Wind Farm](#)). This proposed project is in the pre-planning stage. The proposed location extends across parts of Bracklin, Lislogher East, Carranstown and Ballivor Bogs. It is expected to be submitted to planning in 2023.

Bord na Móna is also currently developing a thermal power plant at Derrygreenagh (Drumman Bog). It is expected this power plant will be fuelled by natural gas. This project was consented in 2010. This project is applying for consents to facilitate connection of the development to the national gas and electrical grid infrastructure [Bord na Móna Energy Park - Bord Na Mona \(bnmenergypark.ie\)](#) A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC License Ref. PO-501-01-01 is outlined in Table Ap-2.

Table Ap-2: 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.	2020	Draft 2022

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.		
Bracklin	680	Industrial peat production commenced at Bracklin in the 1940s. Some sections have been cutaway. Some sections still have relatively deep residual peat.	<p>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.</p> <p>The main section was never re-developed to milled peat and has revegetated as mature cutaway habitats</p> <p>Bare peat is prevalent in the western section, which was in milled peat extraction.</p> <p>Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.</p> <p>Part of Bracklin is being assessed for PCAS in 2023.</p>	2020	Draft 2022 Bracklin West (sub-site) rehabilitation is ongoing in 2023
Carranstown	306	Industrial peat production commenced at Carranstown in the 1980s. The majority of the site has relatively deep peat.	<p>Carrenstown Bog formerly supplied a range of commercial functions including the supply of horticultural peat and latterly; fuel peat for Lough Ree Power.</p> <p>The majority of the site is bare peat. There are cutaway habitats developing on the eastern side.</p> <p>Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.</p>	2020	Finalised 2022 Rehab started in 2022
Lislogher East	486	Industrial peat production commenced at Lislogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	<p>Lislogher East formerly supplied sod turf both for fuel and horticulture. This bog was never re-developed to supply milled peat.</p> <p>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.</p> <p>Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.</p>	2020	Draft 2022
Lislogher West	239	Lislogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	<p>Lislogher West was drained but never fully developed for industrial peat extraction.</p> <p>Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.</p>	N/A	Rehab plan finalised in 2023. Rehab to start 2023
Kinnegad	352	Industrial peat production commenced at Kinnegad in the 1980s. The majority of the site still has relatively deep peat.	<p>Kinnegad Bog formerly supplied a range of commercial functions -mainly the supply of horticultural peat and latterly; fuel peat for Lough Ree Power.</p> <p>The majority of the site is bare peat.</p>	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	<p>Ballybeg Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power.</p> <p>Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.</p>	2020	Draft 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.		
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. Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.	2015	Draft 2023
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.	2020	Draft 2023
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). Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.	2020	Draft 2023
Toar	445	Industrial peat production commenced at Toar in the 1980s. 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). Part of the east of the site is being considered for a gravel extraction project.	2020	Draft 2023

See Drawing number BNM-ECO-23-35-24 titled **Derrygreenagh Bog Group**, included in the accompanying Mapbook which illustrates the location of Derryarkin Bog and the Derrygreenagh Bog Group in context to the surrounding area.

APPENDIX II: ECOLOGICAL SURVEY REPORT

Ecological Survey Report			
<p><i>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.</i></p>			
Bog Name:	Derryarkin	Area (ha):	710.0 ha (1754.5 acres)
Works Name:	Derrygreenagh	County:	Offaly/Westmeath
Recorder(s):	MMC & DF	Survey Date(s):	27 th & 28 th October 2009
<p>Habitats present (in order of dominance)</p> <p>The most common habitats present on the industrial cutaway include:</p> <ul style="list-style-type: none"> 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). 			
<p>Description of site</p> <p>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 broadly 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.</p> <p>North East Section</p> <p>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 (<i>Picea sitchensis</i>) and Lodgepole Pine (<i>Pinus contorta</i>). 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 <i>Phragmites</i> 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.</p> <p>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.</p> <p>North Section</p> <p>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</p>			

<p>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.</p> <p>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 (<i>Picea sitchensis</i>) and Lodgepole Pine (<i>Pinus contorta</i>) and is in an overall poor condition with areas ranging from moderate quality trees to dying and completely stunted areas of forestry.</p> <p>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.</p> <p>South West Section</p> <p>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 in the silt pond area and 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.</p> <p>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).</p> <p>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).</p> <p>South East Section</p> <p>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).</p> <p>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 <i>Sphagnum</i>. In this section of the site boundary habitats include agricultural grasslands, raised bog, quarry and the R400 Road.</p> <p>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).</p>
<p>Designated areas on site (cSAC, NHA, pNHA, SPA other)</p> <p>None</p>
<p>Adjacent habitats and land-use</p> <p>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).</p>
<p>Watercourses (major water features on/off site)</p> <p>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.</p> <p>All of the aforementioned watercourses have been canalised and modified along their BNM boundaries.</p>
<p>Site topography</p> <p>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.</p>
<p>Fauna biodiversity</p>

- 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 gravelly 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 around the silt pond area. Many plants (500-1000) were growing on exposed gravel and glacial till that made up the spoil heaps from the silt ponds. 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 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 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.

Bord na Moña 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 <i>Sphagnum</i> and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer <i>Campylopus</i> -dominated community	pCamp	PF2
		Pioneer <i>Juncus effusus</i> -dominated community (Soft Rush)	pJeff	PF2
		Pioneer <i>Eriophorum angustifolium</i> -dominated community (Bog Cotton)	pEang	PF2
		Pioneer <i>Juncus bulbosus</i> -dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer <i>Triglochin palustris</i> -dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with <i>Cladium</i> (rich fen)	pCladium	PF1
		pioneer <i>Schoenus nigricans</i> community (rich fen)	pSchon	PF1
	pioneer <i>Carex viridula</i> /brown moss community (rich fen)	pVir	PF1	
	Emergent communities	Pioneer <i>Carex rostrata</i> -dominated community (Bottle Sedge)	pRos	PF2/FS1
		Pioneer <i>Phragmites australis</i> -dominated community (Common Reed)	pPhrag	FS1
		Pioneer <i>Typha latifolia</i> -dominated community (Reedmace)	pTyp	FS1
		Pioneer <i>Schoenoplectus lacustris</i> -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 <i>Betula/Salix</i> -dominated community (A) (Birch/Willow)	eBir	WS1
		Open <i>Betula/Salix</i> -dominated community (B) (Birch/Willow)	oBir	WS1
		Closed <i>Betula/Salix</i> -scrub community (C) (Birch/Willow)	cBir	WS1
		<i>Ulex europaeus</i> -dominated community (Gorse)	eGor	WS1
		<i>Betula/Salix</i> -dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry <i>Calluna vulgaris</i> -dominated community (Heather)	dHeath	HH1
		Dense <i>Pteridium aquilinum</i> (Bracken)	dPter	HD1
	Grassland	Pioneer dry calcareous and neutral grassland (Centaureo-Cynosuretum)	gCal	GS1
		<i>Dactylis-Anthoxanthum</i> -dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2

		<i>Anthoxanthum-Holcus-Equisetum</i> community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		<i>Molinia caerulea</i> -dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (<i>Filipendulion ulmariae</i>)	Mar	GM1
Disturbed		<i>Tussilago farfara</i> -dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		<i>Epilobium</i> -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.

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 Pendunculate 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	

	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	

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 Bord na Móna staff and updated as required.

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 Bord na Móna 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 plague⁷ 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 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, Bord na Móna 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 Bord na Móna 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.

Bord na Móna 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 Bord na Móna. 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 Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore Bog Group (IPC License Ref. P0503-01). 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. The bog is part of the Allen - Lullymore group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 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.

Bord na Móna 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.

3 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 Bord na Móna.

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.

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna 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 Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna 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 Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the proposed future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse 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 Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna 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.

4 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)

The National River Basin Management Plan (Department of Housing, Planning, Community and Local Government 2017) 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 2018-2021 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part of the WFD (2018-2021) programme of measures. The NRBMP 2018-2021 takes account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (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 2018-2021 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Peatland Climate Action Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 2018-2021 deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The draft NWBMP 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 hydromorphological condition of rivers.

The draft NWBMP 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 are 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 Bord na Móna 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 NWBMP 2022-2027.

5 National Biodiversity Action Plan 2016-2021

The National Biodiversity Action Plan 2016-2021 has a vision that biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally. Ireland's 2nd National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BNM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

Rehabilitation of Derryarkin Bog is expected to significantly contribute in the future to actions and targets of the National Biodiversity Action Plan 2016-2021, particularly in relation to peatland restoration and creation of new habitats such as wetlands and woodlands.

6 National conservation designations

Bord na Móna 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, cNHAs) and National Nature Reserves). Bord na Móna 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.

7 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.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. The Peatland Climate action scheme (PCAS), which includes enhanced rehabilitation measures, is expected to restore

several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna 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. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

8 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 Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

9 Land-use planning policies

As Bord na Móna 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. Bord na Móna 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 Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

10 National Archaeology Code of Practice

Bord na Móna 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>)

The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna 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 Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

11 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 Bord na Móna 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 Bord na Móna'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 EU's 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 policies.

12 Bord na Móna commitments

Bord na Móna 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.

The company announced that industrial peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Rehabilitation measures would 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 Climate Action Plan 2019, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. To date, 15,000 hectares of cutaway and cutover bog have been rehabilitated using this approach with 5,000 hectares in active rehabilitation.

In line with Bord na Móna'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.

The above commitments have now been followed by the decision by the company to cease industrial peat extraction and rehabilitate a target of 33,000 ha between 2021-2025.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. 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.

13 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020 (Draft)

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how Bord na Móna's cutover peatland estate is complex in nature with great variability in terms of peat depths, peat types, drainage, subsoil condition and environmental value. Thus, future options require consideration on a site-specific basis, also bearing in mind the considerable internal variation within bogs. The development of the land-bank will also take account of national needs, while also taking account of the various national legislation, policies and plans related to the management of peatlands. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of these sites, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

Any consideration of other future after-uses for Bord na Móna land such as development or other mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this peatland rehabilitation plan.

Draft

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 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	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 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 needed
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.

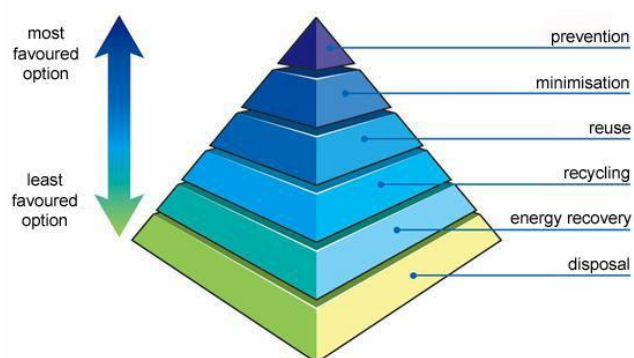
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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, 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 and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A Bord na Móna 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 Bord na Móna 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, Bord na Móna 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 Bord na Móna 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.

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 IPPC Licence's Ref P0501-01, Derrygreenagh Bog Group, County 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 IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or 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 than 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 bog timbers. Schedule 3 (ii) of the IPPC 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 IPPC 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 IPPC 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 31st 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.

IPPC 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 IPPC 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 our 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 IPPC 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.

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 IPPC 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 IPPC 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 IPPC 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 their 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 IPPC Licence P0501-01.

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/fag/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.



	Procedure: ENV017	Rev: 1
	Title: Archaeological Findings	Approved: EM

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

2) Procedure

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1			
2			

Bord na Móna

Derryarkin Bog Rehab Plan GIS Map Book 2023

Document Control Sheet

Document Name:	Derryarkin Bog Rehab Plan GIS Map Book 2023
Document File Path:	
Document Status:	Draft v1.0

This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
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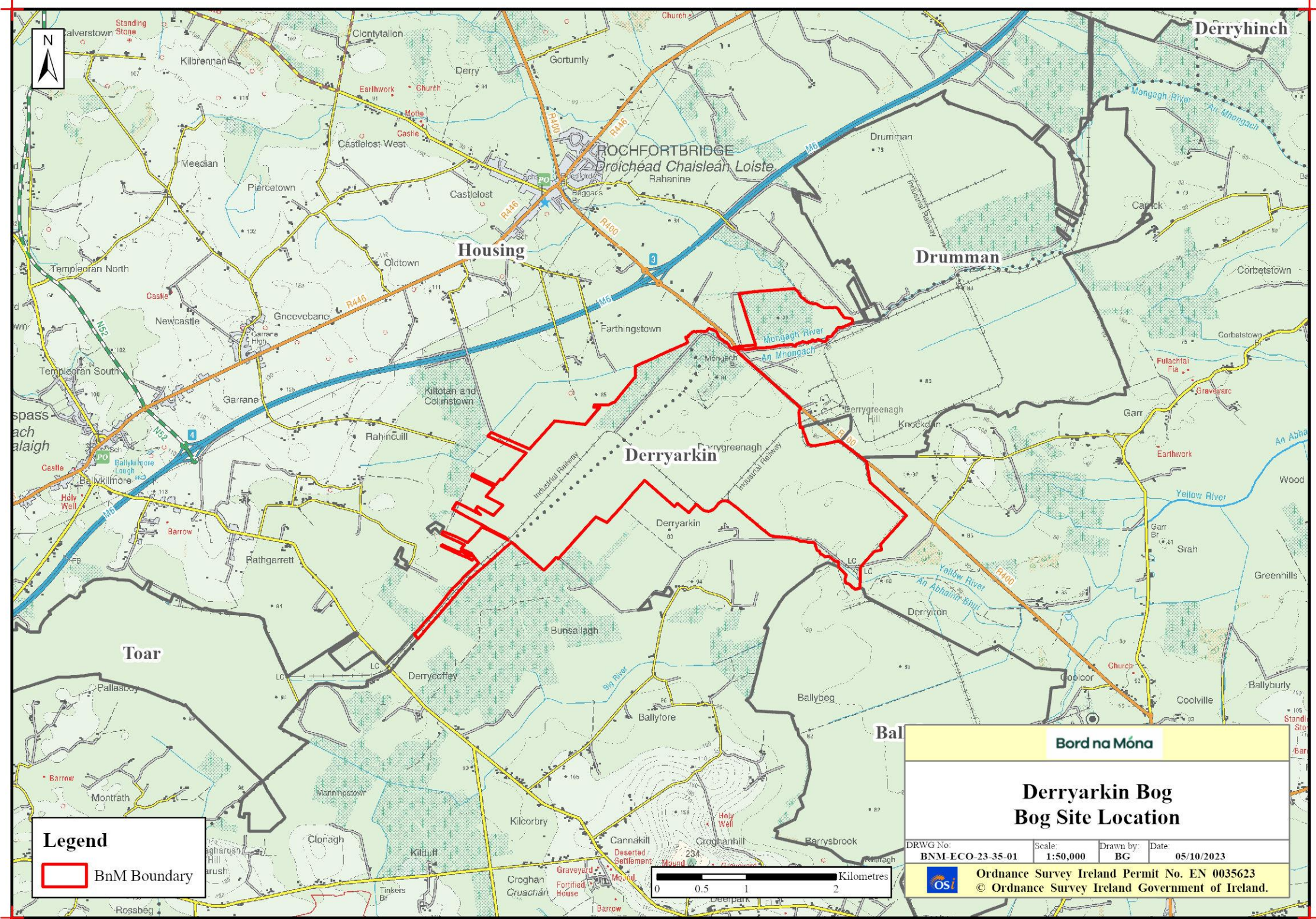
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		09/11/2023	10/11/2023	

