Clonad Bog

Cutaway Bog Decommissioning and Rehabilitation Plan 2021

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 Clonad 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 Clonad Bog. Bord na Móna have now announced the complete cessation of industrial peat production.

In addition, to preparing this document to comply with Condition 10 of IPC Licence Ref. P0503-01, due regard was also given to the proposed Peatlands Climate Action Scheme (PCAS) announced by the Minster. This Scheme will see the Minister support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed 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 proposed Scheme will be supported by Government through the Climate Action Fund, 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 Clonad 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 proposed 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 proposed Scheme.

Bord na Móna have defined the key rehabilitation outcome at Clonad 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 Clonad Bog, such as amenity, 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 Clonad Decommissioning and Rehabilitation Plan – Addendum 1 for more details.

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SUMMARY

Name of bog: Clonad Bog **Area:** 447 ha

Site description:

- Clonad Bog is located between Daingean and Geashill in Co. Offaly.
- Clonad Bog was in industrial peat production since the early 1970s until 2019. The peat was formerly used as fuel peat to supply Edenderry Power. Industrial peat extraction has now completely ceased at Clonad Bog.
- Clonad Bog has a gravity drainage regime.
- The majority of the former peat production footprint is bare peat and contains active drainage channels. A small portion of the bog has become cutaway and is developing pioneer cutaway habitats with Birch scrub prominent.
- The western section of the bog contains the deepest residual peat with over 2.6m of peat remaining in the south-west corner. The eastern area has shallower remaining peat and is now considered to be cutaway.
- Clonad Bog is located on the watershed between the River Shannon And River Barrow catchments; the majority of the site drains into the Barrow catchment, but the south-west corner drains into the Shannon catchment.

Rehabilitation goals and outcomes

Bord na Móna is committed to discharging the obligations arising from Condition 10 of the IPC licence. The primary goals and outcomes of this plan are:

- Meeting conditions of the IPC License.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- Optimising hydrological conditions for **climate action benefits as part of PCAS.** This will be achieved via **deep peat re-wetting and optimising re-wetting on shallower cutaway areas** and eventually naturally functioning wetland/peatland habitats.
- Environmental stabilisation.
- Rehabilitation will support the National Policies on Climate Action and GHG mitigation by maintaining and enhancing the current peat storage capacity of the bog (locking the carbon into the ground). It is expected that the bog will have reduced emissions (reduced source) and in time develop its carbon sink function, in part, as some peat-forming habitats develop on site. It will also support Ireland's commitments towards Water Framework Directive and the National River Basin Management Plan 2018-2021.
- Optimising hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future.

Scope of rehabilitation

The principal scope of this rehabilitation plan is defined by:

- The area of Clonad Bog.
- EPA IPC Licence - Ref. P0503-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The key objective of 'rehabilitation', as required by this licence, is achieved by the **environmental stabilisation** of the bog.

- **The proposed 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 Clonad Bog, in particular, optimising **climate action benefits**.
- The local environmental conditions of this bog. Clonad Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography. Part of the site large remnants of deep peats and is suited to deep peat re-wetting.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, some boundary drains around Clonad Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Other constraints including archaeology and the proposed Irish Water pipeline.
- Future land-use at Clonad has not been defined by Bord na Móna and is outside the scope of PCAS. Biodiversity and ecosystem services have been identified as the current primary land use.

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 emissions to water. 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 potential 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.
- 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 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 appraisal.
- 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, cell-bunding, wetland creation 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*.
- 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:

- 2020-2021: Short-term planning actions.
- 2021: Short-term practical actions.
- 2021-2024: 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, Bord na Móna in developing a package of measures, 'the proposed 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.
- For the avoidance of doubt, should the proposed 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, see Appendix I, and for which financial provisions have been made, to comply with that element of the Licence.

Monitoring, after-care and maintenance

The monitoring, after-care and maintenance programme for Clonad 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, 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 remote sensing 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 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 Allen Bog Group (Ref. P0503-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Clonad bog is part of the Allen Bog Group (see Appendix II for details of the bog areas within the Allen Bog Group). Clonad Bog is located in Co. Offaly.

This document seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01:

> "*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 (PCAS) on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme'. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund, 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 enhanced rehabilitation. This proposed Scheme will significantly go beyond what is required to meet rehabilitation and decommissioning obligations (Appendix VII & IX) under existing EPA IPC licence conditions. Interventions 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, it is important for all stakeholders to understand that 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 proposed Scheme. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021).

It is expected that the proposed Scheme (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 pump management, drain-blocking and cell bunding;
- re-profiling 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, which will develop other habitats. Other areas will naturally have deeper water). 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.

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

1.1 Constraints and Limitations

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

Future land-use at Clonad Bog has not been defined by Bord na Móna. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Clonad 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.

The proposed Irish Water pipe-line is anticipated to cross part of the site.

Industrial peat extraction at Clonad Bog permanently ceased in 2020. Currently most of the former peat production area is bare peat. It is anticipated that the combination of active enhanced rehabilitation measures and natural colonisation will quickly support the development of pioneer vegetation. Nevertheless, it will take some time (30-50 years) for naturally functioning peatland ecosystems to fully re-establish.

Parts of Clonad Bog (both within and 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 Clonad Bog that are outside of the control of Bord na Móna. Nevertheless,

Bord na Móna are aware of such issues which may constrain the proposed rehabilitation actions, and this rehabilitation plan considered potential impacts of these on the delivery of the stated objectives.

Rehabilitation in other areas of the bog may also be constrained due to other property issues or issues such as rights of way. In addition, there is substantial archaeology evidence present at Clonad Bog which is similarly treated as a possible constraint to the extent and type of rehabilitation proposed.

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 proposed 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 Clonad Bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-practise regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke, 2002; Clarke & Rieley, 2010; Gann *et al*., 2019);
- 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 proposed 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 Clonad 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-practise guidance (full citations are in the References Section):

- Anderson *et al*. (2017). An overview of the progress and challenges of peatland restoration in Western Europe.
- Barry, T.A. et al (1973). A survey of cutover peats and underlying mineral soils. Soil Survey Bulletin No. 30. Dublin, Bord na Móna and An Foras Taluntais.
- Bonn *et al*. (2017). Peatland restoration and ecosystem services- science, policy and practice.
- Carroll *et al*. (2009). *Sphagnum* in the Peak District. Current Status and Potential for Restoration. Moors for the Future Report No 16.
- Clark & Rieley (2010). Strategy for responsible peatland management.
- Eades *et al*. (2003). The Wetland Restoration Manual.
- Farrell & Doyle (2003). Rehabilitation of Industrial Cutaway Atlantic Blanket Bog, NW Mayo, Ireland.
- Gann *et al*. (2019). International Principles and Standards for the practice of Ecological Restoration.
- Hinde *et al*. (2010). *Sphagnum* re-introduction project: A report on research into the re-introduction of *Sphagnum* mosses to degraded moorland. Moors for the Future Research Report 18.

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

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

- Allen Integrated Pollution Control Licence;
- Allen Annual Environmental Reports;
- Review of the National Biodiversity Data Centre (NBDC) webmapper;
- Inland Fisheries Ireland (IFI) Reports;
- Environmental Protection Agency database (www.epa.ie);
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity;
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Historic Environment Viewer at https://webgis.archaeology.ie/historicenvironment/
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive catchments.ie/maps/ Map Viewer (www.catchments.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie);
- River Basin Management Plan for Ireland 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

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

2.3 Field Surveys

Bord na Móna carried out a baseline ecological survey of all of its properties in 2009-2012 and developed habitat maps. As part of this exercise, Clonad Bog was surveyed in February 2012. Additional ecological walk-over surveys and visits have taken place at Clonad Bog between 2012-2020 to inform rehabilitation planning and habitat maps have been updated, where required, with the most recent visit undertaken in November 2020. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). Map outputs including all habitat maps and target notes were produced using GIS software application packages (ArcGIS). General marginal habitats and other habitats that had not been modified significantly by industrial peat extraction were classified using Fossitt *et al*. (2000). Plant nomenclature for vascular plants follows Stace (2010), while mosses and liverworts nomenclature follows identification keys published by the British Bryological Society (2010). A more detailed 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 Clonad Bog is contained in Appendix III.

3. SITE DESCRIPTION

Clonad Bog is located in Co. Offaly, approximately 2km south of Daingean and c.2.5km north of Geashill (See Figure 3.1). Clonad Bog is comprised of two lobes; the larger area in the west that is dominated by bare peat and a smaller lobe in the east including; areas of former production bog (see Figure 3.2), cutover bog used for domestic turf cutting and an area of degraded high bog. The surrounding landscape is dominated by a mosaic of farmland, largely consisting of improved grassland, and other bogs, many owned and managed by Bord na Móna. The watershed between the Lower Shannon catchment and the Barrow catchment runs through the south-west corner of the Clonad Bog. However, most of the gravity drainage system for Clonad Bog takes water in an easterly direction towards the Philipstown River which flows either side of the eastern part of the bog and is within the Barrow catchment.

The eastern side of Clonad Bog is immediately adjacent to Mount Lucas Bog, with a local road forming the common boundary of these two Bord na Móna properties. Clonad Bog is also connected via a Bord na Móna rail link to Daingean Townparks (Daingean Bog NHA) to the west and Mountlucas Bog to the east.

3.1 Status and Situation

3.1.1 Site history

Clonad Bog was in industrial (milled) peat production since the early 1970s, with the peat used as fuel peat in Edenderry Power. Industrial peat extraction completely ceased at Clonad Bog in 2019.

There is a large area in the north-east part of Clonad Bog that was not developed for peat production and is used for private sod turf cutting. Private sod-peat cutting is being carried out in the north-west part of the site as well, along a narrow band of remnant high bog. There is also some sod-peat production in SW part of the site.

3.1.2 Current land-use

Industrial peat production has now completely ceased at Clonad Bog. Private sod turf cutting is being carried out in the north-east part of the site, the north-west part of the site (along a narrow band of remnant high bog) and there is also turf-cutting in SW part of the site. There is a small length of bog railway and some other infrastructure on this site (Figure 3.5).

Future land-use at Clonad has not been defined by Bord na Móna.

The proposed Irish Water pipe-line, which will connect Lough Derg to Dublin, is proposed to cross part of Clonad Bog. This project is in its pre-planning stage.

3.1.3 Socio-Economic conditions

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

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

In respect of Clonad Bog, jobs included in the above study would have included those to facilitate extraction of peat at this site, and associated processing and transfer to the relevant power station.

As the primary employer in many Midland counties, Bord na Móna played a central role in building communities through several initiatives, including Education bursaries, support of local sporting clubs, the provision of community gain funds, charity programmes and the provision and building of amenity areas."

These job numbers have now declined with the cessation of peat extraction at this bog. It is anticipated that the proposed scheme (PCAS) will provide some employment for a team of workers at this site for a period of time (> 1 year).

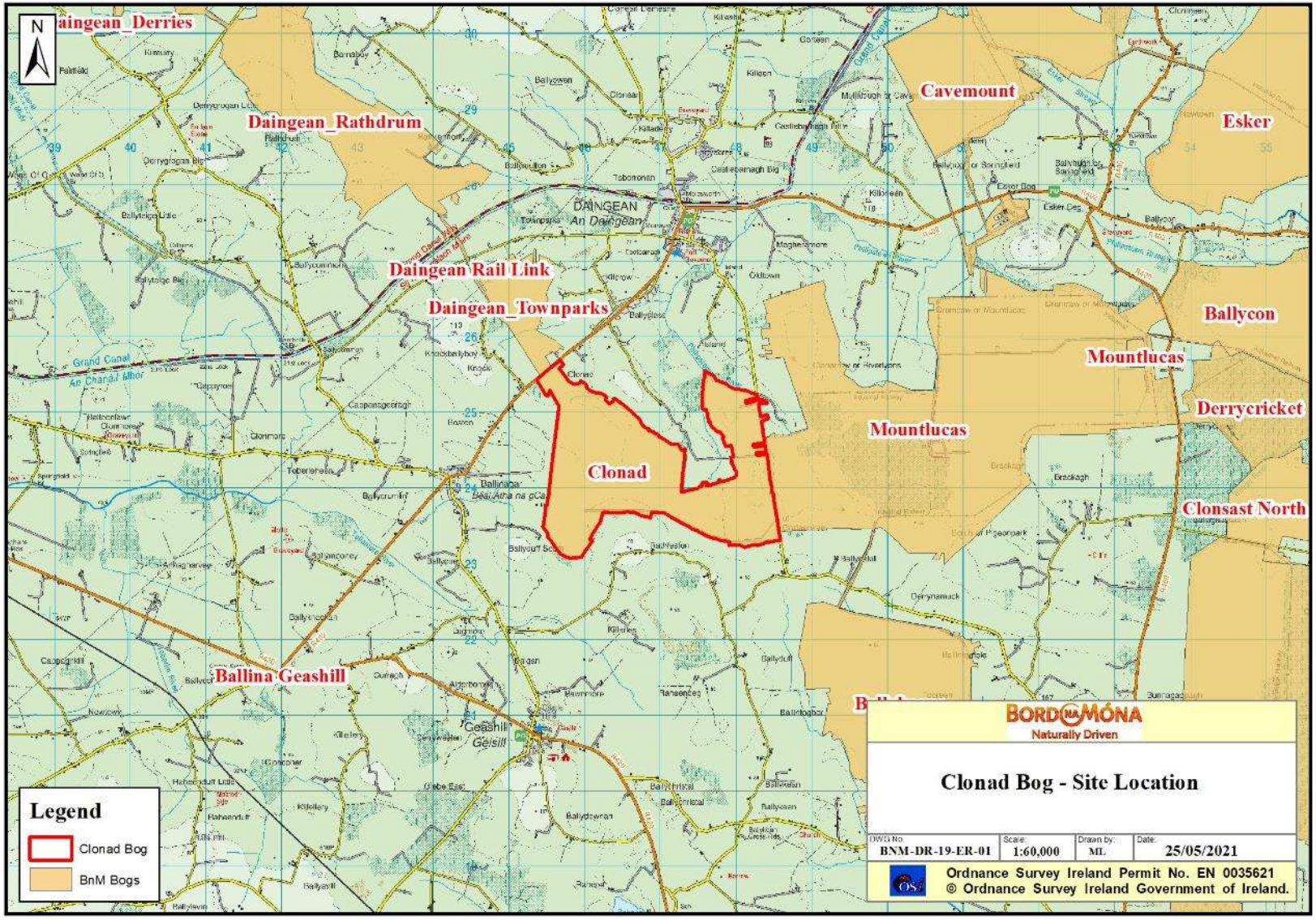

Figure 3.1 Location of Clonad Bog in context to other Bord na Móna bogs and surrounding area.

3.2 Geology and Peat Depths

3.2.1 Sub-soil geology

The majority of Clonad Bog is underlain by a dark limestone and shale bedrock. However, there is a small area in the south-east corner that is underlain by oolitic limestones with a think extrusion of thick-bedded limestone between the other two bedrocks [1]. The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'.

Clonad Bog has a variable topography and there are glacial ridges and mounds underlying the peat that are visible in the overlying peat. The peat soils are likely to be underlain with limestone tills, as these sub-soils are exposed around the margins of the site.

3.2.2 Peat type and depths

The main exposed peat type at Clonad Bog is black fen peat. Where the pet depths are greater, towards the south-west corner of the site, some of the peat is redder and may be somewhat more acidic or younger.

Within the production footprint of Clonad Bog, the majority of the remnant peat is shallow, with less than 1m of peat remaining and much of the eastern production area would be considered to be cutaway. However, deeper peats remain in the south-west corner of the site, where peat depths may exceed 2.5m (see Figure 8.3).

3.3 Key Biodiversity Features of Interest

The majority of the large area in the west of Clonad Bog within the Bord na Móna boundary is dominated by bare peat (Figure 3.3) and the eastern section is largely cutaway. The Philipstown River flows north along the north-east boundary of Clonad Bog and the majority of the bog drains in this direction. A small tributary of the Philipstown River drains the extreme north-east corner of Clonad Bog and a separate tributary drains the extreme north-west corner. The south-east corner appears to be linked, via agricultural field drains, to the Tullamore River.

3.3.1 Current habitats

There is an undeveloped section of raised bog (PB1) and associated habitats in the north-east part of the site. This section is being actively cut for sod-turf and has been degraded, although it still retains some features of interest. The high bog contains typical raised bog characteristics (that qualifies as the Annex I EU Habitats Directive habitat – 'degraded raised bogs still capable of regeneration'), although it is a poor example, and has been degraded by recent burning.

The majority of the bog is only recently out of production and therefore has no significant features of biodiversity interest. There is some typical cutaway developing towards the centre of the site, which is dominated by Birch scrub. There are some remnant and secondary habitats of some interest around the margins including scrub, some fragments of high bog and Birch woodland.

A habitat map of Clonad Bog is shown in Figure 3.3.

