

# **Bord na Móna**

## **Kilaranny Bog**

# **Cutaway Bog Decommissioning and Rehabilitation Plan 2022**

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0500-01:

*“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 Kilaranny 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 Kilaranny Bog.*

*In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0500-01, due regard was also given to the proposed Peatlands Climate Action Scheme (PCAS) announced by the Minister. This Scheme will see the Minister support, via the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, ‘the Scheme’, for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme’. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support. The additional costs of the Scheme will be supported by Government through the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator.*

*While this document outlines the enhanced rehabilitation measures planned for the Kilaranny Bog, activities which goes beyond that required by Condition 10 in the Licence, rehabilitation necessary to comply with the ‘standard’ requirement of Condition 10 (in the absence of the Scheme) is also included, to estimate costs. The inclusion of the ‘standard’ rehabilitation together with the enhanced rehabilitation in this document allows the Scheme Regulator to distinguish and objectively determine the specific activities (and their associated costs) eligible for support under the Scheme.*

*Bord na Móna have defined the key rehabilitation outcome at Kilaranny Bog as environmental stabilisation, re-wetting and setting the bog on a trajectory towards development of naturally functioning peatland and wetland habitats.*

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

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Note: This finalised version of the Rehabilitation Plan has been updated to take account that several planning actions listed in Section 8.1 have been completed and have been incorporated into the plan. This includes an Appropriate Assessment of the rehabilitation plan. See Kilaranny Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

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## NON-TECHNICAL SUMMARY

- Bord na Móna is planning to rehabilitate Kilaranny Bog, southwest of Tullamore, in Co. Offaly.
- Peat harvesting is now finished at Kilaranny Bog.
- This is happening as Bord na Móna are obliged to carry out peatland rehabilitation via an IPC License issued by the Environmental Protection Agency. In addition, the Government has agreed to support peatland rehabilitation via the establishment of the Peatland Climate Action Scheme (PCAS). This is funded via the government and by Bord na Móna.
- The key objective of peatland rehabilitation is environmental stabilisation. This means developing habitats and vegetation back onto the bare peat, and minimising impacts to downstream. The bog was drained in the past to allow peat production. Better results for water quality improvements, climate action, the reduction of carbon emissions and biodiversity are achieved when the remaining peat is re-wetted. This means drain-blocking and other measures to raise water levels to the surface of the bog and to encourage the natural colonisation of vegetation.
- In general, soggy ground conditions are preferred. This means the remaining peat is wet and that plants that prefer wetter conditions, like Bog Cotton and Reeds will thrive.
- Many Bord na Móna bogs cannot be restored to raised bog, as so much peat has been removed and the environmental conditions have been modified. However other natural habitats will develop like shallow wetlands with Reedbeds and Birch woodland, and in time a naturalised peatland can be restored.
- Re-wetting peat is also better for climate action. This reduces carbon emissions as re-wetting the remaining peat reduces carbon losses such as the production of Carbon Dioxide, the main Greenhouse Gas. The site is expected to still be a reduced carbon source for some time, but eventually the carbon sink function can re-establish as peat-forming conditions are restored. This will take some time.
- The development of a range of habitats in Kilaranny 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 wetland habitats.
- Kilaranny Bog was drained and developed for industrial peat production in the 1980's. Peat production ceased in 2020. Therefore, much of the site currently comprises of bare peat. A small part of the site has already established pioneer peatland habitats.
- Part of Kilaranny has been leased to NPWS and has been used for the relocation of turf-cutters from Clara Bog. This was in support of raised bog conservation objectives at Clara Bog, which included the cessation of turf-cutting at this site and in support of the National Raised bog Special Areas of Conservation management plan 2017-2022 (NPWS 2017).
- A small area of Kilaranny has been used by Bord na Móna to establish a Eucalyptus biomass trial.
- Measures proposed for Kilaranny Bog include drain blocking and other measures required to raise water levels to the surface of the peat (changing levels of pipes for example). Some fertiliser will be spread on headlands and other areas (a small part of the overall area) to encourage vegetation growth.
- Bord na Móna plan to carry out this work in 2022.
- These rehabilitation measures will be planned by a team consisting of ecologists, hydrologists and engineers. It is a principle of Bord na Móna rehabilitation planning that no actions will be taken that would negatively impact on adjacent land. No boundary drains will be blocked. Water will still leave the site via the existing outlets.

- It will take some time for vegetation and habitats to fully develop at Kilaranny, and a peatland ecosystem to be restored. However, it is expected that most of the site will be developing pioneer habitats after 5-10 years.
- This is a peatland rehabilitation plan. This plan does not consider future after-use or development. Bord na Móna continually reviews its land-bank to consider future commercial or industrial developments, such as renewable energy. Any other proposed development will be planned in adherence to relevant planning guidelines and will consider the rehabilitation and the condition of the site.
- Peatland rehabilitation of the Bord na Móna bogs will bring a range of benefits to the local community via improvements to the local landscape and is also important for supporting national policies and strategies in relation to reduction of carbon emissions from these peatlands, supporting biodiversity and improvements to water quality.

## SUMMARY

**Name of bog:** Kilaranny      **Area:** 244 ha

### Site description:

- Kilaranny Bog is located in Co. Offaly, ca.7km west of Tullamore. It is part of the Boora Bog group.
- Kilaranny Bog has been in peat production since the early 1980's. The peat was primarily harvested for fuel peat to be used at Cloghan Power Station, West Offaly Power in Shannonbridge and Derrinlough Brickette Factory in Co. Offaly. Some horticultural peat was also harvested at Kilaranny Bog.
- Private turf cutters were relocated to Kilaranny Bog from Clara Bog as part of the Clara Bog restoration project. The turf cutters are currently harvesting turf from a section in the east of Kilaranny Bog.
- Some sections of Kilaranny Bog are already rehabilitated/stabilised.
- A relatively large remnant high bog section exists in the north west of the former production area.
- Much of the site is bare peat.
- Deep peat reserves remain on much of the former production area.
- Industrial peat production in the remaining active peat production areas to the west of the site ceased in 2020.

### Rehabilitation goals and outcomes

Bord na Móna is committed to discharging the obligations arising from Condition 10 of the IPC licence. This is defined as:

- Meeting conditions of the IPC licence.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Optimising hydrological conditions in the former area recently in industrial peat production for the further development of wetland, Reed swamp, wet woodland and fen habitats on shallow cutaway peats, along with management of existing wetlands.
- The site has already developed a mosaic of pioneer cutaway habitats, notably wetland, Birch woodland and fen habitats and is largely stabilised. These areas will be assessed for potential for targeted actions to enhance existing wetland habitats and create small wetland features.
- Integrating rehabilitation measures with current land-uses,
- Optimising hydrological conditions for the protection of any exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current residual peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) as it develops naturally functioning wetland and peatland habitats. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.

### Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Kilaranny Bog.
- EPA IPC Licence - Ref. P0500-01. As part of Condition 10.2 of this licence, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.



- **The Scheme (PCAS)** includes enhanced measures which are designed to exceed/meet the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Kilaranny Bog optimising **climate action benefits**.
- The local environmental conditions of this bog. Kilaranny Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, some boundary drains around Kilaranny Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Other constraints including archaeology and rights of way.
- Current Land-uses. It is not proposed to carry out any intensive rehabilitation actions to change or negatively affect any existing land-uses. A section of Kilaranny bog, to the east of the site has been used to relocate local turf cutters from Clara Bog.

### Criteria for successful rehabilitation:

The Criteria for successful rehabilitation to meet Condition 10 of the IPC Licence have been defined as:

- Rewetting of residual deep peat in the former area of industrial peat production to slow water movement across the site to retain silt, encouraging development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat (IPC Licence validation). The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed. (IPC Licence validation).
- Stabilising/improving key potential emissions to water (e.g. suspended solids). This will be measured via water quality monitoring (suspended solids and ammonia) for at least 2 years after the rehabilitation has been completed (IPC Licence validation).
- Reducing pressure from peat production on the local river catchment (IPC Licence validation). This will be measured by the EPA WFD monitoring programme.
- Optimising the extent of suitable hydrological conditions for climate action (Climate action verification). This will be measured by an aerial survey after rehabilitation has been completed.
- Reduction in carbon emissions (Climate action verification). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including wetland, fen, Reed swamp, wet woodland, heath, embryonic *Sphagnum*-rich peat forming communities, scrub and Birch woodland communities, where conditions are suitable, and eventually towards a reduced Carbon source (Climate action verification). Some areas will naturally be dry and develop Birch woodland and other drier habitats. It will take some time for stable naturally functioning habitats to fully develop at Kilaranny Bog.
- Improvement in biodiversity and ecosystem services (Climate action verification).

Meeting climate action verification criteria and monitoring of these criteria after the Scheme is completed is dependent on support from the Climate Action Fund and Ireland's National Recovery and Resilience Plan or other sources of funding.

### Summary of measures:

The below section is a summary of measures proposed for rehabilitation.

- Planning actions, including developing a detailed site plan and carrying out a hydrology and drainage assessment.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.

- Carry out proposed measures, which will be a combination of drain blocking, peat field re-profiling, wetland creation, targeted drain-blocking within stabilised areas and fertiliser applications targeting bare peat on headlands, high fields and other areas.
- Phase 2 measures may include seeding of targeted vegetation and inoculation of *Sphagnum* in compatible areas.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

**Timeframe:**

- 2021: Short-term planning actions.
- 2022: Short-term practical actions.
- 2023-2024: Any Long term practical actions; Evaluate success of short-term rehabilitation measures outlined above and remediate, where necessary.
- 2024: Decommission silt-ponds, if necessary.

**Budget and Costing**

- The rehabilitation plan outlined in this document is predicated on the understanding that it is the Minister's intention to support, via the Climate Action Fund and Ireland's National Recovery and Resilience Plan, Bord na Móna in developing a package of measures, 'the Scheme', for enhanced decommissioning, rehabilitation and restoration of cutaway peatlands referred to as, the Peatlands Climate Action Scheme'. *However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing standard mandatory decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.*
- In relation to the pre-existing Condition 10 IPC Licence requirement to carry out what can be termed the 'standard' decommissioning and rehabilitation, Bord na Móna maintains a Provision on its balance sheet to pay for these future costs when industrial peat extraction ceases. This is updated every year. For more information see the Bord na Móna Annual Report (Bord na Móna 2020). Bord na Móna is fully committed to meeting its obligations relating to rehabilitation and decommissioning under the Integrated Pollution Control Licence.

**Monitoring, after-care and maintenance**

The monitoring, after-care and maintenance programme for Kilaranny Bog, as required to meet Condition 10 of the IPC Licence, is defined as:

- Quarterly monitoring assessments of the site to determine the general status of the site, 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, if needed.
- **Water quality monitoring** will be established. Monitoring of key water quality parameters for 2 years after rehabilitation will include: Ammonia, Phosphorous, Suspended solids (silt), pH and conductivity.
- Where other uses are proposed for the site, 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 appropriate assessment and planning procedures.

**Additional Monitoring:**

- The monitoring and validation of re-vegetation via natural colonisation and changes in bog condition will be carried out using an aerial survey, after rehabilitation measures are implemented. It is proposed that sites can be monitored against this baseline in the future.
- Biodiversity Ecosystem services will be monitored using specific indicators.
- Carbon emissions monitoring only be carried out on a small proportion of BnM sites to develop better understanding of carbon emissions and GHG emission factors from different types of BnM sites and will be developed on association with other established research programmes. Reduction in carbon emissions will be modelled by a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the Scheme). It is proposed that sites can be monitored against this baseline in the future.
- Monitoring as part of Climate Action Verification is dependent on support from the Climate Action Fund and Ireland's National Recovery and Resilience Plan or other external funding.

### **Validation and IPC Licence surrender**

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.
- Water quality monitoring demonstrates that water quality indicators are stabilising/improving.
- The site has been environmentally stabilised.

## 1. INTRODUCTION

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Boora bog group (Ref. P0500-01). 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. Kilaranny bog is part of the Boora bog group (see Appendix I for details of the bog areas within the Boora Bog Group). Kilaranny Bog is located in Co. Offaly.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0500-01:

*“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 plan is a specific rehabilitation plan for the bog and outlines:

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

It is proposed by 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 additional costs of the Scheme will be supported by Government through the Climate Action Fund and Ireland’s National Recovery and Resilience Plan, administered by the Department of Environment, Climate and Communications (DECC), while the National Parks and Wildlife Service (NPWS) will act as the Scheme regulator. Bord na Móna have identified a footprint of 33,000 ha as peatlands suitable for this scheme. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Improvements supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered.

Only the costs associated with the additional, enhanced and accelerated rehabilitation, i.e. those measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the Scheme. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021).

It is expected that the PCAS will have benefits accruing from biodiversity provision, water quality and storage attenuation as well as increased carbon storage, reduced carbon emissions and acceleration towards carbon sequestration. The Scheme will also facilitate monitoring of carbon fluxes (Greenhouse Gases and fluvial carbon) in selected areas (in addition to other established Research programmes), to monitor changes in where the interventions will accelerate the trajectory towards a naturally functioning peatland ecosystem.

It is envisaged that the PCAS will support activities, interventions, or measures across the Bord na Móna cutaway peatlands which accelerate the original timelines. Selected rehabilitation measures will take account of site environmental conditions, which can vary significantly. These measures potentially include:

- more intensive management of water levels through outfall management, drain-blocking and management of water levels within the bog;
- re-profiling/re-wetting of extant deep peat that will deliver suitable conditions for development of wetlands, fens and bog habitats;
- targeted fertiliser applications,
- seeding of targeted vegetation; and
- proactive inoculation of suitable peatland areas with *Sphagnum*.

These are collectively designed to optimise hydrological conditions (ideally and where possible water-levels <10 cm) for climate action benefits and to accelerate the trajectory of the site towards a naturally functioning ecosystem, and eventually a reduced carbon source/carbon sink again. (In some areas of dry cutaway this trajectory will be significantly longer and it is not feasible in the short-term to re-wet some areas. These areas will develop other habitats. The key to optimising climate action benefits is the restoration of suitable hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised.

These measures are designed to encourage the development of peat-forming habitats, where possible. They are also designed to further slow the movement of water across the site (with the site acting similarly to a constructed wetland), slowing the release of water (improving local water attenuation) and water quality is also expected to improve as the site returns to a naturally functioning peatland ecosystem. The measures will also accelerate the development of new habitats for a range of species under pressure in the wider landscape and will have the potential to develop habitats (e.g. Annex I raised bog, wetlands that support wader water birds of conservation interest) that will contribute towards the delivery of national biodiversity objectives.

Kilaranny Bog is proposed to be part of this this Scheme (PCAS) and this rehabilitation plan outlines the approach taken.

## 1.1 Constraints and Limitations

This document covers the area of **Kilaranny Bog**.

This rehabilitation plan takes account of the **current land-uses** of Kilaranny Bog. A section of Kilaranny bog, to the east of the site has been leased to NPWS to relocate local turf cutters from Clara Bog. Turf cutting began in the eastern section of Kilaranny in 2012. This supports conservation objectives at Clara Bog SAC and the National Raised Bog Special Area of Conservation Management Plan 2017-2022. This area is not part of the planned rehabilitation.

Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Kilaranny Bog will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Industrial peat extraction at Kilaranny Bog permanently ceased in 2020.

The area in recent peat production is bare peat. However substantive areas of Kilaranny are recolonising or have been for a number of years, with resultant pioneering vegetation now in situ. In addition, some parts of the site were used as a Eucalyptus forestry trial.

It is anticipated that the combination of active enhanced rehabilitation measures and further natural colonisation will quickly support the further development of pioneer vegetation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish across the entirety of Kilaranny Bog.

Parts of Kilaranny Bog (outside the areas owned and under the control of Bord na Móna) are currently 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 Kilaranny 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.

A Bord na Móna Eucalyptus biomass trial area is also present.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way. There are known archaeology records at or near Kilaranny Bog itself.

## 2. METHODOLOGY

This rehabilitation plan was developed with a combination of desktop and field surveys, consultations with internal and external stakeholders and cognisance of the Scheme (PCAS). The development of this rehabilitation plan considered **recently published** guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

The ecological information and site information collected during the Bord na Móna ecological baseline survey, additional confirmatory site visits and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-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 LIDAR data;
- Hydrological modelling; and
- The development of a **Methodology Paper (draft) outlining the Scheme (PCAS)**. This rehabilitation includes enhanced measures defined in the Methodology Paper which are designed to exceed the standard stabilisation requirements as defined by the IPC Licence and to enhance the ecosystem services of Kilaranny Bog, in particular, optimising **climate action benefits**.

### 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.
- Bonn *et al.* (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al.* (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al.* (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al.* (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al.* (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.
- 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.
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- 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:

- Boora Integrated Pollution Control Licence;
- Boora Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) web mapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database ([www.epa.ie](http://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](http://www.birdwatchireland.ie));
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database ([www.gsi.ie](http://www.gsi.ie));
- Historic Environment Viewer at <https://webgis.archaeology.ie/historicenvironment/>
- National Parks & Wildlife Services Public Map Viewer ([www.npws.ie](http://www.npws.ie));
- Water Framework Directive catchments.ie/maps/ Map Viewer ([www.catchments.ie](http://www.catchments.ie));
- OPW Indicative Flood Maps ([www.floodmaps.ie](http://www.floodmaps.ie));
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps ([www.cfram.ie](http://www.cfram.ie));



- River Basin Management Plan for Ireland 2018 – 2021;
- Bord na Móna Annual Report 2020.
- 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

Several stakeholders have been identified during the course of Bord na Móna's rehabilitation and Biodiversity Action Plan activities and will be 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, Kilaranny Bog was surveyed in 2011. Additional ecological monitoring and visits have taken place at Kilaranny Bog between 2013-2021 to inform rehabilitation planning, where required.