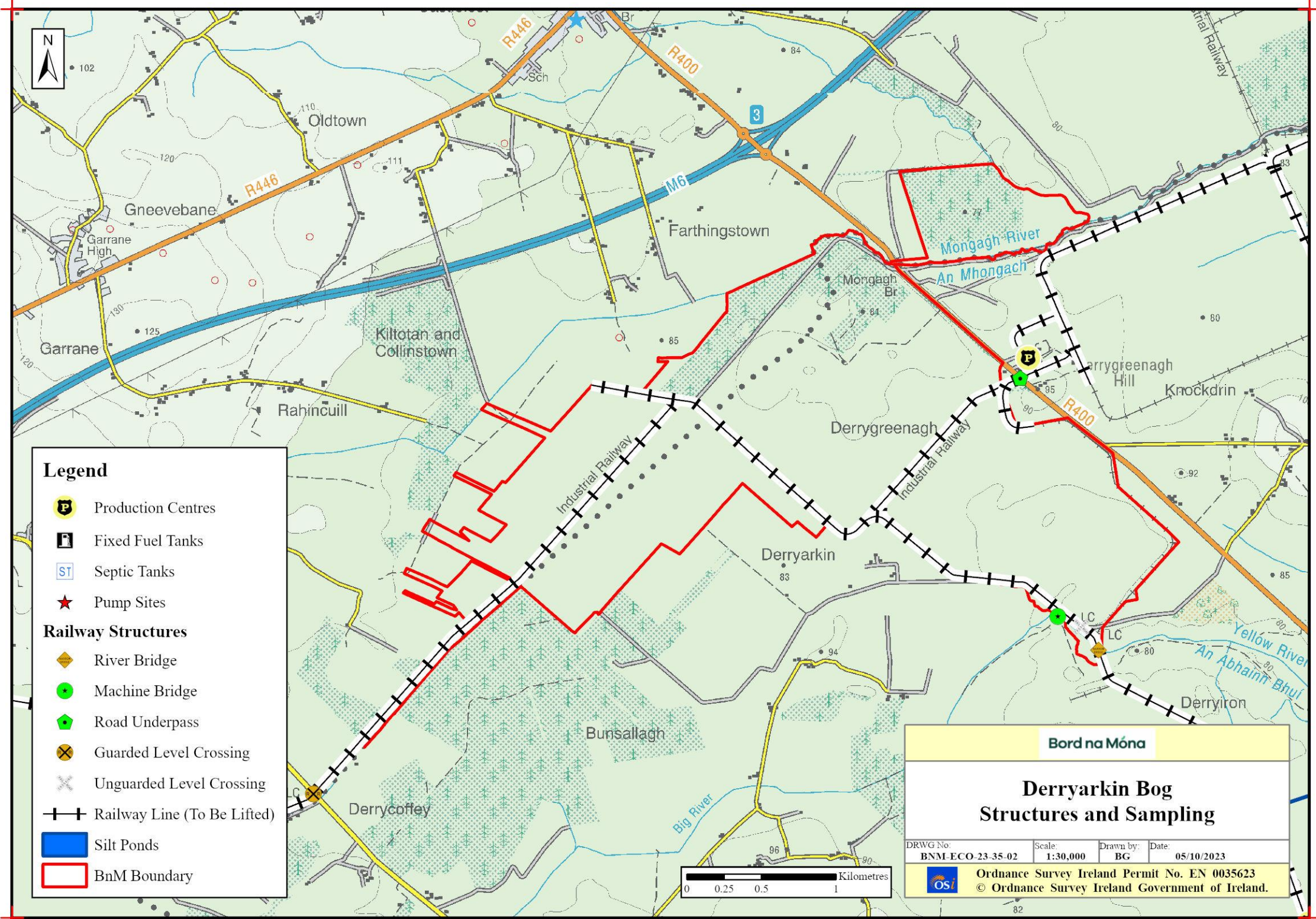
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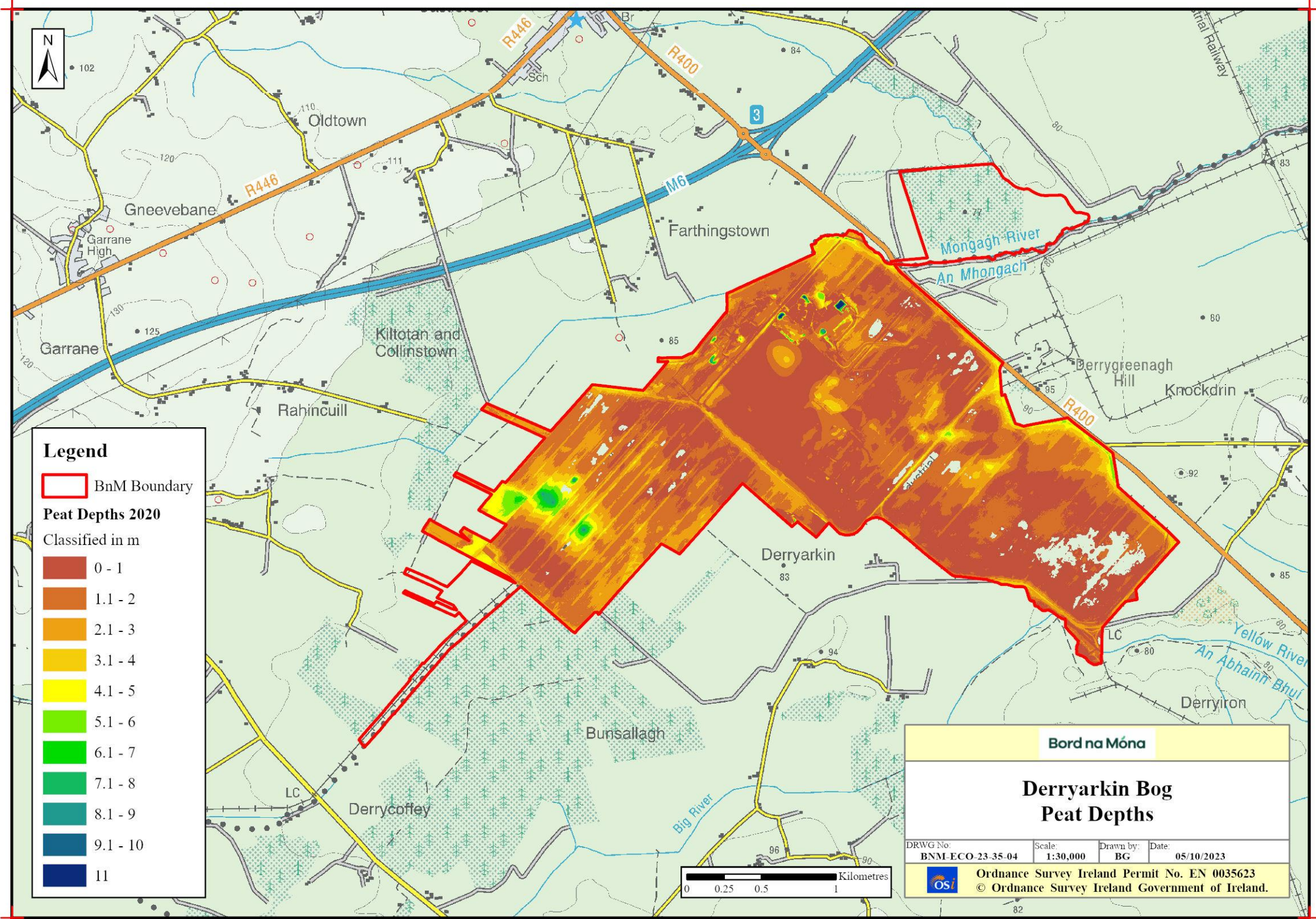
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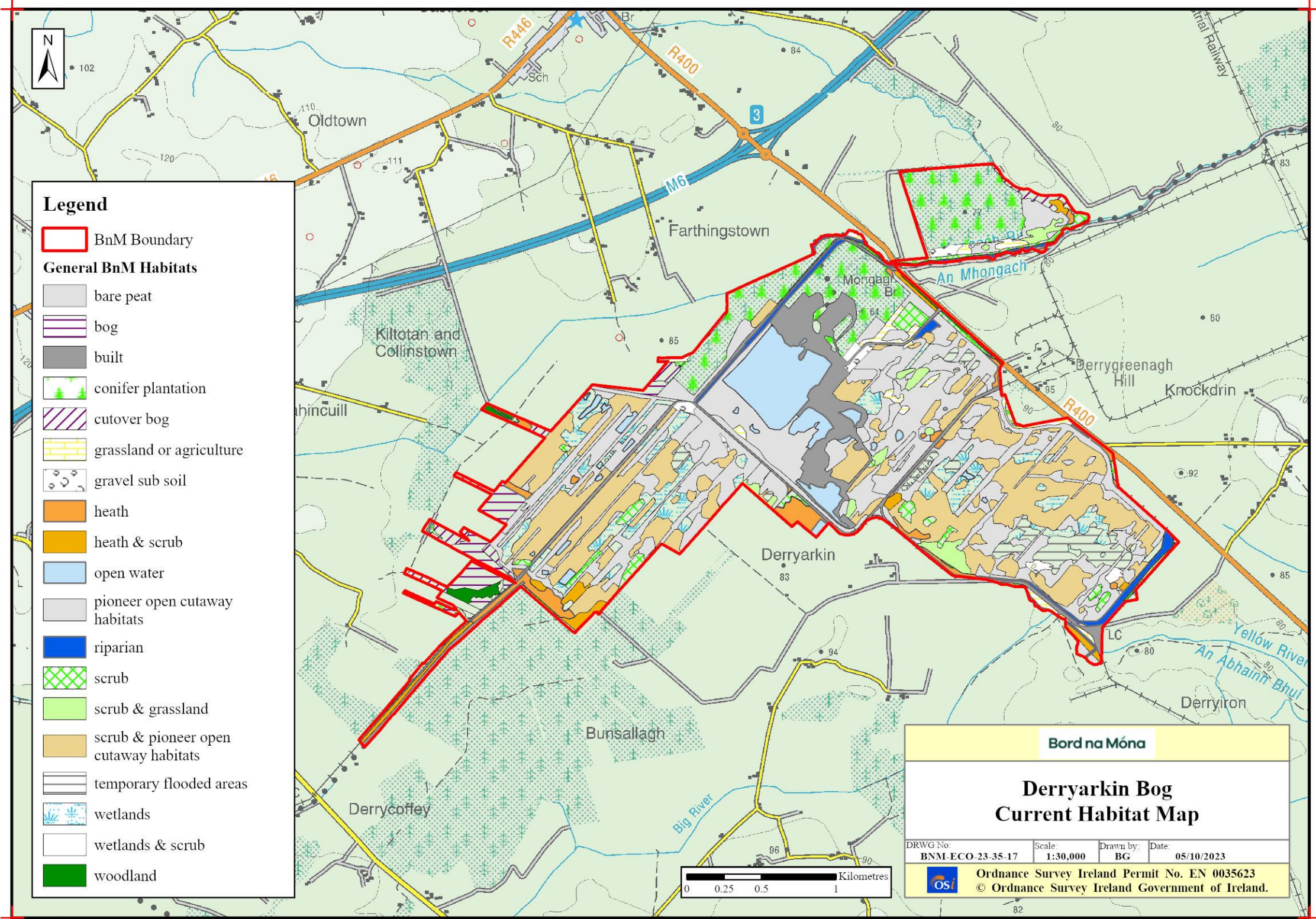
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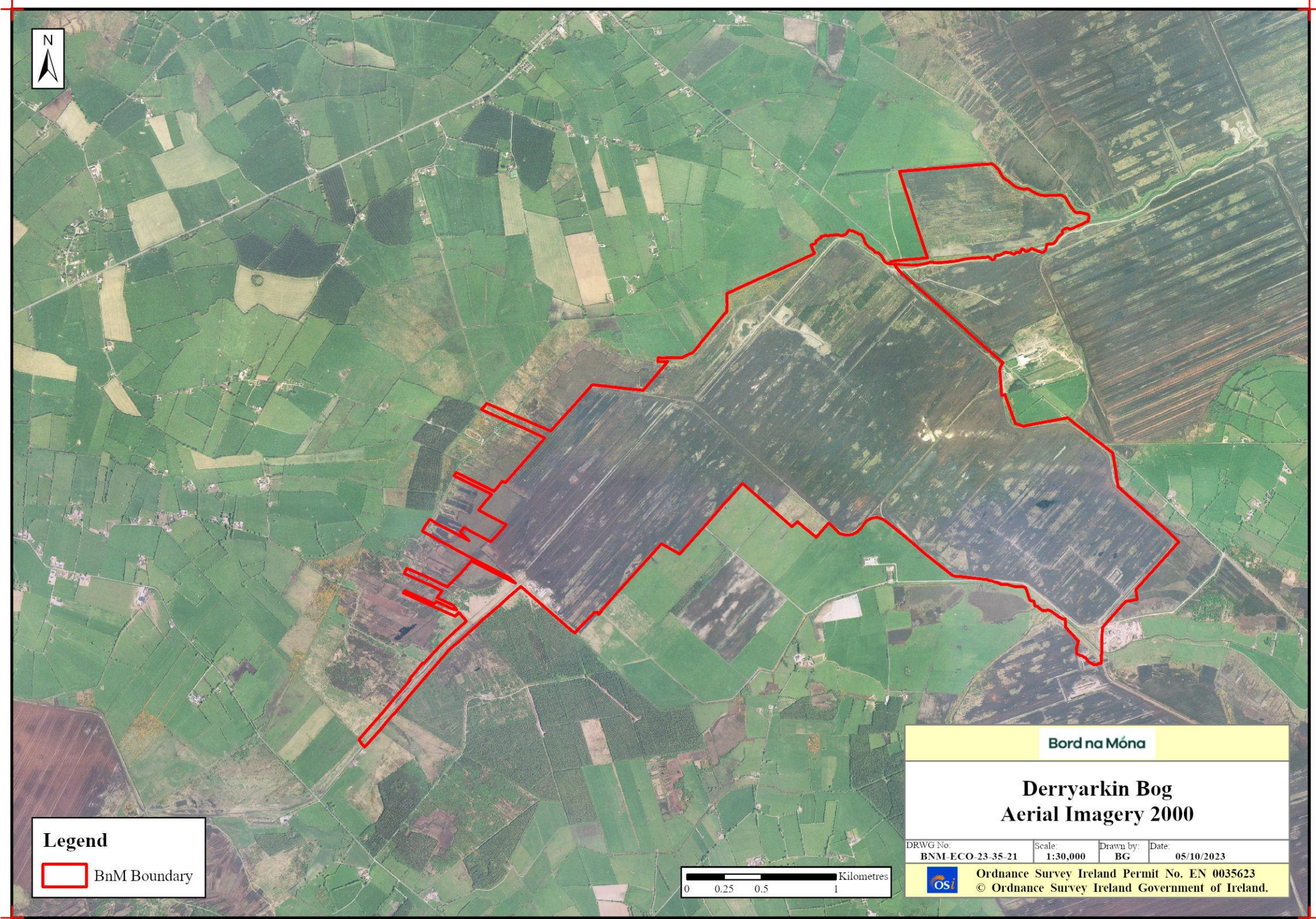
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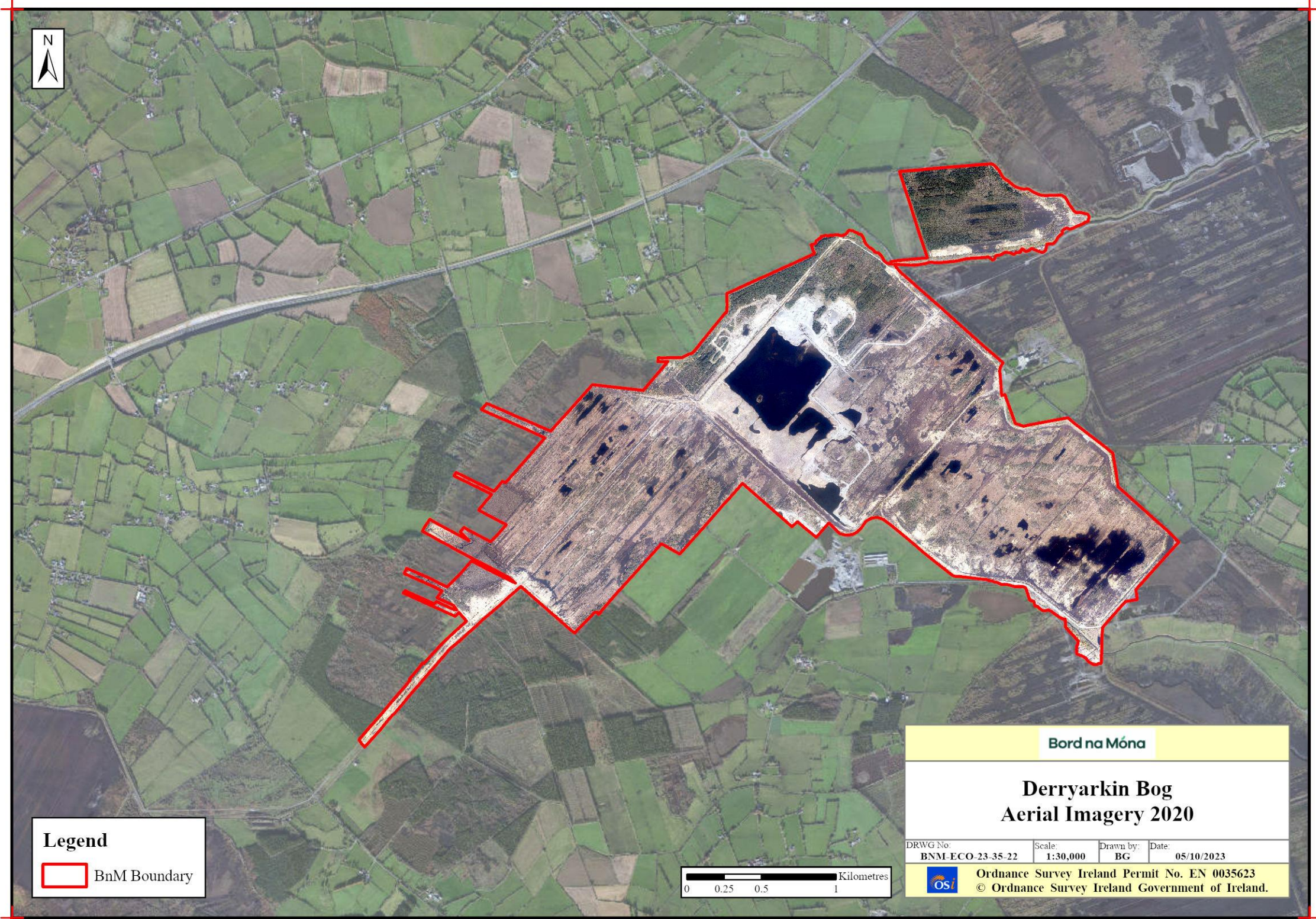