[1] https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx

Figure 3.2 Bare peat of former production area at Clonad Bog

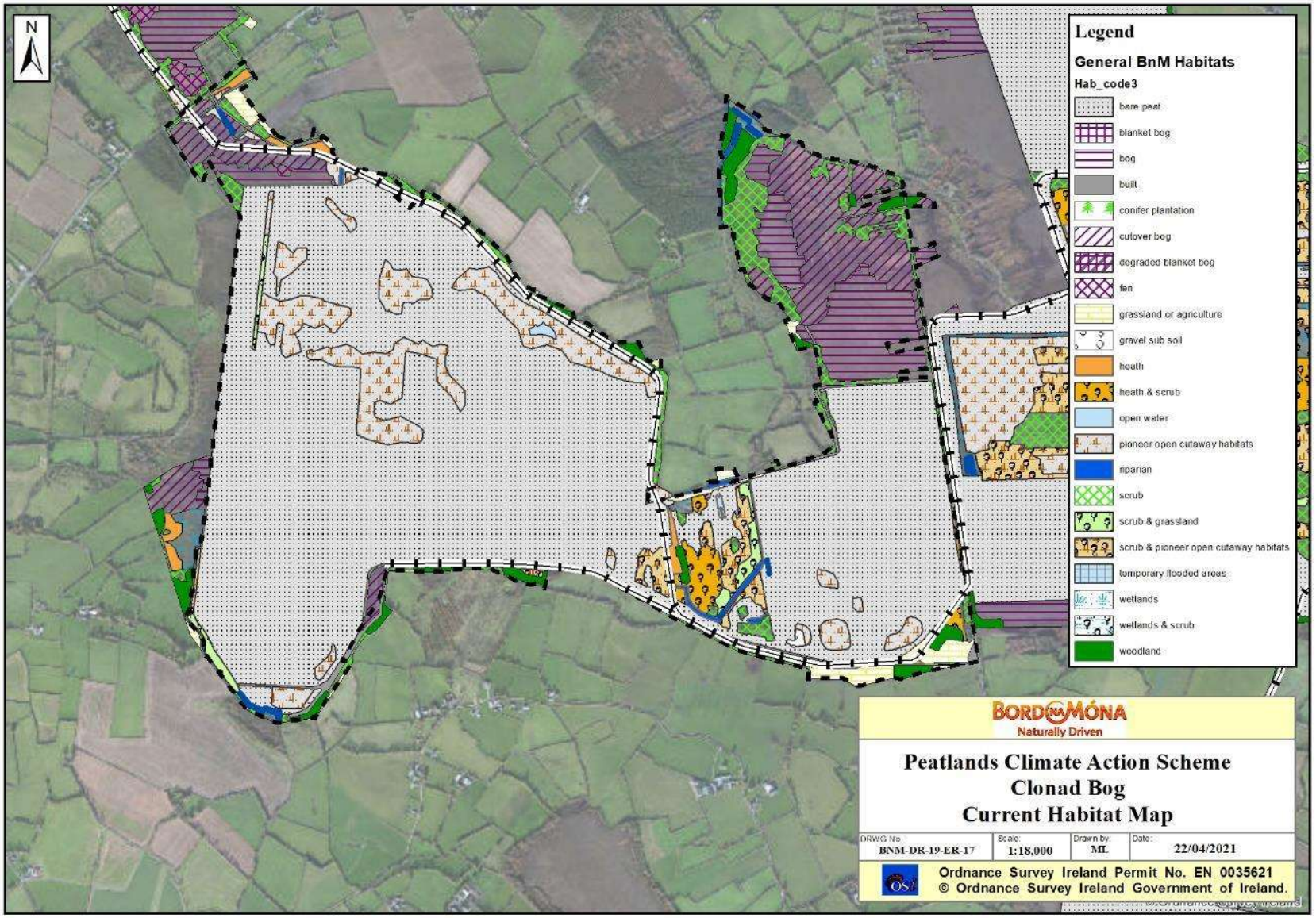

Figure 3.3 Habitat map of Clonad Bog showing Bord na Móna habitat categorisation.

3.3.2 Species of conservation interest

Clonad Bog is used occasionally by several species of conservation interest including Snipe and small flocks of wintering Golden Plover and Whooper Swans rest/forage occasionally on the production bog. A Badger sett has been recorded onsite at Clonad Bog and evidence of Otters using some of the drainage channels has also been noted.

3.3.3 Invasive species

No invasive flora species, as listed under Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species have been recorded at Clonad Bog (See Appendix V).

3.4 Statutory Nature Conservation Designations

Daingean Bpg NHA is located immediately to the north-west of Clonad Bog (see Figure 3.4). The two bogs are separated by the R402 road. Daingean Bog NHA is of national importance for its raised bog habitats.

The Grand Canal pNHA is located c.1.8km north-west of Clonad Bog (on the other side of Daingean Bog NHA). The ecological value of the canal lies in the diversity of species it supports along its length and its functioning as an ecological corridor rather than in the presence of rare species.

3.4.1 Other Nature Conservation Designations

The Ramsar Convention entered into force in Ireland on 15th March 1985. Ireland currently has 45 sites/wetlands designated as Wetlands of International Importance (Ramsar Sites). These cover a surface area of 66,994ha. There are no Ramsar Sites in the local vicinity of Clonad Bog (i.e. within 3km) The closest Ramsar Sites to Clonad Bog include Pollardstown Fen (Kildare) and Raheenmore Bog (Offaly).

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

3.5 Hydrology and Hydrogeology

Clonad Bog has a gravity drainage regime. The majority of the bog is currently relatively dry with active functioning drains. Initial hydrological modelling indicates the bog has topographical basins that are expected to develop a mosaic of wetland habitats when rehabilitation is carried out and drains are blocked. A significant part of the site on the western side is also modelled as being relatively dry due to more elevated topography and slopes (Figure 8.2).

The watershed between the Lower Shannon catchment and the Barrow catchment runs through the south-west corner of the Clonad Bog. However, most of the gravity drainage system for Clonad Bog takes water in an easterly direction towards the Philipstown RIver (or its tributaries) which is within the Barrow catchment. Drainage data for Clonad Bog indicate that the majority of the bog drains into the Philipstown Rover at the eastern end of the site. However, there is an outflow at the north-west corner where a silt ponds apparently drains into agricultural field drains and subsequently into an unnamed tributary of the Philipstown River. Similarly, it seems likely that parts of the central and north-eastern corner of the bog drain into the Rathfeston stream, also a tributary of the Philipstown River. There is a small part of Clonad Bog that is drains into the Lower Shannon catchment with a drainage outflow, through a silt pond, at the very south-east corner of the bog.

Although there is a slight difference in absolute direction (by only a few degrees), the field drains on both the western and eastern sections of Clonad Bog run north to south. There are apparently four outlets for water draining off Clonad bog, all of which pass through silt ponds.

The western side of Clonad Bog is located in an area with a locally important bedrock aquifer (EPA Map Viewer) with bedrock that is moderately productive only in local zones only (Li). The eastern end of the bog is an area with a locally important bedrock aquifer with bedrock that is generally moderately productive (Lm). The small extrusion oolitic limestone is over a locally important (karstified) aquifer (Lk). An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m^3/d). These data give an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

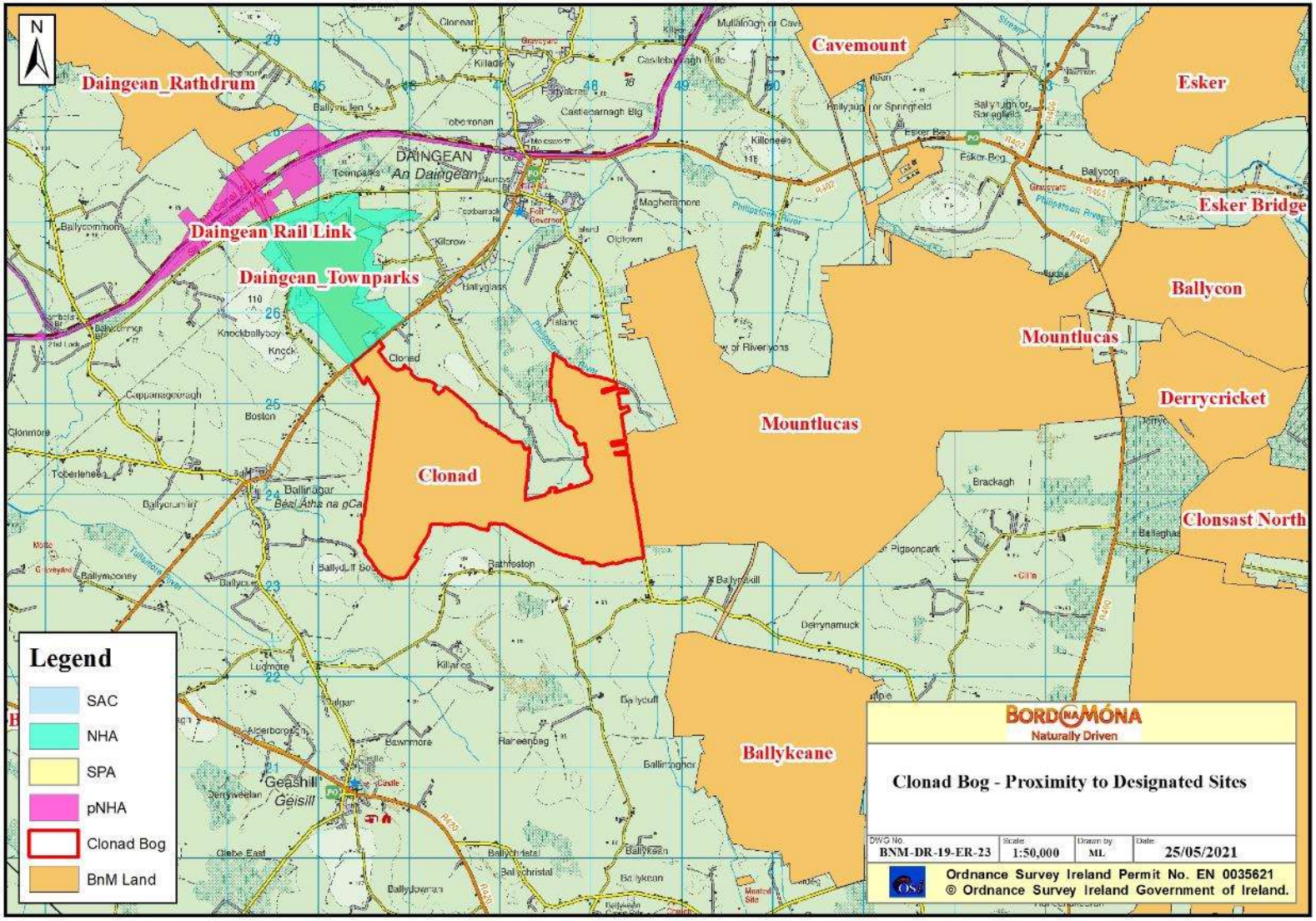

Figure 3.4 Sites designated for nature conservation in the vicinity of Clonad Bog

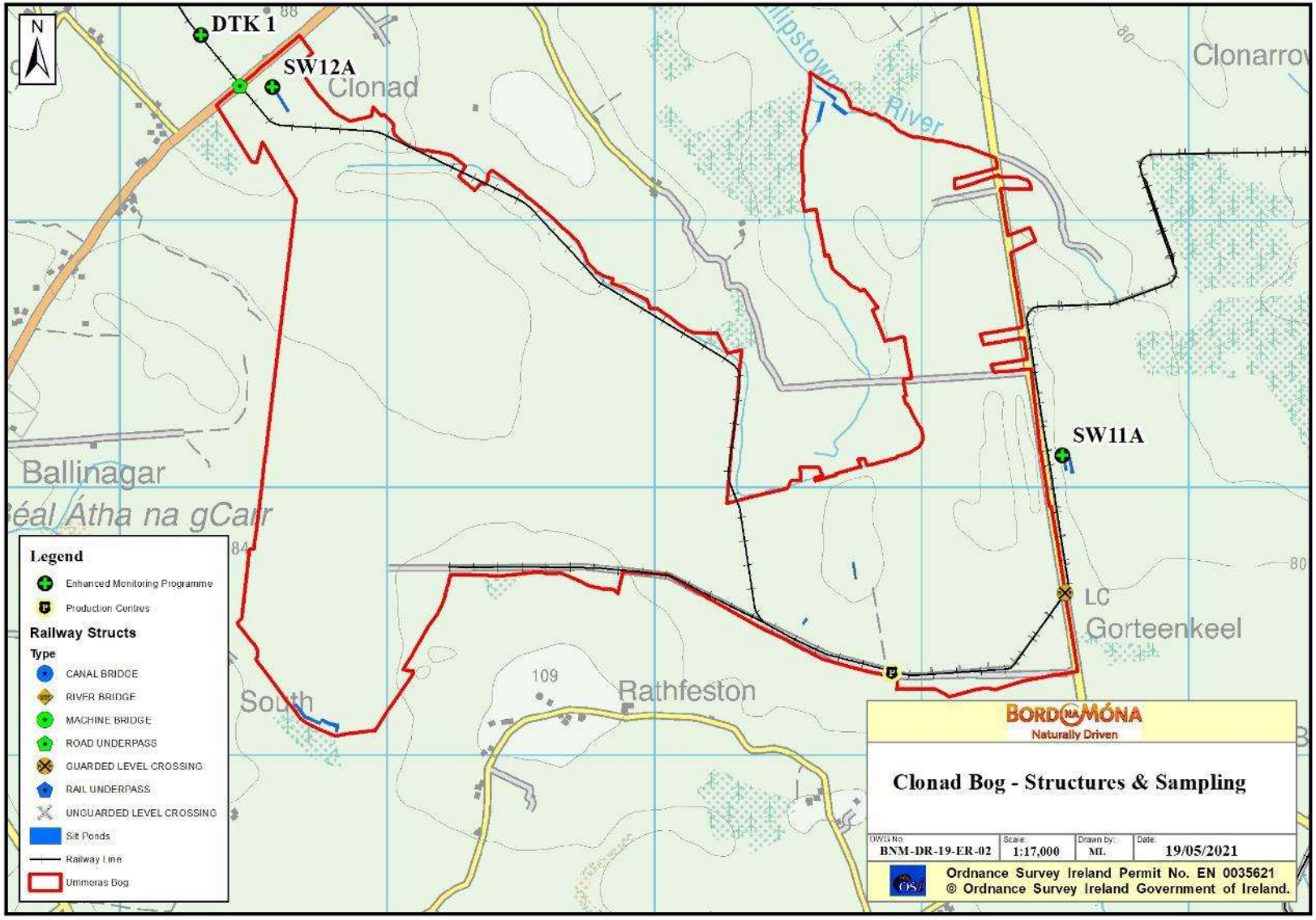

Figure 3.5. Map of Clonad Bog showing structures and designated emission points.

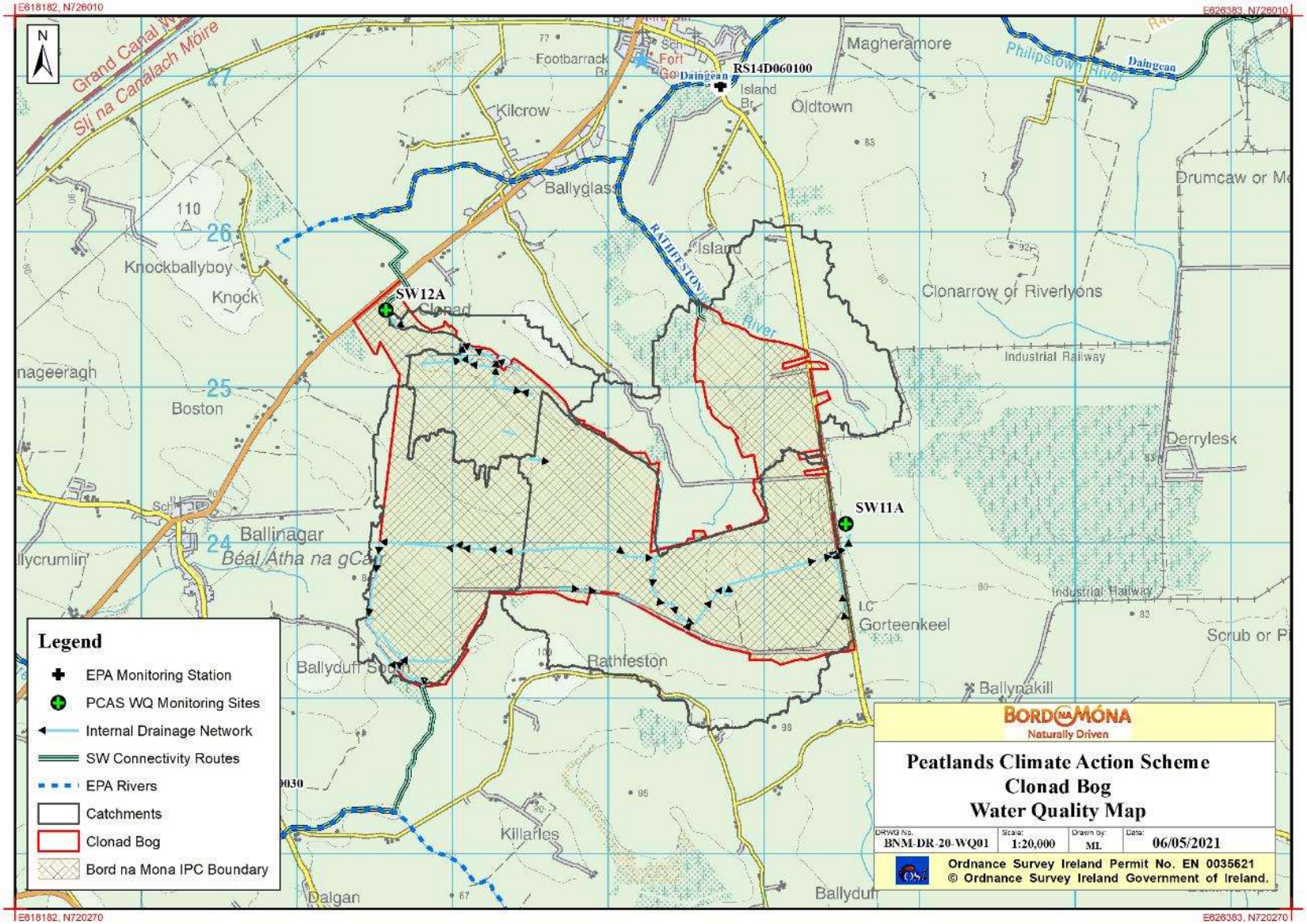

Figure 3.6. Maps of Clonad Bog showing water management features and water quality monitoring points.

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

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. Some ridges and mounds of underlying glacial gravel/sub-soil are being exposed in places. The bog water table across the site is expected to be high when bog drains are blocked and perched above the underlying regional groundwater table. The ability of the shallow peat water to interact with the underlying regional groundwater flows is limited by the permeability of the underlying glacial deposits.

3.6 Emissions to surface-water and water-courses

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

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

Clonad bog has 3 treated surface water outlets, 2 to the Daingean IE_SE_14D060200 and 1 south to the Tullamore River IE_SH_25T030100 (Figure 3.5 & 3.6). Peat extraction was identified as a pressure in both rivers in the second cycle of the river basin management plan and is indicated as remaining so in the third cycle, currently under preparation. 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 attached water quality map (Figure 3.6).

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.00mg/l and COD 100mg/l. From an analysis if any available monitoring over the past 5 yrs. of the IPC licence environmental monitoring programme, indicate that results were under the ELV for SS and the trigger level for Ammonia, and within the trigger level for COD (Table 3.1).

Initial monthly ammonia concentrations from November to August 2021 have a range of 0.07 to 0.462mg/l with an average of 0.265mg/l.

Suspended Solids monitoring for the same period has a range of 2 to 7 mg/l with an average of 2.6mg/l.

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, a re-wetted peat is less vulnerable to wind erosion. Re-wetted peat and the development of wet peatland habitats can also act as sinks for silt and mobile peat, and increases additional retention time for solids, and the peatland vegetation can quickly stabilise this material within blocked drains on site (by acting like constructed wetlands).