A final site visit to inform the current Rehab Plan took place by BNM Ecologists in July of 2021 and habitat maps have been updated, where required, accordingly.

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 (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed Bord na Móna classification system was developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet.

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

### 3. SITE DESCRIPTION

Kilaranny Bog is located approximately 7km kilometres west of Tullamore, Co Offaly. There are no primary routes close to the bog, the R357 Blueball to Cloghan passes within four kilometres to the south. Access to the site is via the local road L20113. This road forms a boundary with the eastern edge of the site. A gravel track road dissects the site close to the western boundary of the site. An area to the west of the bog was leased by the NPWS to relocate private turf cutters from Clara Bog SAC.

See Drawing number BNM-DR-23-02-01 titled **Kilaranny Bog: Bog Site Location**, included in the accompanying Mapbook<sup>1</sup>, which illustrates the location of Kilaranny Bog in context to the surrounding area.

A stream dissects the site into two main eastern and western sections, while a bog track further separates the south-western area from the rest of the site.

The surrounding landscape is a mosaic primarily consist of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting.

#### 3.1 Status and Situation

##### 3.1.1 Site history

Kilaranny Bog has been in peat production since the early 1980's. The peat was primarily harvested for fuel peat to be used in Cloghan Power Station, Derrinlough Brickette Factory and West Offaly Power in Shannonbridge, Offaly. The bog retains deep peat reserves in some places.

##### 3.1.2 Current land-use

A Eucalyptus biomass planting trial was carried out in the central area of the site. Some underdeveloped Silver Dollar Gum *Eucalyptus polyanthemos* persist in the planted area.

Private Turf cutting occurs in the eastern portion of the site. This area is under the management of the NPWS who lease the area from BnM to facilitate relocation of private turf cutters from Clara Bog SAC.

An active rail line is still operational between Kilaranny and other BnM bogs to the west of the site. The rail line is used to transport peat from Kilaranny to Derrinlough and will continue to be used until Derrinlough Brickette factory ceases production. Decommissioning of this infrastructure is dependent on the general cessation of the supply of peat to Derrinlough Brickette Factory.

##### 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

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<sup>1</sup> Cutaway Bog Decommissioning and Rehabilitation Plan - Kilaranny Bog Map Book

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. These job numbers have now declined with the cessation of peat extraction.

In respect of Kilaranny Bog, jobs included in the above study would have included those to facilitate extraction of peat at Kilaranny, and associated processing and transfer to the relevant power station, in addition to staff employment at workshops and the main Bord na Móna facility located at Leabeg.

As the primary employer in many Midland counties, Bord na Móna played a central role in building communities through a number of 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.

## **3.2 Geology and Peat Depths**

### *3.2.1 Sub-soil geology*

The underlying geology at Kilaranny Bog is Waulsortian Limestones, described as massive unbedded lime-mudstone and Thick-bedded limestone, described as Pale-grey generally massive shelf limestones and their dolomitised equivalents.

Published bedrock and Quaternary geological maps only present the shallowest deposits encountered, and fail to present in information on the buried peat substrate. Coring carried out by RPS in 2021 across Kilaranny provided further insight into the deposits underlying the site, particularly when combined with GPR data concerning the elevation of the peat substrate.

Combining the two datasets reveals that the bog has developed in two separate basins, with the western lobe predominately underlain by lacustrine clay (below c. 52mOD), with the substrate topography rising rapidly to the south of this lobe (up to c.56mOD), which has been interpreted as limestone till (based on the presence of clayey material in all cores). Further east, the elevation of the substrate varies between 54-55mOD, with areas <54.5mOD typically corresponding to lacustrine clay, while sands and gravels appear to extend from the gravel aquifer to the south and extends to the north-east. The small section of bog to the south-west appears to have relatively flat substrate topography (typically 52.4mOD) and has been interpreted as lacustrine clay. The lacustrine deposits encountered would be expected to limit vertical losses to depth in areas where this occurs; however, more elevated losses of water to depth would be anticipated in those areas underlain by limestone till but particularly those areas to the east underlain by sands and gravel. These sub-soils tend to be calcareous.

### *3.2.2 Peat type and depths*

Commercial peat extraction has been undertaken at Kilaranny Bog since the 1980's. Most the site retains relatively deep peat reserves with some smaller pockets of shallow residual peat depths where the peat has been cutway (BNM-DR-23-02-01 titled **Kilaranny Bog: Bog Site Location**). Peat depths of 2-3 m occur across most of the former production area.

### 3.3 Key Biodiversity Features of Interest

Kilaranny bog can be sub-divided into three main sections, east, central and southwest for ease of description. The east and central sections are separated by a stream while the southwest section is demarcated by the BnM railway line crossing the south side of the bog.

A relatively large section of remnant high bog (approx. 13ha.) remains in the north west area of the site. There are signs of degradation present on this high bog remnant but it still qualifies as the Annex I EU Habitats Directive habitat – ‘degraded raised bogs still capable of regeneration [7120]’.

#### 3.3.1 Current habitats

##### Kilaranny East

In the extreme east of site private turf cutting is occurring. This has resulted in a mosaic of cutover plots of different peat depths, in varying states of use. Bare peat and pioneer cutover vegetation communities are the dominant habitats in the region with some larger drains forming water bodies that contain riparian vegetation as well some Sphagnum species such as *S. cuspidatum*, *S. subnitens*, *S. capillifolium* and *S. papillosum*. A large area of bare peat exists in the between the eastern private turbary area and the central area of the bog. Some stockpiles of peat are still present in this area.

##### *Central Area*

The central area of the bog is dominated by cutover bare peat. Some pioneer cutover vegetation communities are establishing in the southwest of this portion of the site. Two silt ponds and the associated riparian vegetation communities exist in the extreme north west of the central area of the bog. The silt ponds are flanked to the west by old turbary zones that are in various stages of natural colonisation by cutover vegetation communities. A strip of birch woodland and scrub exists immediately to the west of the silt ponds. Further west more recent cutover areas are dominated by scrub and pioneer Purple Moorgrass grassland habitats.

To the northwest of the central area, a remnant high bog of approx. 13ha exists. There are frequent signs of degradation present. However, the bog still qualifies as the Annex I EU Habitats Directive habitat ‘degraded raised bogs still capable of regeneration [7120]’.

A woodland/scrub habitat with a stream flowing through, acts as a boundary between the eastern and central sections of the bog. Birch and Willow species dominate the wooded area with the canopy closing in many places. There are also specimens of *Eucalyptus polyanthemus* present. These were planted during a previous BnM biomass trial.

##### *South West Area*

The south west area of the bog is dominated by bare peat. In some areas close to drains and areas where surface water is present in topographical hollows, pioneering riparian and poor fen vegetation communities are establishing. In the extreme north and the north west of the south western portion of the bog, well developed mosaics of wet woodland/scrubland can be found. Some patches of drier woodland/scrubland and acid grassland can be found in higher areas. A single silt pond with the associated riparian fringe habitat is present in the southwest section of Kilaranny bog.

The railway track running along the southern boundary of the site is dominated by calcareous grassland.

See Drawing number BNM-DR-23-02-17 titled **Kilaranny Bog: Current Habitat Map**, included in the accompanying Mapbook, which illustrates the habitats at Kilaranny Bog.



*Sphagnum cuspidatum* present in drains in Kilaranny East



*View of large drains in Kilaranny East*

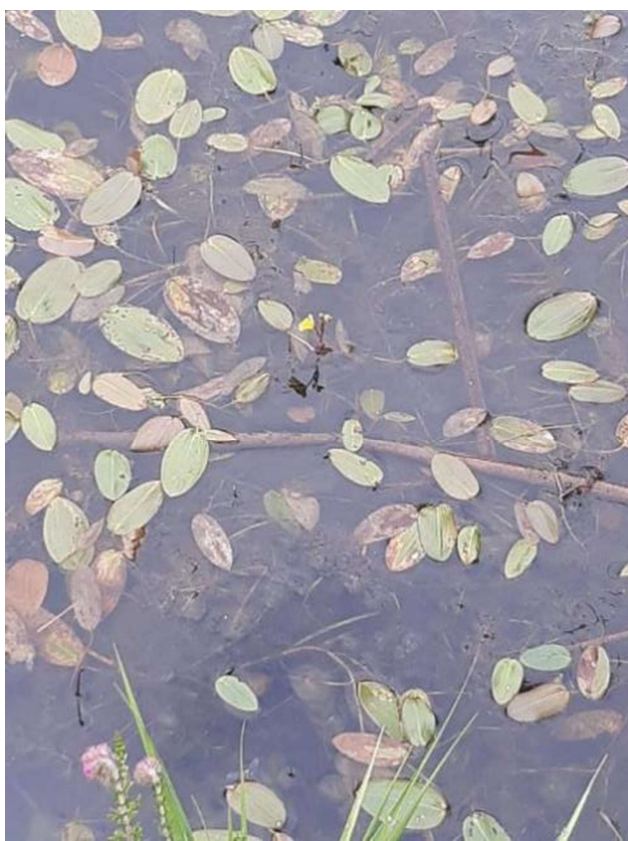


*View of wetland at Kilaranny west*

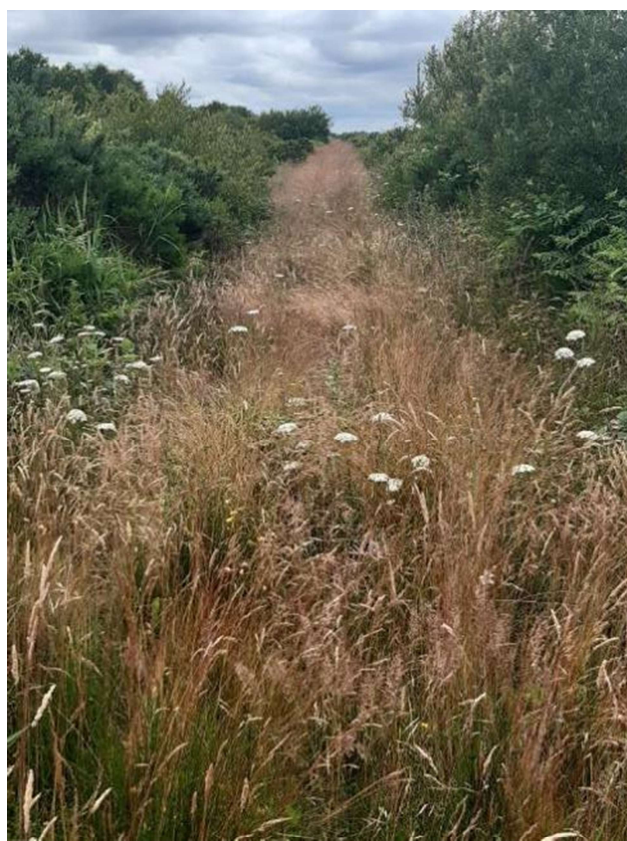


*Stream surrounded by grassland and scrub, central area Kilaranny bog*





*Bladderwort in drains kilaranny*



*Grassland developing on railway track near the southern boundary of the bog*

*Table 1: Photos of Habitats at Kilaranny Bog*

### 3.3.2 Species of conservation interest

A number of species of conservation concern utilize the habitats available at Kilaranny Bog. The following is a summary of the records of these species available within both BnM records and those of the National Biodiversity Centre.

Multiple mammal species have been recorded on or in close proximity to the bog including Eurasian Red Squirrel *Sciurus vulgaris*, Irish Hare *Lepus timidus subsp. Hibernicus*, Irish Stoat *Mustela erminea subsp. Hibernica*, Red Fox *Vulpes Vulpes*, Eurasian Badger *Meles meles*, European Otter *Lutra lutra*, and Pine Marten *Martes martes*. Badger, hare and deer species field signs were observed throughout the bog by BnM ecologists during a walkover survey in July 2021. A number of bat species have also been recorded on or within 1km of the bog including Leislars bat *Nyctalus leisleri*, Natterer's Bat *Myotis nattereri*, Pipistrelle *Pipistrellus pipistrellus sensu lato*, Soprano Pipistrelle *Pipistrellus pygmaeus* and Daubenton's Bat *Myotis daubentonii*.

Regarding lepidopteran species, within 1km of the bog boundary and on-site records exist for Holly Blue *Celastrina argiolus*, Orange-tip *Anthocharis cardamines*, Brimstone *Gonepteryx rhamni*, Common Blue *Polyommatus icarus*, Speckled Wood *Pararge aegeria*, Wall *Lasiommata megera*, *Agriphila geniculea* and Common Grass-veneer *Agriphila tristella*. BnM survey records also contain records for Latticed Heath *Chiasma clathrate* and Common heath *Ematurga atomaria*, Straw Dot Moth *Rivula sericealis* and Asteroid moth *Cucullia asteroides*.

White tailed bumblebee *Bombus Lucorum agg.* and Garden Bumblebee *Bombus hortorum* were also recorded on Kilaranny Bog by BnM ecologists.

There are records of common frog on Kilaranny bog in both the NDBC database and in BnM walkover survey data. Numerous bird species are known to use the cutover bogs in Ireland's midlands as breeding grounds, wintering grounds or both. Records for bird species of immediate conservation concern at Kilaranny Bog or within 1Km of the site include House Martin *Delichon urbicum*, Common Kestrel *Falco tinnunculus*, Common Sandpiper *Actitis hypoleucos* and Eurasian Tree Sparrow *Passer montanus*.

### 3.3.3 Invasive species

Invasive alien species known to occur at the subject bog (or desktop review suggests presence is likely), and for which reasonably foreseeable source impact pathways for dispersal may result from the proposed PCAS are described here.

In the 10Km grid square (N22) in which Kilaranny Bog is situated the following invasive species have been recorded; American Mink *Mustela vison*, Bank Vole *Myodes glareolus*, Brown rat *Rattus norvegicus*, Grey squirrel *Sciurus carolinensis*, Fallow Deer *Dama* and Greater white toothed shrew *Crocidura russula*. Canadian Waterweed *Elodea canadensis*, Nuttall's Waterweed *Elodea nuttallii*, Traveller's Joy *Clematis vitalba*. Invasive invertebrate species including aquatic zebra mussel, keeled slug and wrinkled snail were also recorded.

A broad range of common garden escapes are occasionally present around the margins of Bord na Móna bogs, and although spatial overlap with the PCAS is expected to be limited, these are, where necessary, to be treated in line with Best Practice during PCAS activities.

## 3.4 Statutory Nature Conservation Designations

There are a number of European Sites (SAC's or SPA's) in close proximity (i.e. within a 5km radius at minimum) to Kilaranny Bog.

Charleville Wood SAC (Site Code: 000571) is situated approximately 5Km east of Kilaranny Bog. Chareville wood SAC qualifying interests include alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* and Desmoulin's Whorl Snail (*Vertigo moulinsiana*). Clara Bog SAC (Site Code: 000572) is situated approx. 4Km north of Kilaranny Bog. The qualifying interests of Clara Bog SAC include semi-natural dry grasslands and scrubland facies on calcareous substrates, active raised bogs, degraded raised bogs still capable of natural regeneration, depressions on peat substrates of the *Rhynchosporion* and bog woodland.

A number of pNHA's occur within 5km of Kilaranny Bog (BNM-DR-23-02-23 titled **Kilaranny Bog: Bog – Proximity to Designated Sites**). These include; The Grand Canal pNHA (Site Code 002104), Pallas Lough pNHA (Site Code 000916), Ballyduff Esker pNHA (Site Code 000885) and Kilcormac Esker pNHA (Site Code 000906).

### 3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15<sup>th</sup> 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 in the local vicinity of Kilaranny Bog (i.e. within 3km) The closest Ramsar Sites to Kilaranny Bog include Pollardstown Fen (Kildare), Clara Bog and Raheenmore Bog (Offaly).

<https://www.arcgis.com/apps/MapTour/index.html?appid=cd6e1a247bdc4179b9dfc0461e950f1e#>

### 3.5 Hydrology and Hydrogeology

Kilaranny forms part of the Lower Shannon Catchment (Catchment ID : 25A) as defined by the EPA under the Water Framework Directive (WFD) and is situated within the BROSNA\_SC\_040 Sub-Catchment. The bog is located west of the town of Tullamore and is drained by the Kilaranny stream to the west and the Moin Armstrong stream to the east, both of which drain towards the Clodiagh River to the North, which is a tributary of the River Brosna.

Two tributaries of the Moin Armstrong flow through the central area of the site. A branch of the Glasshouse river (EPA Code: 25G95) flows through the south west portion of the bog. A separate branch of the same river flows north along the western boundary of Kilaranny Bog.

A canal feeder crosses Kilaranny Bog. This is connected to the Grand Canal and supplies the canal with water from a catchment to the south of the bog. There are no known hydrological connections from the former BnM production areas to the canal feeder. There is no direct hydrological connectivity from the bog to the Grand Canal.