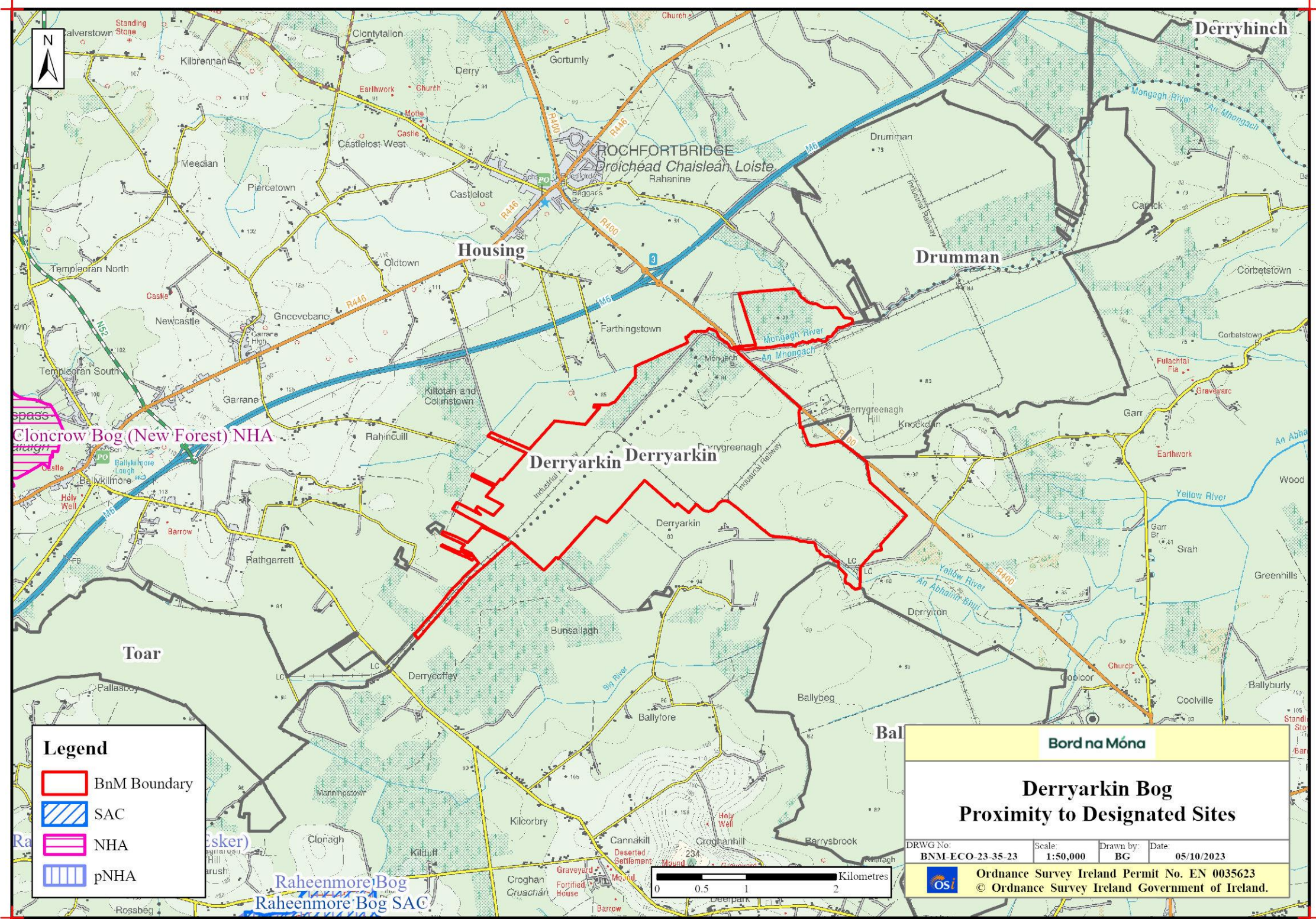












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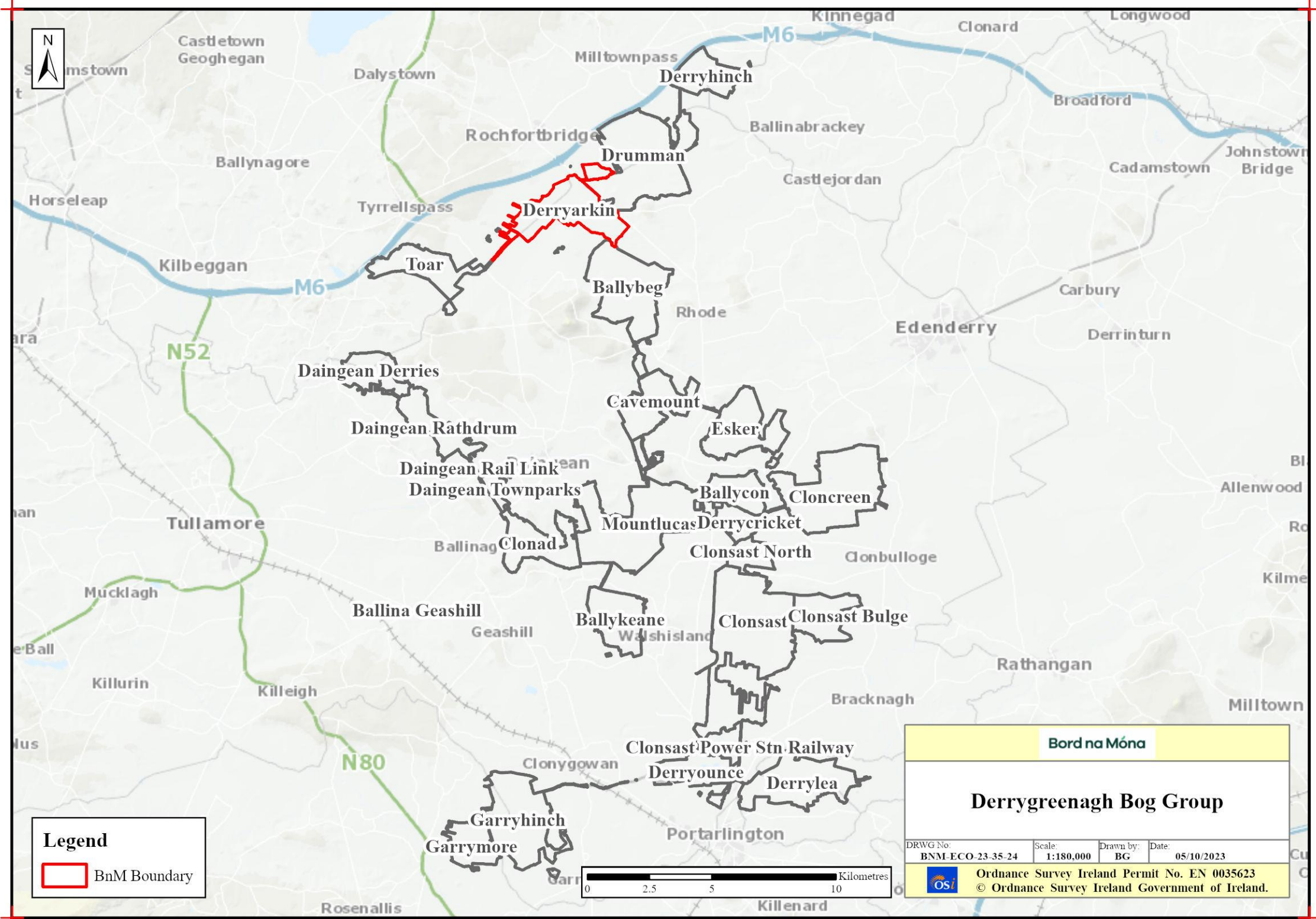
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Bord na Móna

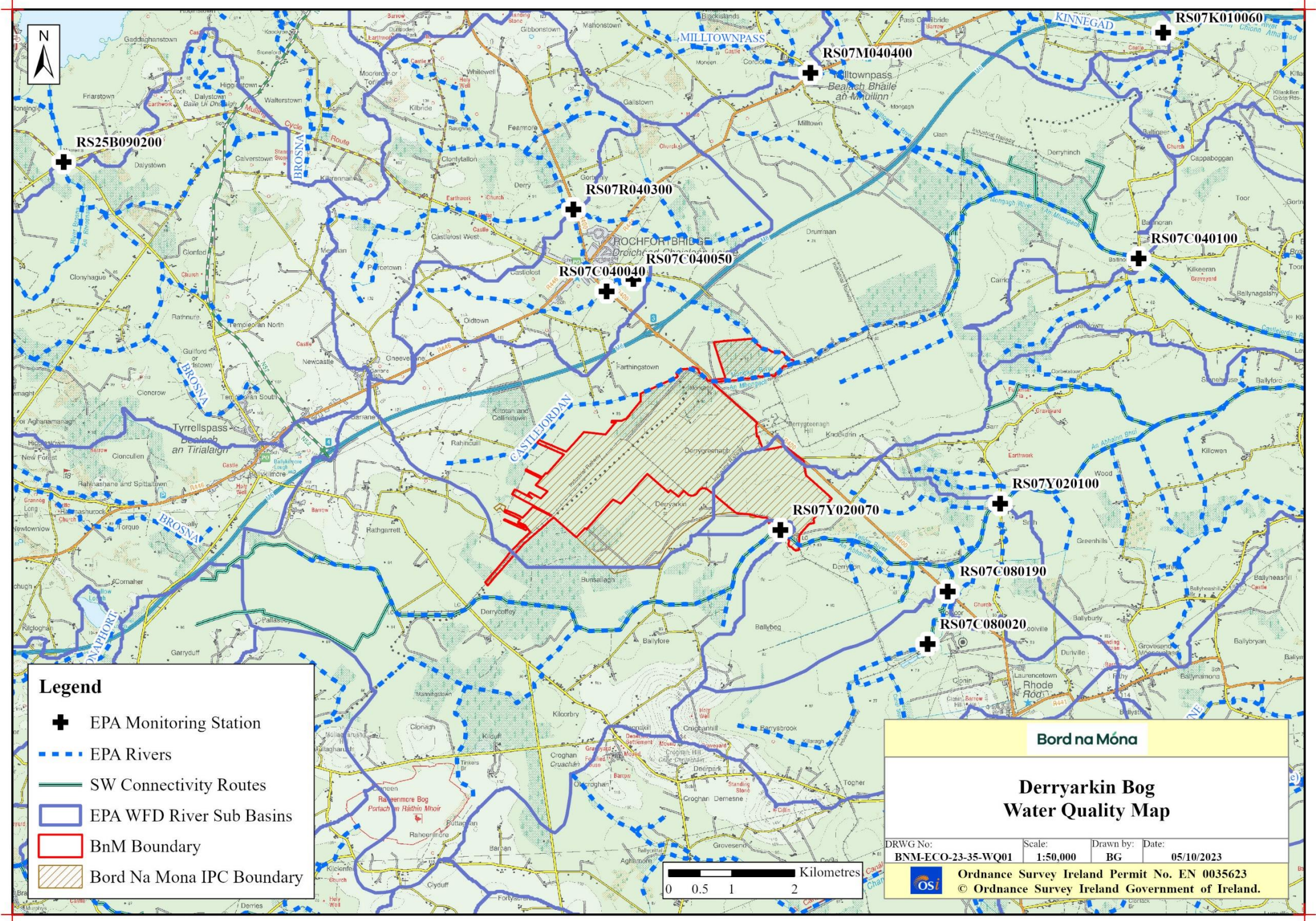
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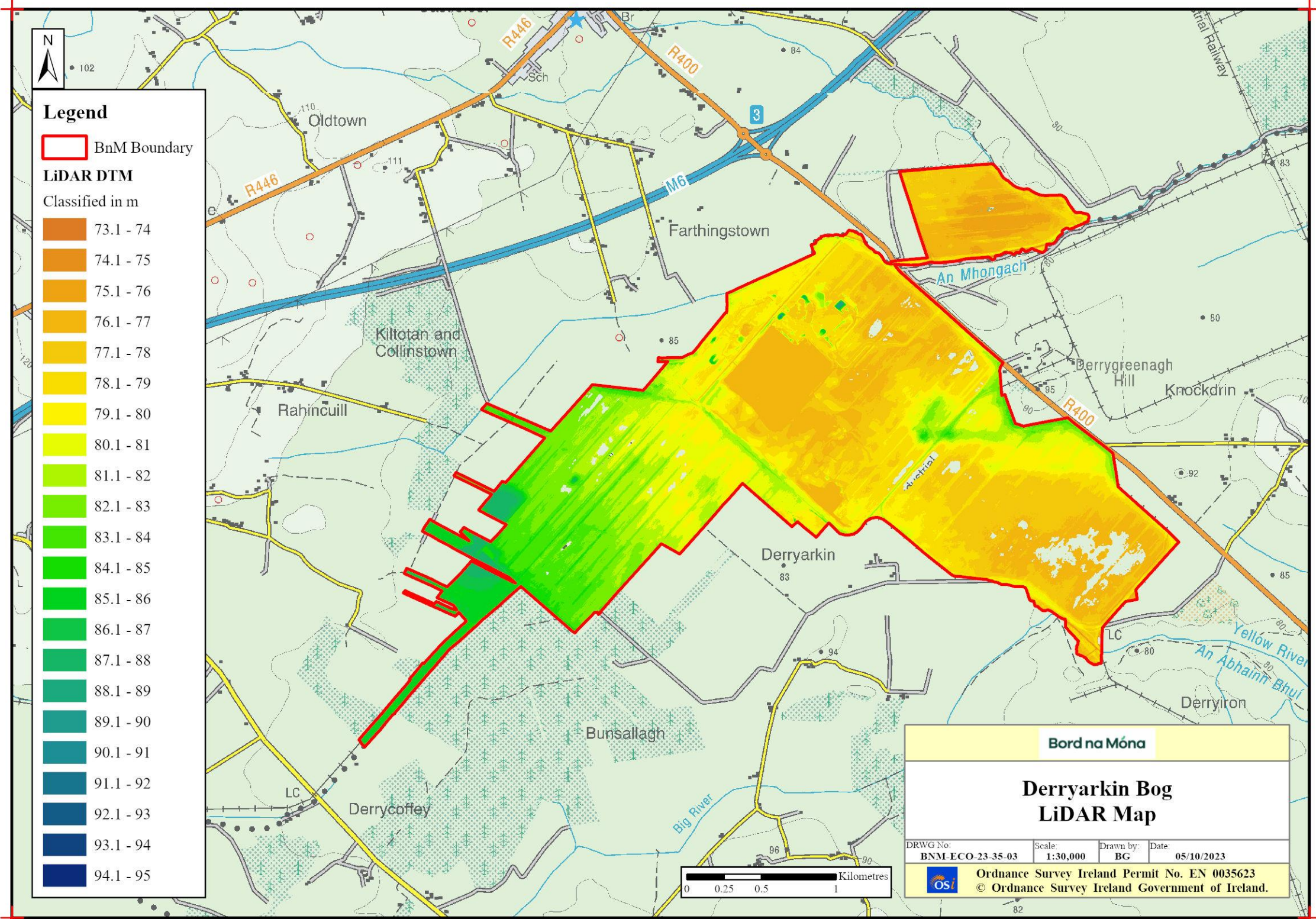
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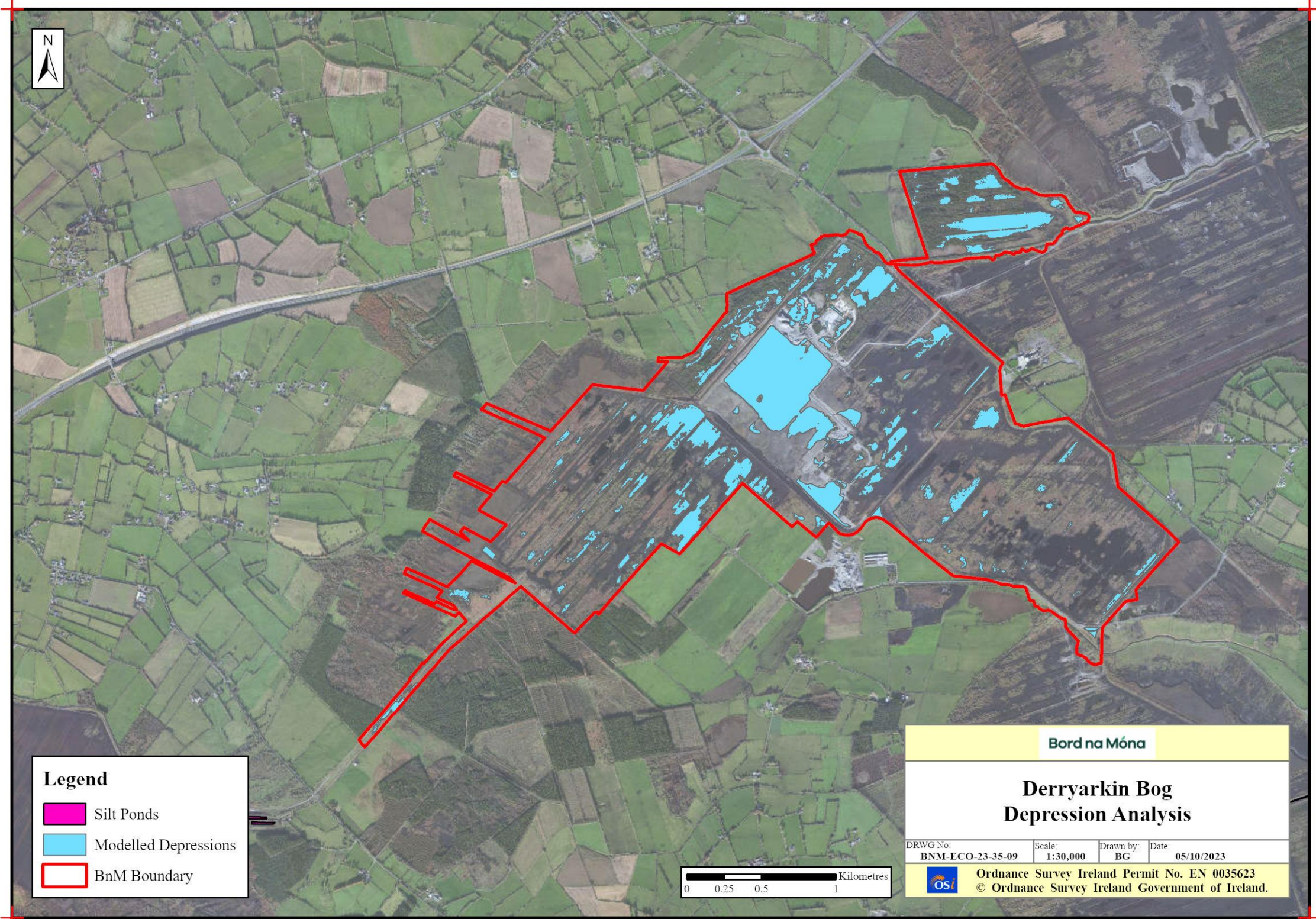
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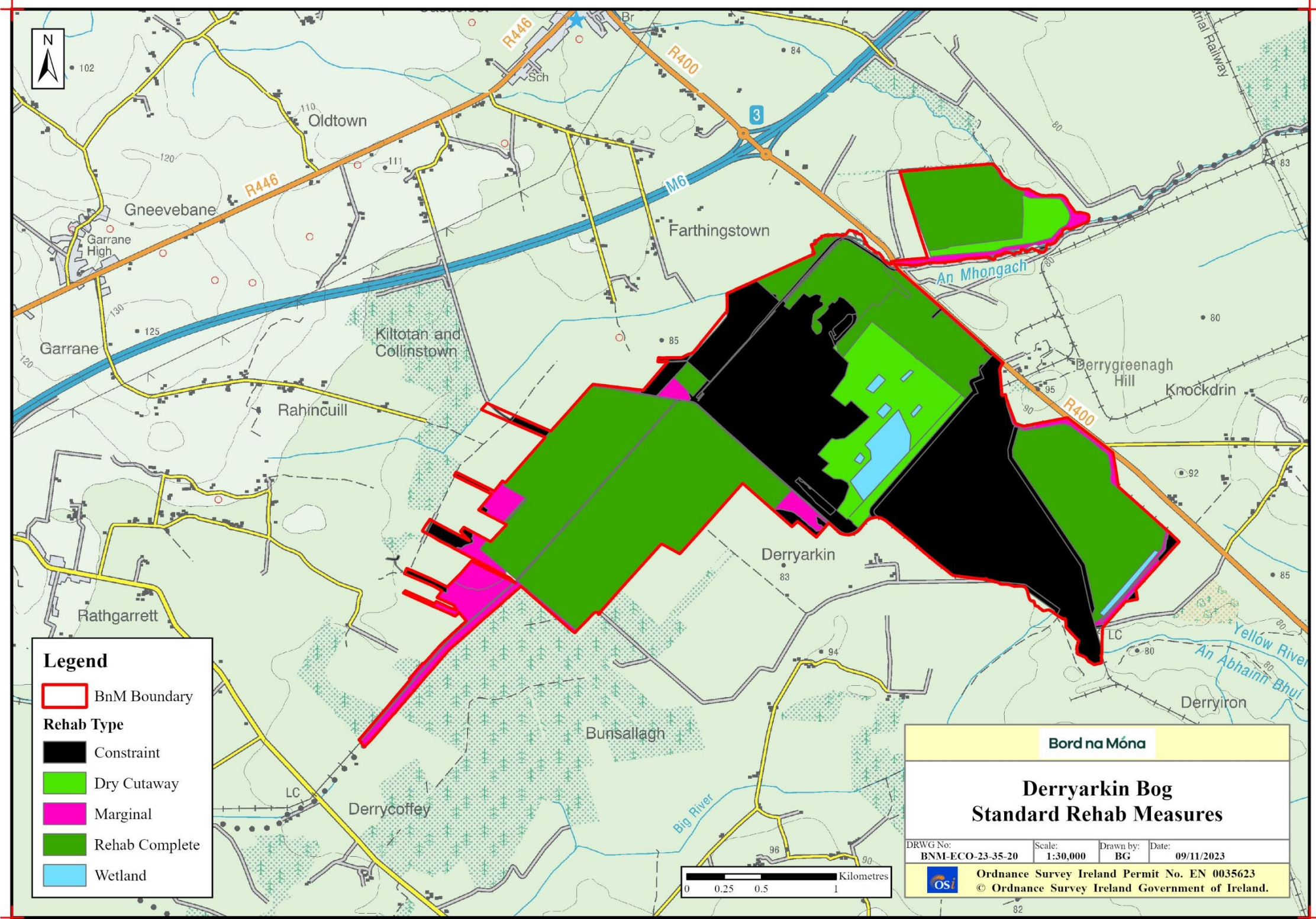
Hydrology / Topography Maps