Table 3.1.

Bog	SW	Monitoring	Sample Date	pH	SS	TS	Ammonia	TP	COD	Colour
Clonad	SW-12	Q3 19	29/07/2019	7.8	5	382	0.88	0.07	51	87
Clonad	SW-12A	Q3 19	29/07/2019	8.1	5	322	0.05	0.05	41	83
Clonad	SW-13	Q3 19	29/07/2019	7.7	5	274	0.6	0.07	49	114
Clonad	SW-12	Q1 18	21/03/2018	7.4	5	230	0.54	0.08	69	163
Clonad	SW-12A	Q1 18	21/03/2018	7.8	5	330	0.85	0.05	37	66
Clonad	SW-13	Q1 18	21/03/2018	7.3	5	174	1	0.05	40	88
Clonad	SW-13	Q2 16	12/05/2016	7.9	5	248	1.3	0.05	43	114
Clonad	SW-12A	Q2 16	12/05/2016	7.9	20	324	0.7	0.05	44	66
Clonad	SW-12	Q4 16	13/10/2016	8	6	348	0.29	0.05	57	37

Water quality of water discharges from restored peatlands normally improves as a result of bog restoration measures and the restoration of natural peatland processes (Bonn *et al*., 20017). Bog restoration is also expected to improve water attenuation of the site as the drains are blocked, slowing water movement and water release from the site. Restored peatlands help slow the release of water and aid the natural regulation of floods downstream (Minayeva *et al*., 2017). The National River Basin Management Plan (NRBMP) 2018-2021 (DHPCLG, 2017) is the key national plan for Ireland to achieve the objectives of the Water Framework Directive (WFD). The NRBMP outlines how key actions such as Bord na Móna peatland rehabilitation is expected to have a positive impact on water quality and help the NWBMP deliver its objectives in relation to the WFD.

Water will still discharge from designated emission points when rehabilitation at Clonad Bog has been completed. This discharge will have improving water quality and there will be increased wetland attenuation, meaning slower release of water. his 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 Mona 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.

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

Clonad 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

Clonad Bog is likely to be currently a carbon source as it is a drained (degraded) peatland with some active drainage, which facilitates the oxidation of peat. Peat extraction generally transforms a natural peatland 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_2 and a source for Methane) 6 years after bog restoration was carried out (Renou-Wilson et al. 2018).

It is expected that Clonad Bog will become a reduced Carbon source following rehabilitation. The site does have potential to become a carbon sink in part, in the longer-term. This depends on the success of the rehabilitation measures, the extent of development of *Sphagnum*-rich habitats, the balance of carbon fluxes from different cutaway habitats (some of the cutaway is expected to develop Reed Swamp and fen habitats with alkaline emission factors) and future climatic conditions. Part of this site is expected to develop embryonic *Sphagnum*-rich peat-forming habitats along with scrub, some fen and some wetland habitats such as Reed Swamp. Birch woodland is expected to develop on the drier mounds and peripheral headlands.

3.9 Current ecological rating

(Following NRA (2009) Evaluation Criteria)

Current ecological rating (ranges from Local Importance (lower and higher value) to National Importance; following NRA (2009) Evaluation Criteria)

The majority of Clonad Bog is deemed to be of **Local Importance (lower value)** due to the dominance of bare peat managed for industrial peat production. Some pioneer and semi-natural habitats such as birch woodland are rated higher and are deemed to be of **Local Importance (higher value)**.

The larger area of degraded raised bog would be considered of **County Importance**,

It is expected that the overall ecological value of this site will increase in the future as the site re-vegetates, matures and forms semi-natural naturally functioning peatland habitats.

3.10 Clonad Bog Characterisation Summary

Clonad Bog is located in Co. Offaly, approximately 2km south of Daingean and c.2.5km north of Geashill. Clonad Bog is comprised of two sections; the larger area in the west that is dominated by bare peat and a smaller section in the east including; areas of former production bog, cutover bog used for domestic turf cutting and an area of degraded high bog.

Clonad Bog has been in peat production since the 1970's. The peat was harvested for fuel peat to be used in Edenderry Power, Offaly. Industrial peat extraction has now completely ceased at Clonad Bog (2019). Within the production footprint of Clonad Bog, the majority of the remnant peat is shallow, with less than 1m of peat remaining and much of the eastern production area would be considered to be cutaway. However, deeper peats remain in the south-west corner of the site, where peat depths may exceed 2.5m

Clonad Bog is situated on the watershed between the Lower Shannon catchment and the Barrow catchment. The watershed runs through the south-west corner of the Clonad Bog. However, most of the gravity drainage system for Clonad Bog takes water in an easterly direction towards the Philipstown River which flows either side of the eastern part of the bog and is within the Barrow catchment.

Clonad Bog is located in proximity to several designated designated sites. Daingean Bpg NHA is located immediately to the north-west of Clonad Bog (see Figure 3.4). The two bogs are separated by the R402 road. Daingean Bog NHA is of national importance for its raised bog habitats. The Grand Canal pNHA is located c.1.8km north-west of Clonad Bog (on the other side of Daingean Bog NHA).

The bog can be broadly divided into four categories: (1) Wetland cutaway bog (2) Deep residual peat (3) Dry cutaway and marginal areas of the former production area (4) Other marginal areas with no rehabilitation proposed. (The bog is divided into these four areas to assist rehab planning. In reality, there are natural transitions between these areas where there are ecological and environmental gradients in relation to residual peat, etc.). These are summarised further as follows.

(1) Due to the varied topography of the site, a significant portion of the former production area will develop into wetland habitats post rehabilitation. Dependant on local water chemistry conditions a mosaic of rich fen, poor fen and Reedswamp habitats are expected to develop in these areas.
(2) A significant part of the former production area is residual deep peat. Ground-water is unlikely to have a significant influence on the development of vegetation. If this peat can be re-wetted, and a stable water level developed close to the peat surface, it is expected to develop an embryonic *Sphagnum*-rich vegetation. The topography of this area is variable. Some of this area is modelled as wet and should be relatively straight-forward to re-wet once drains are blocked. Some of this area is modelled as dry and more intensive deep peat measures with bunding, re-profiling and cell berms are proposed to optimise hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation.
(3) The dry cutaway and marginal areas of the former production area are located throughout the site. Drain-blocking and some fertiliser application is proposed for these areas. A large portion of the western section of Clonad will develop as dry cutaway. A smaller area of dry cutaway is expected to develop on the eastern portion of the site. These sections of the former production area have a raised topography and is generally developing scrub or birch woodland habitat already. The habitats already present are expected to continue to develop post rehabilitation. Enhanced rehabilitation measures are expected to facilitate and expedite the development of cutaway birch and scrub habitat in these areas.
(4) Some parts of the former production area are constrained from rehabilitation to prevent unintended consequences form occurring on neighbouring lands. There is a minor amount of former production area that is constrained from rehab due to the presence of archaeology or public rights of way.

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 can be emailed a copy of this draft plan when it has been finalised internally by Bord na Móna, and invited to make submissions on the objectives and content of this plan in relation to Clonad Bog.

Local stakeholders will also be identified through ongoing engagement with neighbours whose land adjoins Clonad Bog. Additionally, local representatives of national bodies (such as Regional National Parks and Wildlife staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will also be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified will be invited to submit their comments or observations in relation to the proposed rehabilitation at Clonad Bog.

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

- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Proposed Irish Water pipeline with Irish Water.

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

- Midlands & East Regional WFD Operational Committee (River Basin Management Plans).
- Archaeological Liaison Committee (National Museum of Ireland & Dept of Culture Heritage and the Gaeltacht).
- Proposed WaterSupply Project – Eastern and Midlands Region pipeline (Irish Water).

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

Further to the above, telephone correspondence was undertaken as either follow up to submissions received, or to instigate consultation. All correspondence received has been acknowledged and evaluated against the rehabilitation work proposed here; these are also summarised in Appendix XI.

4.2 Issues raised by Consultees

To date, a number of issues have been raised by consultees during the consultation process for both the current and previous drafts of the rehabilitation plan for Clonad Bog – these are summarised below.

4.2.1 Assessments of rehabilitation

Queries on pre-rehabilitation assessments were raised by NPWS, Offaly County Council and the National Museum of Ireland in relation to Appropriate Assessment, Environmental Impact Assessment and Strategic Environmental Assessment.

4.2.2 Restoration scope

Restoration/rehabilitation of marginal habitats was raised by IPCC and BCI as worthy of consideration within the rehabilitation measures to support carbon sequestration and biodiversity objectives.

4.2.3 Monitoring

Further details on monitoring of ecological metrics, and how and where reporting on this monitoring would take place, was raised in the submissions by IPCC, UCD and Trinity College. Butterfly Conservation Ireland also suggested that monitoring of Large Heath butterfly be considered to assess the success of the proposed rehabilitation actions.

4.2.4 Flooding

The IFA and ICMSA queried likely impacts 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.

4.2.5 Other issues

Other issues (raised by IPCC) 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.

Ervia requested that the preferred route for the of a proposed pipeline corridor for the Water Supply Project-Eastern and Midlands region is displayed within the rehab plan for Clonad Bog.

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 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 Clonad 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. 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. There are four extant or possibly extant sightings identified from the AIA and will be avoided by the rehabilitation works. Bord na Móna aim to achieve this through including all known archaeology in the planning process of rehabilitation works and implementing and exclusion or buffer zone around these features. These measures should sufficiently protect any archaeology in these areas, during any ground works in the final plan. It is anticipated that any archaeology will benefit hugely 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.

An archaeological end of life survey of all the bogs as requested by National Museum of Ireland and National Monuments Unit is not part of the current scope of the scheme. Bord na Móna would be happy to assist such a survey, where possible.

4.3.2 Restoration scope

As part of the PCAS, all restoration/rehabilitation options have been developed to support climate action and biodiversity objectives.

4.3.3 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 fauna monitoring (pollinator transect) is proposed as part of the monitoring and verification at Clonad 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 Clonad Bog. The re-colonisation of species such as Large Heath is likely to take a longer timeframe.

4.3.4 Flooding

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 flood, this will be avoided and alterations made to the rehabilitation plan. In general, 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.

The rehabilitation measures proposed at Clonad 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.

Bord na Móna will continue to manage their land bank into the future. As 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.

4.3.5 Other Issues

Creating amenity such as walking tracks is not part of the direct scope of PCAS. However, PCAS will enable and support future amenity development.

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

4.3.6 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.
- Several marginal drains will not be blocked to avoid impacts on adjacent lands, rights of way, or turf-banks.
- A small portion of cutaway bog (15 ha) will be constrained from re-wetting as it is part of the Proposed WaterSupply Project – Eastern and Midlands Region pipeline (Irish Water) route. It is anticipated that rehabilitation across the site will occur in advance of the construction of this pipeline. Constraining this area from re-wetting does not alter the overall substance of the rehabilitation plan (key goals and outcomes). There is expected to be ongoing consultation to further minimise the footprint of the constrained Irish Water footprint. This area will be allowed to colonise naturally in advance of the pipeline project.
- No changes were required to the rehabilitation plan to enable future potential amenity.

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**. Optimising hydrology for the development of embryonic *Sphagnum*-rich vegetation communities on deep peat, and eventually naturally functioning and peatland habitats.
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the protection of 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.

- It will take some time for stable naturally functioning habitats to fully develop at Clonad 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, making the overall bog wetter. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.
- WFD status in receiving water bodies can be affected by peatlands and peat extraction but is also affected by other sources such as agriculture. In addition, receiving water bodies that are assessed as At Risk from

peatlands and from peat extraction are likely to have several contributary sources of impacts (private peat extraction and Bord na Mona).

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

6. SCOPE OF REHABILITATION

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

- The area of Clonad Bog (Figure 3.1).
- EPA IPC Licence - Ref. P0503-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Clonad Bog is part of the Allen Bog Group (Clonsast sub-group).
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. This scheme is designed to enhance the ecosystem services of Clonad Bog, in particular, optimising **climate action benefits**. 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 Clonad Bog identify wetland creation, deep peat re-wetting and drain-blocking on the drier cutaway as the most suitable rehabilitation approach for 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 Clonad Bog as **environmental stabilisation** and **optimising deep peat re-wetting, and setting the site on a trajectory towards the development of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on deep peat, and the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.**
- Enhanced Rehabilitation of Clonad Bog will support multiple national strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- The time frame for the delivery of the planned rehabilitation will be undertaken according to available resources and appropriate constraints.
- It is not proposed to carry out any rehabilitation in the marginal cutover bog zone. The cutover bog mainly consists of active private turbary.

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 Clonad Bog, remnant peat depths are in excess of 2.5m in the western section. By contrast, the smaller eastern section contains shallower residual peat and is partly cutaway. These two areas will therefore require different approaches to rehabilitation. Furthermore, there are local factors (such as topography and drainage) that will influence the future trajectory of this bog. These need to be considered as part of the wider rehabilitation work.
- **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. While the rehabilitation will optimise hydrological conditions for the protection of exposed archaeological structures, their retention in situ and preservation into the future, any new archaeology may require rehabilitation measures to be reviewed and adapted. If this occurs, rehabilitation measures will be reviewed and adapted. An archaeological impact assessment of the proposed rehabilitation at Clonad Bog was carried out (Appendix XII). There are four known archaeological features. Rehabilitation in these zones has been avoided or amended (e.g. location of peat barriers adjusted) to avoid or minimise impact to any archaeological features (Figure 8.5 & 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.
- **Proposed Water Supply Project – Eastern and Midlands Region (Irish Water).** This proposed Irish Water Project that is currently in the pre-planning stage also traverses the eastern side of Clonad Bog. It is expected that the enhanced rehabilitation measures planned for Clonad will be carried out in advance of the construction of the pipeline, which is still subject to planning consent. Bord na Móna do not propose to carry out any rehabilitation works within the footprint of the proposed Water Supply Project – Eastern and Midlands Region until a decision has been made by the relevant authorities in relation to the statutory consent applications for the project. It is expected that the footprint of the corridor will be rehabilitated post the construction of the proposed Water Supply Project – Eastern and Midlands Region. This zone is expected to recolonise naturally during this period.

6.2 Key Assumptions

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

6.3 Key Exclusions

The scope of this rehabilitation plan does not cover:

- 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 Clonad Bog.

- The longer-term management of this site, potentially as a nature conservation site, or for amenity, or for other uses in the future.

7. CRITERIA FOR SUCCESSFUL REHABILITATION

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

The key objective of this 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 key emissions (e.g. potential silt run-off).

In addition, Bord na Móna wish to optimise climate action and other ecosystem service benefits via enhanced rehabilitation measures. Enhanced rehabilitation will significantly go beyond what is required to meet rehabilitation and decommissioning obligations under existing EPA IPC licence conditions. The proposed interventions will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other benefits particularly for climate action will be accrued.

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

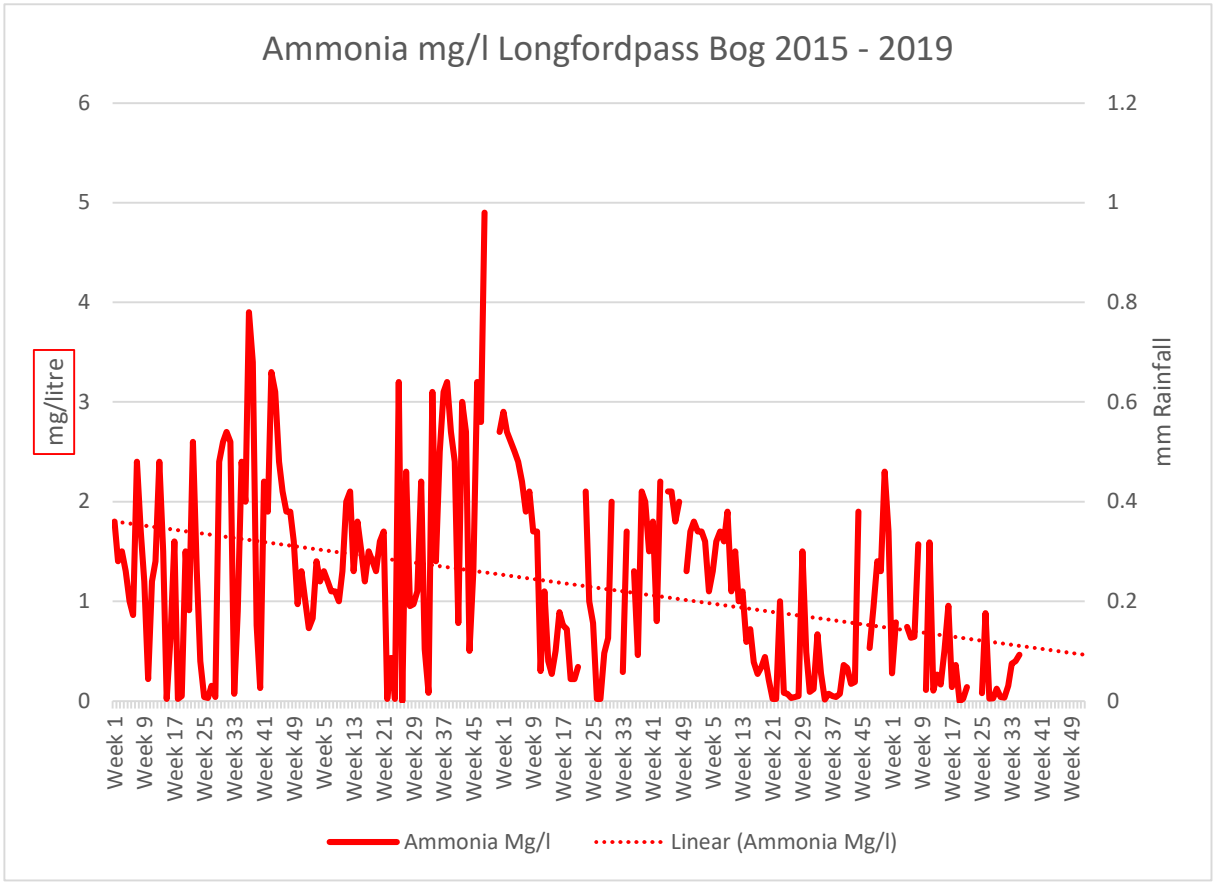
- Rewetting of residual peat in the former area of industrial peat production to offset potential silt run off and to encourage/accelerate development of vegetation cover via natural colonisation, and reducing the area of bare exposed peat. See Table 7.1 for a summary of the criteria for successful rehabilitation 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 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). 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.