Regional hydrological data suggest that Kilaranny receives average precipitation of 851mm/yr (1981-2010), with an estimated evapotranspiration rate of c. 500.5mm/yr. A, leaving an average effective precipitation of 350.5mm/yr. Assuming no recharge to groundwater and no groundwater contribution to discharge from the bog, the available precipitation that may become runoff (assuming no change in storage) is 427mm/yr, which equates to an annual runoff rate of c. 3,505m<sup>3</sup>/ha.

Kilaranny Bog currently has a gravity drainage regime. Depression analysis (BNM-DR-23-02-09 titled **Kilaranny Bog: Depression Analysis**) indicates that parts of the bog are natural basin with significant potential for re-wetting, with the assumption that all drains would be blocked. It is likely that a portion of the basins in target areas will re-wet with deeper water, creating a mosaic of wetland habitats, when drains are blocked.

Three outfall points and associated silt pond infrastructure exist on Kilaranny former production area. Outfalls are situated in the north, west and south west of the site. The outfalls in the west discharge water into the Glasshouse while the outfall in the north discharges into the Moin Armstrong river.

GSI data indicates that Kilaranny Bog is primarily underlain by Waulsortian Limestones which is classified as a locally important aquifer as it is moderately productive only in Local Zones. The north-western lobe of the bog, along with a small section to the south-east are underlain by the Allenwood Formation which is a regionally important aquifer as it is subject to diffuse karstification. In addition, there is a locally important gravel aquifer which extends very close to the southern boundary of the bog.

Geological Survey of Ireland (GSI) mapping has identified as number of karst features in close proximity to the bog, including two springs located within 1km to the south-east of the bog. Given the karstified nature of the Allenwood Formation which underlies part of the site, combined with the gravel aquifer along the southern boundary of the bog, there is potential for the bedrock and gravel to have the potential to facilitate high rates of groundwater flow. No data exists concerning depth to bedrock and no bedrock outcrop features can be identified in close proximity to the bog using available mapping.

Kilaranny is located mainly in an area with a Locally Important Aquifer zone- i.e. Bedrock which is Moderately Productive only in Local Zones. However, part of Kilaranny bog is located in an area with a Regionally Important Aquifer - Karstified (diffuse).

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. Regionally important aquifers are those in which the network of



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

The main subsoil types in the surrounding area includes till derived from limestone to the west, north-west, north and north-east, with glacial-fluvial gravels to the south and south-east. While 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. Groundwater vulnerability for the surrounding areas is generally considered to be moderate in the surrounding areas with limestone till subsoil; however, the gravels to the south of the bog are considered to have high groundwater vulnerability.

Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes.

### **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 bog lands 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 Kilaranny Bog.

Silt ponds are the key silt control infrastructure to control potential emissions from industrial peat production sites. As required under licence, BNM have several 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.

Kilaranny bog has three treated surface water outlets, one to the IE\_SH\_25B090761 BROSNA\_100 (Moin Armstrong), which is a tributary of the River Brosna, IE\_SH\_25B090600 BROSNA\_080. The remaining two emission outlets are to the IE\_SH\_25D130400 DERRYCOOLY STREAM\_010 (Derrycooly Stream), which in turn is a tributary of the Brosna.

The Derrycooly body is currently unclassified, but is listed as being under pressure from peat extraction in the third cycle of the river basin management plan, currently under preparation. Peat extraction was identified as pressure in the second cycle of the river basin management plan but is not indicated as remaining so in the third cycle, in relation to the Brosna River.

Details of silt ponds, associated surface water emission points and those being monitored and sampled as part of the PCAS scheme are detailed on the accompanying structures map along with water quality map. See Drawing number BNM-DR-23-02-02 titled **Kilaranny Bog: Structures and Sampling**, along with Drawing number BNM-DR-23-02-WQ01 titled **Kilaranny Bog: Water Quality Map** included in the accompanying Mapbook, which illustrate the various drainage and water quality infrastructure present at Kilaranny.

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 National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.7 mg/l and COD 100mg/l.

Initial monthly ammonia concentrations from November to May 2021 have a range of 0.034 to 0.614mg/l with an average of 0.254mg/l, see Appendix XIII.

Results for suspended solids for the same period indicate a range of >2 to 6mg/l with an average of 3.8mg/l.

From an analysis of any monitoring over the past 3 yrs. of the IPC licence environmental monitoring of some of the discharges from this bog, indicate that results were under the ELV for SS and trigger levels for ammonia and COD (Table 3.1).

**Table 3.1. Decommissioning and Rehabilitation Programme Water Quality Monitoring.**

Bog	SW	Monitoring	pH	SS	TS	Ammonia	TP	COD	Colour
Kilaranny	SW-24	Q4 20	7.5	3	230	0.136	<0.05	94	250
Kilaranny	SW-24A	Q4 20	8.1	5	255	0.025	<0.05	59	351
Kilaranny	SW-24	Q2 19	7.9	5	284	0.06	<0.05	77	140
Kilaranny	SW-24A	Q2 19	7.7	<5	272	1.3	<0.05	80	146
Kilaranny	SW-24	Q3 17	7.8	13	512	0.06	0.05	55	161
Kilaranny	SW-24A	Q3 17	7.7	5	490	1.3	0.05	48	122
Kilaranny	SW-24	Q1 15	7.5	5	308	0.07	0.05	54	234
Kilaranny	SW-24A	Q1 15	7.6	6	254	1.2	0.05	43	174

Rehabilitation of cutaway peatland is closely linked with control of emissions. One of the criteria for successful rehabilitation is stabilisation through re-vegetation, which will stabilise all substrates and in turn remove the need for further silt control measures. Re-wetted peat also aid the primary objective of stabilizing peat, as when peat is re-wetted it minimises risk 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 because of bog rehabilitation and restoration measures and the restoration of natural peatland processes (Bonn *et al.*, 20017). Peatland rehabilitation 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 raised bog restoration programme 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 Kilaranny Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. This is expected to have a positive impact on status of downstream watercourses.

### **Decommissioning and Rehabilitation Programme Water Quality Monitoring.**

The licence obligation of quarterly sampling regime on a selected number of ponds to be sampled over a 3 year cycle will not be sufficient to be able to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation programme, so this sampling regime will occur on a monthly basis.

In order to assist in monitoring surface water quality from this bog, it was agreed to increase the existing licence monitoring requirements of the IPC Licence, to sampling for the same parameters every month.

This new sampling programme commenced in November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.

In the preparation of this monitoring programme, Bord na Móna have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 monitoring programme and these are included in the Water Quality Map.

This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.

This enhanced monitoring programme will aim to include a minimum of 70% of a bog's drainage catchments, whatever number of surface water outlets these include.

Monitoring results will be maintained, trended every six months 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](http://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 & COD. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.

### 3.7 Fugitive Emissions to air

None.

The bog is no longer in industrial peat production. Rehabilitation of the cutaway peatland will seek to re-wet the dry peat where possible, and re-vegetate all areas (whether wet or dry). Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust.

### 3.8 Carbon emissions

The bog is likely to be a carbon source as it has large sections of drained (degraded) peatland with currently active drainage, which facilitates the oxidation of peat, areas planted with conifer forestry, areas developing Birch woodland and scrub, and areas re-wetted but developing fen and wetland habitats. Peat extraction generally transforms a natural raised bog which acts as a modest carbon sink into a cutaway ecosystem which is a large source of carbon dioxide (2–5 t C/ha/year) (Waddington & McNeil, 2002; Alm *et al.*, 2007; Wilson *et al.*, 2007, Wilson *et al.*, 2015). Furthermore, they are also a significant source of methane (Huttunen *et al.*, 2003; Laine *et al.*, 2007a) as a consequence of the conditions within the peat body that provide a suitable environment for the microbial breakdown of plant litter and root exudates. Degraded peatlands also release carbon/GHG emissions via the fluvial/aquatic pathway (Dissolved Organic Carbon – DOC, Suspended Solids/Particulate Matter, degassing of GHGs from water).

The EPA-funded CarbonRestore Project (Renou-Wilson *et al.* 2012) found that rewetting of drained peatlands can lead to restoration of functional peatland, such as the return of typical plant and animal species, which in turn may lead to the restoration of peat-formation and the carbon sink function. The EPA NEROS project carried out GHG flux research at Moyarwood Bog and found that Moyarwood Bog was overall a Carbon sink (sink for CO<sub>2</sub> and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson *et al.* 2018).

It is expected that Kilaranny Bog can become a reduced carbon source/part carbon sink following rehabilitation. The potential of any cutaway site to develop as a reduced carbon source/carbon sink in the longer-term depends on land-use, the success of the rehabilitation measures, the extent of optimal re-wetting and hydrological conditions, 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. Some of the cutaway is expected to develop Reed Swamp and fen habitats with alkaline emission factors. This site is expected to develop a mosaic of fen, Reed swamp, wet woodland and scrub. Birch woodland is expected to develop on the drier mounds and peripheral headlands. Part of the site is planted with conifer forestry and the site will continue to be used for amenity.

### 3.9 Current ecological rating

Most of Kilaranny Bog can be considered to have a **high local value (D)** as it is dominated by a range of typical cutaway habitats such as scrub, dry heath and wetlands are developing in areas where there has been no production for some time. The former production areas with bare peat have an ecological rating of low local ecological value (E). The intact high bog at the north west area of the central section of Kilaranny Bog is assessed as having a high local ecological value (D) as it is still intact and still contains typical raised bog features and a typical species assemblage. However, there are also frequent signs of degradation with old pools systems now dried out and the margins dominated by Heather.

## 4. CONSULTATION

### 4.1 Consultation to date

Consultation will seek 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.

Stakeholders were notified when the draft plan was finalised internally by Bord na Móna, and invited to make submissions on the objectives and content of this plan in relation to Kilaranny Bog. The draft plans and final versions of the rehab plans are available on the Bord an Mona website ([www.pcasinfo.ie](http://www.pcasinfo.ie)).

There has been ongoing consultation about rehabilitation and other general issues over the years about BnM bogs in general and Kilaranny 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.
- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Sub-committee on Shannon Flooding Work Programme and Measures (OPW, Waterways Ireland, ESB, LA's, Fisheries Ireland, NPWs etc.).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Bird surveys and monitoring carried out by Birdwatch Ireland for Bord na Móna,
- Ongoing development of cycle tracks/greenways on BnM land to create loops, to connect different areas and to support local amenity and tourism (Offaly Leader, Offaly County Council, ORNI and Failte Ireland);
- Consultation with Green Offaly regarding a proposed Peatland Biosphere Reserve in Offaly.

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Kilaranny 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) were contacted. Any identified local interest groups were sought and informed of the opportunity to engage with this rehabilitation plan, and when identified were invited to submit their comments or observations in relation to the proposed rehabilitation at Kilaranny Bog (see Appendix XI).

### 4.2. Issues raised by Consultees

#### 4.2.1 Assessments of rehabilitation

To date a number of consultees including the Irish Farmer's Association (IFA), the Irish Milk Suppliers and Creamery Association (IMSCA) Trinity College Dublin and Inland Fisheries Ireland have raised concerns during consultation regarding the duration and scope of PCAS consultation period. Stakeholders suggested that the consultation period should be extended to allow all potential stakeholders to make submissions where required.

#### 4.2.2 *Assessments of rehabilitation*

Queries on pre-rehabilitation assessments were raised by NPWS and the National Museum of Ireland relating to the finalisation of several bog rehab plans in 2021 in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

#### 4.2.3 *Restoration scope*

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI relating to the finalisation of several bog rehab plans in 2021 as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

#### 4.2.4 *Monitoring*

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised by the IPCC, University College Dublin and Trinity College researchers in their respective submissions relating to the finalisation of several bog rehab plans in 2021. Butterfly Conservation Ireland also suggested during consultation in 2021 that monitoring of Large Heath butterfly be considered to assess the success of the proposed rehabilitation actions. Irish Water reiterated the requirement of a strong monitoring program with respect to water quality during and post rehabilitation.

#### 4.2.5 *Flooding and drainage*

The IFA, The Department of Agriculture Food and the Marine, OPW, individual local residents and ICMSA queried likely impacts relating to the finalisation of several bog rehab plans in 2021 and the finalisation for this Kilaranny Rehabilitation Plan arising from the proposed re-wetting associated with the rehabilitation in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices. The OPW queried if there would be any impacts on normal OPW arterial drainage maintenance and expressed support for the scheme in general. Several land-owners in the area queried issues around blocking of boundary drains.

Waterways Ireland queried about the potential impact of the proposed rehabilitation on The adjacent Grand Canal due to potential hydrological connectivity through the bog to the canal.

#### 4.2.6 *Future management*

The IFA expressed concerns regarding the future ownership of the BnM bogs subject to rehabilitation. They expressed a desire for contingency planning for potential future ownership of designated bogs so as to ensure no negative impacts arise on adjacent properties from any new ownership.

#### 4.2.7 *Other issues*

Other issues (raised by IPCC) during the finalisation of several bog rehab plans in 2021 included after use of the bog and turf cutting on the margins of the bog (outside of the area owned by Bord na Móna).

Archaeological end of life survey of all the bogs were requested by National Museum of Ireland and National Monuments Unit.

Offaly County Council requested more information on the large constraint at the east side of the site (turf-cutting area leased to NPWS to support objectives of the National Raised Bog SAC Management Plan 2017-2022).

Several land-owners contacted BnM: (1) looking for the more information and to address several queries and (2) querying the scope of the plan and potential other land-uses (vegetable growing), and potential impacts on the hare population.

The NARGC have expressed interest in growing Heather on BnM bogs. BnM facilitated a site visit to Kilaranny Bog. Consultation and engagement is ongoing.

For a complete summary of submissions received and replies, see Appendix XI.

### **4.3 Bord na Móna response to issues raised during consultation**

#### *4.3.1. Consultation*

BnM are carrying out ongoing consultation as part of the process of developing the rehabilitation plan for Kilaranny Bog. This is ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties. A website has been developed to make information available. This will be continually updated. It is expected that some PCAS Bogs will become demonstration sites so that interested stakeholders can come to visit and observe the measures on the ground. Bord na Móna will continue to engage with interested stakeholders regarding peatland rehabilitation and land management issues.

#### *4.3.2 Assessments of rehabilitation*

AA screening will be undertaken on all the bogs as part of PCAS and this is currently being undertaken by external consultants for Kilaranny Bog. Where required, Natura Impact Statements shall be completed and submitted to the Minister in accordance with 42(9) and 42(10) of the Habitats Regulation, noting that Bord na Móna is prescribed as a 'public authority' under this legislation. In relation to the SEA Directive and EIAR Directive, this has been considered and the legal advice to date is that the scheme does not come under these Directives.

An Archaeological Impact Assessment (AIA) has been undertaken on all the bogs in PCAS (Appendix XII). The aim for known archaeology on these bogs is to accomplish preservation in situ and we are taking steps to identify and avoid all known archaeology. It is anticipated that any archaeology will benefit from the ultimate remit of the rehabilitation, in that water tables will be raised thereby preserving in-situ. There is also an identified procedure for managing reports of stray finds that may arise during rehabilitation works.

#### *4.3.3 Restoration scope*

As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives. Other issues such as existing amenity, social impacts, industrial history, archaeology were not part of the direct scope of PCAS but were considered when developing the rehabilitation plan. After use of the bog is outside the scope of PCAS. Rehabilitation will lead to the development of a stable diverse re-wetted cutaway landscape that will have added benefits for amenity in the future.

#### 4.3.4 Monitoring

As part of the PCAS, a monitoring and verification plan has been developed to support climate action and biodiversity objectives. This will include stratified monitoring of bog condition, habitats and biodiversity at several different scales. Some biodiversity monitoring is proposed as part of the monitoring and verification at Kilaranny Bog during the period of the scheme (2021-2025). However, note that fauna typically take longer to respond to the changes in vegetation colonisation and habitats arising from the proposed rehabilitation measures identified for Kilaranny Bog. Significant changes in vegetation colonisation are unlikely to be observed over a short time period.

#### 4.3.5 Flooding, drainage or other impacts on adjacent land.

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands. Where it is deemed that blocking of a shared drain would cause any adjoining lands to be adversely affected, this will be avoided and alterations made to the rehabilitation plan. Drains around the margins of the bog will not be blocked.

External consultants have been appointed to carry a hydrological assessment to identify any potential impacts to neighbouring lands and to mitigate against any such impacts. No issues were identified. There is no potential for direct impacts on arterial drainage downstream.

The rehabilitation measures proposed at Kilaranny Bog will generally result in reduced runoff and drainage from the existing peat fields through a mixture of techniques including drain blocking, cell bunding and re-profiling. It is intended that these measures will not significantly alter the existing topographical catchments and that the spine of the drainage networks, those which the upstream catchments drain through, will be retained by Bord na Móna. Based on evidence from other bogs, rehabilitation measures will reduce the run-off from the bog by returning the peatlands towards its natural water retention function.

A canal-feeder crosses Kilaranny Bog and connects to the adjacent Grand Canal. This is part of the water supply for the Grand Canal. There is no direct hydrological connection between the BnM drainage system and this canal feeder. Measures will be put in place to minimise impact to this canal feeder and minimise any potential indirect risk to water quality in the Grand Canal. These will include a set-back area to avoid disturbance, and SOPs and information sharing with the Operations Team to highlight environmental sensitivities.