Rehabilitation Maps



Bord na Móna

Drumman Bog

Draft Cutaway Bog Decommissioning and Rehabilitation Plan

2023

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 Bord na Móna 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.

Bord na Móna 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. Bord na Móna 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.

Bord na Móna are planning to develop Derrygreenagh Power Project at Drumman Bog as well as the nearby bogs Derryarkin and Ballybeg. This project is currently in the pre-planning stages and is expected to be submitted for planning permission in the second half of 2023. The development boundary overlaps the Drumman Bog rehabilitation boundary. This area has been mapped as a constraint in the rehabilitation plan.

Document Control Sheet

Document Name:	Drumman Bog - Cutaway Bog Decommissioning and Rehabilitation Plan 2023					
Document File Path:	Q:\Ecology Team\EPA draft rehab plans 2017 word docs\Derrygreenagh ref.501 (EPL)\Drumman\2023 Rehab Plans					
Document Status:	Draft					
This document comprises:	DCS	TOC	Text (Body)	References	Maps	No. of Appendices
	1	1	29	4	0	10
Rev.	0.1	Author(s):		Checked By:		Approved By:
	Name(s):	PE		MMC		MMC
	Date:	28/06/2023		31/07/2023		31/07/2023
Rev.	1	Author(s):		Checked By:		Approved By:
	Name(s):	JOS		MMC		MMC
	Date:	28/09/2023		28/09/2023		28/09/2023
Rev.	1.1	Author(s):		Checked By:		Approved By:
	Name(s):					
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Non-technical summary

- Bord na Móna is updating the draft 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 boundary.
- The Bord na Móna works offices and works 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.
- 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 2020.
- There is still an industrial railway through the site that is part of the greater Derrygreenagh industrial rail network.
- The majority of the site is now developing pioneer and maturing habitats.
- Part of the cutaway bog across the site was developed as a conifer plantation by Coillte in the 1980's and-1990's.
- A large section of cutaway bog has also been developed since 2001 for sand and gravel extraction by a joint venture between Roadstone and Bord na Móna (Derryarkin Sand & Gravel Ltd).
- A small part of the site is used as a timber storage depot for the supply of biomass to Edenderry Power (29.17 Ha).
- There is a 30m high telecommunications mast carrying antennas and link dishes together with associated equipment container and security fencing located on the south of Derrygreenagh Works
- There have been several phased pilot rehabilitation measures at Drumman Bog.
- This rehabilitation plan has been prepared as Bord na Móna 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.
- A significant part of Drumman Bog has already been rehabilitated via re-wetting and the development of conifer forestry. Part of the bog is also used for gravel extraction.
- 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 Bord na Móna rehabilitation planning that no actions or activities will be undertaken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will 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 Drumman 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 Bord na Móna bogs cannot be restored back to raised bog, as the majority of peat has been removed and the environmental conditions have been modified. However other natural habitats 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.
- This peatland rehabilitation plan does not outline future after-use or development. Bord na Móna 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.

1. INTRODUCTION

Bord na Móna (referred to as ‘Bord na Móna’ or ‘BNM’ 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 passing through the centre of the bog, broadly following 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.

Bord na Móna 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. It has been specifically prepared to address the integration of the proposed Derrygreenagh Power Project at Drumman Bog. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

It has been proposed by the Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on its peatlands. Note this proposal is also known colloquially as the ‘Peatlands Climate Action Scheme’ (PCAS). The Peatlands Climate Action Scheme is expected to operate between 2021-2025. Enhanced rehabilitation measures that have been proposed as part of 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 Bord na Móna where rehabilitation is

planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Drumman Bog. Nevertheless, Bord na Móna 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 Bord na Móna 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 or issues such as rights of way.

Bord na Móna are planning to develop Derrygreenagh Power Project at Drumman Bog, Derryarkin Bog and Ballybeg Bog. Derrygreenagh Power Project Proposed Development consists of a Power Plant Area with Combined Cycle Gas Turbine (CCGT) and Open Cycle Gas Turbine (OCGT) and associated infrastructure on Drumman Bog and an Electricity Grid Connection on Derryarkin Bog and Ballybeg Bog consisting of 200kV tail substation, hybrid transmission of double circuit 220kV overhead line and underground cable to allow for power output to the national electricity network via a new loop-in 400kV substation (outside of BNM lands) onto the Oldstreet-Woodland 400kV line. The Overall Project will be facilitated by a Gas Connection Corridor c. 10km to the north of the Power Plant area, this will be through Third Party lands. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in second half 2023. The development planning boundary overlaps Drumman Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan. The Power Plant Area which is predominantly in Drumman Bog (with the exception of a process water discharge corridor in Derrarkin Bog) is a First Schedule activity under the EPA Act as amended and will require an Industrial Emissions (IE) Licence (per activity class 2.1). The areas within Drumman Bog within the IPC Licence required to facilitate the operational Power Plant Area will thus require decommissioning and closure in advance of an IE Licence determination. The Transmission Service Operator (TSO, EirGrid)) and the Transmission Asset Operator (TAO, ESBN) will require full operational control of the 220kV substation area (on Derryarkin Bog) and the line-cable interface compound (Ballybeg Bog) and will thus require advanced decommissioning and closure of these areas.

Drumman Bog will be rehabilitated **either** in association with the proposed Derrygreenagh Power Project, with peatland rehabilitation integrated into the proposed project, **or** will be completed in the future in the event of an unsuccessful planning application for this project. It is expected that Bord na Móna will revise and update the rehabilitation plan for Drumman when a decision is made in relation to planning permission for this project Bord na Móna remain fully committed to rehabilitating the whole bog and meeting the conditions of the IPC Licence. 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 draft rehabilitation plan. If future after-uses are proposed for Drumman Bog it is expected that the draft rehabilitation plan would be iterated.

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 Bord na Móna 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);
- 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.
- 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.
- Pschenyckj *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 (2019). Conserving Bogs – Management Handbook.
- 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:

- Allen bog group Integrated Pollution Control Licence;
- Allen 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);
- 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
- Bord na Móna Annual Report 2023.
- 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 Bord na Móna'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

Bord na Móna 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 Bord na Móna 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.

3. SITE DESCRIPTION

Drumman Bog is 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, broadly following the county boundary and dividing the site into two large sections. See Drawing number BNM-ECO-23-35-01: Bog Site Location, included in the accompanying Mapbook¹, which illustrates the location of Drumman Bog in context to the surrounding area.

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 2020. 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 Bord na Móna (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 in Drumman North 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 2020. 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 Bord na Móna.

Bord na Móna, 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 entire footprint of the gravel extraction on Derryarkin and Drumman Bogs 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. Peat stock removal is expected to be completed in 2023.

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*

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

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

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In respect of Drumman Bog, jobs included in the above study would have included those to facilitate peat extraction for the supply of fuel peat for Edenderry Power Station.

As the primary employer in many Midland counties, Bord na Móna 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 geology² 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

² <https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx>

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.

The majority of Drumman Bog comprises a mosaic of bare peat along with cutaway habitats. Some of these areas contain developing wetlands and other sections are developing scrub/woodland.

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-23-35-17 titled **Drumman Bog: Current Habitat Map**, 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.

The rare plant Blue Fleabane (*Erigeron acer*) has been recorded at several locations around the site. The plant is an annual species that is found in dry pastures and sandy or gravelly places such as eskers and its distribution is mainly confined to the central and south-eastern parts of Ireland. This species is a Red List plant species whose status is "Least Concern".

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.

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 flammae cabaret*), Linnets (*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*).

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 platyrhynchos*), 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-listed³ 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*), Bewick's Swan (*Cygnus columbianus bewickii*), Black-headed Gull (*Larus ridibundus*), Common Quail (*Coturnix coturnix*), Common Scoter (*Melanitta nigra*), Corn Crake (*Crex crex*), Curlew (*Numenius arquata*), Golden Plover (*Pluvialis apricaria*), Grey Partridge (*Perdix perdix*), Herring Gull (*Larus argentatus*), Lapwing (*Vanellus vanellus*), Nightjar (*Caprimulgus europaeus*), Pintail (*Anas acuta*), Redshank (*Tringa totanus*), Red Grouse (*Lagopus lagopus*), Shoveler (*Anas clypeata*) and Yellowhammer (*Emberiza citrinella*).

A review of the Biodiversity Chapter for the proposed Derrygreenagh Power Project Ecological Impact Assessment Report (EIAR)⁴ was also undertaken. The below paragraphs provide a summary of the species of conservation concern recorded, from Drumman, Ballybeg and Derryarkin during the surveys carried out to inform the EIAR. A full list of bird species recorded within and adjacent to the bog, in the wider study area, is provided in the EIAR. No protected plant species or invasive species were recorded from the study area.

Bat species recorded within the Derrygreenagh Power Project development boundary (including Ballybeg, Drumman and Derryarkin) include Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Leisler's Bat (*Nyctalus leisleri*), Daubenton's Bat, *Myotis* sp., Whiskered Bat (*Myotis mystacinus*), Natterer's Bat (*Myotis nattereri*) and Brown Long-Eared Bat (*Plecotus auritus*). Seven bat roosts were confirmed within buildings / structures within / associated with the Power Plant Area. Of these, two Soprano Pipistrelle (*Pipistrellus pygmaeus*) maternity roosts and a single Natterer's Bat (*Myotis nattereri*) maternity roost were confirmed. All other roosts are considered to be transitional / occasional roosts or night roosts / feeding perches.

Two badger (*Meles meles*) setts were identified within Drumman bog, and outlier setts were identified in Ballybeg Bog, along with evidence such as trails, latrines, push-throughs, and snuffle holes, with most field evidence found in proximity to the setts. Otter (*Lutra lutra*) spraints were recorded along the Yellow River and the Mongagh River. Irish Hare (*Lepus timidus hibernicus*) and Pine Marten (*Martes martes*) were also recorded. Salmonids and lamprey (*Lampræta* sp.) were recorded from the Mongagh River and the Castlejordan River. A positive eDNA result for white-clawed crayfish was recorded from the Yellow River. Amphibian species recorded within the study area included Frogs and smooth newt. Marsh Fritillary larval webs were recorded at Ballybeg Bog and 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 AECOM, 2023, Derrygreenagh Power Project Environmental Impact Assessment Report (EIAR), Volume I.

Birds recorded from the study area (Ballybeg, Drumman and Derryarkin bogs) during the breeding season 2021/2022 included the BOCCI⁵ red listed species Kestrel (*Falco tinnunculus*) and Lapwing (*Vanellus vanellus*), amber listed species Lesser Black-backed Gull (*Larus fuscus*), and green listed species Little Egret (*Egretta garzetta*), Sparrowhawk (*Accipiter nisus*), Buzzard (*Buteo buteo*), and Mute Swan (*Cygnus olor*). Annex I species Peregrine (*Falco peregrinus*) was also recorded.

Wintering bird surveys were carried out at the study area (Ballybeg, Drumman and Derryarkin bogs) between 2021 and 2023. Flocks of wintering Whooper Swan (*Cygnus cygnus*) were recorded at Derryarkin Bog. During the 2022-2023 winter bird survey season, they were recorded in abundances higher than 1% of the national population on one occasion and were recorded in abundances higher than 1% of the county population on 10 of the 28 survey dates.

At Drumman Bog a large flock of Mute Swan (*Cygnus olor*) occurred on through the winter survey season, with a peak population of 80 individuals recorded during the 2021-2022 winter season, and a maximum population of 106 birds in the 2022-2023 season (recorded in October 2022).

A large population of red listed species Golden Plover (*Pluvialis apricaria*) was regularly recorded flying between Drumman Bog and the other Derrygreenagh bogs, with up to 400 individuals recorded at Drumman in 2021-22, and 560 individuals recorded in February 2023. Wintering flocks of red listed species Lapwing (*Vanellus vanellus*) were recorded in 2021-22, with 200 individuals within the largest flock (recorded in late October 2021), increasing to 569 in February 2023. Amber listed species Hen Harrier (*Circus cyaneus*) was also recorded, with two individuals recorded roosting in January and February 2023 on Drumman Bog.

Other species recorded during the wintering bird surveys include the red listed species Kestrel (*Falco tinnunculus*) and snipe (*Gallinago gallinago*), amber listed species Lesser Black-backed Gull (*Larus fuscus*), Merlin (*Falco columbarius*), and green listed species Little Egret (*Egretta garzetta*), Sparrowhawk (*Accipiter nisus*), Buzzard (*Buteo buteo*). The Annex I Peregrine (*Falco peregrinus*) was also recorded.

3.3.3 Invasive species

There are to date no BNM records for high impact invasive species recorded from Drumman bog.

A broad range of common garden escapes are also occasionally present around the margins of Bord na Móna 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 is Raheenmore Bog SAC, approximately 7.2 km to the south-west.

With regard to nationally designated sites for nature conservation in the vicinity of Drumman Bog, the Milltownpass Bog NHA (Site code 002323) lies approximately 2.8 km to the north. The next closest nationally designated site is Black Castle Bog NHA, which lies approximately 5.3km to the south-east of Drumman Bog.

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 of Drumman bog (the nearest, Raheenmore Bog (designated as an SAC and pNHA), is located approximately 7.2km to the south-east).

See drawing BNM-ECO-23-35-23: Drumman Bog 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 as defined by the EPA under the Water Framework Directive (WFD).

The Monagh River 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 mapped by the EPA flows parallel to the Monagh River approximately 500 m to the south, and subsequently enters the river. Subsequently, the river flow north along the western boundary of the north-eastern section of the bog. A flowing stream mapped by the EPA flows parallel to the Monagh River, and subsequently enters the river. Significant riparian works have been carried out in the past along the Monagh River to increase the height of the banks, create berms to protect against flooding and increase the size of the main channel.

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.

Geological Survey of Ireland (GSI) mapping identifies the nearest karst feature (a spring) as being located approximately 6.5km south of the bog.

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 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.

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 2020.

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 regular basis by Bord na Móna 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 three treated surface water outlets to the River Boyne (07) catchment and the Yellow (CastleJordan) sub-catchment. Water discharges from the site to the Mongagh River (CastleJordan_07)) and the and from this river to the River Boyne. The Kiltootan and Collinstown 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 not under pressure in the third cycle.

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-23-35-02: Structures and Sampling, along with Drawing number BNM-ECO-23-35-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.*, 20017). 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) 2018-2021 (DHPCLG, 2017) 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 Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NRBMP 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 Figle River (IE_SE_14F010600) 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, 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 monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.