(See Table 7.1 for a summary of the criteria for successful rehabilitation and associated monitoring.)

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 Clonad 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.



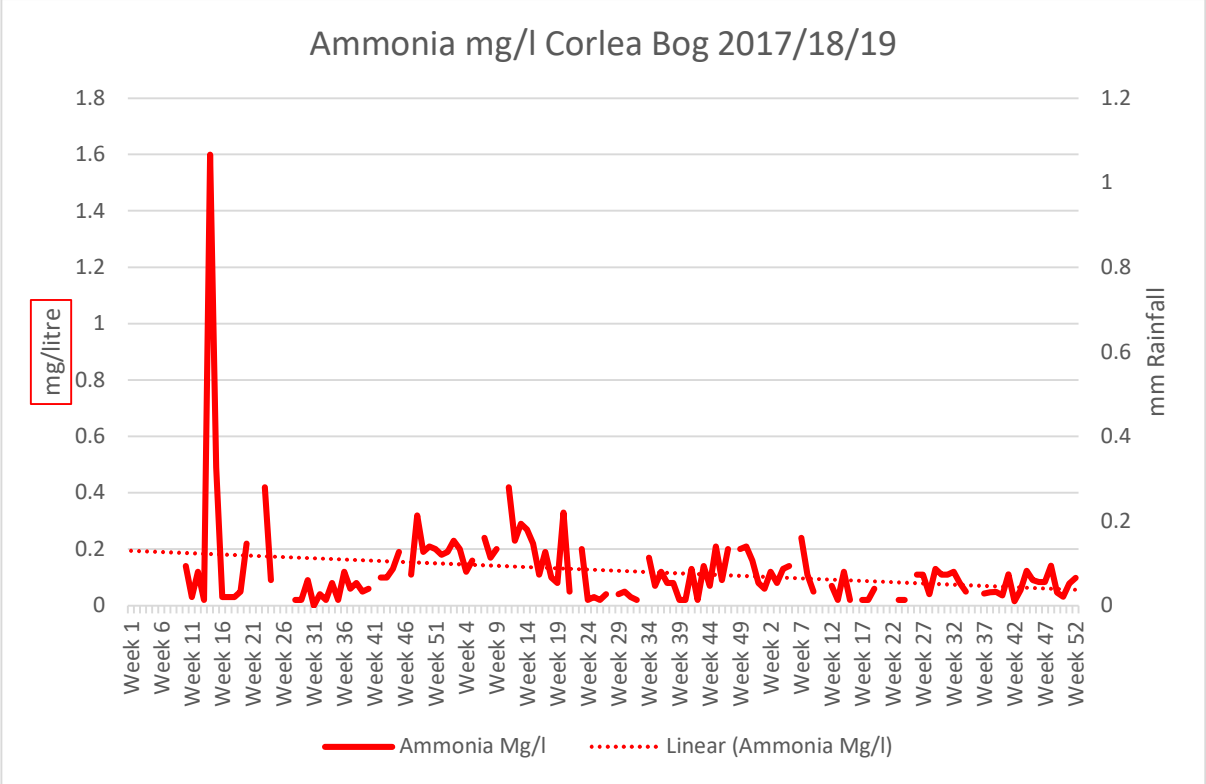


Figure 7.1. Ammonia levels over the period 2015-2019 at Longfordpass and Corlea.

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 site 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.
- 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.	2021-2025
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.	2021-2023
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.	2021-2025

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.	2021-2025
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.	2021-2025
Climate action verification	Biodiversity and ecosystem services. Habitat establishment Presence of key species – Sphagnum Breeding and wintering birds Pollinators	Improvement in biodiversity and ecosystem services.	Metrics that relate to selected biodiversity and ecosystem services (to be defined). Presence of key species – Sphagnum – Walkover survey Breeding birds – Breeding bird survey Pollinators – Pollinator walk	2021-2025

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 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 through the Climate Action Fund.
- **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 practise applied internationally in peatland management. Measures proposed in this plan have already been shown to be affective 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 make take 20-30 years to develop. However, it may take 50 years for active raised bog vegetation to re-develop on ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. 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. These data, as well as aerial photographs (Figure 8.1), peat depths (Figure 8.3) and topographical (LiDAR; see Figure 8.2) and hydrological modelling (Figures 8.4) are important in planning the future peatland landscapes and targeting the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling (Figure 8.4) 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).

The rehabilitation actions will be a combination of PCAS measures to re-wet peat. The distribution of these measures is provisionally outlined in Figure 8.5. (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 Clonad Bog will include**:**

- Re-wetting the deep 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;
- Inoculation of *Sphagnum* on compatible residual deep peat areas;
- The construction of berms to create wetlands;
- Intensive drain blocking to create wetlands (up to 7 blocks/100m), and the introduction of Reeds and other rhizomes;
- Optimising water retention in wetland areas, including placement of berms where required;
- Regular drain blocking (3/100) on dry cutaway adjacent to wetland mosaics, along with the blocking of outfalls and management of water levels;
- Management of water levels with overflow pipes;
- Re-alignment of piped drainage;
- Targeted fertiliser applications on bare peat areas to accelerate vegetation establishment on headlands and high fields.;
- 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 there is no silt run-off, 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 Figure 8.5.

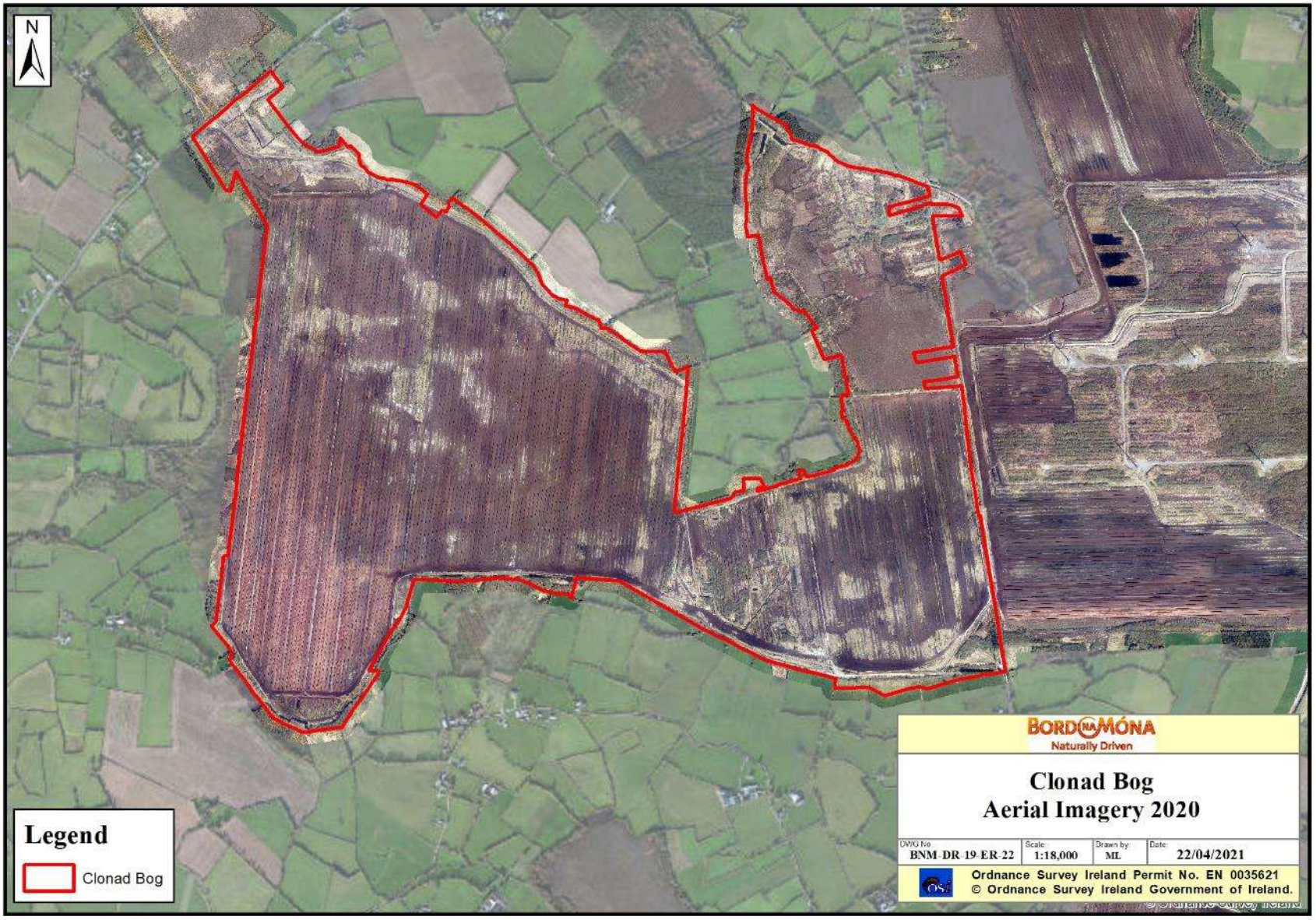


Figure 8.1. Aerial photo of Clonad Bog. Extant bare peat and pioneering vegetation are visible.

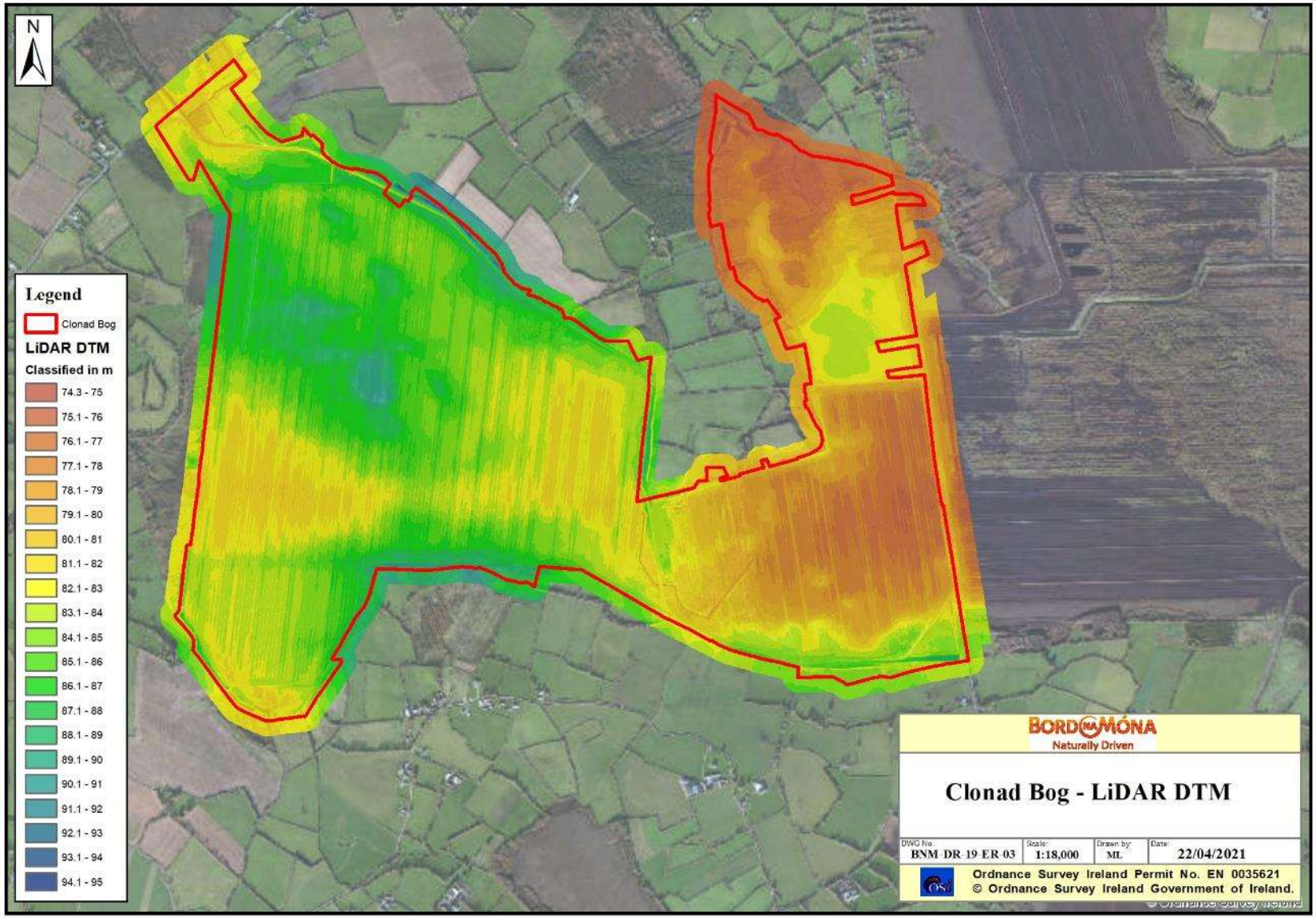


Figure 8.2. *LiDAR topography map of Clonad Bog; low areas and basins are orange-yellow, more elevated areas are blue-green; the majority of the bog slopes from west to east.*

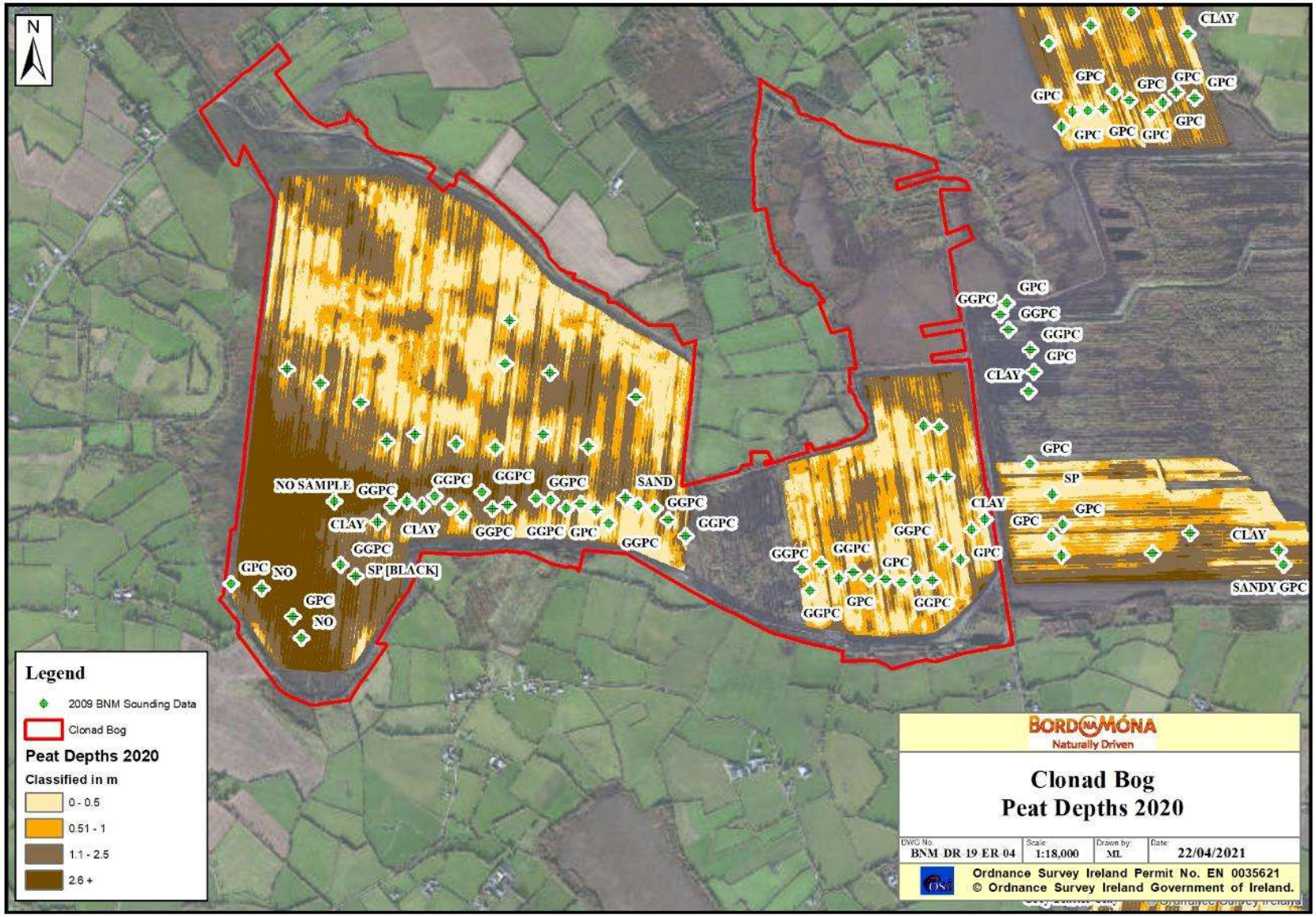


Figure 8.3. Peat depth map for Clonad Bog. Most of the bog is characterised as shallow peat cutaway bog. Some deep peat persists in the south west section of the bog.