#### 4.3.6 Amenity

Creating amenity such as walking tracks is not part of the direct scope of PCAS. There is no current amenity planned for Kilaranny by BnM. However, PCAS will enable and indirectly support any future amenity development by encouraging the development of a semi-natural peatlands landscape. There can be further opportunities to develop amenity at this site, for example on the headlands and decommissioned bog railways. Any future amenity can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Kilaranny Bog.

#### 4.3.7 Water quality

In general, peatland restoration and rehabilitation has been shown to demonstrate positive impacts on downstream water quality (Minayeva *et al.*, 2017). BnM expect that rehabilitation measures will positively impact the water quality in receiving water bodies through enhancing the water attenuation across rehabilitated sites. The



robust water monitoring programme implemented as part of PCAS will be used to assess water quality leaving rehabilitated sites at designated points.

#### *4.3.8 Future management*

Bord na Móna will continue to manage their land bank into the future. As industrial peat production has now ceased on Bord na Móna lands and rehabilitation measures will be carried out, a regular drainage maintenance programme will not be required or carried out as would have been the case in the past. However, if issues arise with the Bord na Móna internal drainage system that affects upstream or downstream landowners, then these issues will be addressed by Bord na Móna.

Bord na Móna considers issues regarding estate security, fire risk, invasive species and water pollution of utmost importance. BnM intends to maintain security and manage fire risk over the entirety of the estate. In this regard, PCAS activities, should have no detrimental impact on these issues. Regarding water pollution, BnM is regulated by the EPA and as such adheres to the strict water pollution measures laid out by the same.

#### *4.3.9 Other issues*

Other issues, including after-use and management issues outside the boundary of Kilaranny Bog, are acknowledged but are specifically outside the scope of this rehabilitation plan.

Security: It is the intention of Bord na Móna to keep secure the estate and ensure that any anti-social behaviour that occurs within the estate is reported and dealt with by the appropriate authorities.

Part of the bog has been leased to NPWS for turf-cutting. This was to support relocation of turf cutters from the adjacent Clara Bog. This area is under the management of NPWS.

PCAS is specifically designed around climate action and peatland re-wetting. Previous BnM and An Foras Taluntais trials investigating commercial vegetable growing at BnM cutaway sites and peatland at Lullymore and in Co. Mayo ultimately proved unsuccessful (not commercially viable). More recent BnM Herb growing trials have also been suspended. This was due to key limiting factors such as the low nutrient regime and water levels, which affected the growth of the plants.

#### *4.3.10 Concluding statement.*

- No specific issues were raised during consultation that required significant changes to the substance of the rehabilitation plan.
- Issues raised by several consultees in relation to potential impacts on adjacent land had already been accounted for during the hydrological analysis and assessment, and corresponding adaptations to incorporate Drainage Management Plan mitigation measures.
- Marginal drains will not be blocked to avoid impacts on adjacent lands, rights of way or turf-banks. This does not change the overall rehabilitation goals and outcomes and can be integrated with the other rehabilitation measures to allow cutaway re-wetting.
- Turbary rights will remain unaffected.
- No changes were required to the rehabilitation plan to enable any future potential amenity, such as a potential cycle track on the headland adjacent to the road, proposed by OCC.

## 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.
- Stabilisation or reduction in water quality parameters of water discharging from the site (e.g. suspended solids).
- Reducing pressure on receiving water-bodies 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 **climate action benefits as part of PCAS**.
- Carrying out an intensive rehabilitation measures in the area that is recently out of peat extraction (including hydrological management, drain-blocking, re-profiling, wetland creation, fertiliser application, seeding of vegetation &, inoculation of *Sphagnum*, where appropriate).
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich bog vegetation communities on deep residual peat, where possible.
- Optimising or enhancing hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Integrating rehabilitation measures with current land-use (e.g. turf-cutting).
- Optimising hydrological conditions for the protection of any exposed archaeological structures, their retention in situ and preservation into the future, where possible.
- The main goal and outcome of this plan is the successful rehabilitation (environmental stabilisation) of peatlands used for industrial peat production at the bog in a manner that is acceptable to both external stakeholders and to Bord na Móna and which optimise climate action and other ecosystem service benefits.

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

- Current land-uses. Part of the site is leased to NPWS for turf-cutting. This supports conservation objectives at Clarra Bog SAC and the National Raised Bog Special Area of Conservation Management Plan 2017-2022. It is not proposed to carry out any rehabilitation actions to change or negatively affect this land-use. It is expected that turf-cutting will continue in this area for the foreseeable future.
- It will take some time for stable naturally functioning habitats to fully develop across the entirety of Kilaranny Bog. This will happen over a longer time-frame 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. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe.

Nevertheless, re-wetting across the entire bog, as part of the Scheme, 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).
- Re-wetting in general will benefit the future preservation of most known and unknown archaeological features.
- Bord na Móna are also planning rehabilitation measures in some adjacent bogs (e.g. Oughter) in 2021. There are expected to be cumulative water quality and other ecosystem service benefits to receiving water bodies such as the Silver River and downstream River Brosna from rehabilitation more than one bog in the same catchment.

## 6. SCOPE OF REHABILITATION

The principal scope of this enhanced rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Kilaranny Bog (BNM-DR-23-02-01 titled **Kilaranny Bog: Bog Site Location**).
- EPA IPC Licence - Ref. P0500-01. 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. Kilaranny Bog is part of the Boora Bog Group.
- The Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Kilaranny Bog, in particular, optimising **climate action benefits of the area recently out of industrial peat extraction**. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other ecosystem service benefits particularly for climate action will be accrued.
- The local environmental conditions of Kilaranny Bog identify wetland creation, dry cutaway measures and deep peat re-wetting as the most suitable rehabilitation approach for the area recently out of peat production at this site.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog. Bord na Móna have defined the key goal and outcome of rehabilitation at Kilaranny Bog as **environmental stabilisation** of the site via **optimising climate action benefits, where possible, and integrating rehabilitation with the existing land-uses**. The re-wetting of residual peat in the area recently out of peat extraction will be optimised, **setting the site on a trajectory towards the development of peat-forming communities on residual deep peat, and the development of wetlands/Reed Swamp and fen on shallow more alkaline peat and other subsoils**.
- Enhanced Rehabilitation of Kilaranny 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.
- Current land-uses. It is not proposed to rehabilitate the area used by private turfcutters in the east of Kilaranny bog.

### 6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. For example, there is potential for raised bog restoration at some sites where there has not been significant industrial peat extraction and the peat body is largely intact (deep peat sites that are drained). At other sites, most of the peat mass has been removed, the environmental characteristics of these areas have therefore changed radically (peat depths, hydrology, water chemistry, substrate type, nutrient status, etc.) and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). At Kilaranny Bog, peat depths of above 1.1m occur over most of the site with large sections containing residual peats of >2.6m. Some pockets of shallower peat exist in the central and south west sections of the site. Shell marl and sandy gravels are exposed in these areas.
- Furthermore, there are local factors (such as topography and drainage) that will influence the future trajectory of this bog. At Kilaranny Bog, a large proportion of the bog has existing habitat cover of pioneering vegetation and established woodland or scrub, with only the most recently utilised portions

for peat extraction having an un-vegetated surface over deep peat deposits. These need to be considered as part of the wider rehabilitation work.

- **Current land-use.** Kilaranny Bog is largely a bare peat former production area cutover bog. The eastern section of the bog is currently harvested by private turf cutters, relocated to Kilaranny as part of the Clara Bog restoration project. A relatively large fragment of bog remnant exists in the north west of the site. This area is still used by private turf-cutters (turbary). The remainder of the site is occupied by access tracks, disused railway and marginal land.
- **Biomass trials.** It is not proposed to carry out any intensive rehabilitation measures that would affect these areas. Some targeted drain-blocking will be considered.
- **Surrounding landscape and neighbours.** Another key constraint is the interaction between the Bord na Móna sites and the surrounding landscape. Care has to be taken that no active rehabilitation management is carried out that could negatively and knowingly impact on surrounding land. This includes any hydrological management on neighbouring farmland, as well as potential changes to the hydrology of surrounding designated sites. 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.** The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Kilaranny Bog has been carried out (Appendix XII). Rehabilitation in areas of archaeological interest will be avoided or amended (e.g. buffers in line with Best Practice) to avoid or minimise impact to any archaeological features (Appendix XII).
- **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 remain intact where possible. In some instances, depending upon previous land uses and management, alternative solutions may be required. These will be explored in consultation with local communities and statutory bodies during the consultation work associated with the decommissioning and rehabilitation work described here. No known rights of way exist at Kilaranny Bog.

## 6.2 Key Assumptions

- It is assumed that Bord na Móna will have all resources required to deliver this project. For the avoidance of doubt, should the Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete only the 'standard' decommissioning and rehabilitation required under Condition 10, and for which financial provisions have been made, to comply with that element of the Licence.
- 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:

- The longer-term raised bog restoration trajectory of the site. The plan covers the short-term rehabilitation **actions** and a **monitoring and after-care programme** to monitor the rehabilitation during the Scheme and to respond to any needs. It is expected that this rehabilitation plan will set the site on an enhanced and accelerated trajectory towards stabilisation and deep peat re-wetting. The plan does not set any goals or outcomes, for example, the extent (specific area) of active raised bog habitat (ARB) that may develop at this site in the long-term. This is beyond the scope of this rehabilitation plan.
- This plan is not intended to be an after-use or future land-use plan for Kilaranny Bog.
- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.
- The area in the east of Kilaranny Bog, utilised by private turf cutters relocated by the NPWS as part of the Clara Bog SAC conservation objectives.

## 7. CRITERIA FOR SUCCESSFUL REHABILITATION

This section outlines what criteria will be used to indicate successful rehabilitation and what key criteria/targets will be used to mark the achievement of the rehabilitation goals and outcomes and validate the completion of the rehabilitation.

The key objective of this enhanced 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 natural colonisation; and
- mitigation of potential key emissions (e.g. suspended solids).

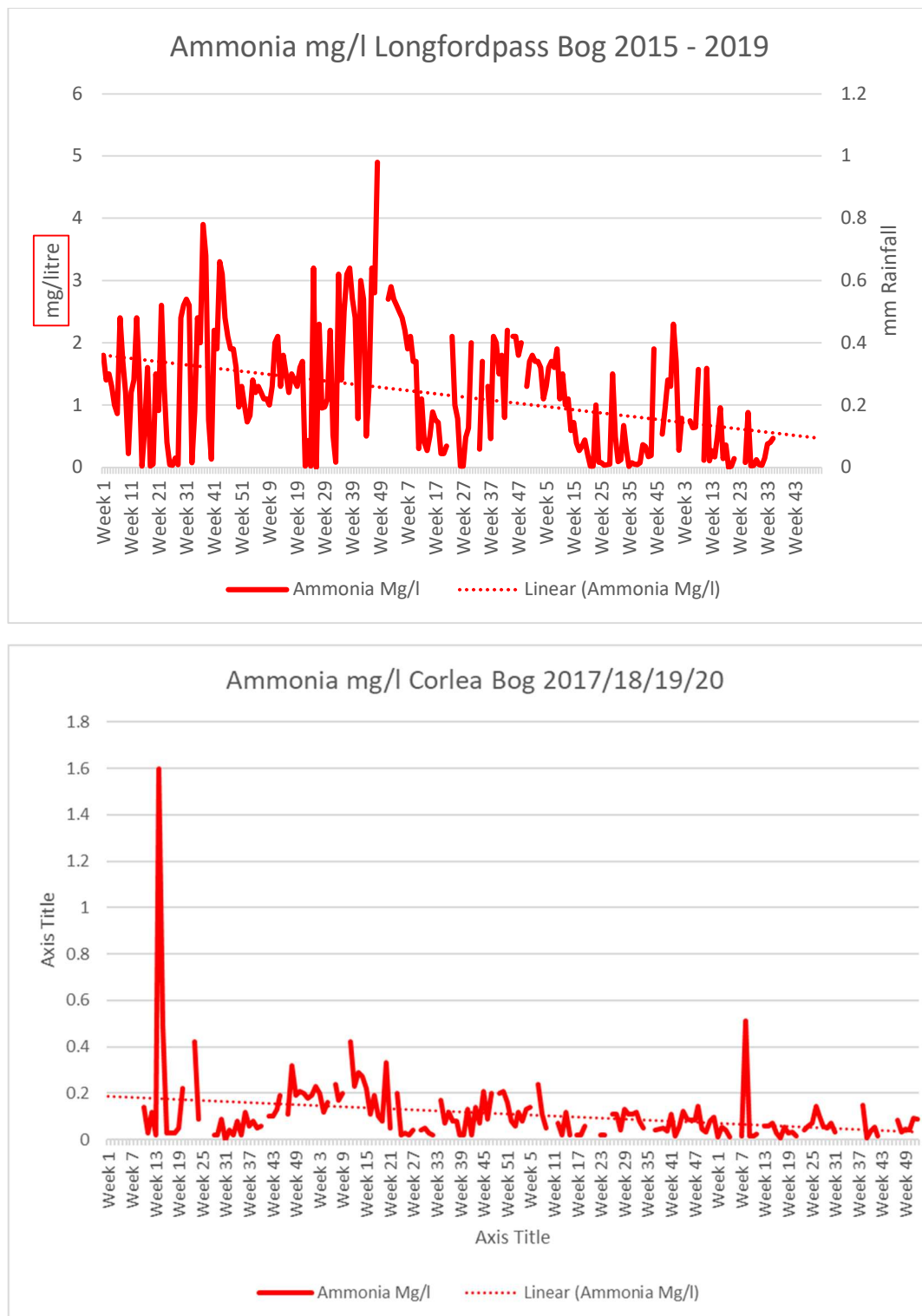
### 7.1. Criteria for successful rehabilitation to meet EPA IPC licence conditions:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage/accelerate development of vegetation cover via natural colonisation and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring. The target will be the delivery of measures and this will be measured by an aerial survey after rehabilitation is completed.
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from 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.

As the monthly monitoring program at Kilaranny continues in 2021 during the rehabilitation works, and data from the 2020 monitoring program is compiled, further trending will be produced to verify any ongoing trends.



**Figure 7.1. Ammonia trends at Longfordpass and Corela 2015-2019.**

**Additional criteria for successful rehabilitation to optimise climate action and other ecosystem service benefits:**



- Optimising the extent of suitable hydrological conditions to optimise climate action and other ecosystem service benefits (optimising deep peat re-wetting). This will be measured by an aerial survey after rehabilitation has been completed.
- Accelerating the trajectory of the former area of industrial peat extraction towards becoming a reduced carbon source/carbon sink. This will be measured through habitat mapping and the development of cutaway bog condition assessment. This cutaway bog condition assessment will include assessment of environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels (similar to ecotope mapping). Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Reduction in carbon emissions. This will be estimated via a combination of habitat condition assessment and application of appropriate carbon emission factors derived from other sites. Baseline monitoring (habitat condition) will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Setting the site on a trajectory towards establishment of a mosaic of compatible habitats including wetland, Reed swamp, poor fen, wet woodland, heath, scrub, poor fen and embryonic *Sphagnum*-rich raised bog peatland communities, where conditions are suitable. These habitats will generally establish initially as pioneer vegetation. It will take some time for stable naturally functioning habitats to fully develop at Kilaranny Bog. This will be demonstrated and measured via aerial photography, habitat mapping and cutaway/habitat condition assessment. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future.
- Improvement in biodiversity and ecosystem services. This will be demonstrated by metrics outlined in Section 9.1 that can be used to measure changes in ecosystem services (e.g. water quality parameters, development of pioneer habitats, breeding bird monitoring). This will be measured by 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. Baseline monitoring will be carried after rehabilitation is completed (during the scheme). It is proposed that sites can be monitored against this baseline in the future. These metrics will be defined in the context of the overall Scheme resources and after consultation with stakeholders.

**Table 7.1. Summary of Success criteria, targets, how various success criteria will be measured and expected time-frames.**

Criteria type	Criteria	Target	Measured by	Expected Time-frame
IPC validation	Rewetting in the former area of industrial peat production	Delivery of rehabilitation measures  Reduction in bare peat.	Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking)  Establishment of a baseline for future monitoring of bare peat, vegetation establishment and habitat condition.	2022-2025

IPC validation	Key water quality parameters  Ammonia, Phosphorous, Suspended solids, pH and conductivity	Reduction or stabilisation of key water quality parameters	Water quality monitoring. Started in advance of the proposed rehabilitation.	2021-2024
IPC validation	Reducing pressure from peat production on the local water body catchment (WFD)	No decline in the WFD status of the local river catchment related to this bog	EPA WFD monitoring programme	WFD schedule
Climate action verification	Optimising the extent of suitable hydrological conditions to optimise climate action	Optimal extent of suitable hydrological conditions	Aerial photography and Habitat mapping to map extent of suitable hydrological conditions.  Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025
Climate action verification	Reduction in carbon emissions.	Reduction in carbon emissions	Carbon emissions – estimated using a high bog condition assessment and appropriate carbon emission factors.	2022-2025
Climate action verification	Setting the site on a trajectory towards establishment of a mosaic of compatible habitats	Establishment of compatible cutaway habitats	Habitat map, Cutaway bog condition map  Baseline monitoring to be carried out during the scheme when rehabilitation is complete. Sites can be re-monitored in the future and compared against this baseline.	2022-2025
Climate action verification	Biodiversity and ecosystem services.	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined).	2022-2025

	Habitat establishment		Presence of key species – Sphagnum – Walkover survey	
	Presence of key species – Sphagnum			

Meeting climate action verification criteria and monitoring of these criteria after the scheme has been completed is dependent on support from the Climate Action Fund and Ireland's National Recovery and Resilience Plan or other sources of funding. Note that monitoring and verification of the overall scheme will be stratified – not all these criteria will be measured at each individual site.