This sampling regime on a selected number of silt ponds will be carried out over a two-year cycle. The original (licence) requirement was for a quarterly sampling regime.

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 CO₂-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 CO₂-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 CO₂-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 CO₂ emissions from drained peatlands or increased methane (CH₄) 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 CO₂ emissions (Gunther *et al.* 2020). This means the increase in methane due to rewetting of dry peatlands is still negated by the CO₂ 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 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)

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 refuge and as ecological corridors for wildlife and are therefore deemed to be **locally important (higher value)**.

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 Bord na Móna 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).

There has been ongoing public consultation about the proposed Derrygreenagh Power Project, rehabilitation, biodiversity and other general issues at Drumman Bog in relation to the proposed project (<https://bnmenergypark.ie/derrygreenagh-power/>) and with relevant statutory and non-statutory stakeholders as part of the EIA process. Specific consultation relating to the project is not listed here, although there has been detailed consultation with stakeholders in relation to these issues and their overlap with rehabilitation and biodiversity.

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 Bord na Móna response to issues raised during consultation

N/A - consultation has not yet commenced.

5. REHABILITATION GOALS AND OUTCOMES

The rehabilitation goals and outcomes outline what Bord na Móna 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., gravel extraction and conifer forestry) and future proposed land-use (Derrygreenagh Power). It is not proposed to change or affect any industrial use, conifer or commercial forestry, or amenity use.
- 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 Bord na Móna.

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 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 contributory sources of impacts (private peat extraction and Bord na Móna). 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 Bord na Móna).

- Bord na Móna 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.

Draft

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 Ballivor-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 gravity-based drainage regime and has some areas of residual deep peat along with areas of shallow cutaway and shallow cutaway areas that are already developing as wetland, Heather and birch scrub.
- Bord na Móna have defined the key goal and outcome of rehabilitation at Drumman Bog as **environmental stabilisation** 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.
- 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) and future proposed land-use (Derrygreenagh Power).
- 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 as 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 at 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.
- **Potential land-use.** Bord na Móna are planning to develop Derrygreenagh Power Project at Ballybeg Bog, Drumman Bog and Derryarkin Bog. Derrygreenagh Power Project is a gas-fired Power Plant Area with a total electricity generation capacity of c. 710 MW including Electricity Grid Connection for power output onto the 400kV Oldstreet-Woodland line. The majority of the Proposed Development will be on Bord na Móna lands (with the exception of 400kV substation and sections of underground cable). The Gas Connection Corridor will be entirely through third party lands.
- The proposed Derrygreenagh Power Project consists of the following elements: the Power Plant Area and associated infrastructure, Electricity Grid Connection infrastructure and temporary construction compounds to facilitate the works. This development is currently in the pre-planning stage and is expected to be submitted for planning permission in the second half of 2023. The development planning boundary overlaps Drumman Bog rehabilitation boundary and has been mapped as a constraint in the rehabilitation plan. The proposed Power Plant Area will be located in Drumman Bog (with the exception of a process water discharge corridor through Derryarkin Bog) on the site of the BnM Derrygreenagh works and there will also be associated infrastructure, electricity grid connection infrastructure and a peat deposition area.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna 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 Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.
- **Public Rights of Way.** Where a public right of way or similar burden exists on Bord na Móna 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.** 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 Bord na Móna where rehabilitation is planned.

6.2 Key Assumptions

- It is assumed that Bord na Móna 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.
- Derrygreenagh Works 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 Bord na Móna 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 Bord na Móna 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 are indicating a downward trend in Ammonia concentrations (Figure 7.1).

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

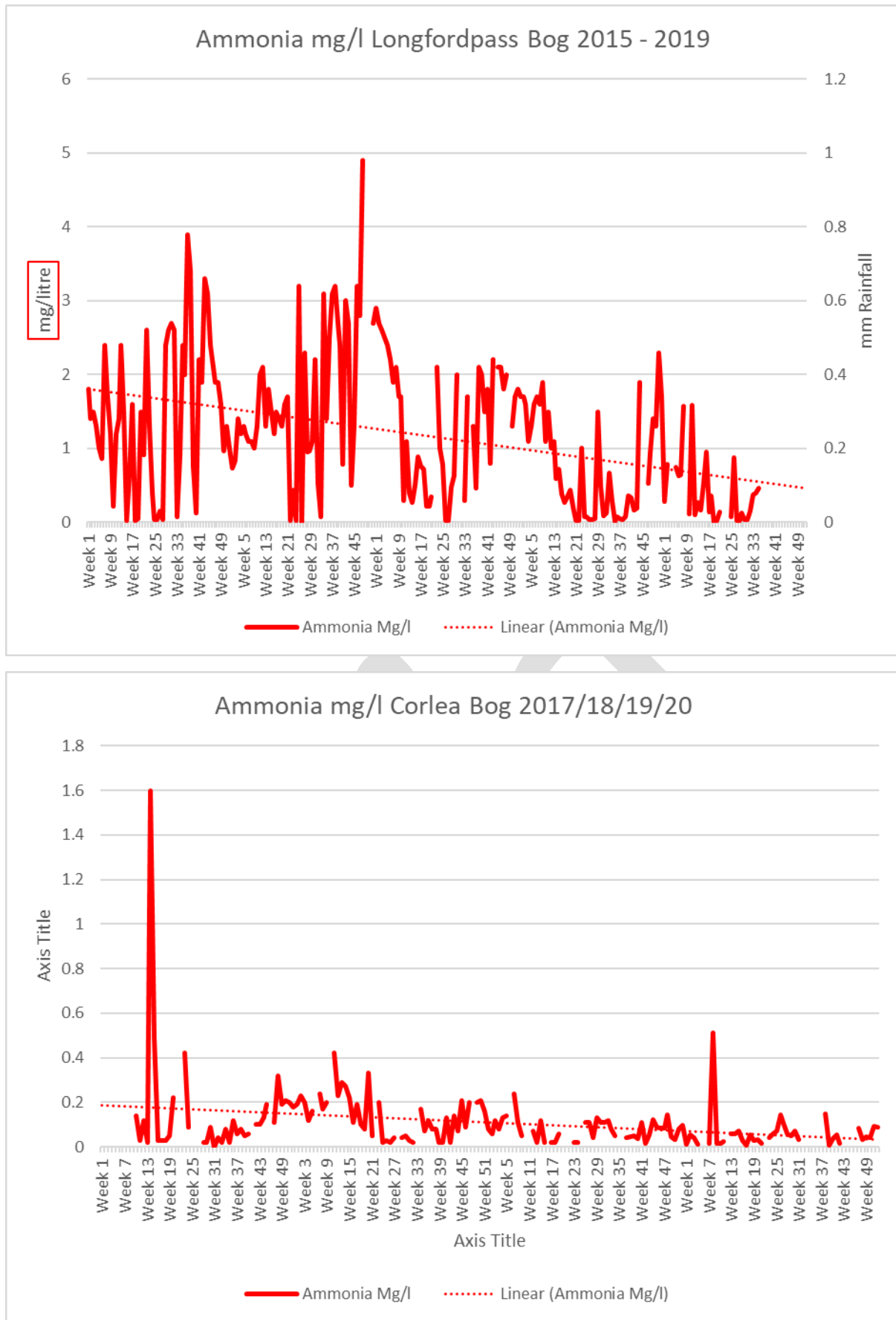


Figure 7.1. Ammonia levels over the period 2015-2019/2020 at Longfordpass and Corlea.

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

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 (Bord na Móna).** Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.
- **Bord na Móna to have sufficient resources (staff and training) to deliver the planned rehabilitation with required associated skills and competencies.**
- **Bord na Móna 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. Bord na Móna 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 Bord na Móna experience of peatland management and best practice applied internationally in peatland management. Measures proposed in this plan have already been shown to be effective at other sites. Bord na Móna will apply a flexible and adaptable approach to the more innovative rehabilitation measures proposed in this plan. If measures are not initially effective, Bord na Móna 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 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. Bord na Móna 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 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.

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-23-35-22 titled **Drumman Bog: Aerial Imagery 2020**

BNM-ECO-23-35-04 titled **Drumman Bog: Peat Depths**

BNM-ECO-23-35-03 titled **Drumman Bog: LiDAR Map**

BNM-ECO-23-35-09 titled **Drumman Bog: Depression Analysis**

The restoration and rehabilitation measures are provisionally outlined in drawing titled **BNM-ECO-23-35-20 Drumman Bog: 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).

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.

Category	Type	Code	Description	Area (Ha)
Rehab	Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	136.4
	Wetland cutaway	WLT1	Modifying outfalls and managing water levels with overflow pipes within low lying areas and depressions on shallow peat.	199.1
Marginal	Marginal land	MLT1	No work required	63.5
Rehab complete	Completed rehab	Completed rehab	Completed rehab	396.5
Other	Silt Pond	Silt Pond	Silt Pond	1.1
	Water Bodies	Water Bodies	Water Bodies	1.4
Constraint	Constraint	Constraint	Renewable Energy Development Footprint, Industrial, Access, Turf Cutting/ Turbary, Marginal Grassland, Other	325.2
Total Area				1123.1

8.1 Completed 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 Drumman 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 been completed and the herb production has helped to establish vegetation as a nursery crop.
- Parts 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).

- 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 finalised)

- **2023 – 2025:** Short-term planning actions.
- **2025:** Short-term practical actions
- **>2025:** Decommission silt-ponds, if necessary

8.6 Budget and costing

Bord na Móna 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 Bord na Móna Annual Report (Bord na Móna 2023). Bord na Móna 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 monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This monthly 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 Bord na Móna 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.

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. There is still some historical energy peat stock remaining on some bogs and these peat stock will be transferred via the BnM rail network to Edenderry Power Station up to 2024 when the power station is expected to have ceased using peat as fuel.

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 Lislogher 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.

Lislogher 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. Lislogher 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 Bord na Móna (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. Bord na Móna 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 conifer plantations in the 1980s and 1990s. Several rehabilitation trials (test programmes) have been developed more recently, where different techniques have been trailed and implemented.

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.

During the 1980's/1990's 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.

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 Bord na Móna 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 started at Carrenstown in 2022.

Intensive decommissioning and rehabilitation for the Derrygreenagh Bog Group started in 2021 at a number of individual bogs.

Bord na Móna is currently developing a wind energy project called Ballivor Windfarm ([Bord na Móna Wind Farm | Ballivor Wind Farm](#)). This proposed project is in the pre-planning stage. The proposed location extends across parts of Bracklin, Lislogher East, Carrenstown and Ballivor Bogs. It is expected to be submitted to planning in 2023.

Bord na Móna is also currently developing a thermal power plant at Derrygreenagh (Drumman Bog). It is expected this power plant will be fuelled by natural gas. This project was consented in 2010. This project is applying for consents to facilitate connection of the development to the national gas and electrical grid infrastructure [Bord na Móna Energy Park - Bord Na Mona \(bnmenergypark.ie\)](#).

A breakdown of the component bog areas for the Derrygreenagh Bog Group IPC Licence Ref. PO-501-01-01 is outlined in Table Ap-2.

Table Ap-2: 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..	2020	Draft 2022

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			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.		
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 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. Part of Bracklin is being assessed for PCAS in 2023.	2020	Draft 2022 Bracklin West (sub-site) rehabilitation is ongoing in 2023
Carranstown	306	Industrial peat production commenced at Carranstown in the 1980s. The majority of the site has relatively deep peat.	Carrenstown 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 Rehab started in 2022
Lislogher East	486	Industrial peat production commenced at Lislogher East in the 1950s. Part of the site is cutaway while there is a mosaic of residual peat depths.	Lislogher 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 2022
Lislogher West	239	Lislogher West was drained in 1980s. The bog is drained and still has residual vegetation in places.	Lislogher West was drained but never fully developed for industrial peat extraction. Expected to be part of the proposed Ballivor Windfarm, which is currently in pre-planning.	N/A	Rehab plan finalised in 2023. Rehab to start 2023
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.	2020	Draft 2023

Bog Name	Area (ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
			<p>Much of the site is bare peat. The northern half has been cutaway and is establishing cutaway habitats.</p> <p>Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.</p>		
Derryarkin	710	<p>Industrial peat production commenced at Derryarkin in the 1950s.</p> <p>Most of the site is cutaway</p>	<p>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.</p> <p>Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past.</p> <p>Part used for gravel extraction in past.</p> <p>Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.</p>	2015	Draft 2023
Derryhinch	337	<p>Industrial peat production commenced at Derryhinch in the 1950s.</p> <p>There is a mosaic of residual peat depths left</p>	<p>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.</p> <p>Most of the site is bare peat with emerging cutaway habitats.</p> <p>Part of the site was used to trial herb production. This initiative has now ceased.</p>	2020	Draft 2023
Drumman	1,122	<p>Industrial peat production commenced at Drumman in the 1950s.</p> <p>Most of the site is cutaway</p>	<p>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.</p> <p>Most of the site is developing cutaway habitats. Some re-wetting was carried out in the past.</p> <p>Part used for gravel extraction.</p> <p>Part of the site was used to trial herb production.</p> <p>Part of the site is used for log storage (biomass).</p> <p>Expected to be part of the proposed Derrygreenagh Energy Project, which is currently in pre-planning.</p>	2020	Draft 2023
Toar	445	<p>Industrial peat production commenced at Toar in the 1980s.</p> <p>Most of the site has deep residual peat.</p>	<p>Toar Bog formerly supplied a range of commercial functions including the supply of horticultural peat and fuel peat for Edenderry Power.</p> <p>Most of the site is bare peat.</p> <p>Part of the site is used for log storage (biomass).</p> <p>Part of the east of the site is being considered for a gravel extraction project.</p>	2020	Draft 2023

See Drawing number BNM-ECO-23-35-24 titled **Derrygreenagh Bog Group**, included in the accompanying Mapbook which illustrates the location of Drumman Bog and the Ballivor-Derrygreenagh Bog Group in context to the surrounding area.

Draft

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:	<u>Drumman</u>	Area (ha):	1122ha
Works Name:	Derrygreenagh	County:	Offaly & Westmeath
Recorder(s):	MMC & DF	Survey Date(s):	16 th & 17 th 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, broadly following 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.

- 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 gravelly 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 gravelly 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*, *Diploxys 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 caespitosa*, *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

Bord na Moña 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 <i>Sphagnum</i> and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer <i>Campylopus</i> -dominated community	pCamp	PF2
		Pioneer <i>Juncus effusus</i> -dominated community (Soft Rush)	pJeff	PF2
		Pioneer <i>Eriophorum angustifolium</i> -dominated community (Bog Cotton)	pEang	PF2
		Pioneer <i>Juncus bulbosus</i> -dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer <i>Triglochin palustris</i> -dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with <i>Cladium</i> (rich fen)	pCladium	PF1
	Emergent communities	Pioneer <i>Carex rostrata</i> -dominated community (Bottle Sedge)	pRos	FS1
		Pioneer <i>Phragmites australis</i> -dominated community (Common Reed)	pPhrag	FS1
		Pioneer <i>Typha latifolia</i> -dominated community (Reedmace)	pTyp	FS1
		Pioneer <i>Schoenoplectus lacustris</i> -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 <i>Betula/Salix</i> -dominated community (A) (Birch/Willow)	eBir	WS1
		Open <i>Betula/Salix</i> -dominated community (B) (Birch/Willow)	oBir	WS1
		Closed <i>Betula/Salix</i> scrub community (C) (Birch/Willow)	cBir	WS1
		<i>Ulex europaeus</i> -dominated community (Gorse)	eGor	WS1
		<i>Betula/Salix</i> -dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry <i>Calluna vulgaris</i> -dominated community (Heather)	dHeath	HH1
		Dense <i>Pteridium aquilinum</i> (Bracken)	dPter	HD1
Grassland	Pioneer dry calcareous and neutral grassland (Centaureo-Cynosuretum)	gCal	GS1	

		<i>Dactylis-Anthoxanthum</i> -dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2
		<i>Anthoxanthum-Holcus-Equisetum</i> community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		<i>Molinia caerulea</i> -dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (<i>Filipendulion ulmariae</i>)	Mar	GM1
Disturbed		<i>Tussilago farfara</i> -dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		<i>Epilobium</i> -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.

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 Pendunculate 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 grslid	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	

	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

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 Bord na Móna staff and updated as required.

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 Bord na Móna 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 plague⁶ 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 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, Bord na Móna 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 Bord na Móna 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.

Bord na Móna 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 Bord na Móna. 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 Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Ballivor - Derrygreenagh Bog Group (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. The bog is part of the Ballivor - Derrygreenagh group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

2 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.

Bord na Móna 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.

3 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 Bord na Móna.

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.

Bord na Móna is a key stakeholder in the National Peatlands Strategy and the Peatlands Strategy Implementation Group. The strategy recognises the potential for some Bord na Móna 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 Bord na Móna) for the after-use of cutaway bog.

- Bord na Móna 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 Bord na Móna is not to open up any undrained new bogs for peat production.
- Lands identified by Bord na Móna as having high biodiversity value and/or priority habitats will be reserved for these purposes as the proposed future land use.
- Generally, Bord na Móna cutaway bogs that flood naturally will be permitted to flood unless there is a clear environmental and/or economic case to maintain pumped drainage.
- In deciding on the most appropriate afteruse 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 Bord na Móna's Strategic Framework for the Future Use of Peatlands.

The National Peatlands Strategy highlights the importance and value of developing peatland rehabilitation plans for Bord na Móna 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.

4 Draft National River Basin Management Plan 2022-2027 (Water Framework Directive)

The National River Basin Management Plan (Department of Housing, Planning, Community and Local Government 2017) 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 2018-2021 outlined how peat extraction can be a potentially significant pressure on various water quality parameters. Peatland rehabilitation of Bord na Móna cutaway (in addition to other measures) was part of the WFD (2018-2021) programme of measures. The NRBMP 2018-2021 takes account of the fact that Bord na Móna was in the process of phasing out the extraction of peat for energy production, that it set a target to rehabilitate 9,000 ha of cutaway bogs (covering 25 peatlands) by 2021 (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 2018-2021 rehabilitation target was superseded by the acceleration of the Bord na Móna de-carbonisation programme and the Peatland Climate Action Scheme (PCAS).