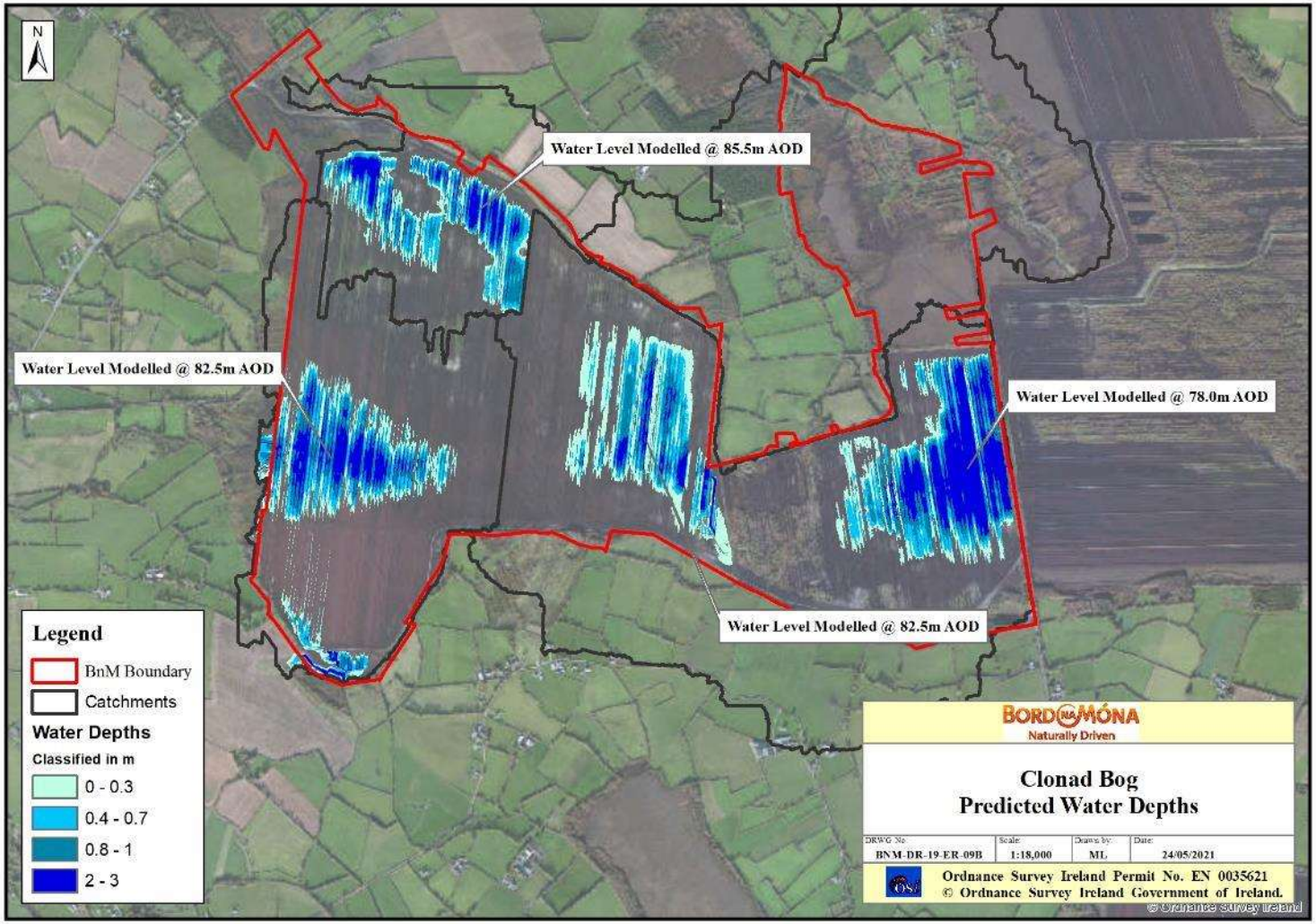


Figure 8.4. Hydrological modelling for Clonad Bog showing range of expected water depths based on current topography; water levels can be managed at this site due to gravity drainage.

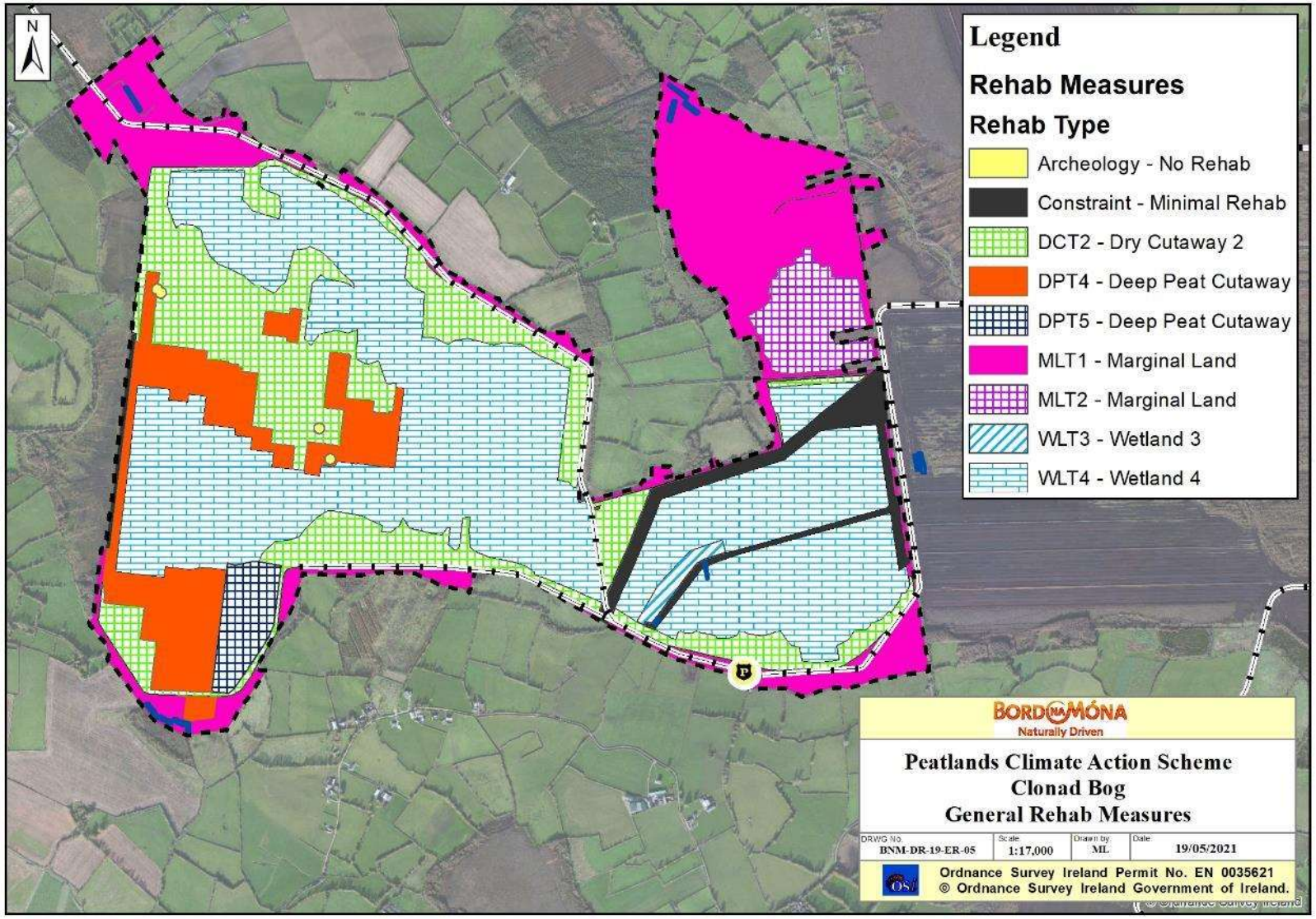


Figure 8.5 *Indicative Enhanced Rehabilitation Plan for Clonad Bog. Note that the actual distribution of these measures may be subject to change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.*

Table 8.1 Enhanced rehabilitation measures and target area at Clonad Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	
	DPT2	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows	
	DPT3	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows	
	DPT4	Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	38.0
	DPT5	Cut and Fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation	8.3
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	
	DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	84.7
	DCT3	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows + targeted fertiliser treatment	
Wetland cutaway	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	
	WLT2	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes + Targeted blocking of outfalls within a site	
	WLT3	Turn off or reduce pumping to re-wet cutaway + blocking 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	2.4
	WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	189.6
	WLT5	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes	
Marginal land	MLT1	No work required	93.6
	MLT2	More intensive drain blocking (max 7/100 m)	13.96
	MLT3	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing overflows with + boundary berm	
Other		Silt-ponds	0.7
		Archaeology constraints	0.5
		Irish Water pipeline (and other constraint)	15.7
Total			447.3

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 proposed Scheme not materialise, from the EPA;
- Agree an *ex ante* budget of eligible costs (based on the approved enhanced plan) with the Scheme regulator;

- Develop a detailed site plan with detailed site drawings outlining how the various rehabilitation methodologies (within the proposed PCAS) will be applied to Clonad Bog. This will take account of peat depths, topography, drainage and hydrological modelling. (See Figure 8.5 for an indicative view of the application of different rehabilitation methodologies);
- A hydrology and drainage management assessment of the proposed enhanced rehabilitation measures was carried out. Issues identified have been integrated into the rehabilitation plan to prevent unintended impacts to adjacent land.
- A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation was carried out. The results of this assessment was incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible.
- A review of issues that may constrain rehabilitation such as known rights of way, archaeology, proposed Irish Water pipeline and existing land agreements, turbary, and existing land agreements was carried out and incorporated in the rehabilitation plan, where required.
- A review of remaining milled peat stocks was carried out. It is expected that all peat stocks will eventually be removed before rehabilitation measures at the site are completed.
- 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 was carried out. The scheduling of rehabilitation operations was adapted, where required.
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.
- An Appropriate Assessment of the Rehabilitation Plan was carried out. (Note that an AA screening of Clonad and a subsequent NIS of the rehab plan was carried out).
- See Clonad Decommissioning and Rehabilitation Plan – Addendum 1 for more details of the NIS conclusion and specific NIS mitigation measures relating to water quality.
- Track implementation and enforcement of the relevant IPC Licence conditions, the mitigation measures (AA) and other environmental control measures during the implantation of the rehabilitation plan.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of pump management, 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 silt run-off 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 proposed 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

- **2020-2021**: Short-term planning actions.
- **2021**: Short-term practical actions.
- **2021-2024**: 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) appreciates the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed 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 enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the proposed 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 be allocated to the site based on the area of different types of cutaway across Clonad Bog (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.
- Enhanced water quality monitoring will aim to include up to 70% of a bogs drainage catchments.
- Monitoring results will be maintained, trended and reported on each year as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, which will be available in April each year at www.epa.ie.
- The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus, Total Ammonia, Colour, and COD.
- This 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 proposed 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 after rehabilitation is completed using a cutaway bog 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.

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

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

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

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

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APPENDIX I: A STANDARD PEATLAND REHABILITATION PLAN TO MEET CONDITIONS OF THE IPC LICENCE

In the event that the proposed 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.

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 Clonad Bog (Figure 8.1).
- EPA IPC Licence - Ref. P0503-01. As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Clonad bog is part of the Allen Bog group.
- The current condition of Clonad Bog. Pioneer cutaway vegetation is developing across parts of the site whilst other remain unvegetated with some peat stockpiles remaining.
- 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 Clonad Bog will be left unblocked as blocking boundary drains could affect adjacent land.
- Land-use. Irish Water pipeline.

Rehabilitation goals and outcomes

The key rehabilitation goal and outcome for Clonad 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 silt run off 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).
- That the main watercourses associated with surface water from this bog are excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the watercourse has been identified as under pressure from peat extraction, that the intervening EPA monitoring programme associated with its Programme of Measures for this water body shows positive improvements in water quality impacts that were attributable to the original peat extraction activity.

Rehabilitation targets

- 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 (silt run-off). 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: (see Figure Ap-1)

- 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:

- 2021. 1st phase of rehabilitation. Field drain blocking and water-level management.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by pump management, 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) + blocking outfalls and managing water levels with overflow pipes	46.2
Dry cutaway	DCT1	Blocking outfalls and managing water levels with overflow pipes	84.7
Wetland	WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	192.0
Marginal Land	MLT1	No work required	107.6
Other	N/A	Silt ponds	0.74
		Archaeology constraints	0.45
		Irish Water pipeline (constraint)	15.7
Total			**447.5**

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.
- 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.

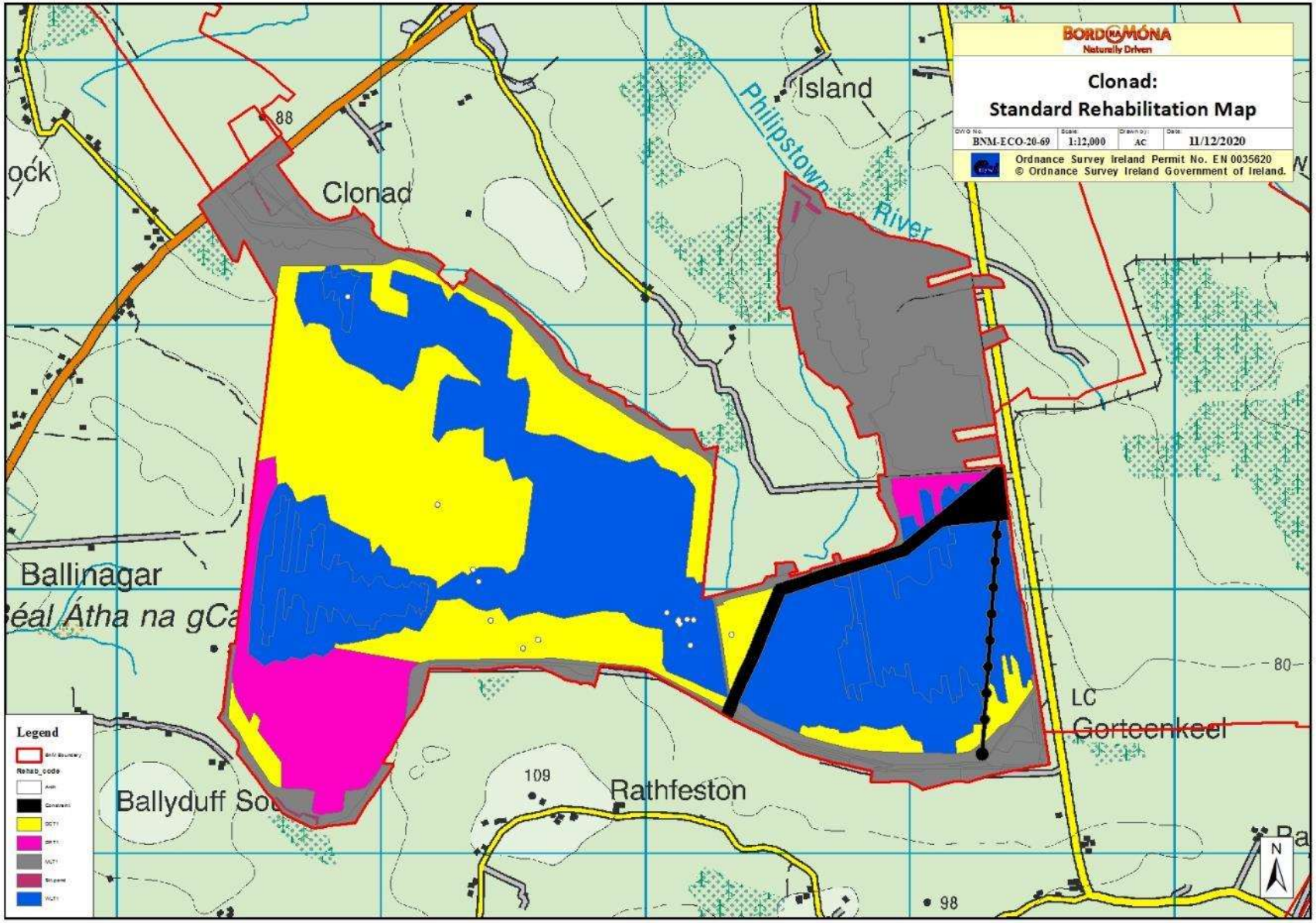


Figure Ap-1. Indicative standard rehabilitation plan for Clonad Bog.

APPENDIX II: BOG GROUP CONTEXT

The Allen -Clonsast Bog Group is located mainly in counties Offaly and Westmeath. Garrymore Bog is located in Co. Laois. All the associated bogs are located in the River Barrow Catchment area except Clonad Bog which is located in the Lower Shannon River Catchment.

The Allen- Clonsast Bog Group is one of the first developed bog groups in Ireland. Bord na Móna was set up in 1946 and it commenced the development of bogs to fuel power station and supply peat for the horticultural industry. The Allen - Clonsast bogs were developed for the supply of milled peat to the Edenderry Power Station, Croghan Power Station (now decommissioned) and the Croghan Briquette factory (now decommissioned).

Much of the Allen -Clonsast Bog complex became cutaway as long term peat production activity reduced the peat reserves on individual bogs. Rehabilitation measures comprising naturalisation and development of alternative after-uses have been already explored at the Allen -Clonsast Bog Group, including coniferous forestry, biomass, agricultural grassland, amenity use, rare species conservation management 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 Allen - Clonsast, it was found that these require financial investment that exceeds any potential commercial output value. A windfarm has been constructed at Mountlucas Bog and another windfarm project is currently in development at Cloncreen.

The Long Derries SAC is located south of Ticknevin Bog. Ticknevin also contains a relatively large area of remnant raised bog that was never developed by Bord na Móna. This area, called Cloncannon bog, was assessed by consultants for NPWS as part of the review of the raised bog Natural Heritage Area network (NPWS 2014).

A breakdown of the component bog areas for the Allen - Clonsast Bog Group IPC License Ref. PO503-01, and current, indicative Peat Production Status, is outlined in Table Ap-2.