## 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 and external).** 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. It is expected that additional costs of enhanced rehabilitation will be supported by Government.
- **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 may 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 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 and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

## 8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling indicates those areas that are likely to re-wet when drains are blocked, based on the current topography, and areas where water levels may have to be modified, where needed. Enhanced rehabilitation measures will look to optimise hydrological conditions for re-wetting peat in other areas. This planning is also essential for matching the most sustainable rehabilitation methodology to the most suitable cutaway environment to maximise the benefits of the resource outlay (maximising cost/benefit).

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

BNM-DR-23-02-22 titled **Kilaranny Bog: Aerial Imagery2020**

BNM-DR-23-02-04 titled **Kilaranny Bog: PeatDepths**

BNM-DR-23-02-03 titled **Kilaranny Bog: LiDAR Map**

BNM-DR-23-02-09 titled **Kilaranny Bog: Depression Analysis**

The rehabilitation actions themselves will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in drawing titled **BNM-DR-23-02-05 Kilaranny Bog: Rehabilitation Measures** in the accompanying Mapbook (Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.)

These enhanced measures for areas out of recent peat extraction at Kilaranny bog will include:

- Initial hydrological modelling indicates that a significant part of the area that has recently come out of peat extraction will develop a mosaic of wet habitats. Hydrological management will look to optimise summer water levels to maximise the development of wetland vegetation (by looking to set water depths close to the peat surface and at < 0.5 m, where possible). Water-levels will be adjusted at outfalls and by adjusting piped drainage. More sustainable permanent gravity drainage solutions will be examined.
- Intensive drain blocking to create wetlands, where needed;
- Management of water levels with overflow pipes;
- Re-alignment of piped drainage;
- Re-wetting the deep peat and some shallow peat areas of the bog using berms and field re-profiling. This enhanced measure seeks to create large (c. 45m x 60m) flat areas or cells of shallow (< 10 cm) water conditions on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water;
- Re-wetting some deep peat areas of the bog through field drain blocking using a dozer to create peat barriers (up to seven every 100 m along each field drain);
- Regular drain blocking (3/100) on dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Field re-profiling on deep peat fields using a screw leveller, along with drain blocks, drain infilling and keyed berms across the fields, in conjunction with outfall management;

- Inoculation of *Sphagnum* on compatible residual deep peat areas;
- Targeted fertiliser applications on bare peat areas to accelerate vegetation establishment on headlands and high fields.
- Targeted drain blocking around existing wetlands or standing water to create/promote the spread of wetland habitats;
- Silt ponds will be retained and maintained during the rehabilitation phase. During the monitoring and verification phase silt ponds will be continually inspected and maintained, where appropriate. When it is deemed that silt ponds are not required, as the bog has been successfully stabilised and water quality parameters meet targets the condition of the silt ponds will be reviewed. 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).

An indication of the areas for these various measures is shown in Table 8.1 and in BNM-DR-23-02-05 titled **Kilaranny Bog: Rehabilitation Measures**.

**Table 8.1** *Enhanced rehabilitation measures and target area at Kilaranny Bog. Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced 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	0
	DPT2	More intensive drain blocking (7/100 m) + modifying outfalls and managing overflows	2.6
	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling with screw leveller + drain infilling + cross berms + modifying outfalls and managing overflows	0
	DPT4	Berms and field re-profiling (45m x 60m cell) + modifying outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	81.94
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	0
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	0
	DCT2	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	17.20
	DCT3	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows + targeted fertiliser treatment	0
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes	0
	WLT2	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	0
	WLT3	Turn off or reduce pumping to re-wet cutaway + modifying outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site + constructing larger berms to re-wet cutaway + transplanting Reeds and other rhizomes	0
	WLT4	More intensive drain blocking (max 7/100 m), + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes	21.04
	WLT5	More intensive drain blocking (max 7/100 m), + field reprofiling + modifying outfalls and managing overflows + transplanting Reeds and other rhizomes	0
Marginal land	MLT1	No work required	41.22
	MLT2	More intensive drain blocking (max 7/100 m)	0
	MLT3	More intensive drain blocking (max 7/100 m) + modifying outfalls and managing overflows with + boundary berm	0
Additional land	AW2	Targeted drain blocking	22.26
Other		Silt-ponds	0.62
Other		Constrained Areas	57.35
<b>Total</b>			<b>244.23</b>

## 8.1 Short-term planning actions (0-1 years)

- Seek formal approval of the enhanced plan, noting the alternative standard plan should funding from the Scheme not materialise, from the EPA;

- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator;
- A detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (within the proposed PCAS) will be applied to Kilaranny Bog has been developed. This will take account of peat depths, topography, drainage and hydrological modelling;
- A hydrology and drainage management assessment of the proposed enhanced rehabilitation measures has been carried out, with no significant issues identified;
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation has been carried out. The results of this assessment have been incorporated into the rehabilitation plan to minimise known archaeological disturbance, where needed;
- A review of issues that may constrain rehabilitation such as amenity, forestry, other land-uses, known rights of way, archaeology, turbary, and existing land agreements has been carried out and incorporated into the rehabilitation plan, where needed;
- A review of remaining milled peat stocks has been carried out. All peat stocks will eventually be removed.
- An ecological appraisal of the potential impacts of the planned rehabilitation such as the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) or larval webs of Marsh Fritillary butterfly, etc will be carried out.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan has been carried out. (Note that the rehabilitation plan for Kilaranny screened out at the Stage I.)
- See Kilaranny Decommissioning and Rehabilitation Plan – Addendum 1 for more details.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) (where required), and other environmental control measures during the implantation of the rehabilitation plan.

## 8.2 Short-term practical actions (0-2 years)

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas. All rehabilitation will be carried out with regard to environmental control measures (Appendix IV);
- Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions;
- Carry out the proposed monitoring, as outlined.
- While natural colonisation is expected to commence almost immediately once peat production ceases, Phase 2 actions will be carried out in targeted areas to accelerate re-vegetation and colonisation of target species. Phase 2 actions may include seeding of targeted vegetation and inoculation of *Sphagnum*;
- Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential
- from the site during the rehabilitation phase; and



- Submit an *ex post* report to the Scheme regulator to verify the eligible measures to be carried out in year 1 of the Scheme, and an *ex ante* estimate for year 2 of the Scheme; and so on for each year of the Scheme

### 8.3 Long-term (>3 years)

- Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary;
- Delivery of a monitoring, aftercare and maintenance programme (See section 10.2 below);
- Decommissioning of silt-ponds will be assessed and carried out, where required; and
- Reporting to the EPA will continue until the IPC License is surrendered.

### 8.4 Timeframe

- **2021:** Short-term planning actions.
- **2022:** Short-term practical actions.
- **2023-2024:** Long term practical actions. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- **2024:** Decommission silt-ponds, if necessary

### 8.5 Budget and costing

Bord na Móna (BnM) understand that it is the Minister's intention to impose an obligation on Bord na Móna to develop a package of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of cutaway peatlands (PCAS). It is understood that additional costs of the Scheme will be supported by the Government. However, only the additional costs associated with the additional and enhanced rehabilitation, i.e, measures which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support.

The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

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 2020). 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 types of cutaway across the site (See Appendix I).

## 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.
- **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.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- This new sampling programme commenced in November 2020 and is enabling a baseline to be established, with sampling to progress during the scheduled works, and for a period of up to 2 years post rehabilitation. Depending on the period required to confirm that the main two parameters, suspended solids and ammonia as remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration, the monitoring programme and intensity will be periodically reviewed and amended.
- In the preparation of this monitoring programme, Bord na Móna have been providing the Local Authority Water Programme (LAWPRO) with details of the surface water emissions points associated with this bog and will be amending some of the proposed monitoring locations on foot of this engagement. LAWPRO have in turn provided details of their 2021 monitoring programme and these are included in the Water Quality Map.
- This is necessary to ensure that there is alignment with the WFD monitoring programme and that where possible, the monitoring programme will enable any improvements in water quality or establishing trends to be quantified against any available WFD monitoring data. It will also enable the periodic sharing of data which will inform the monitoring reports, success criteria and enable LAWPRO under the Water Framework Directive to track any changes in pressures and be aware of changes in water chemistry.
- This enhanced monitoring programme will aim to include a minimum of 70% of a bog's drainage catchments, whatever number of surface water outlets these include.

- Monitoring results will be maintained, trended every six months 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](http://www.epa.ie).
- The parameters to be included as per condition 6.2 of the IPC Licence include monthly monitoring for pH, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, COD and DOC. In addition, DOC has been included as a parameter to try and identify any changes in carbon in the surface water, and where required by LAWPRO, to assist in investigating other changes in water chemistry, the series of parameters can be reviewed and amended.
- This monthly 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 but this has been increased to a monthly regime to appropriately track the changing water chemistry that will occur as part of this enhanced rehabilitation. In addition, DOC will be included as a parameter to try and identify any changes in carbon in the surface water.
- 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 appropriate assessment process and planning procedures.

Additional monitoring measures are also proposed to monitor ecosystem service benefits that have been derived by rehabilitation. These proposed monitoring measures will be funded by the Scheme or additional other funding. Monitoring of climate action and other ecosystem service benefits will be designed to take account of the requirements of monitoring benefits of the overall Scheme and will be stratified; that is not all monitoring will be carried out in each site. These are defined as:

- Vegetation and habitat monitoring will be carried out using a condition assessment (similar to ecotope mapping). This assessment will include assessment of on environmental and ecological indicators such as vegetation cover, vegetation communities, presence of key species, *Sphagnum* cover, bare peat cover and water levels.
- The condition of the bog can be assessed using the condition assessment and suitable Greenhouse Gas (GHG) emission factors can be assigned to different habitats. GHG emission factors have been determined for various peatland habitats in Ireland (Wilson *et al.*, 2015) and are constantly being refined with more and more research. BnM is actively supporting research into GHG fluxes in different rehabilitated

peatland habitats. This means that potential GHG emissions can be estimated from the site, as the site continues along its trajectory towards a naturally functioning peatland ecosystem.

- It is proposed to monitor the improvement of some biodiversity ecosystem services. To be defined in relation to monitoring of the overall Scheme and after consultation with stakeholders.

## **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 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: A STANDARD PEATLAND REHABILITATION PLAN TO MEET CONDITIONS OF THE IPC LICENCE

In the event that the Scheme (PCAS) is not supported by additional funding, Bord na Móna is still obligated to carry out peatland rehabilitation to meet the conditions of the IPC Licence. Under its EPA licences and following cessation of peat extraction, BnM is mandated to 'decommission' its operations by removing materials 'that may result in environmental pollution' and establish that 'rehabilitation' measures have environmentally stabilised peat production areas.

This proposed standard peatland rehabilitation plan is outlined here to **estimate potential costs**. Bord na Móna will still be expected to cover the costs that would have accrued from standard decommissioning and rehabilitation activities, as part of its original obligations. The existing costs associated with both the removal of potentially polluting materials and the environmental stabilisation of the peatlands resides with Bord na Móna. However, the expenditure necessary to deliver the additional and enhanced decommissioning, rehabilitation and restoration and the benefits that flow from these measures and interventions/improvements will be eligible for funding by government through the Climate Action Fund and Ireland's National Recovery and Resilience Plan.

The same process as outlined in Section 2 will be followed.

### Scope of rehabilitation

The principal scope of this rehabilitation plan is to rehabilitate the bog. This is defined by:

- The area of Kilaranny Bog (BNM-DR-23-02-01 titled **Kilaranny Bog: Bog Site Location**).
- EPA IPC Licence - Ref. P0500-01. 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. Kilaranny bog is part of the Boora Bog group.
- The current condition of Kilaranny Bog. Pioneer cutaway vegetation is developing across parts of the site, whilst some parts have already been stabilised/rehabilitated whilst other remain unvegetated.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- To minimise potential impacts on neighbouring land. Some boundary drains around Kilaranny Bog will be left unblocked as blocking boundary drains could affect adjacent land.

### Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Kilaranny Bog is environmental stabilisation of the site via wetland creation and deep peat re-wetting. This is defined as:

- Carrying out drain blocking to re-wet peat and slow runoff.
- Stabilising potential emissions from the site (e.g. suspended solids).
- Environmental stabilisation.

The outcome is setting the site on a trajectory towards establishment of natural habitats.

### Criteria for successful rehabilitation:

- Rewetting of residual peat in the former area of industrial peat production to offset potential run off of suspended solids and to encourage development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat.

- That there is a stabilising/improving concentration of suspended solids and ammonia associated with the measures undertaken to stabilise the peat surface by the blocking of the internal drainage system and the maximised 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).
- 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.

#### **Rehabilitation indicators:**

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat blockages and re-wetting). This will be demonstrated by a post rehab survey.
- Stabilising potential emissions from the site (e.g. suspended solids). The key target will be developing a stable or downward trajectory of water quality indicators (suspended solids and ammonia). This will be demonstrated by water quality monitoring results.

#### **Rehabilitation measures:**

- Blocking field drains in the former industrial production area to create regular peat blockages (three blockages per 100 m) along each field drain;
- Re-alignment of piped drainage; and management of water levels to create wetlands;
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

#### **Timeframe:**

- 2022. 1<sup>st</sup> phase of rehabilitation. Field drain blocking and water-level management.
- 2022. 2<sup>nd</sup> phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1<sup>st</sup> phase re-wetting, ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if needed. These will be determined by ongoing monitoring.
- 2023-2024. Evaluate success of short-term rehabilitation measures outlined above and remediate where necessary.
- 2023-2024. Decommission silt-ponds, if necessary.

**Table AP-1. Rehabilitation measures and target area.**

Type	Code	Description	Area (Ha)
Deep peat	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	84.5
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	17.2
Wetland	WLT1	Modifying outfalls and managing water levels with overflow pipes	21.3
<b>Marginal Land</b>	MLT1	No work required	41.22
Other	Silt Pond	Silt ponds	0.6
Other	Additional Land	Additional Land to be rehabilitated	22.2
Other	Constraint	Rights of Ways and constrained areas/buffers/Archaeology	57.3
<b>Total</b>			<b>244.2</b>

See Drawing number BNM-DR-23-02-20 titled **Kilaranny Bog: Standard Rehab Measures** included in the accompanying Mapbook which illustrates the standard rehab measures to be applied.

### Monitoring, after-care and maintenance

- 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.
- Water quality monitoring will be established.
- 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](http://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.
- Where other uses are proposed for the site, 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 and planning procedures.

### Validation and IPC Licence surrender

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;
- Water quality monitoring demonstrates that water quality of discharge is stabilising or improving; and
- The site has been environmentally stabilised.

## APPENDIX II: BOGA GROUP CONTEXT

The Boora group of bogs are sited between Killeigh (Offaly) in the East to Banagher (Offaly) in the West and between Kinnitty (Offaly) in the south and Clara (Offaly) in the North. The River Shannon is the major river catchment for the area with a smaller area lying within the Barrow catchment.

The Boora Group is one of the oldest bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of the Boora Bogs in 1946 with milled peat production commencing in 1955. Milled peat was produced in the Boora Bog for the supply of fuel peat to the power station in Fermanagh which commenced power generation in 1957 and closed in 2001. The Boora bogs were also developed for the supply of milled peat to the Derrinlough Briquette factory, which commenced production in 1957.

Much of the Boora Bog complex became cutaway as it was in peat production at an early stage. A number of rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Boora Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management (specifically Grey Partridge) and wetland creation. Some of this was carried out in the 1980s. While agricultural fields and coniferous forestry have been developed successfully on the cutaway bogs at Boora, it was found that these require financial investment that at this time exceeds any potential commercial output value. The Lough Boora Discovery Park encompasses all areas relating to amenity and biodiversity. [www.loughboora.com](http://www.loughboora.com).

The bogs in The Boora Bog Group have been used in the past to supply milled peat for the horticultural market, local power stations (Fermanagh, Shannonbridge and West Offaly Power) and Derrinlough Briquette factory.

A breakdown of the component bog areas for the Boora Bog Group IPC License Ref. PO500-01, and current, indicative Peat Production Status, is outlined in Table Ap-2. These areas are also outlined in BNM-DR-23-02-24 titled **Boora Bog Group**.