The development of site rehabilitation plans and the delivery of peatland rehabilitation by Bord na Móna was expected to have a positive impact on water quality and will help the NRBMP 2018-2021 deliver its objectives in relation to the Water Framework Directive and is one of the five key principle actions.

The draft NWBMP 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 hydromorphological condition of rivers.

The draft NWBMP 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 are 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 Bord na Móna 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 NWBMP 2022-2027.

5 National Biodiversity Action Plan 2016-2021

The National Biodiversity Action Plan 2016-2021 has a vision that biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally. Ireland's 2nd National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BnM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

Rehabilitation of Drumman Bog is expected to significantly contribute in the future to actions and targets of the National Biodiversity Action Plan 2016-2021, particularly in relation to peatland restoration and creation of new habitats such as wetlands and woodlands.

6 National conservation designations

Bord na Móna 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, cNHAs) and National Nature Reserves). Bord na Móna 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.

7 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.

Bord na Móna has played a key role in the development of the National Raised Bog Special Area of Conservation Management Plan 2017-2022 and the Review of the Raised Bog Natural Heritage Area Network. Several Bord na Móna sites were assessed by the National Parks and Wildlife Service as part of the above Plan and Review and there is an expectation that several Bord na Móna sites will be designated as SACs and NHAs in the future. This will reinforce the network of protected raised bog sites and replace in part sites that will be de-designated as they have been deemed to be significantly damaged and are deemed to have no raised bog restoration prospects. The Peatland Climate action scheme (PCAS), which includes enhanced rehabilitation measures, is expected to restore

several sites that will contribute to The National Raised Bog Special Areas of Conservation (SACs) Management Plan 2017-2022 targets in relation to the restoration of raised bog habitat.

Bord na Móna 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. Bord na Móna and the National Parks and Wildlife Service continues to engage regarding the ongoing relocation of turf-cutters from protected raised bog sites.

8 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 Bord na Móna specific action in this plan includes the adoption of pollinator-friendly management within the Bord na Móna network of sites. One action to help achieve this objective is habitat rehabilitation and restoration, where possible, of pollinator-friendly habitats, including peatland habitats.

9 Land-use planning policies

As Bord na Móna 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. Bord na Móna 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 Bord na Móna: heritage, tourism, biodiversity/conservation, landscape, renewable energy, and economy/enterprise.

10 National Archaeology Code of Practice

Bord na Móna 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>)

The Code replaced a set of Principles agreed with the Department of Arts, Heritage and the Gaeltacht in the 1990s. Under the Code Bord na Móna, the Minister and Director work together to ensure that appropriate archaeological mitigation is carried out in advance of peat extraction.

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna 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 Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will adhere to the Archaeology Code of Practice relating to management of any archaeological finds that may arise during cutaway peatland rehabilitation and decommissioning.

11 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 Bord na Móna 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 Bord na Móna'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 EU's 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 policies.

12 Bord na Móna commitments

Bord na Móna 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.

The company announced that industrial peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Rehabilitation measures would 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 Climate Action Plan 2019, the Water Framework Directive, etc.) and rehabilitation guidelines set down by the Environmental Protection Agency. To date, 15,000 hectares of cutaway and cutover bog have been rehabilitated using this approach with 5,000 hectares in active rehabilitation.

In line with Bord na Móna'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.

The above commitments have now been followed by the decision by the company to cease industrial peat extraction and rehabilitate a target of 33,000 ha between 2021-2025.

These commitments outline the importance of peatland rehabilitation to Bord na Móna. 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.

13 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020 (Draft)

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2020 (draft document). This document outlines how Bord na Móna's cutover peatland estate is complex in nature with great variability in terms of peat depths, peat types, drainage, subsoil condition and environmental value. Thus, future options require consideration on a site-specific basis, also bearing in mind the considerable internal variation within bogs. The development of the land-bank will also take account of national needs, while also taking account of the various national legislation, policies and plans related to the management of peatlands. In general, Bord na Móna will seek to balance and optimise commercial, social, and environmental value of these sites, and develop integrated land-uses, while taking account of the need for sustainability and their biodiversity value.

Any consideration of other future after-uses for Bord na Móna land such as development or other mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this peatland rehabilitation plan.

Draft

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	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	Not 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.

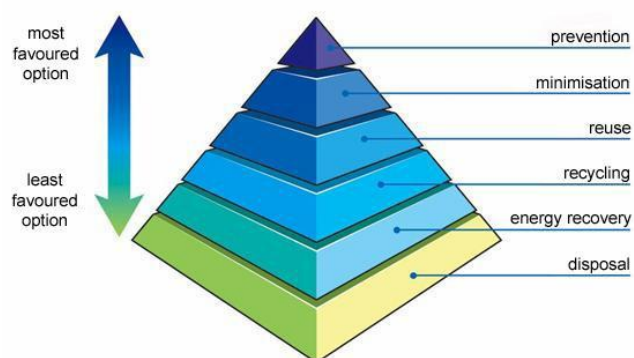
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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, 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 and EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

APPENDIX VII. GLOSSARY

Cutaway Bog: A Bord na Móna 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 Bord na Móna 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, Bord na Móna 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 Bord na Móna 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.

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 IPPC Licence's Ref P0501-01, Derrygreenagh Bog Group, County 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 IPPC Licensing in 1999 and since licensing, the excavated material is stored adjacent to the silt pond, where it either remains in situ or 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 than 2-3 metres.

1.2 Power Station screenings:

Peat from the bogs is screened prior to processing. This screening removes oversized peat, stones and bog timbers. Schedule 3 (ii) of the IPPC 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 IPPC 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 IPPC 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 31st 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.

IPPC 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 IPPC 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 our 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 IPPC 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.

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 IPPC 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 IPPC 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 IPPC 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 their 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-affected 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 IPPC Licence ref. P0501-01.

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/fag/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.



	Procedure: ENV017	Rev: 1
	Title: Archaeological Findings	Approved: EM

1) Purpose

The purpose of this procedure is to describe the arrangements in Bord na Móna for findings of Archaeological material (Stray Finds).

All objects, sites or monuments, no matter how fragmentary, are important elements of our heritage.

2) Procedure

1. Check whether there are any known archaeological monuments in your area.
2. Be vigilant at all times - objects or traces of structures can be found on the field surfaces, in the drain faces, on the bog margins or caught within the mechanics of machinery.
3. If an object is found leave it in place, if it is safe to do so, note its position and immediately contact your Archaeological Liaison Officer who will assess the situation and contact the Duty Officer of the National Museum of Ireland.
4. Resist the temptation to investigate the find spot as this may disturb fragile archaeological deposits.
5. If the object is already dislodged or is in imminent danger, remove it carefully, mark its find spot and report it immediately to your Archaeological Liaison Officer.
6. Objects made of wood, leather or textile, which are removed from peat should be kept in conditions similar to those in which they are found. This can be done by packing them in peat or, if waterlogged, placing them in a clean basin of water and sealing the container. Resist the temptation to clean or remove peat from the object.
7. If timbers or other materials, such as gravel or stones, which could be part of a man-made structure are noted on the bog, mark the location and report it immediately to your Archaeological Liaison Officer. If you suspect the find is of archaeological importance, resist the temptation to expose it any further as this could result in damage to the structure.
8. Report anything that looks unnatural in the bog – your Archaeological Liaison Officer will decide whether it should be referred to the appropriate authorities.

NOTE: Our archaeological heritage is a finite, non-renewable resource. Once a site is destroyed its information is lost forever and we have lost the chance to understand a little more about our past, where we have come from and perhaps the opportunity to learn for the future.

Your Archaeological Liaison Officer is

3) Records

Revision Index			
Revision	Date	Description of change	Approved
1			
2			

Bord na Móna

Drumman Bog Rehab Plan GIS Map Book 2023

Document Control Sheet

Document Name:	Drumman Bog Rehab Plan GIS Map Book 2023
Document File Path:	
Document Status:	Draft v1.0

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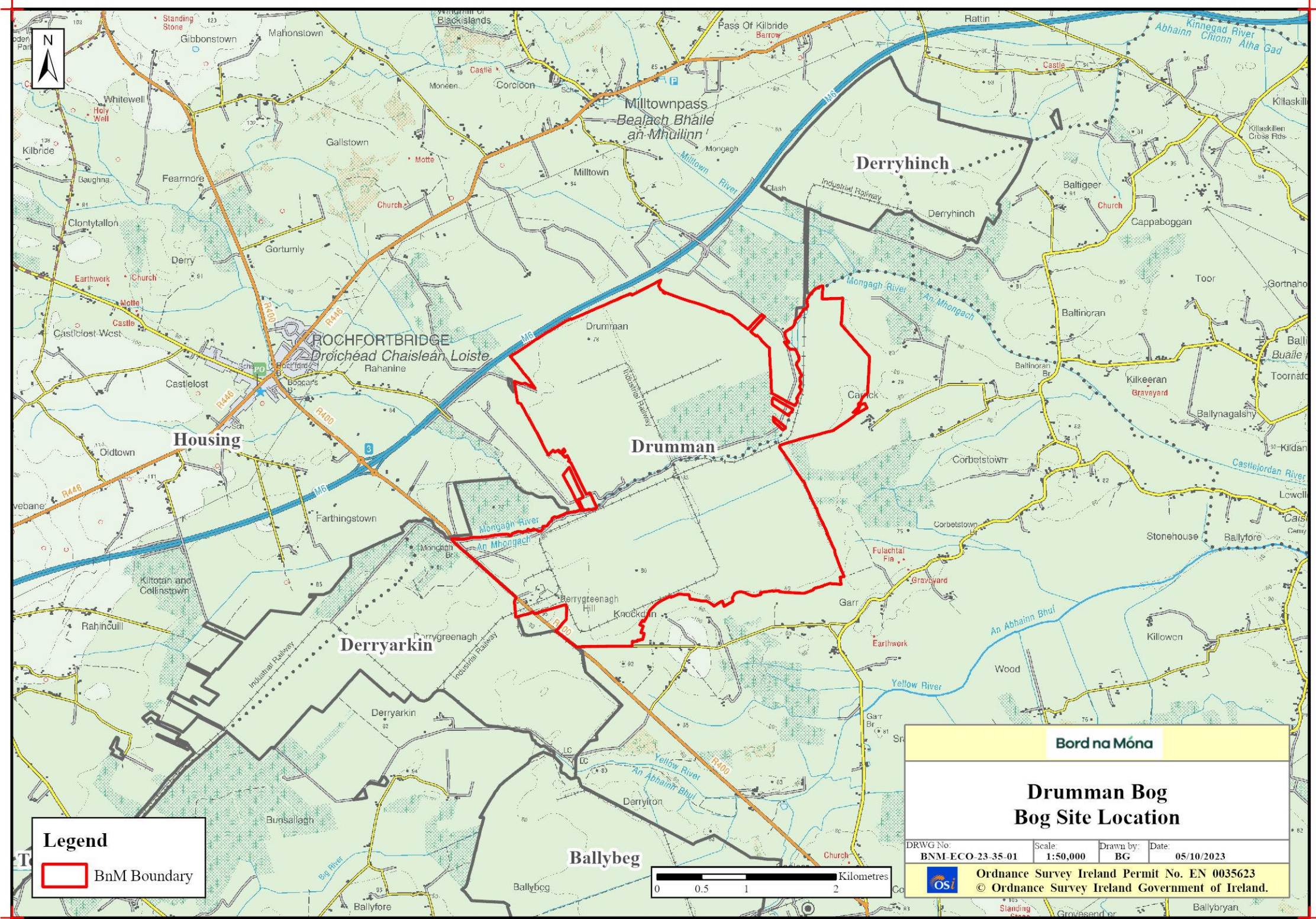
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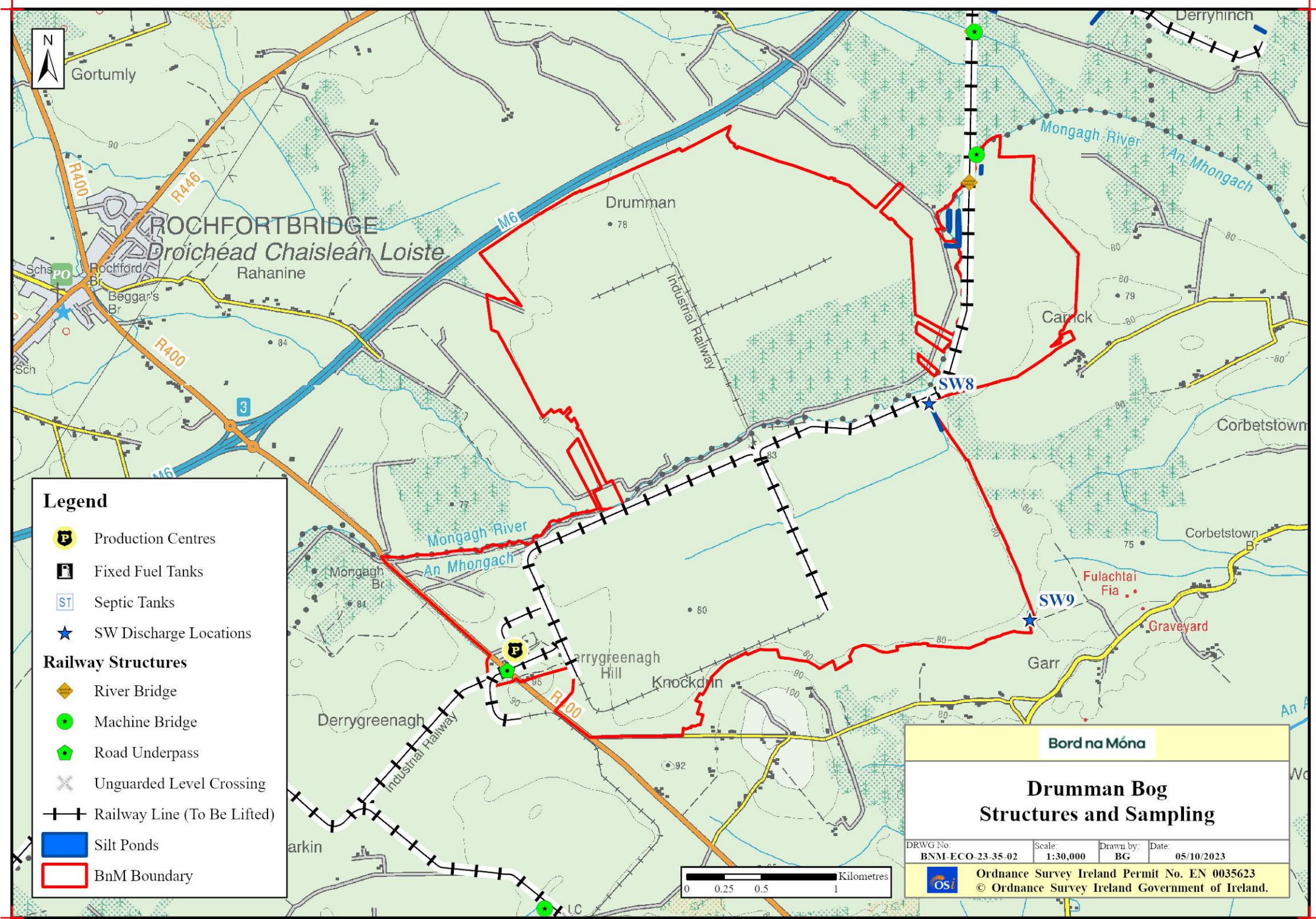
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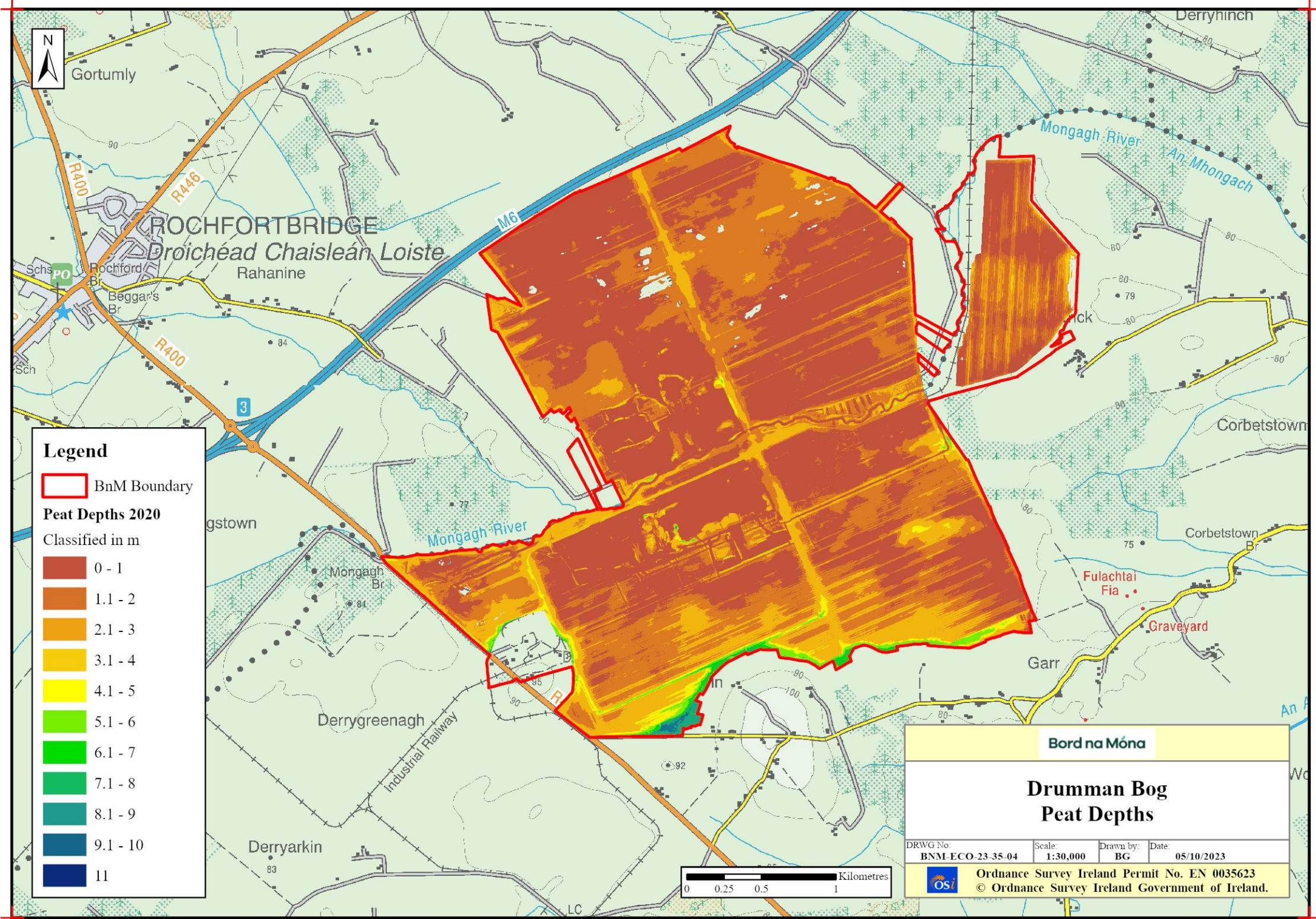
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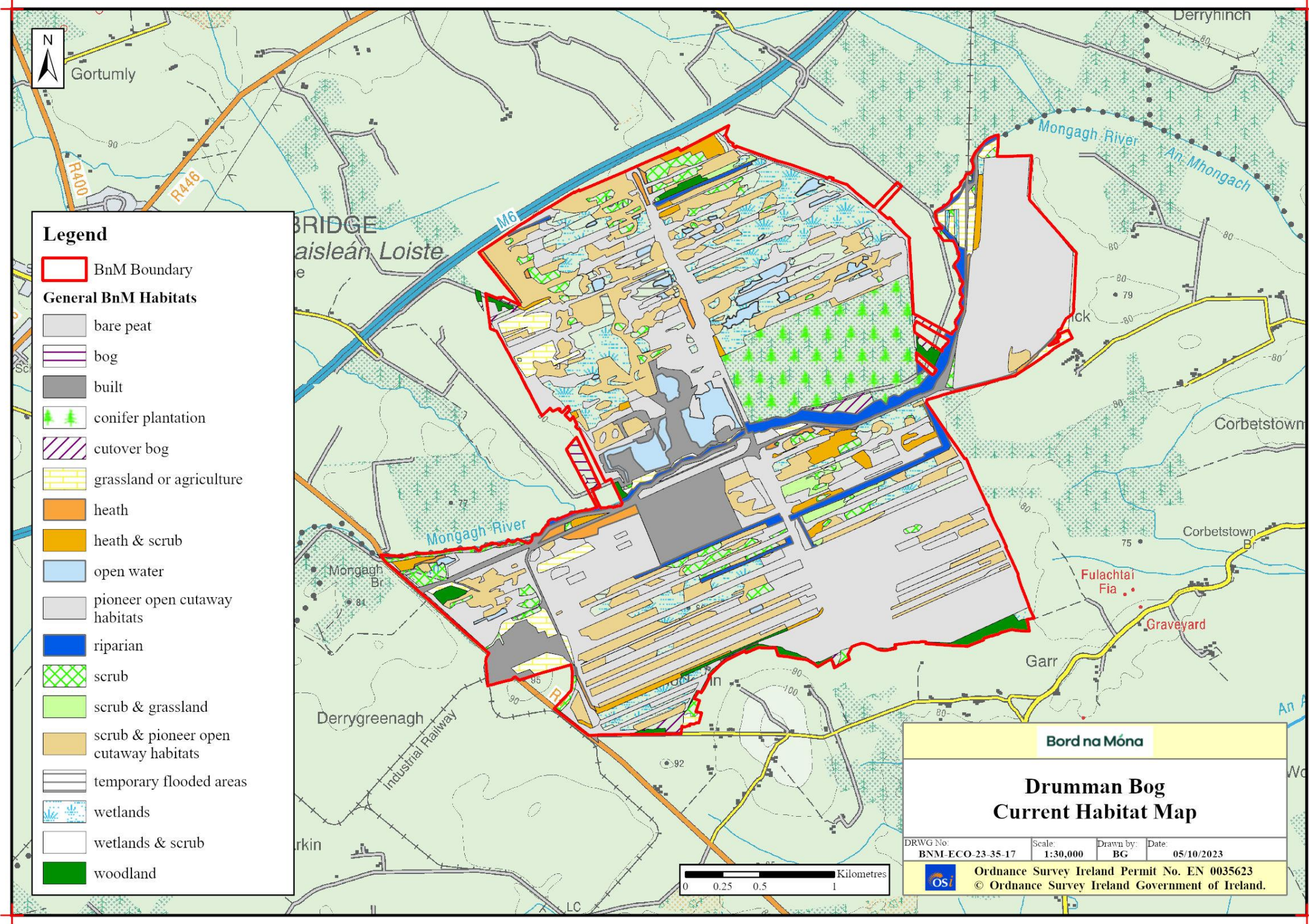
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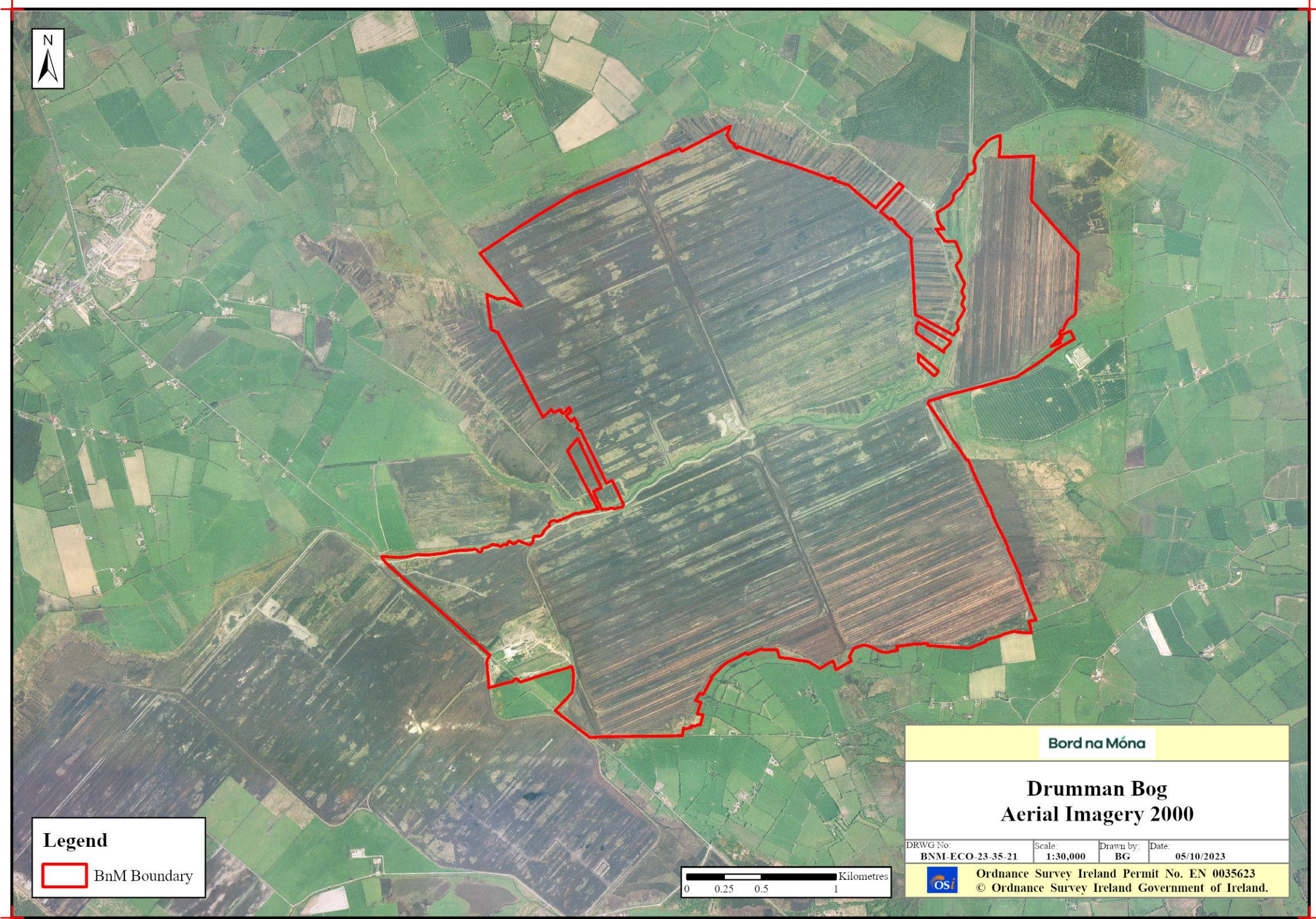