Table Ap-2: Allen- Clonsast Bog Group names, area and indicative status

Bog	Area (Ha)	Stage of development	Land-Use and History	Peat Production Cessation	Rehab Plan Status
Ballycon	281	Cutaway Bog Ballycon was first developed for industrial peat harvesting in the 1960's and the majority of peat has been removed. Ballycon is considered a shallow peat cutaway bog.	Rehabilitation works were carried out in 2006 that consisted of drain blocking and bund construction. Some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats and there was follow-up drain blocking in 2018. The site is now a mosaic of cutaway wetland and woodland habitats and is a Biodiversity Area. BnM has also operated a workshop on site. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. There is a rail transport link along the southern boundary of the site.	2001	Draft 2020
Ballykeane	451	Cutaway Bog	Part of the site is cutaway and has started to develop pioneer vegetation. The majority of the bog is still bare peat.	2020	Draft 2017

		Ballykeane Bog was developed for industrial peat production in the 1970's. Ballykeane is a shallow peat cutaway bog.	Part of Ballykeane Bog is being used for a herb production trial.		
Cavemount	499	Cutaway Bog Cavemount Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2015. Cavemount is a shallow peat cutaway bog.	Ongoing rehabilitation has been carried out across the site which is now developing as a wetland, holding nationally important numbers of wintering and breeding wetland birds. A portion of the site still has bare peat but is vegetating. Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte. Flux tower and GHG monitoring onsite as part of the SmartBOG project. The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner. There is a rail transport link through the site.	2015	Draft 2020
Clonad	447	Cutaway Bog Clonad Bog was first developed for industrial peat production in the 1970's.	The majority of the former production area is bare peat with some establishing cutaway habitats at various stages of development. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2017
Cloncreen	1,009	Cutaway Bog Cloncreen Bog was first developed for industrial peat production in the 1970's. Peat production ceased in 2018 and the majority of peat has been cutaway. Cloncreen Bog is a shallow peat cutaway bog.	The site has developed a mosaic of pioneer cutaway habitats with some bare peat mosaics. Planning Permissions was granted in 2016 for Cloncreen Windfarm. Construction has started (summer 2020) on 22 turbines (Approx. 75 MW) at various locations around the site in association with linking road infrastructure, a sub-station and power-lines. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2018	Draft 2017
Clonsast	1,534	Cutover Bog Clonsast Bog was first developed for industrial peat production in the 1950's and was used for sod peat. Peat production ceased in 1980's. The majority of the bog was never converted to milled peat production and some relatively deep peat remains. Clonsast Bog is considered a deep peat cutover bog.	Clonsast has now established a mosaic of mature cutaway habitats. BnM formerly operated a farm at Clonsast. Farmland was developed on rehabilitated cutaway bog. The farm venture ceased in the 1980's and the farmland was sold. A significant portion of the site has been leased to Coillte and planted with conifer forestry in the 1980s. Some of the original research on establishing forestry on cutaway was established at Clonsast (Trench 14). BnM carried out a re-wetting trial in 2018. This site is largely stabilised. There is a rail transport link through the site.	1980's	Draft 2017
Clonsast Bulge	379	Cutover Bog Clonsast Bulge was first developed by BnM in the 1950's.	The majority of Clonsast Bulge used for peat extraction has been developed by Coillte for conifer forestry in the 1980's.	1960's	Draft 2017

			Part of the site is undeveloped (Clonavoe Bog remnant). This site is largely stabilised.		
Clonsast North	191	Cutaway Bog Clonsast North was first developed by BnM in the 1930's. The remaining peat deposits at Clonsast North are generally shallow and so the bog is considered a shallow peat cutaway bog.	The cutaway is naturally colonising with a mosaic of Birch woodland and wetland. The site was partially re-wetted in 2018. There is a rail transport link through the site.	2000's	Draft 2017
Daingean Derries	277	Cutover Bog Daingean Derries was first developed in the late 1980's. Deep peat reserves remain. Daingean Derries is considered a deep peat cutover bog.	Daingean Derries Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. Some bog restoration on part of the site completed in 2017-2018. There is a rail transport link through the site.	2020	Draft 2017
Daingean Rathdrum	367	Cutover Bog Daingean Rathdrum was first developed in the late 1980's. Deep peat reserves remain. Daingean Rathdrum is considered a deep peat cutover bog.	Daingean Rathdrum Bog formerly supplied both horticultural peat and fuel peat. The majority of former production area is bare peat. There is a rail transport link through the site. A small area of development bog (32 ha) has been restored.	2020	Draft 2017
Daingean Townparks	90	This bog was never drained or developed but there is a transport link along the margin of the site	Daingean Bog NHA (intact raised bog) There is a rail transport link through the site. No rehabilitation required.	N/A	N/A
Daingean Raillink	5	N/A	N/A	N/A	N/A
Derrycricket	190	Derrycricket was originally developed for peat production in the 1950's-1960's. Peat production at Derrycricket ceased in the 1980's.	Coilte developed approximately 80% of the former production area for conifer forestry in the 1980's. This site is largely stabilised. Transport link.	N/A	N/A
Derrylea	665	Cutover Bog Derrylea bog was first developed for commercial peat production in the 1940's. However, peat production at Derrylea predates BnM and is believed to have commenced in the 19th century. Despite a long history of production, deep peat reserves on much of the site with some shallow pockets of peat on the western half of the former production area. Derrylea Bog is considered a deep peat cutover bog.	Some rehabilitation has been completed around the margins of the bog. There is a rail transport link through the site.	2020	Draft 2017
Derryounce	389	Cutover Bog Derryounce Bog was first developed prior to 1975. Derryounce is considered a deep peat cutover bog. Peat production at Derryounce ceased in the 1980's.	Coilte have developed 80% of the former production area as conifer forestry. Rehabilitation was carried out to create a lake and wetland habitats in the 1990s. Derryounce Lake Amenity area is leased to Portarlington Community Development Association. This site is now largely stabilised. There is a rail transport link through the site.	1980's	Draft 2017

Esker	567	Cutover Bog Esker Bog was first developed in 1975. Peat production at Esker ceased in the 2020. There is deep peat remaining on the western side of the former production area but the eastern area is considered cutaway. Esker Bog is a deep peat cutover bog.	The majority of the site is bare peat. The eastern portion is establishing cutaway habitats. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2021
Garryhinch	814	Cutover Bog Garryhinch Bog was first developed in 1950's. Peat production ceased at Garryhinch in 2020. There is some deep peat remaining on much of the former production area. Garryhinch Bog is considered a deep peat cutover bog.	The majority of the site is re-vegetated with a range of wetland and woodland habitats. Extensive sod peat production (private and licenced by BnM) has occurred across the site in the past few years and these areas are bare peat.	2020	Draft 2017
Garrymore	307	Cutover Bog Garrymore Bog was first developed in the 1980's. Peat production at Garrymore ceased in the 2020. There is deep peat remaining. Garrymore Bog is considered a deep peat cutover bog.	Garrymore Bog formerly supplied horticultural peat. Part of the site is used for sod turf. The former production area is bare peat.	2020	Draft 2017
Mount Lucas	1225	Cutover Bog Peat Production at Mount Lucas commenced in the mid-1970's and ceased in 2020. Most of Mount Lucas is cutaway with shallow residual peat depths. The north-west corner of the former production area retains some pockets of deep peat. Mount Lucas is considered a shallow peat cutover bog.	Peat production ceased across a significant part of the site before 2005 with ongoing peat extraction in the western side up to 2020. The cutaway area has developed a mosaic of cutaway habitats with Birch woodland dominant. The recently ceased production area is bare peat. Mountlucas windfarm is now operational (since 2014). Some rehabilitation was carried out in association with windfarm construction, specifically the creation of small wetland features. A public amenity walking route was developed on the existing windfarm. This was opened in 2015. BnM have developed an aquaculture project in partnership with Bord Iascaigh Mhara and have developed herb production trials on site. There is a rail transport link through the site. The proposed Irish Water pipeline crosses this bog.	2020	Draft 2021

The Lullymore Bogs sub-group is mostly situated in west Co. Kildare and overlaps with Co. Offaly. The core area extends across an area between Rathangan and Edenderry. A second section of peatland is found further east (Timahoe North and South Bogs) and is separated from the core area by the Grand Canal. The core area of the Lullymore Bogs sub-group is very much a continuous area of bogland (Bog of Allen) that has developed according to the local topography and been sub-divided by Bord na Móna for administrative purposes. The Edenderry-Rathangan Road crosses the main section and is bordered by milled peat production bog.

The Lullymore Bogs sub-group has also had a long industrial peat production history. Sod peat for fuel was originally produced at Lullymore and in the Timahoe Bogs, which then supplied at old power station at Allenwood (now demolished). Much of the peatland around Lullymore is now cutaway. An agricultural research station was also established at Lullymore by An Foras Talúntais to investigate the potential future after-uses of cutaway bog. Agricultural grassland was also established in this area by Bord na Móna. This grassland has now been sold to local farmers. A large area of cutaway at Lullymore was also developed for conifer forestry by Coillte. Part of Timahoe South Bog has been re-developed as a waste disposal and composting facility (Drehid). Bord na Móna is currently developing a project with ESB to develop solar energy at Timahoe North bog. This project has recently got planning permission. Wetlands have been created in part of Lullymore Bog. An amenity area has also been created at Lullymore that has now been leased to the Lullymore Heritage and Discovery Centre. Bord na Móna have also transferred ownership of two separate parcels of land to the Irish Peatland Conservation Council. The first section was an intact remnant of raised bog at Lodge Bog. The second was an area of cutaway called Lullymore West. Both areas are now being managed as nature reserves by the IPCC. A small section of Lullybeg cutaway is currently being managed by Butterfly Conservation Ireland for butterfly conservation and to maintain the status of Marsh Fritillary (butterfly species of conservation interest) on the site. Bord na Móna also maintains transport links and an industrial railway through some of the cutaway that has developed in the Lullymore Bogs sub-group.

There are three land units within the Clonsast Bogs sub-group that are active (Daingean_Rail_Link, Daingean_Townparks) or inactive (Clonsast Power Stn Railway) transport links. Timahoe McNally in the Lullymore Bogs sub-group is also a transport link with associated farmland.

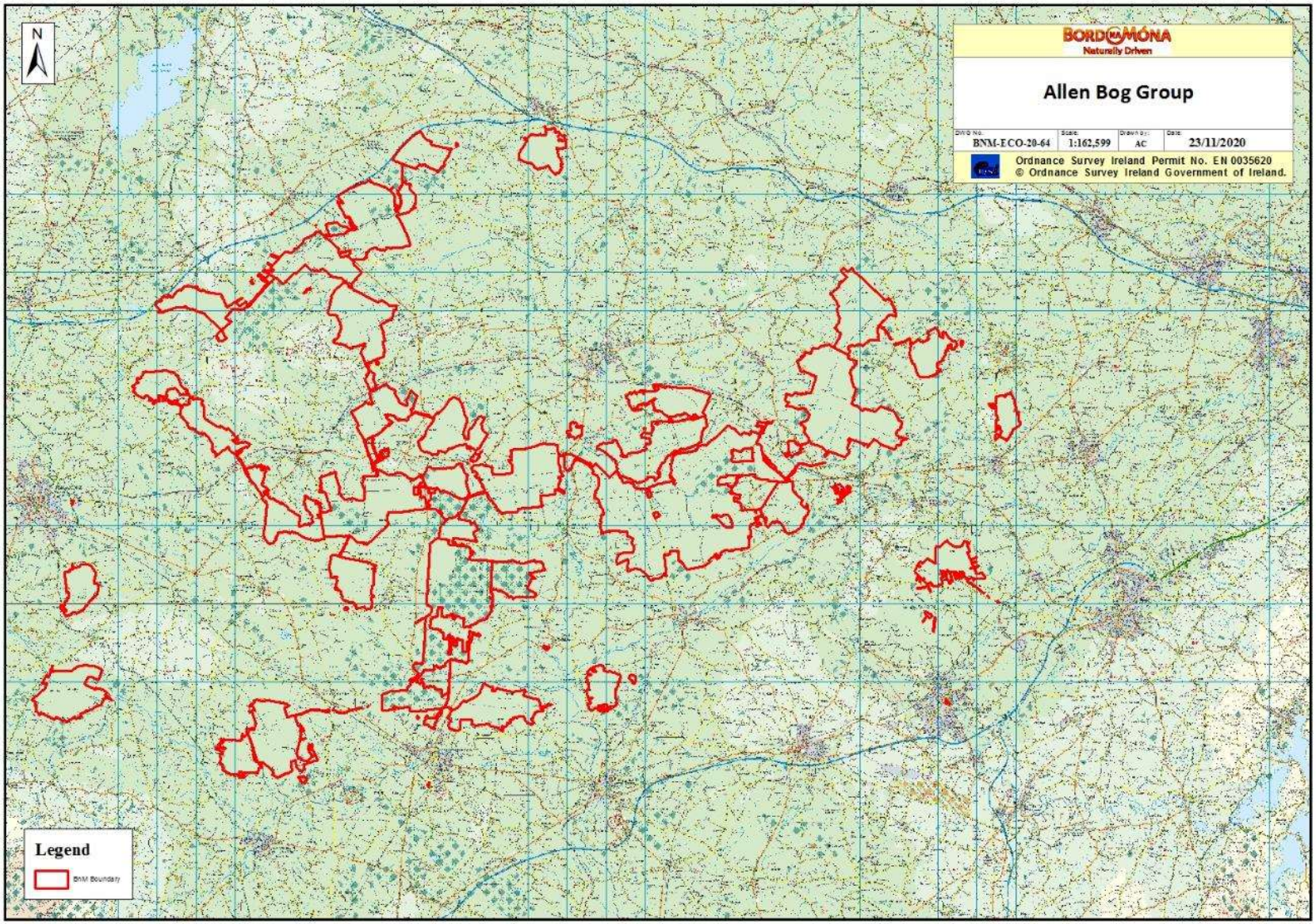


Figure Ap-2: Allen Bog Group

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. The report outlines potential options for biodiversity management after industrial peat production has ceased, (if this is the proposed main land-use for the site).

Bog Name:	**Clonad**	**Area (ha):**	461 ha
Works Name:	Derrygreenagh	**County:**	Offaly
Recorder(s):	MMC & DF	**Survey Date(s):**	21/02/2012

Habitats present (in order of dominance)

- Bare peat;
- Emerging, open and closed Birch scrub;
- Pioneer dry grassland/poor fen communities dominated by Creeping Bent and Soft Rush;
- Pioneer poor fen communities dominated by Soft Rush and/or Bog Cotton;
- Pioneer dry grassland dominated by Purple Moorgrass;
- Pioneer dry grassland with Cocksfoot and Sweet Vernal Grass;
- Pioneer dry calcareous grassland;
- Access routes (rail lines and tracks including gravel embankments and associated habitats such as dry grassland communities and scrub); and
- Silt-pond areas with silt ponds and associated spoil heaps and access tracks.

The most common habitats found around the margins and in other parts of the site include:

- Raised bog remnants;
- Cutover bog;
- Scrub – Gorse and Birch scrub;
- Birch woodland; and
- Wet grassland, improved grassland and arable crops.

Description of site

Clonad Bog is located 3 km south of Daingean Town in Co. Offaly. It is part of the Derrygreenagh Bog group and there are railway connections through the site to Daingean Townparks to the west and Mountlucas to the east. The bog is located in a predominantly low-lying agricultural landscape. Access to the site is via a track to a tea centre along the southern boundary.

The majority of the site has been developed for milled peat production. Clonad Bog is a gravity-drained bog and there a relatively few issues with flooding. There are two main lobes to the bog that are separated by a narrow connection. There is a large lobe in the north-east part of the site have was not developed and is used for private sod turf cutting. Private sod-peat cutting is being carried out in the north-west part of the site as well, along a narrow band of remnant high bog. There is also some sod-peat production in SW part of the site.

The western lobe of the production bog is the largest individual section on the site. The majority of this area is in active peat production and is bare peat. This section has a variable topography and there are glacial ridges and mounds underlying the peat that are visible in the overlying peat. Some of these ridges and mounds of sub-soil are being exposed in places and some pioneer cutaway vegetation is developing, particularly along the edges of drains. These sections have been developing for a relatively short time and generally have very little Birch or Willow development. Generally, the area not available for production within a field is small so tractors do not divert and mill over these mounds and ridges. The pioneer vegetation therefore is poorly developed, with the central parts of the fields bare, and mainly consists of frequent Creeping Bent, as well as Soft Rush (classified as a bare peat/dry grassland mosaic).

There is also a small area of production related cutaway along the north-east boundary of the western lobe. Pioneer vegetation development in this section is somewhat more advanced, but is still dominated by Creeping Bent cover and Soft Rush. There is some light cover of emerging Birch and Willow. The majority of the vegetation cover is along the edges of the drains. One feature of this section is that it was partially flooded and there seems to be a small sub-basin that is permanently flooded.

A small area of production-related cutaway located in the south-east part of the western lobe is better developed and contains typical pioneer poor fen communities with Soft Rush and Bog Cotton, mixed with some Birch cover. There is also a little cover of Bulrush.

One feature of the railway that follows the northern boundary of the western lobe is that it is cut into a relatively deep channel into the underlying glacial gravel. This zone may have the potential to flood and develop rich fen habitat when the railway is decommissioned. It is likely to collect seepage from the adjacent higher ground also underlain with the same glacial material. There are some typical indicators of calcareous enrichment with the presence of Jointed Rush and *Calliergonella cuspidata* in the drains. There are also several tussocks of Greater Tussock-sedge along the drain.

The eastern lobe is divided from the western lobe by the railway. There is a small area of production-related cutaway at this location. This is mainly dominated by Birch scrub. It has been disturbed for recently by drainage works and there is some exposed gravel in one section. The Birch scrub is generally developing with pioneer poor fen dominated by Soft Rush, or grassland dominated by Purple Moorgrass. There are occasional small wetter areas where Bog Cotton is pre-dominant as well as drier areas where grasses are more pre-dominant (Creeping Bent, Yorkshire Fog). Heather appears in places around the margins of this section and there is a high field to the west that contains some pioneer dry heath along with Bracken. There is still a significant amount of bare peat that remains un-vegetated within this production-related cutaway area.

The remaining production bog is in production and is bare peat-dominated. There are several small areas that overlay ridges where there is some vegetation development along the margins of the drains and some exposure of sub-soil. This is mainly dominated by dry grasses or by Soft Rush.A larger area of sub-soil is being exposed adjacent to the tea centre and this is being vegetated by pioneer calcareous grassland with Glaucous Sedge and species like Knapweed and Wild Carrot more prominent. Ranker grassland with Yorkshire Fog and Cocksfoot is developing in places along the margins of travel path that are unused.

Some calcareous grassland has developed in a small lay-by adjacent to the old tippler and the minor road. This area may have potential for interesting flora during the summer.

A road/lane divides the production bog from remnant high bog at the north-east end of the site. The high bog is quite degraded and has been burnt in the past few years. Deergrass was a prominent part of the vegetation cover and many remnant hummocks of *S. capillifolium* and *S. papillosum* were damaged. *Sphagnum subnitens* and *S. tenullum* were also recorded. *Sphagnum cuspidatum* was absent. Heather was not dominant and plant height was < 20 cm. *Cladonia portentosa* cover was < 1%. Bare peat and *Campylopus introflexus* was present, particularly around the drier margins of the high bog. The bog is generally dry and firm/spongy underfoot. The majority of this section could be classified as marginal ecotope in quality. There has been some recent drainage/disturbance on the high bog close to the adjacent minor road. There is some sod-tuft cutting along the northern margin of this remnant section. The central section contains a small basin where the bog is much wetter and there is high *Sphagnum* cover (> 50%) including *S. cuspidatum*, as well as prominent White-beak Sedge. *Sphagnum* cover is

dominated by *S. capillifolium* and S. *papillosum*. Some *S. magellanicum* was also present, particularly in an old infilled drain. A Hare and some Meadow Pipit were noted on the high bog.

The remaining other sections of high bog to the north or fragmented and degraded. There is intensive sod-peat cutting around the margins. The remaining area of cutover bog is quite disturbed and there is extensive fly-tipping of household waste along the access route. Some scrub and Birch woodland are developing in small patches. Un-disturbed cutover bog is developing as Purple Moorgrass-dominated grassland.