Table Ap-2: *Boora Bog Group names, area and indicative status*

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Killaun	359.5	Cutover Bog  Industrial peat production commenced at Killaun Bog in 1996 and ceased in 2020. Only the upper most layers of peat have been harvested. Deep peat reserves remain on site. Killaun is considered a deep peat cutover bog.	Killaun Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.  Most of the former production area is bare peat.	2020	Draft  2017
Boora	1,842.4	Cutaway  Harvested since the 1950's resulting in the exhaustion of the commercially viable peat resource at the bog. The majority of Boora Bog is considered a shallow peat cutaway bog. Some areas of deep peat persist at this site.	The majority of Boora bog has already been rehabilitated. A significant area of cutaway bog has been re-wetted, developed as conifer forestry (Coillte) and developed as farmland (1980s).  This site now forms the core of Lough Boora Discovery Park.	2020	Finalised 2021  Rehab beginning 2021

Pollagh/ Cornalaur	280.8	<p>Cutaway</p> <p>At Pollagh Bog, industrial peat production began in 2004 and ceased in 2020.</p> <p>Peat reserves of variable depth remain on site. Some deep peat areas remain. Pollagh is considered a cutover bog with variable peat depths.</p>	<p>Pioneer emergent peatland vegetation communities are developing throughout the bog.</p> <p>The adjacent Cornalaur Bog was never developed for peat production.</p>	2020	<p>Finalised 2021</p> <p>Rehab beginning 2021</p>
Noggusboy	917.4	<p>Cutaway Bog</p> <p>Industrial peat production commenced at Noggusboy during the 1950's and ceased in 2020. Long-term peat extraction has exhausted commercially viable peat reserves on this bog. Noggusboy is considered a shallow peat cutaway bog.</p>	<p>Part of the site was developed for conifer forestry by Coillte.</p> <p>Part of the site was developed as Cloghan Lake, as part of Lough Boora Discovery Park, in 1999.</p> <p>There is some emerging naturally colonising cutaway.</p>	2020	To be finalised in 2021
Drinagh	1,339.1	<p>Cutaway Bog</p> <p>Industrial peat production commenced at Drinagh during the 1950's and ceased in 2020. Some small pockets of deep peat reserves remain in parts of Drinagh Bog but most of the commercially viable peat reserves have been exhausted. Drinagh is considered a shallow peat, cutaway bog.</p>	<p>Drinagh East is cutaway and has been extensively rehabilitated as wetland. This part of the site has extensive development of naturally functioning peatland habitats.</p> <p>Some Coillte conifer forestry is also present.</p> <p>There is some emerging naturally colonising cutaway in Drinagh West.</p>	2020	Draft 2017
Kilaranny	242.8	<p>Cutover Bog</p> <p>Industrial peat production commenced at Kilaranny during the 1980's. Deep peat reserves remain on much of the bog. Kilaranny is considered a deep peat cutover bog.</p>	<p>Kilaranny Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.</p> <p>A portion of the site is leased by NPWS since 2011 as a re-location area for turf cutters from nearby Clara Bog SAC.</p>	2020	Finalised 2021
Oughter	352.9	<p>Cutaway</p> <p>Development of Oughter Bog commenced in the 1960's. Industrial peat production ceased in 2012. Shallow peat depths remain over much of the former production bog area. Oughter is considered a shallow peat cutaway bog.</p>	<p>The site has naturally been re-wetting and there is already significant natural colonisation.</p> <p>Part of the site has been developed as the Midlands National Shooting Centre of Ireland.</p>	2012	<p>Finalised 2021</p> <p>Rehab beginning 2021</p>
Galros	191.5	<p>Cutover Bog</p> <p>Industrial peat production commenced at Galros during the 1980's and ceased in 2020. Some areas of deep peat remain on the former production area. Galros is considered a cutover bog of variable peat depth.</p>	<p>Galros Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.</p> <p>Some naturally emerging cutaway habitats are developing in part of the site.</p>	2020	Draft 2017
Clongawny More	987.2	<p>Industrial peat production commenced at Clongawny More during the 1950's and ceased in 2020. Some pockets of deep peat persist, particularly in the south-</p>	<p>Part of the site rehabilitated, as part of Lough Boora Discovery Park, in 1999.</p>	2020	Draft 2017

		western portion of the former production area. Clongawny More is considered a cutover bog with variable peat depths throughout the site.	Some Coillte conifer forestry is also present.  The site has naturally been re-wetting and there is already significant natural colonisation. BnM currently have submitted an application for renewable energy development on this bog.		
Derrinboy	305.7	Cutover Bog  Derrinboy was first developed by BnM in the 1980's. Peat production ceased at Derrinboy in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat have been harvested. Derrinboy is considered a deep peat cutover bog.	Derrinboy Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	To be finalised in 2021
Moneitta	707.5	Cutover Bog  Moneitta was first developed by BnM in the 1970's. Peat production ceased at Moneitta in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Moneitta is considered a deep peat cutover bog.	Moneitta Bog formerly supplied a range of commercial customers including; horticultural peat and fuel peat.	2020	Draft 2017
Boora Lemanaghan Rail_Link	6.9	N/A	Not applicable	N/A	N/A
Derries	368.2	Cutaway Bog  Development of The Derries Bog commenced in the 1960's. Industrial peat production ceased in 2005. Shallow peat depths remain over much of the former production bog area.  The Derries Bog is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of site in 1999.  Amenity trackway development in 2015. Part of the Lough Boora Discovery Park.  The site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2005	Finalised 2021  Rehab beginning 2021
Turraun	534.5	Cutaway Bog  Development of Turraun Bog commenced in the 1950's. Industrial peat production ceased in 2018. Turraun is considered a shallow peat cutaway bog.	Wetland rehabilitation carried out over part of area in 1999 as part of the Lough Boora Discovery Park. This section of the site has now been extensively naturally colonised and is a mosaic of wetland and Birch woodland habitats.	2018	Finalised 2021  Rehab beginning 2021
Derryclure	327.6	Cutover Bog  Derryclure was first developed by BnM in the 1980's. Peat production ceased at Derryclure in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Derryclure is considered a deep peat cutover bog.	Derryclure Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2021
Lemanaghan	1,253.7	Cutover Bog  Industrial peat production commenced at Lemanaghan during the 1950's and ceased in 2019. Varied peat depths across the site. Deep peat reserves remain on	Lemanaghan Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017

		much of the former production area of Lemanaghan Bog. It is considered a cutover bog.	There are some naturally emerging cutaway habitats.		
Belair North	565.7	Cutover Bog  Belair North was first developed by BnM in the 1960's. TPeat production ceased at Belair North in 2020. This bog was used to supply horticultural peat. Only the upper layers of peat were harvested. Belair North is considered a deep peat cutover bog.	Belair North Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017
Derrybrat	171.6	Cutaway Bog  Industrial peat production commenced at Derrybrat during the 1950's and ceased in 2016. Derrybrat has shallow peat depths across the site. It is considered a shallow peat cutaway bog.	The site has been partially rehabilitated and there is already significant natural colonisation. Some conifer forestry has been developed by Coile on the site.	2016	Finalised 2021
Belair South	228.8	Cutover Bog  Belair South was first developed by BnM in the 1970's. Peat production ceased at Belair South in 2020. This bog was used to supply horticultural peat. As a result, only the upper layers of peat were harvested. Belair South is considered a deep peat cutover bog.	Belair South Bog formerly supplied a range of commercial functions including; horticultural peat and fuel peat.	2020	Draft 2017
<b>Boora Bog Group Total</b>	<b>10,983.7</b>				

See Drawing number BNM-DR-23-02-24 titled **Boora Bog Group**, included in the accompanying Mapbook which illustrates the location of Kilaranny Bog and the Boora Bog Group in context to the surrounding area

## APPENDIX III: 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.*

<b>Bog Name:</b>	<u>Kilaranny</u>	<b>Area (ha):</b>	242 ha
<b>Works Name:</b>	Boora	<b>County:</b>	Offaly
<b>Recorder(s):</b>	MMC & DF	<b>Survey Date(s):</b>	28/01/2011

### Habitats present (in order of dominance)

The most common habitats present at this site include:

- Bare peat
- Dry heath and associated scrub mosaic (dHeath) (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II).
- Scrub ( eBir, oBir, cBir and eGor)
- Poor fen dominated by Bog Cotton or Soft Rush (pEang pJeff)
- Reedbeds (pPhrag)
- Riparian areas (drains and channelised streams) (Rip)
- Dry calcareous grassland (gCal)
- Bracken (dPter)
- Purple Moorgrass-dominated grassland (gMol)
- Access zones (railways and tracks) (Acc)
- Birch woodland (WN7) (Codes refer to Heritage Council habitat classification, Fossitt 2000), See Appendix II.
- Scrub (WS1) mainly developing on old cutover bog around margins
- Wet grassland (GS4)
- Raised bog (PB1)
- Cutaway bog (PB4)
- Improved agricultural grassland (GA1)

### Description of site

Kilaranny Bog is located approximately ten kilometres west of Tullamore, Co Offaly. There are no primary routes close to the bog, the R357 Blueball to Cloghan passes within four kilometres to the south. Access to the site is gained by following a secondary road (first right after Blueball on the R357) for approximately 3.5 kilometres. This road forms a boundary with the eastern edge of the site. An un-tarred bog road dissects the site close to the western boundary of the site.

A stream (canal supply) dissects the site into two main eastern and western sections, while a bog track further separates the south-western area from the rest of the site.

#### Eastern section



This section has been harvested for peat in the past, but no production appears to have taken place for the past five years. Old stockpiles are located throughout the site, and these have become vegetated with Birch and Heather. The majority of the Eastern section of the site is becoming revegetated with time as no production has been carried out in a number of years; dry heath is the dominant vegetation type that is becoming established. The eastern edge of the site has more mature vegetation, containing Birch woodland and scrub. Turf cutting is active in this area resulting in some areas of bare peat. A small section of remnant raised bog is located in this area and is being encroached upon by turf cutting activities.

Some small areas of bare peat still remain throughout this section but vegetation appears to be slowly becoming established in these areas of bare peat.

Overall this section of the site is revegetating since no production has been carried out in a number of years. The remaining peat is acidic and the main vegetation type to become established is dry heath, followed by Birch scrub.

The centre of the site is dominated by two, almost parallel drainage ditches. The vegetation between these drains are a mix of oBir, eBir, gMol, dh and dPter. An access route that is used by tractors (possibly turf cutters) is located in this area.

Dumping has become a problem in the north eastern corner of the site, with one area in particular being used as a frequent dumping ground for domestic waste.

### **Western section**

The majority of the production area still is dominated by bare 'red' acidic peat. However, this area does not seem to have been in use for some time and some of the areas more recently in production are revegetating with Heather (although there are signs of recent activity with some scrub being cleared from some of the stockpiles). Stockpiles running through the bog have become vegetated by Birch and Heather (oBir & dHeath). There is also some *Sphagnum* development in drains at the bases of these stockpiles. There are several areas that have more established typical cutaway vegetation. These include a band of vegetation along the northern boundary on lower ground that is considered production-related cutaway. This area has a range of typical cutaway habitats including poor fen in the wetter areas with Bog Cotton and Soft Rush prominent, and dry heath, Birch scrub and Purple Moorgrass-dominated grassland in the drier areas and on the high fields going through this section.

A similar suite of habitats is also present in the south-west corner. Dry Heath is prominent in this area and Birch scrub has also developed on some of the high fields and abandoned stock-piles. Bog Cotton becomes prominent in association with the dry heath and Birch scrub in a wetter area in a small hollow where there is water-pooling. There is some *Sphagnum* growth in this area with several hummocks of *S. papillosum* present.

Further east there is another area of production-related cutaway. This area has shallower peat and there are more frequent signs of poor fen re-vegetation (Bog Cotton, and Soft Rush-dominated) along with Heather and Birch scrub. Common Reed is also present. However, there are also signs of acidic influence in places with some *Sphagnum* regeneration and *S. cuspidatum* developing in some pools.

The southern part of this section south of the railway is an old cutover bog area and has a mix of somewhat more mature habitats such as scrub (WS1), Purple Moorgrass-dominated grassland (gMol) and dry calcareous grassland (gCal). Some domestic turf cutting is carried out on a small scale in this area resulting in pools being left behind when the peat is extracted. Bulrush and Common Reed are becoming established in some of these peat extraction pits. Gorse is encroaching on this area, creating dense areas of scrub.

There is a small area of intact raised bog to the north-west of the site. This high bog is partially ditched and the ditched area is quite dry and dominated by heather with colonisation by Birch and conifers. The remaining unditched high bog has typical raised bog features such as hummocks and hollows and has a typical raised bog species assemblage. It has not been burnt for some time and the *Cladonia* spp. cover is 20%. *Sphagnum capillifolium* and *S. papillosum* dominated the *Sphagnum* cover and there are some relic hummocks of *S. imbricatum* still present. There is a small hollow towards the centre of the bog where both Bog Cotton species are more prominent. *Sphagnum cuspidatum* is confined to small hollows in this area. There are signs of an old pool system within this hollow but this has degraded and they have largely filled in with other vegetation. Some of the old pools still contain small lawns of *S. cuspidatum* and *S. magellanicum* and the *Sphagnum* cover is up to 50% in some small areas (indicator of active raised bog)

### **South-west area**

The production area is mostly bare peat that seems to have not been in production in the past few years. Hares were frequently seen in this section. The north-east section is a local hollow and is developing typical poor fen vegetation with Bog Cotton prominent. Soft Rush, Marsh Arrowgrass and some Common Reed are also present and form mosaic with bare peat. Both Bulrush and Common Reed are present within some of the drains. Several Whooper Swans were foraging in this area. This area has not been in production for several years. The headland and travel path at the southern end is being colonised by Gorse and Heather (dHeath). There are some high fields where Heather and Purple Moorgrass are attempting to colonise further into the bog. The north-west corner had some standing water, although this was likely to be only temporary. Some pioneer poor fen vegetation dominated by Soft Rush was associated with this area.

There is a BnM railway running along the northern end that connects Lismanny with the rest of Boora. North of this railway there is a band of peatland that was never put into production. Some of this area contains silt ponds and some is being used by private peat cutters for domestic use, while there are also typical cutover habitats present. There is also a relatively large area of abandoned cutover bog adjacent to the track. This section is developing scrub and also has pockets of Heather-dominated vegetation (dry heath) along with pockets of wetland.

There is a small yard at the south-west corner that is been managed privately and is not part of the BnM property.

#### **Designated areas on site (cSAC, NHA, pNHA, SPA other)**

None

The Grand Canal pNHA (NPWS site code 002104) is located close to the site (0.7 km) at the northern end. A feeder channel that crosses the bog is not included within the NHA designation.

#### **Adjacent habitats and land-use**

Wet grassland (GS4), improved agricultural grassland (GA1), conifer plantation (WD4), scrub (WS1), Birch woodland (WN7), cutaway bog (PB4), recently planted woodland (WS5) and (remnant) raised bog (PB1).

#### **Watercourses (major water features on/off site)**

- The Grand Canal flows within 0.7km of the north eastern corner of the site.
- A “canal supply” flows through the site (through the western section and the centre of the site). These channel flows into the Grand Canal to the north of the site.
- A tributary of the Clodiagh River flows through though the eastern edge of the site.
- All watercourses on the site are part of the Shannon catchment.

#### **Peat type and sub-soils**

Kilaranny is a relatively young production bog so the majority of the exposed peat is ‘red’ acidic *Sphagnum* peat. The remaining peat is relatively deep in some sections by has swallowed out in other areas. Black fen peat is exposed in one part of the south-west section.

Blue-silty clay and glacial subsoil has been exposed in silt-ponds around the site.

#### **Fauna biodiversity**

##### **Birds**

Several bird species were noted on the site during the survey.

- Snipe (4)
- Woodcock (1)

- Teal (4) (in a drain/channelised stream)
- Whooper Swan (17) over flew the site
- Whooper Swan (3) foraging on bog.
- Curlew were also heard in the area.
- Other more common species included Blackbird, Rook, Grey Crow, Thrush, Wren, Wood Pigeon, Blue Tit, Pheasant, Redpoll, Heron and Meadow Pipit.

**Mammals**

Several mammals and signs of mammals were recorded on the site

- Badger
- Rabbit
- Hare (4) including a white-phase Hare
- Fox
- Pine Marten

**References**

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

## APPENDIX IV. 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 bowzers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowzers will be bunded to 110% capacity to prevent spills. Tanks for bowzers 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 V. BIOSECURITY

Invasive flora species have been recorded in the vicinity of Kilaranny Bog, including Canadian and Nuttall's waterweed. All measures taken to ensure the prevention of spread on invasive species will follow Best Practice.

The potential for importation or introduction of other, 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 plague<sup>2</sup> /other aquatic invasive species such as Parrots Feather will be adhered with throughout all rehabilitation measures and activities.

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<sup>2</sup> <https://www.biodiversityireland.ie/projects/invasive-species/crayfish-plague/>

## APPENDIX VI. 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 Boora bog group (Ref. PO-500-01). 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 Mount Dillon group. This regulatory requirement is the main driver of the development of this rehabilitation plan.

### 2 The Peatlands Climate Action Scheme (PCAS)

Bord na Móna (BnM) understand that it is the Minister's (DECC) intention to impose an obligation on Bord na Móna to develop a programme of measures, 'the Scheme', for the enhanced decommissioning, rehabilitation and restoration of boglands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the Scheme (PCAS) will deliver benefits across climate action (GHG mitigation through reduced carbon emissions and acceleration towards carbon sequestration), enrich the State's natural capital, increase eco-system services, strengthen biodiversity, improve water quality and storage attenuation as well as developing the amenity potential of the peatlands.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration, under the Scheme (PCAS), and supported by the Climate Action Fund and Ireland's National Recovery and Resilience Plan across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and measures supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However,

only the additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

The proposed enhanced rehabilitation detailed in this document, are predicated on the understanding that the element of the activities, over and above the ‘standard’ rehabilitation necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs be the Scheme regulator and funded by the Climate Action Fund and Ireland’s National Recovery and Resilience Plan.