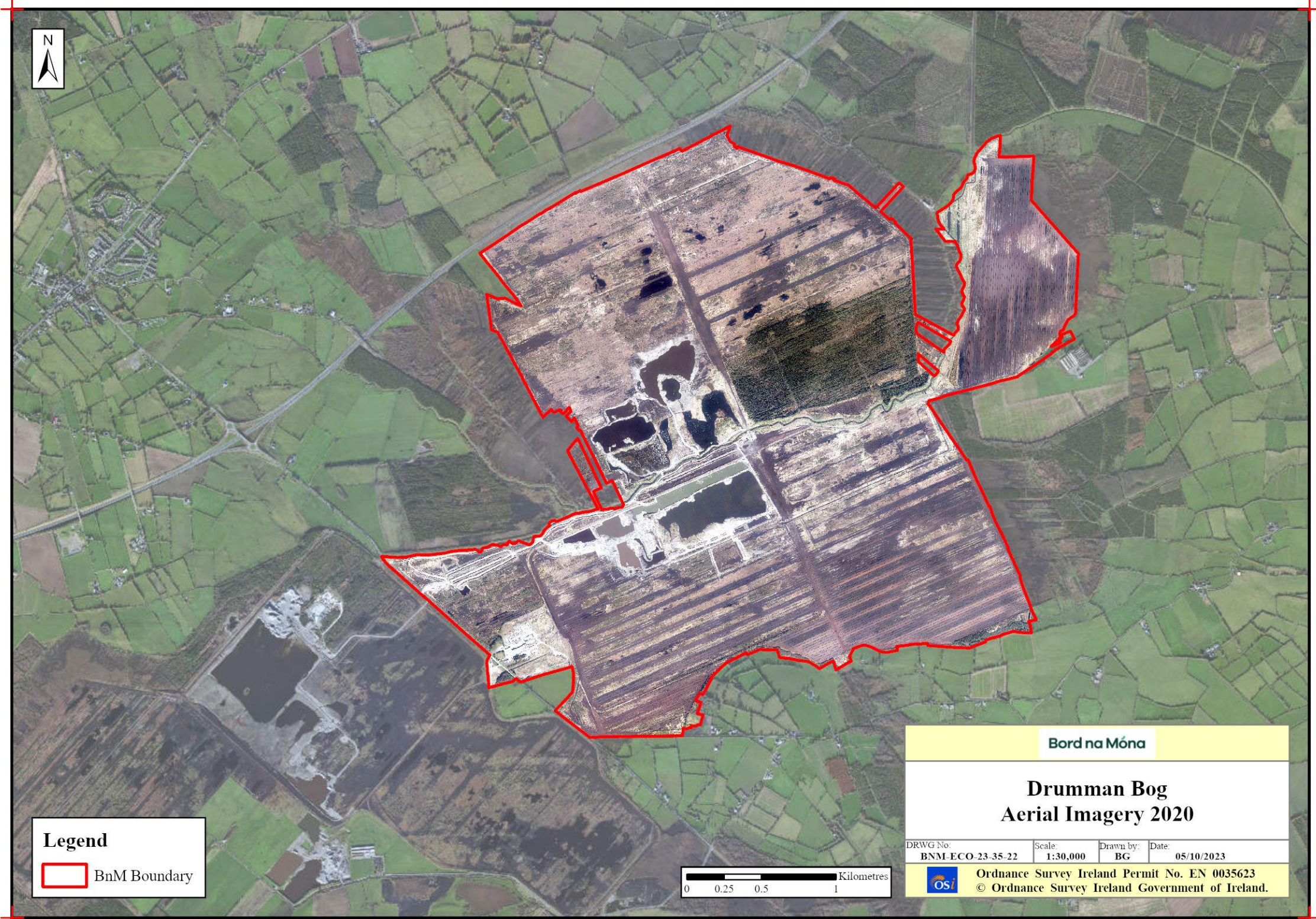
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Drumman Bog Bog Site Location			
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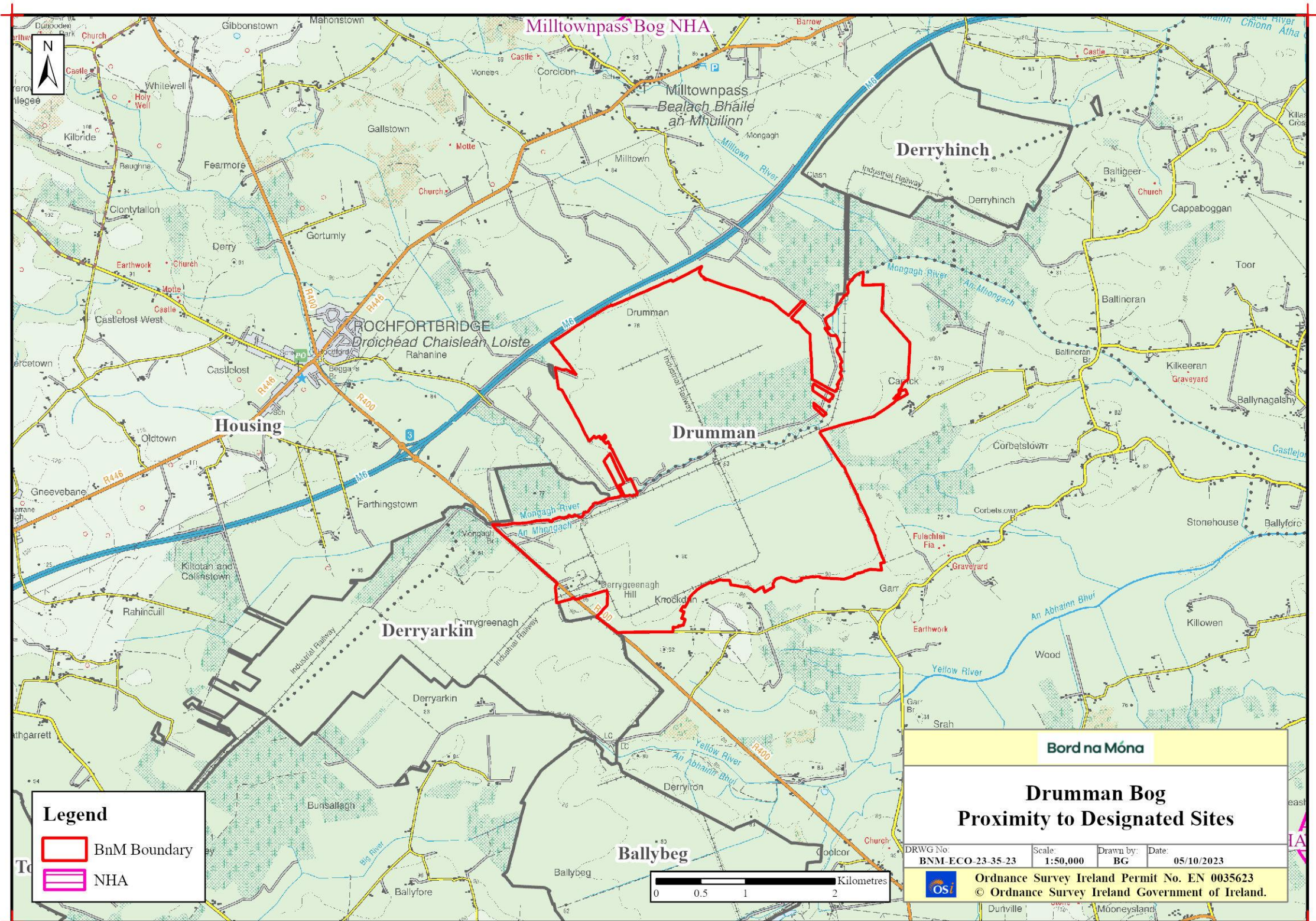