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

None

Adjacent habitats and land-use

Adjacent habitats include conifer plantation, improved grassland, arable crops, scrub/Birch woodland, remnant high bog and some wet grassland,

Watercourses (major water features on/off site)

- Clonad bog is on the boundary between the Shannon and Barrow river catchments. The SW part of the site is within the Shannon catchment.
- The Philipstown River forms part of the boundary along the NE lobe of undeveloped bog.
- There are four main silt pond catchments. The SW area is within the Shannon catchment. The eastern half of the western lobe and the eastern lobe both have silt ponds close to the Philipstown River. The NW section also flows towards the Philipstown River.

Peat type and sub-soils

The main exposed peat type is black fen peat. Some of the peat towards the SW part of the site is redder and may be somewhat more acidic or younger.

The peat is underlain by a mixed glacial gravel and blue-grey marl.

Fauna biodiversity

Birds

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

- Kestrel (high bog)
- Other more common birds included Blue Tit, Robin, Long-tailed Tit, Chaffinch, Goldfinch, Robin, Wren, Blackbird and Dunnock (all in scrub margins), Grey Crow, Meadow Pipit (high bog), Snipe (in cutaway).
- Whooper Swans rest/forage occasionally on the production bog (according to local production staff). Snipe have bred on the site in the past. Pheasant and Mallard are common during the summer.
- Red-legged Partridge bred nearby visit the site.

Mammals

Signs of several mammal species were noted on the site during the survey.

- Hares (2 noted on production bog, 1 on high bog NE corner).
- Rabbits (along southern margin)
- Fox (spoor) (southern margin)
- Badger (signs of foraging in cutaway area)

Other species

- Frogs noted around the site.

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 bowsers. Only dedicated trained and competent personnel will carry out refuelling operations.
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned. When not in use, all valves and fuel trigger guns from fuel storage containers will be locked. All pumps using fuel or containing oil will be locally and securely bunded where there is the possibility of discharge to waters.
- Potential impacts caused by spillages etc. during rehabilitation will be reduced by keeping spill kits and other appropriate equipment on-site.
- Site activities will be carried out in accordance with 'best practice'. In order to ensure compliance and implementation of 'best practice', these measures will be communicated to relevant Bord na Móna staff and updated as required.

APPENDIX V. BIOSECURITY

No invasive flora species have been recorded at Clonad Bog.

The potential for importation or introduction of non-native plant species (such as Japanese Knotweed, Himalayan Balsam, etc.) during future rehabilitation management, such as drain-blocking using excavators, has the potential to result in the establishment of invasive species within the site. Section 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of invasive alien species (particularly plant species) listed on Part 1 (third column) of the 'Third Schedule'.

This section aims to reduce the risk from, and impacts of, invasive species and protecting biodiversity on lands under Bord na Móna ownership. Rehabilitation and decommissioning in the bog will have due regard to the relevant biosecurity measures outlined below:

- Records of problematic invasive species within the various bog units will be marked out with signs to highlight areas of infestation to personnel.
- All plant machinery will be restricted from disturbing known colonies of invasive species.
- All plant machinery will avoid unnecessary crossings to adjoining lands.
- Good site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (i.e. Japanese Knotweed (*Fallopia japonica*), Himalayan Balsam (*Impatiens glandulifera*), Himalayan Knotweed (*Persicaria wallichii*), etc.) by thoroughly washing vehicles prior to entering the area.

The biosecurity measures outlined above are in line with best practice guidelines issued by the National Roads Authority (NRA, 2010) – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads and broadly based on the Environment Agency's (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013, accessed on the Environment Agency's website on the 11th of July 2016).

In addition to the above, Best Practise measures around the prevention and spread of Crayfish plague[2] will be adhered with throughout all rehabilitation measures and activities.

[2] 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 have now announced the complete cessation of industrial peat production across its estate (January 2021).

Bord na Móna is an integral part of the economic, social, and environmental fabric of Ireland and Irish life. As a key employer in the Midlands, the company is conscious that its obligations go beyond purely commercial and environmental – there is also a social responsibility to employees and the communities served by Bord na Móna. It is the company's role and absolute priority to ensure that its long-term strategy delivers on all of these important areas in a robust and balanced way.

There are a wide range of policies, plans, legislation and land designations that inform the development of this Bord na Móna peatland rehabilitation plan. Bord na Móna have also developed and operate various policies and strategies that also inform the development of this rehabilitation plan.

1 EPA IPC Licence

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen Bog Group (Ref. P0503-01). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. The bog is part of the Allen Bog 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) appreciates the Minister's intention to support, via the Climate Action Fund, Bord na Móna in developing a package of measures, 'the proposed Scheme', for the enhanced decommissioning, rehabilitation and restoration of cutaway peatlands, referred to as the 'Peatlands Climate Action Scheme'. The proposed Scheme includes lands previously used to supply peat for electricity generation within the State. The enhanced decommissioning, rehabilitation and restoration of the peatlands funded by the proposed 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.

It is envisaged that Bord na Móna carry out an enhanced decommissioning, rehabilitation and restoration scheme, (PCAS), across a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production). This proposed 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 costs associated with the additional and enhanced measures, i.e., those which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10, will be eligible for support under the proposed Scheme.

The proposed enhanced rehabilitation measures detailed in this document, are predicated on the understanding that the element of the rehabilitation, over and above the 'standard' measures necessary to comply with pre-existing Condition 10 IPC Licence requirements, will be deemed eligible costs for the Scheme regulator.

For the avoidance of doubt, should the proposed 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. 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 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.

5 National River Basin Management Plan 2018-2021 (Water Framework Directive)

The National River Basin Management Plan (2018-2021) (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 outlines 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) is part of the WFD (2018-2021) programme of measures. The NRBMP takes account of the fact that Bord na Móna is 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 rehabilitation target is set to be superseded by the acceleration of the Bord na Móna de-carbonisation programme and the proposed **Scheme (PCAS)**.

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

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 2nd National Biodiversity Action Plan outlines the main policies, strategies, actions and targets in relation to biodiversity. This plan has several Bord na Móna specific objectives and actions including implementing the BnM Biodiversity Action Plan 2016-2021 and overlaps with both the National Peatlands Strategy and the National Raised Bog Special Areas of Conservation Management Plan 2017-2022.

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, cNHAs) and National Nature Reserves). Bord na Móna will take account of this network of conservation objectives and their conservation objectives when developing these rehabilitation plans. It is expected that peatland rehabilitation will, in general, benefit the conservation objectives of this network of nature conservation sites.

Clonad Bog does not overlap with any sites designated for nature conservation, although it does have a short common boundary with Daingean Bog NHA to the north-west.

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.

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, wind energy, and economy/enterprise.

Clonad Bog is located in an area zoned by Offaly County Council as open countryside[3].

11 National Archaeology Code of Practise

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.

[3] https://www.offaly.ie/eng/Services/Planning/Development-Plans/County-Development-Plan-2014-2020/Volume-1-9-10-14-FINAL-pdf.pdf

- 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 endeavour to adhere to this code of practise during the peatland rehabilitation phase and appropriate archaeology mitigation is carried out before and during cutaway peatland rehabilitation. An Archaeological Impact Assessment has been carried out for the proposed rehabilitation at this site (Appendix XII). The recommendations of this assessment will be incorporated into the rehabilitation plan to minimise impacts on known archaeology. In addition, Bord na Móna will adhere to the Archaeology Code of Practise relating to management of stray 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."*

The Clonad Bog Rehabilitation Plan is aligned to the CBD target and the EU Biodiversity Strategy target and will help Ireland meet its commitment to these international Biodiversity polices.

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 peat production would be cut by over 50 percent in 2019 and would entirely cease over most of its lands by the mid-2020s. Bord na Móna have now announced the complete cessation of industrial peat production across its estate (January 2021). Rehabilitation measures will continue to be carried out with the focus on re-wetting and rehabilitation of cutover and cutaway areas in line with national policies (such as the National Peatland Strategy, the National Biodiversity Action Plan, the 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 has also committed to a significantly larger rehabilitation target. This is 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 plan to restore a further 1,000 hectares of raised bog habitat by 2025. These targets are significant in both timing and scale and are indicative of Bord na Móna's increased new ambition in this area.

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.

14 Bord na Móna Strategic Framework for the future use of cutaway peatlands 2020

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. 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, 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 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	Clonad Bog Decommissioning Plan
1	Clean-up of 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.

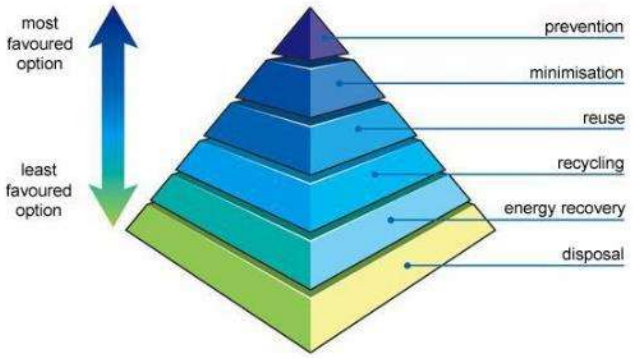
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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	Clonad Bog Decommissioning Plan
1	Removal of Railway Lines	Removal of Railway Lines
2	Decommissioning Bridges and Underpasses	Not 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	Not 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 can not be re-wetted due to boundary constraints. Dry cutaway may also develop in situations where there a relatively steep slope that inhibits re-wetting. The majority of dry cutaway will develop towards grassland, heath, scrub and dry woodland habitats.

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

Enhanced rehabilitation: This is defined as rehabilitation carried out under proposed 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 proposed 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 proposed Scheme.

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 to defined as the process of re-establishing to the extent possible the structure, function and integrity of indigenous ecosystems and the sustaining habitats they provide" (SER 2004). Defined in this way, restoration encompasses the repair of ecosystems (Whisenant 1999) and the **improvement of ecological conditions in damaged wildlands** through the **reinstatement of ecological processes**. In general, Bord na Móna cutaway peatlands cannot be restored back to raised bog in a reasonable timeframe as their environmental conditions has changed so radically (with the removal of the acrotelem – the living layer and much of the peat mass). However, they can be returned to a **trajectory** towards a naturally functioning peatland system (Renou-Wilson 2012). **Raised bog restoration** is an objective of some BnM sites where there is residual natural raised bog vegetation and where the majority of the peat is still intact.

Standard rehabilitation: This is defined as rehabilitation that is designed to meet the conditions of the EPA IPC Licence. The key objective of rehabilitation is environmental stabilisation. This is achieved by a combination of re-wetting, where possible, and natural colonisation of the former cutaway, with or without intervention**.** Other after-use development may also serve to act as rehabilitation.

Standard decommissioning: This is defined as decommissioning that is designed to meet the conditions of the EPA IPC Licence. This is defined as to render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

Wetland cutaway bog. Wetland cutaway bog is defined as former raised bogs that have been in industrial peat production, where production has ceased and the majority of peat has been cutaway, and where this cutaway has the potential to be re-wetted. A significant number of Bord na Móna sites have pumped drainage and these sites are likely to develop a mosaic of wetland habitats when pumping in reduced or stopped. The water chemistry of wetland cutaway frequently is strongly influenced by the more alkaline sub-soils that have been exposed during peat production. This means that pioneer vegetation is more typical of fen and wetland, rather than raised bog. Wetland cutaway will have a broad range of hydrological conditions depending on the local topography. In some cases, these wetlands may form deep water (> 0.5 m) whilst other areas may have the water table at or just below the surface of the ground.

APPENDIX 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 Ref. P0503-01, Allen-Clonsast Group of Bogs in Counties Offaly and Westmeath.

1.0 Extractive Waste:
Waste classified as extractive waste from peat extraction operations arise from three operations associated with this activity.

1.1 Silt Pond excavations and maintenance.
All peat extraction activities in Allen-Clonsast 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 ores levelled out. As required by condition 6.6, these silt lagoons are cleaned twice per annum or more often if inspections dictate. These silt cleanings are also deposited on the same location, adjacent to the silt pond, where they may be levelled periodically to allow room for subsequent cleanings. These mounds of silt pond excavation material and cleanings are generally no higher that 2-3 metres.

1.2 Power Station screenings:
Peat from the bogs is screened prior to processing. This screening removes oversized peat, stones and bogs timbers. Schedule 3 (ii) of the 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 P0502-01 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' December2012. The Plan shall be reviewed at least once every five years thereafter in a manner agreeable to the Agency and amended in the event of substantial changes to the operation of a waste facility or to the waste deposited. Any amendments shall be notified to the Agency.
All extractive waste shall be managed in accordance with the Extractive Waste Management Plan. A report on the implementation of the Extractive Waste Management Plan shall be provided in the AER.

2.2 Condition 7.6 Waste Facility
(i) No new waste facility may be developed or an existing waste facility modified unless agreed by the Agency.
(ii) The licensee shall ensure that all existing waste .facilities are managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iii) The licensee shall ensure that all new waste facilities are constructed, managed and maintained to ensure their physical stability and to prevent pollution or contamination of soil, air, surface water or groundwater.
(iv) Operational measures shall be continuously employed to prevent damage to waste facilities from personnel, plant or equipment.
(v) The licensee shall establish and maintain a system for regular monitoring and inspection of waste facilities.
(vi) All records of monitoring and inspection of waste facilities, as required under the licence, shall be maintained on-site in order to ensure the appropriate handover of information in the event of a change of operator or relevant personnel.

2.3 Condition 7.7 Excavation Voids
7.7.1 Unless otherwise agreed by the Agency, only extractive waste shall be placed in excavation voids.
7.7.2 When placing extractive waste into excavation voids for rehabilitation and construction purposes, the licensee shall, in accordance with regulation 10 of the Waste Management (Management of Waste from the Extractive Industries) Regulations, 2009, and the Extractive Waste Management Plan:

- Secure the stability of the waste
- Put in place measures to prevent pollution of soil, surface water and ground water.
- Carry out monitoring of the extractive waste and excavation void.

Condition 7.5. Extractive Waste Management Plan. 5 (1)

3.0 Minimisation.
3.1 Silt pond excavation material and cleanings.
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 out Bog Rehabilitation Plan. Storage of these wastes in the interim, open to the elements does not present a change on the nature of these wastes that will threaten the environment or prevent their reuse during the bog rehabilitation process.

5 (2a)(iii)
Under Condition 10 of the 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	**C**lassification	Chemical Process treatment	Deposition description	Transport System
Silt Pond Excavations and cleanings	Peat and mineral soils associated with peatlands. Stored for reuse during bog rehabilitation, with no displacement of overburden	01 01 02	None	Excavated from silt ponds by excavator and deposited adjacent to the silt pond.	Excavator
Peat Screenings	Stones, timbers and oversized peat particles, reincorporated into low areas, agreed with the Agency, and stabilized under normal natural bog conditions	01 01 02	None	Removed by screen at the factory and transported by tractor and trailer to the designated and agreed locations	Tractor and trailer.
Bog Timbers	Pine, Oak and Yew species, stored at locations in each bog. Not subject to any stability issues due to exposure to atmospheric/meteorological conditions.	01 01 02	None	Removed from the bog surface by excavator and transported by tractor and trailer to the agreed locations	Tractor and Trailer

Description of operations.
Silt pond excavations arise from the requirement to have silt ponds treating all peat extraction sites. Silt pond cleanings arise from the removal of peat silt from silt ponds as required under 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 Allen-Clonsast 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 there placement back to the bog in smaller concentrated designated waste facilities does not constitute a risk to the prevention of water compliance.
The lands under where these materials are deposited are peatlands and are un-effected by the placing of this material.

Review.
This plan will be reviewed every five years, the first review to take place in September 2017. This review will entail an inspection of these waste facilities to ensure their placing, management, maintenance and stability comply with the requirements of the Extractive Waste Management requirements and condition 7.5, 7.6 and 7.7 of the Allen-Clonsast IPPC Licence Ref. PO503-01.

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^3 or more of water per day, or serving 500 or more people	200 metres (or as little as 30 metres where a local authority allows)
Any water supply source providing 10m^3 or more of water per day, or serving 50 or more people	100 metres (or as little as 30 metres where a local authority allows)
Any other water supply for human consumption	25 metres (or as little as 30 metres where a local authority allows)
Lake shoreline	20 metres
Exposed cavernous or karstified limestone features (such as swallow holes or collapse features)	15 metres
Any surface watercourse where the slope towards the watercourse exceeds 10%	10 metres
Any other surface waters	5 metres*

APPENDIX XI. CONSULTATION SUMMARIES

Table APXI -1 Consultees contacted

Bog Name	Contact Organisation	Contact Name	Date of Issue	Communication Format	Date Response Received	Response format
Clonad	Offaly County Council - Chief Executive	Anne-Marie Delaney	18/01/2021	E-mail		
Clonad	Offaly County Council - Senior Planner	Andrew Murray	18/01/2021	E-mail		
Clonad	Offaly County Council - Heritage Officer	Amanda Pedlow	18/01/2021	E-mail		
Clonad	Offaly County Councillors - Edenderry District	Cllr. Mark Hackett	18/01/2021	E-mail		
Clonad	Offaly County Councillors - Edenderry District	Cllr. Noel Cribbin	18/01/2021	E-mail		
Clonad	Offaly County Councillors - Edenderry District	Cllr. Eddie Fitzpatrick	18/01/2021	E-mail		
Clonad	Offaly County Councillors - Edenderry District	Cllr. John Foley	18/01/2021	E-mail		
Clonad	Offaly County Councillors - Edenderry District	Cllr. Robert McDermott	18/01/2021	E-mail		
Clonad	Offaly County Councillors - Edenderry District	Cllr. Liam Quinn	18/01/2021	E-mail		
Clonad	TD Laois/Offaly	Barry Cowen	18/01/2021	E-mail		

Clonad	TD Laois/Offaly	Charlie Flanagan	18/01/2021	E-mail		
Clonad	TD Laois/Offaly	Sean Fleming	18/01/2021	E-mail		
Clonad	TD Laois/Offaly	Carol Nolan	18/01/2021	E-mail		
Clonad	TD Laois/Offaly	Brian Stanley	18/01/2021	E-mail		
Clonad	Eastern and Midland Regional Assembly	General E-mail Contact	18/01/2021	E-mail		
Clonad	Environmental Protection Agency	General E-mail Contact	18/01/2021	E-mail		
Clonad	National Parks and Wildlife Service	General E-mail Contact	18/01/2021	E-mail	02,03,07,09/12/2020	E-mail
Clonad	Dept of the Housing Local Government and Heritage	Malcom Noonan (Minister of State at the Department of Housing, Local Government and Heritage)	18/01/2021	E-mail		
Clonad	National Monuments Service	General E-mail Address	18/01/2021	E-mail		
Clonad	National Museum of Ireland (Irish Antiquities Division)	General E-mail Address	18/01/2021	E-mail	28/12/2020	E-mail
Clonad	Minister for Environment, Climate and Communications	Minister - Eamon Ryan	18/01/2021	E-mail		
Clonad	Minister of state for Agriculture with responsibility for Land use and Biodiversity	Pippa Hackett Minister of State for Land Use and Biodiversity)	18/01/2021	E-mail		
Clonad	Inland Fisheries Ireland	General E-mail Contact	18/01/2021	E-mail		