For the avoidance of doubt, should the Scheme and the associated statutory obligation on Bord na Móna not materialise, Bord na Móna will not carry out the enhanced decommissioning, rehabilitation and restoration measures described in this plan. Bord na Móna will instead plan to complete an adapted standard decommissioning and rehabilitation measures required under Condition 10 and outlined in Appendix I.

### **3 National Climate Policy**

The National Policy Position establishes the fundamental national objective of achieving a transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out:

- the context for the objective;
- clarifies the level of GHG mitigation ambition envisaged; and
- establishes the process to pursue and achieve the overall objective.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by government of a series of national plans over the period to 2050. GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through the National Climate Action Plan. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals and, at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

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.

### **4 National Peatlands Strategy**

The National Peatlands Strategy (2015) contains a comprehensive list of actions, necessary to ensure that Ireland’s peatlands are preserved, nurtured and become living assets within the communities that live beside them. It sets out a cross-governmental approach to managing issues that relate to peatlands, including compliance with EU environmental law, climate change, forestry, flood control, energy, nature conservation, planning, and agriculture. The Strategy has been developed in partnership between relevant Government Departments/State bodies and key stakeholders through the Peatlands Council.

The strategy recognises that Ireland's peatlands will continue to contribute to a wide variety of human needs and to be put to many uses. It aims to ensure that Ireland's peatlands are sustainably managed so that their benefits can be enjoyed responsibly. It aims to inform appropriate regulatory systems to facilitate good decision making in support of responsible use. It also aims to inform the provision of appropriate incentives, financial supports and disincentives where required. The strategy attempts to strike an appropriate balance between different needs, including local stakeholders like turf-cutters and semi-state bodies such as 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 principal 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.

## **5 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 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 is impacting on 106 water bodies across the country, with peat the single pressure on 28 of these water bodies. However, compared to the data in the second-cycle plan, the number of water bodies impacted by peat has decreased.

The cessation of industrial peat extraction by 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.

## **6 National Biodiversity Action Plan 2016-2021**

The National Biodiversity Action Plan 2016-2022 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 2<sup>nd</sup> 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.

The delivery of rehabilitation via PCAS 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.

## **7 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, pNHAs) 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.

## **8 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. PCAS 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.

## **9 All-Ireland Pollinator Plan 2015-2020**

The All-Ireland Pollinator Plan 2015-2020 outlines key objectives and actions to protect and support pollinating insects and the habitats they rely on. There are several Bord na Móna specific actions in this plan including 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.

## **10 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.

Kilaranny Bog is located in an area zoned by Offaly County Council as open countryside.

## 11 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.

## 12 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 EUs headline target for progress by 2020 is to:

- *"halt the loss of biodiversity and the degradation of ecosystems in the EU by 2020, restore them as far as feasible, while stepping up the EU contribution to averting global biodiversity loss."*

This rehabilitation plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity policies.

### **13 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.

### **14 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.

## APPENDIX VII. 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	Kilaranny Bog Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	Clean-up of Bog
2	Cleaning Silt Ponds	Cleaning Silt Ponds
3	Decommissioning Peat Stockpiles	Peat Stockpile Management via Levelling
4	Decommissioning or Removal of Buildings and Compounds	Not relevant
5	Decommissioning Fuel Tanks and associated facilities	Decommissioning and De-Gassing Mobile Fuel Tanks
6	Decommissioning and Removal of Bog Pump Sites	Not Applicable
7	Decommissioning or Removal of Septic Tanks	De-sludge Septic Tank

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.

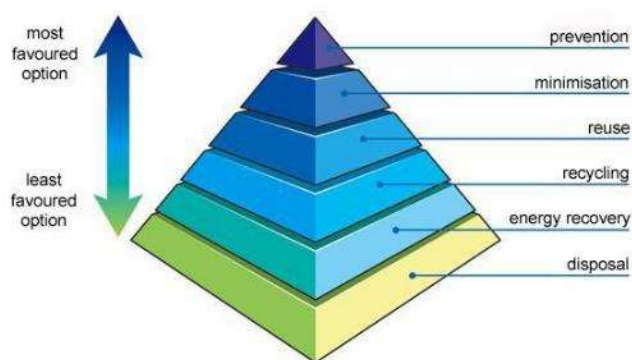
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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.

## 2. Enhanced Decommissioning.

The remaining infrastructure does not constitute a risk to the environment and would not be a requirement of condition 10 of the licence. The removal of these are deemed as enhanced measures. These may enhance the future afteruse of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit. In relation to this bog, this would include the infrastructure defined below:

Item	Enhanced Decommissioning Type	Kilaranny Bog Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Where Applicable
3	Decommissioning Railway Level Crossing	Decommissioning Railway Level Crossing
4	Restricting Access (bogs and silt ponds)	Restricting Access to Bog.
5	Removal of High Voltage Power Lines	Where Applicable

## APPENDIX VIII. 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 *Sphagnum*-rich plant communities in these conditions if the peat can be re-wetted. This brings the opportunity of re-developing *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 (ie. at the margin) where the peat cannot be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there is a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

**Enhanced decommissioning:** This is defined as decommissioning carried out under Scheme, which is proposed to be externally funded.

**Enhanced rehabilitation:** This is defined as rehabilitation carried out under Scheme, which is proposed to be externally funded. It is proposed by Government that Bord na Móna be obligated to carry out enhanced decommissioning, rehabilitation and restoration on peatlands. This Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. Interventions and activities supported by the Scheme will ensure that environmental stabilisation is achieved (meaning IPC obligations are met), and importantly, significant additional benefits, particularly relating to climate action and other ecosystem services, will also be delivered. However, only the costs associated with the additional, enhanced and accelerated measures, i.e., those interventions which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the Scheme.

**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). The Scheme will consider potential rehabilitation and restoration actions (e.g. drain blocking) within marginal land zones, where appropriate.

**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 is 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 have 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 IX. 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 P0500-01, Boora Group of Bogs in Counties Offaly

#### 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 Kilaranny is 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 is levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher than 2-3 metres.

##### 1.2 Power Station screenings:

Lough Ree Power Ltd 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 P0500-01 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 31<sup>st</sup> 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 Boora 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 Kilaranny Bog Licence P0500-01.

## APPENDIX X. 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 <sup>3</sup> 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 <sup>3</sup> 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 XI. CONSULTATION SUMMARIES

**Table APXI -1 Consultees contacted**

Bog Name	Contact Organisation	Contact Name	Date of Issue	Medium	Date Response Received	Response format
Kilaranny	An Forum Uisce (The Water Forum)	General Email Contact	19/11/2021	Email		
Kilaranny	An Taisce	General Email Contact	19/11/2021	Email		
Kilaranny	Bat Conservation Ireland	General Email Contact	19/11/2021	Email		
Kilaranny	Birdwatch Ireland	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Butterfly Conservation Ireland	General Email Contact	19/11/2021	Email		
Kilaranny	CARO (Climate Action Regional Office) Eastern and Midlands	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Coillte	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Coirtrade	General Email Contact	19/11/2021	Email		
Kilaranny	Department of Agriculture, Food, and the Marine	General Email Contact	19/11/2021	Email		
Kilaranny	Department of Environment, Climate and Communications	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Department of Housing, Local Government and Heritage	Specific Email Contact	29/09/2021	Email	Multiple responses	Email
Kilaranny	Department of Housing, Local Government and Heritage	General Email Contact	19/11/2021	Email		
Kilaranny	Department of Housing, Local Government and Heritage NPWS	Multiple Email Contacts	19/11/2021	Email		

Kilaranny	Dept of Rural and Community Development	General Email Contact	19/11/2021	Email	22/11/2021	Email
Kilaranny	Eastern and Midland Regional Assembly	General Email Contact	19/11/2021	Email		
Kilaranny	Environmental Protection Agency	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Fisheries Ireland	General Email Contact	19/11/2021	Email		
Kilaranny	Friends of the Earth	General Email Contact	19/11/2021	Email		
Kilaranny	Friends of the Irish Environment	General Email Contact	19/11/2021	Email		
Kilaranny	ICMSA (Irish Creamery Milk Suppliers Association)	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	ICSA (Irish Cattle and Sheep Farmers Association)	General Email Contact	19/11/2021	Email		
Kilaranny	Inland Fisheries Ireland	Multiple Email Contacts	19/11/2021	Email	17/12/2021	Email
Kilaranny	Inland Waterways Offaly	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Clay and Target Shooting Association (ICTSA)	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Farmers Association	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Irish Farmers Association (Laois Offaly and Westmeath Office)	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Farmers Association (Senior Policy Exec)	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Peatlands Conservation Council	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Raptor Study Group	General Email Contact	19/11/2021	Email		



Kilaranny	Irish Rural Link	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Rural Link (Community Wetlands Forum)	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Water	Multiple Email Contacts	19/11/2021	Email	21/12/2021	Email
Kilaranny	Irish Water- Water Supply Project Eastern and Midlands Region	General Email Contact	19/11/2021	Email		
Kilaranny	Irish Wildlife Trust	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	IWAI	General Email Contact	19/11/2021	Email		
Kilaranny	Local Authority Waters Programme	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Midlands & East Regional WFD Operational Committee	General Email Contact	19/11/2021	Email		
Kilaranny	Minister for Environment, Climate and Communications	General Email Contact	19/11/2021	Email		
Kilaranny	Minister of state for Agriculture with responsibility for Land use and Biodiversity	General Email Contact	19/11/2021	Email		
Kilaranny	National Association of Regional Game Councils	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	National Museum of Ireland	Multiple Email Contacts	19/11/2021	Email	24/11/2021	Email
Kilaranny	NPWS Rangers North East	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	NUIG Galway	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	NWRA	General Email Contact	19/11/2021	Email		
Kilaranny	Offaly County Council - Chief Executive	General Email Contact	19/11/2021	Email		

Kilaranny	Offaly Co Co	General Email Contact	19/11/2021	Email	28/01/2022	Email
Kilaranny	Offaly County Council	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Offaly County Council - Local Enterprise Office	General Email Contact	19/11/2021	Email		
Kilaranny	Offaly County Council - Director of Services	General Email Contact	19/11/2021	Email		
Kilaranny	Offaly County Council - Heritage Officer	General Email Contact	19/11/2021	Email		
Kilaranny	Offaly County Council - Senior Planner	General Email Contact	19/11/2021	Email		
Kilaranny	Offaly County Councillors - Birr District	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Offaly County Councillors - Edenderry District	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Offaly County Councillors - Tullamore District	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Office of Public Works	Multiple Email Contacts	19/11/2021	Email	19/11/2021	Email
Kilaranny	Oireachtas	General Email Contact	19/11/2021	Email		
Kilaranny	Pollagh Residents Development Association	General Email Contact	19/11/2021	Email		
Kilaranny	PPN Offaly Public Participation Network	General Email Contact	19/11/2021	Email		
Kilaranny	NPWS Ranger Association Committee	General Email Contact	19/11/2021	Email		
Kilaranny	Shannon Flood Risk State Agency Co-ordination Working Group	General Email Contact	19/11/2021	Email		
Kilaranny	Sustainable Water Action Network (SWAN)	Multiple Email Contacts	19/11/2021	Email		

Kilaranny	TD Laois/Offaly	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Teagasc	General Email Contact	19/11/2021	Email		
Kilaranny	The Heritage Council	General Email Contact	19/11/2021	Email		
Kilaranny	Trinity College Dublin	Multiple Email Contacts	19/11/2021	Email		
Kilaranny	Tullamore Tidy towns	General Email Contact	19/11/2021	Email		
Kilaranny	Turf Cutters and Contractors Association	General Email Contact	19/11/2021	Email		
Kilaranny	UCD / Irish Rural Link	General Email Contact	19/11/2021	Email		
Kilaranny	University College Dublin	General Email Contact	19/11/2021	Email		
Kilaranny	Waterways Ireland	Multiple Email Contacts	19/11/2021	Email	19/11/2021	Email
Kilaranny	Waterways Ireland Org	General Email Contact	19/11/2021	Email		
Kilaranny	Woodlands of Ireland	General Email Contact	19/11/2021	Email		
Kilaranny	All Landowners in vicinity of bog	Local Stakeholders		Letter/Leaflet	Multiple responses	Telephone/Email
Kilaranny	All those with turbary rights	Local Stakeholders		Letter/Leaflet	Multiple responses	Telephone/Email
Kilaranny	NARGC		28/01/2022	Meeting on site		Meeting on site

**Table APX -2 Response summary from Consultees contacted**

Organisation	Summary of Response by Stakeholder	BnM Response
Department of Housing, Local Government and Heritage	<p>BnM advised we were planning to rehabilitate Kilaranny bog and part of the bog is leased to NPWS as a turf cutting relocation site, BnM asked that NPWS confirm this area could be considered as a constraint and therefore not subject to any measures.</p> <p>NPWS responded on the 08/10/2021 and 12/10/2021 confirming they agreed with this suggestion and asked that the wording of the rehabilitation plan be updated to reflect same.</p>	No response necessary
Dept of Rural and Community Development	The Dept. responded to our mail on 22/11/2021, thanking us for our correspondence and advising they would review document and submit an input if necessary.	No response necessary
Inland Fisheries Ireland	Inland Fisheries Ireland responded on 17/12/2021 acknowledging receipt of consultation mail and seeking extension to response deadline until 31/01/2022	N/A
Irish Water	<p>IW made a submission on 21/12/2021 outlining their support for the scheme and asking if</p> <p>(1) we could highlight within the plan the potential for improvements to drinking water sources and referencing these improvements in the criteria for successful rehabilitation.</p> <p>(2) They also requested that consideration be given to the design of the monitoring programme, the extent of the monitoring post restoration, and water colour as an indicator to track.</p> <p>(3) They asked that they be kept informed if silt pond decommissioning is necessary. In addition, they asked if this project had potential to offer cumulative beneficial impacts with other bog rehabilitation projects in the same catchment and if that had been assessed?</p>	N/a
National Museum of Ireland	The NMI responded on 24/11/2021 acknowledging receipt of our email and thanking us for the opportunity to comment. They advised they would shortly issue a collective response.	
Offaly County Council	Offaly County Council responded on 28/1/2022 querying the nature of the constrained area on the eastern side.	<p>BnM acknowledge receipt of query on 28/01/2022 and advised would revert.</p> <p>BnM subsequently followed up on 28/02/2022 and advised that the constrained area is currently leased to NPWS as a relocation site for turf-cutters from Clara SAC.</p>
Office of Public Works	<p>The OPW made a submission on 19/11/2021 seeking clarification from Bord na Móna on the following: 1. Does BnM envisage any impacts or constraints on OPW carrying out normal Arterial Drainage Maintenance activities on the OPW scheme channels, 2. What will future drainage maintenance liabilities be for the OPW in the future.</p> <p>They also expressed their support for the scheme.</p>	Bord na Mona replied on 9/12/2022, thanking them for expressing support and responding to the specific questions raised advising no constraints on OPW access and no requirement for drain maintenance activities on Bord na Mona lands.

Waterways Ireland	WI responded on the 19/11/2021 thanking us for our email and asking if we would contact them to discuss a specific watercourse feature in the northern part of Kilaranny, they also expressed a desire to discuss the impact of the peatland rehabilitation works on the Royal and Grand Canal lines.	BnM telephoned the representative from WI on 24/11/2021 and advised him that we are aware of the Kilaranny canal feeder and from our investigation we do not discharge into it. We advised him that we have appointed RPS to ensure the rehab measures do not impact on adjoining third party lands. All main drains that flow into and out of the bogs will be retained and not blocked and marginal drains will also be retained so we should not impact on any canal feeders. We asked if they could provide us with further details of the canal feeders, IW advised this is an on-going project and they will provide when available.  We offered to arrange a meeting including a site visit at a later date when the detailed design has been carried out.
Landowner A	Landowner A contacted us on 04/01/2022 asking if we would meet him onsite to discuss his queries regarding Kilaranny	BnM contacted the landowner and advised we would contact him shortly to arrange a visit.
Landowner B	Landowner B contacted us on the 11 <sup>th</sup> and 24 <sup>th</sup> of January expressing his concerns.	BnM spoke with Landowner on 25/01/22. The main objection was that Kilaranny was subject to a CPO for peat extraction and now it has ceased, could the bog be redeployed to grow vegetables. He also queried how the significant hare population will be impacted by the rewetting. We explained the legal requirement to decommission/rehabilitate the bog and that trials in the past on growing vegetable did not produce any results.
NARGC	NARGC have expressed interest in growing Heather on BnM bogs. Meeting on site to discuss a potential Heather growing trial.	BnM have identified a suitable area for a Heather growing trial and are working with NARGC to develop a lease for this area. Consultation ongoing.