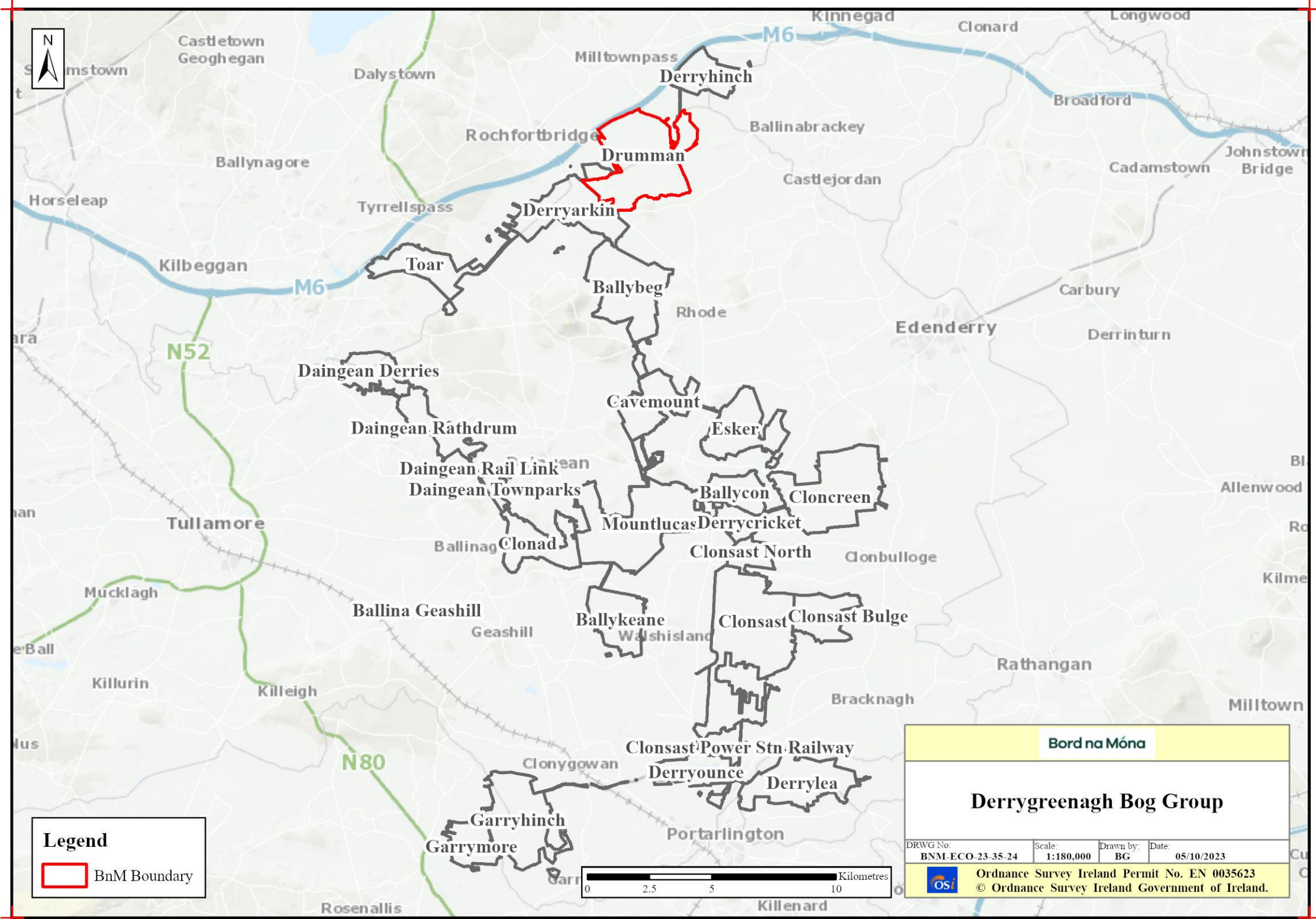




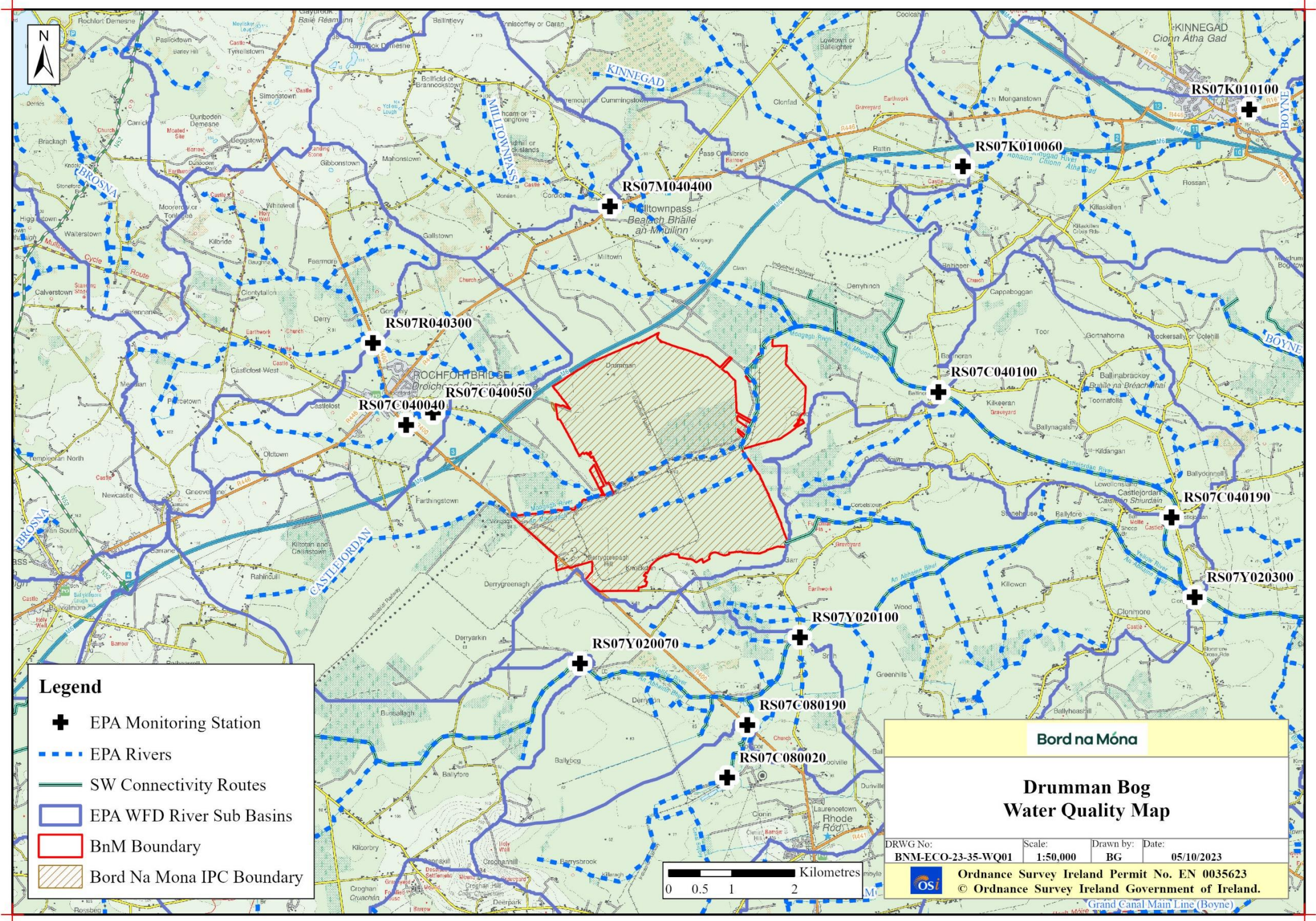


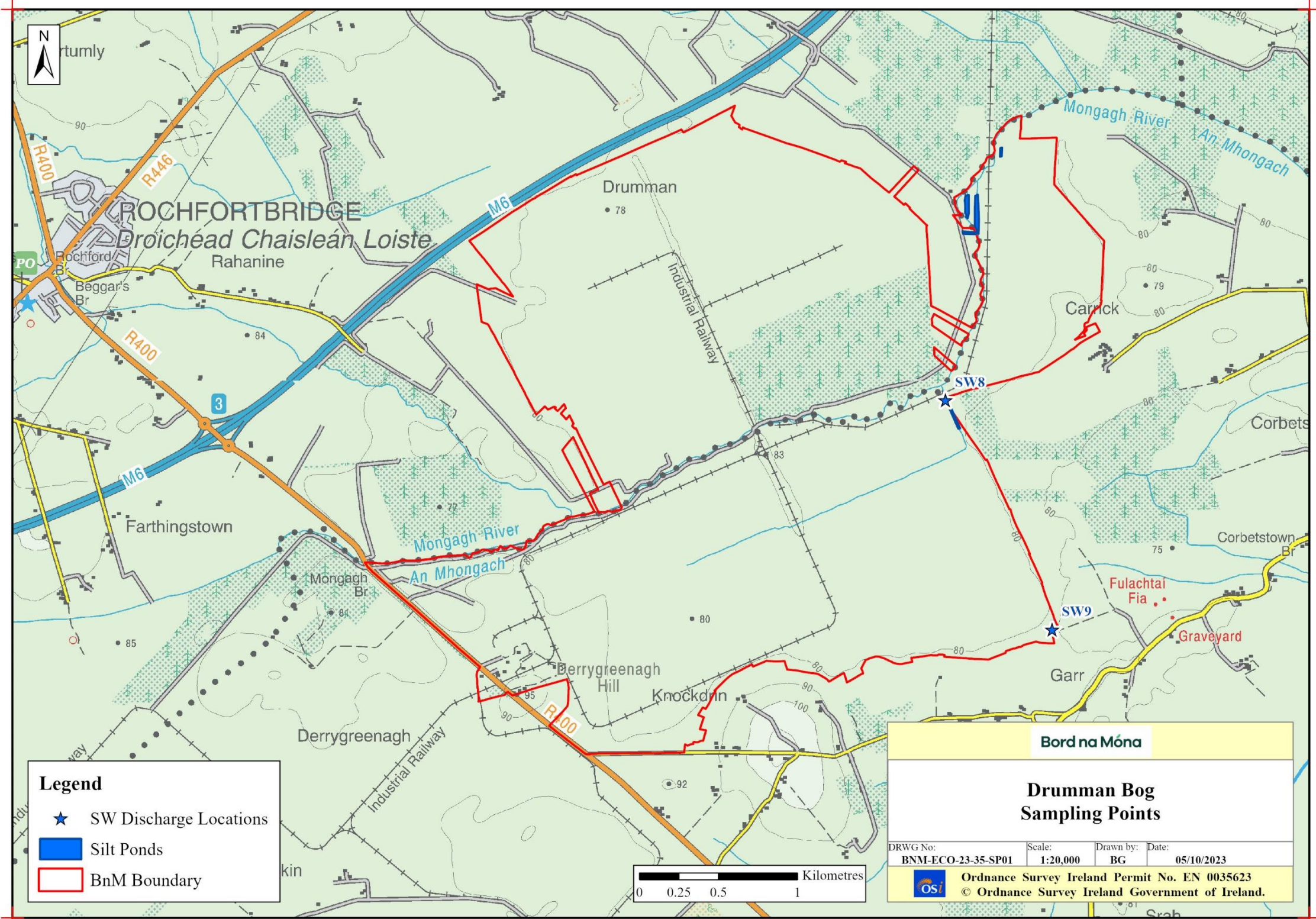


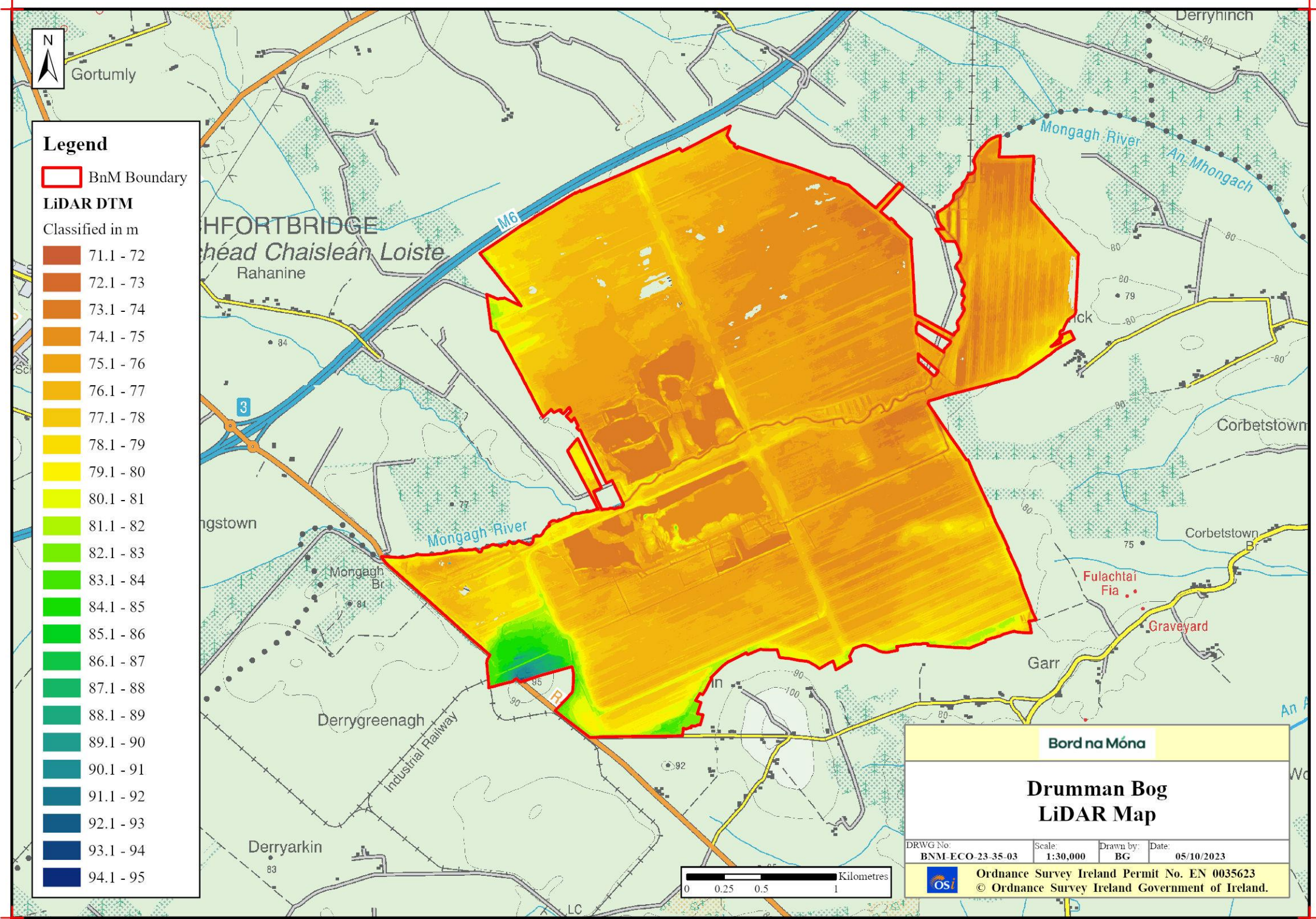


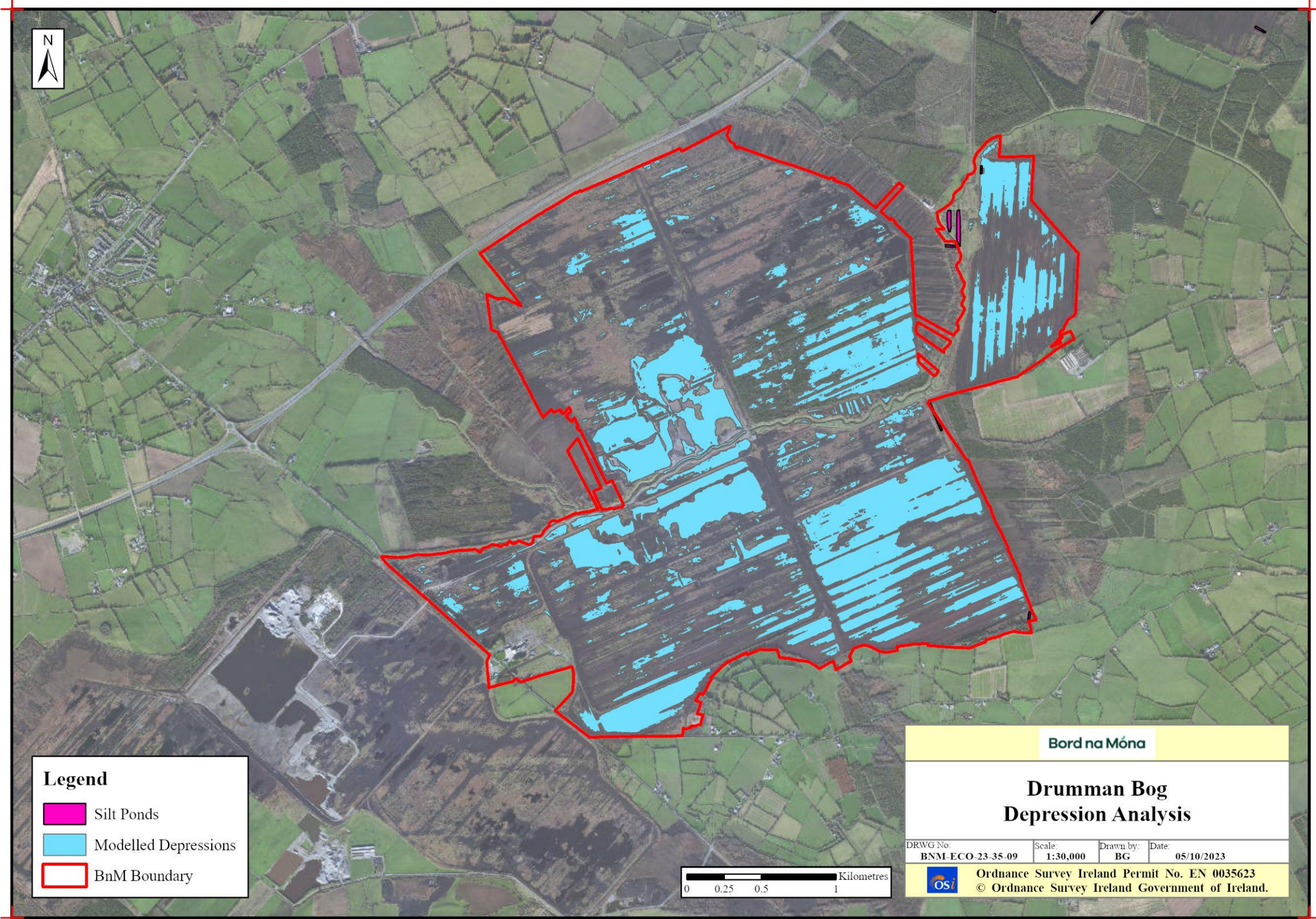


Hydrology / Topography Maps









Rehabilitation Maps