## APPENDIX XII. 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.



<b>Bord na Móna</b>	<b>Procedure: ENV017</b>	<b>Rev: 1</b>
<b>Title: Archaeological Findings</b>	<b>Approved: EM</b>	<b>Date: 13/10/2020</b>

**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	13/19/2020	First release	EMcD
2			





**Archaeological Impact Assessment of Proposed Bog  
Decommissioning and Rehabilitation at Killaranny Bog, Co.  
Offaly**

**Draft**

**Report For**

**Bord Na Móna Energy Ltd.**

**Author**

**Dr. Charles Mount**

**Bord Na Móna Project Archaeologist**



## Introduction

The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation of c.195 hectares at Killaranny Bog, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Killaranny Bog will include:

- Blocking field drains in the former industrial production area to create regular peat blockages (three blockages per 100 m) along each field drain;
- Re-alignment of piped drainage; and management of water levels to create wetlands;
- No measures are planned for the other surrounding marginal peatland habitats.
- Silt ponds will continue to be maintained during the rehabilitation and decommissioning phase.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

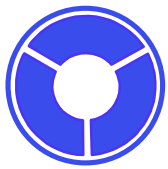
Killaranny Bog is located c.13km southwest of Rahan, Co. Offaly, and north of the R437 road. The overall rehabilitation area occupies the townlands of Ballincur, Ballindrinan, Cappaloughan, Derrinvullig, Killaranny, Loughroe, Newtown, Rabbitburrow, Rahan Demesne and Roscore Demesne, on OS 6 inch sheets Offaly No. 16.

## Methodology

This is a desk-based archaeological assessment that includes a collation of existing written and graphic information to identify the likely archaeological potential of Killaranny Bog. The overall extent of the rehabilitation is indicated in Fig. 1. This area was examined using information from:

- The IAWU Peatland Survey
- Bord na Mona Re-assessment survey 2009
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- The topographical files of the National Museum of Ireland.
- The Excavations database
- Previous assessments

An impact assessment has been prepared and recommendations have been made.



## Desktop assessment

### Recorded Monuments

The Record of Monuments and Places (RMP) for Co. Offaly which was established under Section 12 of the National Monuments (Amendment) Act, 1994 was examined as part of the assessment (DAHGI 1995). This record was published by the Minister in 1995 and includes sites and monuments that were known in Killaranny Bog before that date. This review established that there are no RMPs located in the proposed rehabilitation area (see Fig. 1).

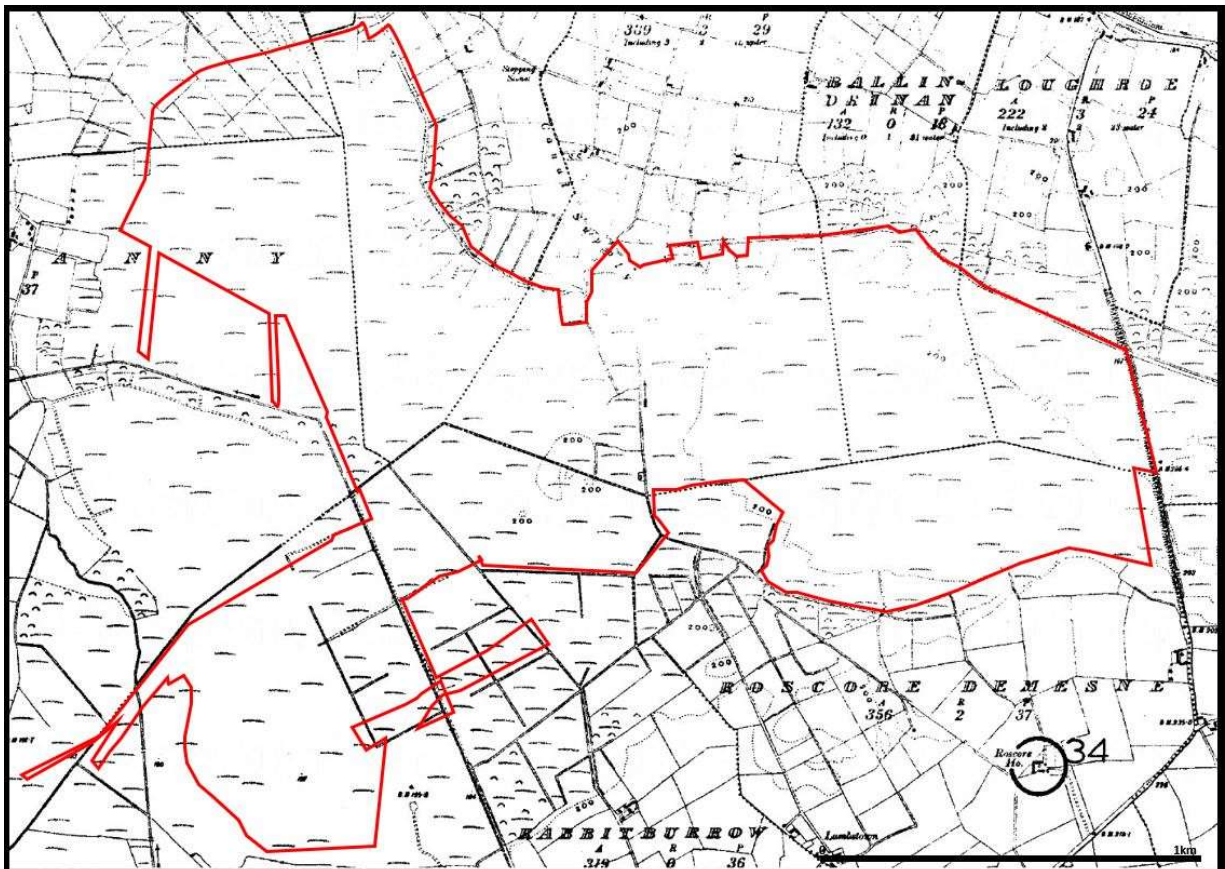


Fig. 1. Killaranny Bog, Co. Offaly, detail of the Record of Monuments and Places map sheet No. 16. The proposed rehabilitation area is outlined with the red line. There are no Recorded Monuments in the rehabilitation area.

### Peatland survey

Killaranny Bog was surveyed by the Irish Archaeological Wetland Unit (IAWU) in 1997 as part of the Archaeological Survey of Ireland Peatland Survey (Unlicensed). Twenty sightings of archaeological material were made (see Table 1). These archaeological sightings were notified to the Archaeological Survey of Ireland.

SMR_NO	SMR Class	IAWU Cat._No.	IAWU Class	Townland	N.G.R. E	N.G.R. N	Depth BS m
		OF-BLN 0001	WOWO	Ballindrinan	225178	223786	0.00
OF016-058----	Road - class 3 togher	OF-RND 0001	TOGH	Rahan Demesne	225245	224154	0.00



OF016-059----	Redundant record	OF-RND 0002	WOWO	Rahan Demesne	225328	223820	0.00
-	-	OF-RSD 0001	FIND	Roscore Demesne	225441	223540	-1.00
OF016-066----	Road - class 3 togther	OF-DVG 0001	TOGH	Derrinvullig	224095	222872	0.47
OF016-070----	Road - class 3 togther	OF-DVG 0002	WOWO	Derrinvullig	223986	223153	0.00
OF016-071----	Redundant record	OF-DVG 0003	WOWO	Derrinvullig	223960	223174	0.00
-	-	OF-DVG 0004	WOWO	Derrinvullig	223982	223157	0.00
OF016-069----	Road - class 3 togther	OF-DVG 0005	TOGH	Derrinvullig	223973	223163	0.00
OF016-073----	Road - class 3 togther	OF-DVG 0006	TOGH	Derrinvullig	223955	223184	0.13
OF016-063----	Road - class 3 togther	OF-DVG 0007	TOGH	Derrinvullig	223954	223186	0.10
-	-	OF-DVG 0008	COMP	Derrinvullig	223954	223185	0.40
OF016-068----	Redundant record	OF-DVG 0009	WOWO	Derrinvullig	223955	223183	0.48
OF016-065----	Road - class 3 togther	OF-DVG 0010	TOGH	Derrinvullig	223953	223189	0.05
OF016-064----	Redundant record	OF-DVG 0011	COMP	Derrinvullig	223952	223190	0.32
OF016-072----	-	OF-DVG 0012	WOPL	Derrinvullig	223959	223178	0.00
OF016-078----	Road - class 3 togther	OF-DVG 0013	TOGH	Derrinvullig	223959	223179	0.05
OF016-074----	Redundant record	OF-DVG 0014	WOWO	Derrinvullig	223861	223061	0.56
OF016-075----	Redundant record	OF-DVG 0015	WOWO	Derrinvullig	223862	223056	0.00
OF016-077----	Road - class 3 togther	OF-DVG 0016	WOWO	Derrinvullig	224039	222854	0.33

Table 2. List of sites recorded by the IAWU in Killaranny Bog.

### Sites and Monuments Record

The Sites and Monuments Record (SMR) which is maintained by the Department of Housing, Local Government and Heritage was examined as part of the assessment on the 14th of October 2021. The SMR consists of records included in the RMP and sites and monuments notified to the Dept. since the publication of the RMP. This review established that there are 15 entries in the SMR in the proposed rehabilitation area (see Table 2). Nine of these entries are classified as Road - class 3 togther and six are classed as Redundant Record.

### Bord na Mona Re-assessment survey 2009

Killaranny Bog was re-surveyed by the Bord na Mona Re-assessment survey 2009 (Rohan 2009, License No. 09E0409). At the time of the survey the bog was not in production. The eastern extent of the bog was completely overgrown with heather scrub growing on many of the field surfaces. A handheld GPS was used to find the location of the previously identified sites but they were no longer extant. The northern and southern ends of the production fields in the western extent of Killaranny Bog were very overgrown with trees and scrub. Some areas were flooded and colonized by reeds. As a result of the mature vegetation, it was not possible to field walk the northern and southern ends of these fields. While the central part of the bog was walked, the majority of the drains were covered with vegetation so only the field surfaces could be inspected. No sites of archaeological significance were identified during the 2009 fieldwalking survey of this bog.

### Reported finds

The topographical files of the National Museum of Ireland were searched for records of finds from the bog in x 2021 and the finds are included below in Table 3.

Townland	Museum No.	Description
Roscore Demesne	1992E148:54	Ceramic vessels
Roscore Demesne	1990:103	Long four sided wooden post
Newtown	2006:85	Bog butter with the remains of a bark wrapping

Table 3. List of archaeological finds from Killaranny Bog reported to the National Museum of Ireland.

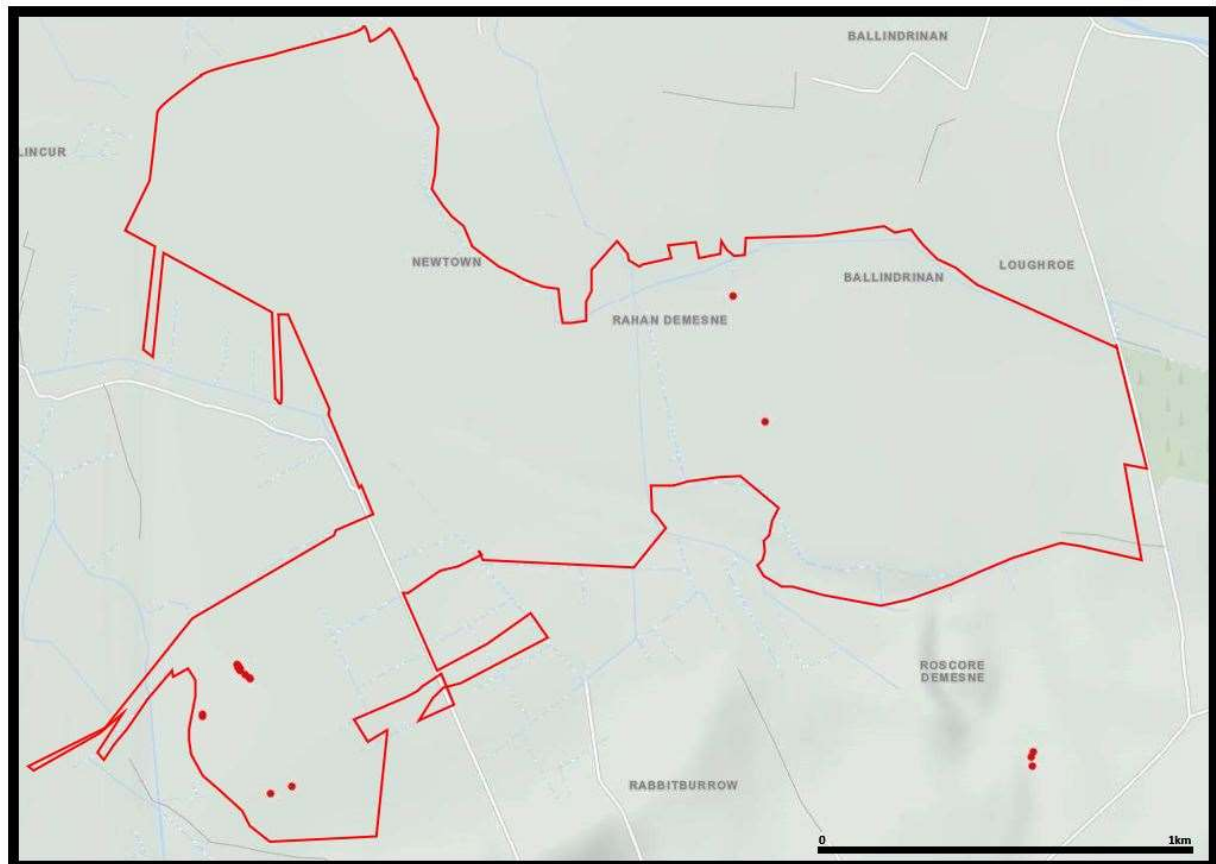


Fig. 2. Killaranny Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line. There are several SMRs in the rehabilitation area.

### Archaeological investigations

Reports of archaeological excavations and licensed monitoring in the study area listed in the excavations database at [excavations.ie](http://excavations.ie) were examined as part of the assessment. There are no additional reports of archaeological investigation carried out in the rehabilitation area.

### Previous assessments

Killaranny Bog has been the subject of an Environmental Impact Assessment Report carried out by Irish Archaeological Consultancy LTD in 2018 for Bord na Móna Energy Limited in relation to IPC Licence P0500-01. The assessment noted the wood identified in the IAWU survey in 1998 and noted that there was a moderate potential for archaeological features to be uncovered during the course of any future development works in Killaranny Bog.

### Impact assessment

A total of 20 sightings of archaeological material were identified and recorded in Killaranny Bog by the IAWU in 1997 and 15 of these were subsequently entered into the Sites and Monuments Record. The Re-assessment Peatland Survey 2009 found that none of the sightings made by the IAWU in 1997 survived. No additional sightings were made during the Re-assessment survey.



## Recommendations

There is no known surviving archaeological material in Killaranny Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There is no known surviving archaeological material in Killaranny Bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## References

DAHGI 1995. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Offaly.

EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.

Rohan, N. 2009. 2009 Re-assessment Field Survey. Unpublished report for Bord na Mona.

Dr. Charles Mount  
14 October 2021



## APPENDIX XIII. WATER QUALITY MONITORING RESULTS FOR KILARANNY BOG

Table AP13.1. Water quality data for 12 months from November 2020 to Dec 2021 at Kilaranny bog.

PCAS SW Sampling Scheme					Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	2	2	17	3	3	3	4	14		2	2
Derrygreenagh	P0501-01	Lisclogher	230	SW25	4	2	2	2	3	8	5	8	9	2	2
				ELV	35	35	35	35	35	35	35	35	35	35	35
PCAS SW Sampling Scheme					Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	354	224	471	271	204	222	522	388		342	274
Derrygreenagh	P0501-01	Lisclogher	230	SW25	327	225	386	305	385	570	586	413	398	490	449
PCAS SW Sampling Scheme					COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	71	41	93	62	52	44	90	88		56	59
Derrygreenagh	P0501-01	Lisclogher	230	SW25	70	40	85	65	81	78	85	82	58	85	88
PCAS SW Sampling Scheme					pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	7.1	7.3	7.1	6.9	7.3	7.9	7.7	7		7.7	7.7
Derrygreenagh	P0501-01	Lisclogher	230	SW25	7.2	7.2	6.8	6.6	6.9	7.6	7.6	7	7.6	7.5	7.3
PCAS SW Sampling Scheme					TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	0.09	0.05	0.09	0.05	0.08	0.05	0.05	0.25		0.05	0.05
Derrygreenagh	P0501-01	Lisclogher	230	SW25	0.05	0.07	0.05	0.05	0.05	0.11	0.11	0.2	0.15	0.09	0.08
PCAS SW Sampling Scheme					TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	198	154	144	150	186	377	311	425		427	374
Derrygreenagh	P0501-01	Lisclogher	230	SW25	204	146	127	187	120	365	382	215	439	344	325
PCAS SW Sampling Scheme					Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	0.124	0.044	0.094	0.055	0.114	0.149	0.066	1.16		0.1	0.105
Derrygreenagh	P0501-01	Lisclogher	230	SW25	0.099	0.067	0.305	0.224	0.063	3.15	2.98	0.817	3.38	2.94	2.43
PCAS SW Sampling Scheme					DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	Unique I.D No.	SW Code GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/10/21	1/11/21	1/12/21
Derrygreenagh	P0501-01	Lisclogher	229	SW24	30	19.6	29.6	21.3	20.4	16.2	32.5	27.2		26	24
Derrygreenagh	P0501-01	Lisclogher	230	SW25	31.5	17.7	33.4	23.8	30.2	26.9	28.4	27.3	25.8	30.5	31.8