Clonad	Waterways Ireland	General E-mail Contact	18/01/2021	E-mail		
Clonad	The Heritage Council	General E-mail Contact	18/01/2021	E-mail		
Clonad	An Forum Uisce (The Water Forum)	General E-mail Contact	18/01/2021	E-mail		
Clonad	OPW	General E-mail Contact	18/01/2021	E-mail		
Clonad	Shannon pipeline	General E-mail Contact	18/01/2021	E-mail		
Clonad	Ervia	General E-mail Contact	18/01/2021	E-mail		
Clonad	An Taisce	General E-mail Contact	18/01/2021	E-mail		
Clonad	Friends of the Earth	General E-mail Contact	18/01/2021	E-mail		
Clonad	Friends of the Irish Environment	General E-mail Contact	18/01/2021	E-mail		
Clonad	Birdwatch Ireland	General E-mail Contact	18/01/2021	E-mail		
Clonad	Irish Peatlands Conservation Council	General E-mail Contact	18/01/2021	E-mail	07/12/2020	E-mail
Clonad	Irish Wildlife Trust	General E-mail Contact	18/01/2021	E-mail		
Clonad	Bat Conservation Ireland	General E-mail Contact	18/01/2021	E-mail		

Clonad	Woodlands of Ireland	General E-mail Contact	18/01/2021	E-mail		
Clonad	Butterfly Conservation Ireland	General E-mail Contact	18/01/2021	E-mail		
Clonad	Community Wetlands Forum (part of Irish Rurallink)	General E-mail Contact	18/01/2021	E-mail		
Clonad	Turf Cutters and Contractors Association	General E-mail Contact	10/12/2020	Postal Address		
Clonad	Offaly Public Participation Network (PPN)	General E-mail Contact	18/01/2021	E-mail		
Clonad	Sustainable Water Action Network (SWAN)	General E-mail Contact	18/01/2021	E-mail		
Clonad	Irish Farmers Association (Laois Offaly and Westmeath Office)	General E-mail Contact	18/01/2021	E-mail		
Clonad	Irish Farmers Association (Head Office)	General E-mail Contact	18/01/2021	Post	Multiple Dates, Dialogue is ongoing	E-mail
Clonad	National Association of Regional Game Councils	General E-mail Contact	18/01/2021	E-mail		
Clonad	ICMSA (Irish Creamery Milk Suppliers Association)	General E-mail Contact	18/01/2021	E-mail	Multiple Dates, Dialogue is ongoing	E-mail
Clonad	ICSA (Irish Cattle and Sheep Farmers Association	General E-mail Contact	18/01/2021	E-mail		
Clonad	Midlands & East Regional WFD Operational Committee	General E-mail Contact	18/01/2021	E-mail		
Clonad	Shannon Flood Risk State Agency Co-ordination Working Group	General E-mail Contact	18/01/2021	E-mail		

Clonad	CARO (Climate Action Regional Office) Eastern and Midlands	General E-mail Contact	18/01/2021	E-mail		
Clonad	Irish Raptor Study Group	General E-mail Contact	18/01/2021	E-mail		

Table APXI -2 Response summary from Consultees contacted

Organisation	Summary of Response by Stakeholder	BnM Response
Irish Peatlands Conservation Council	Responded to consultation regarding Clonad Bog and the PCAS project at large to express support for the project and make a number of comments on how the project might be improved. The main points raised within the submission were; 1) Potential for inclusion of local environmental groups in species specific conservation plans 2) Requested that a map of potentially suitable areas for such projects should be included in rehab plans 3) Promoted the idea of creating a biodiversity action plan that considers the use of site by all relevant stakeholders 4) Recommended following the NPWS community engagement strategy as it was largely successful in bring local communities along with restoration projects	BnM responded 25/01/2021, all issues raised will be consiered in future drafts of plan. Also, BnM advised that; 1) BnM have included DOC as an additional parameter on our suite of water monitoring analysis. 2) BnM are working with LAWCO and WFD to align the BNM monitoring programme with the EPA's 2021 Monitoring programme 3) BnM have an extensive community consultation process ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties
NPWS Regional Network	NPWS responded through e-mail thread on the 02, 03,07,09/12/2020 in relation to all PCAS bogs. The main points discussed were to advise of the requirement to investigate if assessment under the SEA and Birds directives for each site.	BnM acknowledged via e-mail to address queries on 09/12/2021. Also, a phone conversation with local NPWS Conservation Ranger on discussed biodiversity and rehabilitation measures on PCAS bogs including Clonad.
National Museum of Ireland (Irish Antiquities Division)	Responded through e-mail 28/12/2020 in relation to all PCAS bogs. Issues raised were; 1) The request that due diligence be taken during works to protect any archaeologically significant findings or areas 2) The NMI reiterated the importance of peatlands for the preservation of archaeology and requested they be consulted as part of any EIA undertaken	BnM acknowledged and responded via e-mail on 28/12/2020 to assure BnM will give due cognisance to all points within all rehabilitation plans for Clonad Bog. A virtual meeting on PCAS between BnM and NMI was held on 18/01/2021
Irish Farmers Association	Responded to consultation regarding Clonad and the PCAS project at large on multiple dates throughout ongoing discourse. Specific submission on Clonad Bog received from IFA 03/02/2021. Concerns raised were: 1) Potential for flooding on adjacent lands. 2) Health and Safety 3) Perceived potentially detrimental impact of PCAS on property value 4) Reiterated the desire of the IFA that people who have been cutting turf on bogs should retain this right.	A working group has been established at a high level between BnM and IFA on various issues including PCAS. A meeting was held between BnM and IFA representatives on 18/02/2021 to present details on PCAS. Dialogue is ongoing.
The Heritage Council	Responded to consultation via e-mail on 04/01/2021 asking for more information on PCAS in general and looking to be involved in any seminar or information events.	BnM responded via phone conversation on 11/01/2021. Dialogue is ongoing.
The Irish Wildlife Trust	Responded to consultation via e-mail on 01/02/2021 to acknowledge receipt of PCAS plans and indicate desire to make a submission. Submission received on 23/03/2021 supporting the PCAS scheme and specifically requesting: 1. Consideration of statutory protection for rehabilitated bogs; 2. Consideration for re-wilding in determining future habitats and species presence, including species re-introductions; 3. Appropriate monitoring is established.	BnM responded via email and phone throughout February and March. A virtual meeting/PCAS presentation was held for IWT on 17/02/2021. Dialogue is ongoing.
Trinity College	A researcher at Trinity College, Dublin, made a submission by e-mail 24/01/2021. The following points were raised; 1) Advised that the consultation phase of the project should be given more time 2) Advised that there is little evidence of pre-project and post-project measurement 3) Advised that further community engagement with local stakeholders and research based stakeholders would benefit the project	BnM acknowledged and will give due cognisance to all points raised in the submission by Trinity College Researcher in the rehabilitation plan for Clonad Bog. BnM raised responded via e-mail.

Dept. of Agriculture, Food & the Marine (DAFM)	Submission by e-mail to express support for PCAS in general. Submission recommended; 1) That local landowners and stakeholders be considered as part of the consultation process. 2) EIA assessment be carried out prior to PCAS works. 3) Hydrological assessments are carried out with a view to protecting adjoining lands from adverse impacts.	BnM acknowledged and responded via e-mail on 02/03/2021 to assure that all points raised within the submission will be considered. A virtual meeting/PCAS presentation was held for DAFM on 11/12/2020.
Butterfly Conservation Ireland	General comments 1) Alterations to the text of the rehab plan. 2) Request for all turf cutting on BnM land to end. 4) Suggest monitoring for Large Heath Butterfly or food plant Hare's-tail Cottongrass. 5) Suggested alterations to habitat design in rehab plan to further connect regional high bog habitats and create further raised bog habitat on site. Also, BCI reiterated need to protect valuable habitat such as species rich grassland 6) Advised BnM to ensure that quality habitats already found on site are not damaged by PCAs activities.	BnM acknowledged via e-mail; Phone conversation with BCI on 19/01/2021.
ICMSA (Irish Creamery Milk Suppliers Association)	Virtual meeting/PCAS presentation organised for 03/03/2021.	A meeting was held by BnM on 03/03/2021 to present details on PCAS to the ICMSA and members. Dialogue is ongoing.
University College Dublin	A researcher from UCD contacted BnM with a submission on PCAS. The researcher suggested that the rehabilitations contain a good level of detail regarding rehab but could be improved by including more detail on water table level monitoring and measuring.	BnM acknowledged and responded via e-mail to assure that all points raised within the submission will be considered in final draft of Clonad Bog rehabilitation plan.
NARGC	NARGC contacted BnM with a view to being included in the design process of the rehabilitation plans.	A meeting was held by BnM on 28/01/2021 to presentPCAS to the NARGC
Ervia - Water Supply Project Eastern and Midlands Region	A submission on the rehab plan for Clonad Bog was received from Ervia on 15/02/2021. The following points were raised within the submission; 1) Requested that the preferred route for the of a proposed pipeline corridor for the Water Supply Project-Eastern and Midlands region is displayed within the rehab plan 2) Ervia also expressed enthusiasm with regard to future consultation on PCAS at Clonad Bog.	BnM acknowledged and responded via e-mail on 16/02/2021 to assure that all points raised within the submission will be considered in final draft of Clonad Bog rehabilitation plan.
Irish Water	A submission on the rehab plan for Clonad Bog was received from irish Water on 15/02/2021. The following points were raised within the submission; 1) Irish water wished to express support for PCAS 2) IW recognised the potential for beneficial impacts of bog restoration on drinking water supplies 3) IW expressed the need to list the potential benefits of PCAS to regional drinking water supplies within the rehabilitation plans 4) IW expressed support for the increased water monitoring that will arise as part of PCAS	BnM acknowledged and responded via e-mail on 15/02/2021 to assure that all points raised within the submission will be considered in final draft of Clonad Bog rehabilitation plan.
Offaly County Council	Request for all draft rehabilitation plans in Co. Offaly.	BnM provided the requested documents. A virtual meeting, including a general PCAS presentation, was held for Offaly County Council on 10/02/2021
Offaly County Council	Offaly County Council e-mailed a submission to outline potential for integration of PCAS with opportunities regarding the Offaly County Council Inaugural Digital Strategy 2020-2022.	A meeting on Offaly's digital strategy was held between BnM and Offaly County Council on 04/03/2021.
Offaly County Council	Submission provided on behalf on Offaly County Council on a number of PCAS bogs including Pollagh on 22/02/2021. Key points raised were; 1) Requested that details of security fencing to be identified and detailed on plans. 2) Long term rehabilitation plan to be provided addressing above areas of consideration post 2024 if required. 3) Public Rights of Way access locations are to be maintained with relevant stakeholders and marked on drawings. 4) A number of technical issues with draft rehabilitation plans. 5) Advised BnM to carefully consider after use of bogs as part of PCAS	A virtual meeting/general presentation on PCAS to between BnM and Offaly Councillors and OCC personnel was conducted on 10/02/2021. BnM provided further PCAS documentation on request, via e-mail on 27/01/2021. Refer to Section 4 for response on issues raised. Dialogue with Offaly County Council is ongoing.

	6) Request that the impact of PCAS on surrounding roads be considered as part of rehabilitation plans. 7) Advised that long term management (post 2024) is considered by BnM. 8) Advised that Appropriate assessment and the habitats directive are taken into account by BnM. 9) Advised that BnM consider management of flooding & water pollution, fire risk, invasive species and waste management as part of PCAS.	
OPW	"A flood relief engineer for OPW contacted BnM to request rehab plans for Pollagh/Oughter. A submission on the rehabilitation of Pollagh/Oughter on behalf of several un-named concerned members of the Pollagh community was then made 23/01/2021. A number of concerns were raised in the submission; 1) The residents are unhappy with the low level of consultation undertaken by BnM for the project. 2) The perceived risks associated with altering the hydrological regime of the bog was highlighted and a request for detailed hydrological assessment was made 3) Request for details on the drainage management plans for the bog 4) Health and safety concerns were raised regarding high water levels on the rehabilitated bog 5) Request for clarification on post PCAS amenity use of bogs was made	BnM acknowledged and will give due cognisance to all points raised in the submission by OPW flood relief engineer in the rehabilitation plan for Pollagh/Oughter Bogs. BnM raised responded via e-mail.
Just Forests	Submission requesting information on the PCAS consultation phase.	BnM acknowledged and will give due cognisance to all points raised in the submission by Just Forests in the rehabilitation plan for Pollagh/Oughter Bogs. BnM raised responded via e-mail.

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.

BORD NA MÓNA Naturally Driven	**Procedure: ENV017**	**Rev: 1**
Title: Archaeological Findings	**Approved: EM**	**Date: 13/10/2020**

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 Rehabilitation at Clonad Bog. Dr. Charles Mount.

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

Report For

Bord Na Móna Energy Ltd.

Author

Dr. Charles Mount

Bord Na Móna Project Archaeologist

Introduction

The EPA (2002) *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 on c.447 hectares at Clonad, 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 Clonad 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.

Clonad Bog is located c.1.5km south of Daingean and south-east of the R402 road. The bog occupies the townlands of Ballycue, Ballyduff South, Ballynakill, Clonad, Gorteenkeel, Island Knockballyboy and Rathfeston on OS 6 inch sheet Offaly 18.

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 Clonad Bog. The extent of the rehabilitation area is indicated in Fig. 1. This area was examined using information from:

- The IAWU Peatland Survey
- Re-assessment Peatland Survey 2013
- The Bord na Móna excavation programme
- The Sites and Monuments Record that is maintained by the Dept of Housing, Local Government and Heritage
- 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 Clonad Bog before that date. This review established that there is one RMP situated in the proposed rehabilitation area (see table 1 and Fig. 1).

RMP_NO	Site type	Townland	N.G.R. E	N.G.R. N
OF018-016---	togher Site	Ballyduff South, Clonad	24624	22431

Table 1. List of RMP sites in Clonad Bog.

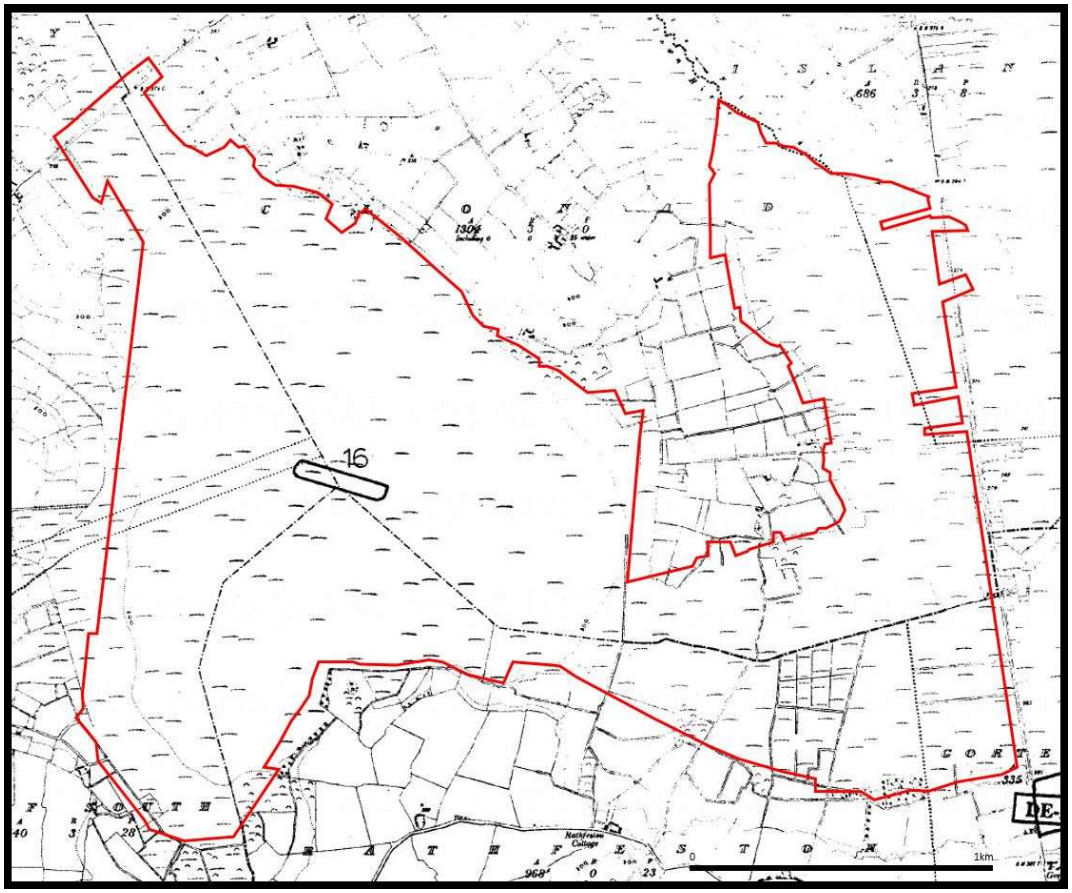

Fig. 1. Clonad Bog, Co. Offaly, detail of the Record of Monuments and Places map sheets No. 18. The proposed rehabilitation area is outlined with the red line. There is one Recorded Monument in the area.

Peatland survey

Clonad Bog was surveyed by the Irish Archaeological Wetland Unit in 2001 (IAWU 2002) as part of the Archaeological Survey of Ireland Peatland Survey Licence number 01E0424. A total of 61 sightings were identified and recorded and subsequently lodged in the records of the Archaeological Survey of Ireland (see Table 1). These consisted of 61 sightings including 19 worked wood, 35 toghers, 3 finds, 3 unworked wood and a complex of brushwood. The sightings were concentrated in three main groups in the north-western, south-western and south-central part of the bog.

SMR No.	Catalogue Code	County	Site Type	Depth below surface	N.G.R. E	N.G.R. N	2013 status
OF018-106----	OF-CLO 0001	Offaly	FIND	0.00	246671	223999	Gone
OF018-079----	OF-CLO 0002	Offaly	TOGHPRI	0.00	247295	223857	Gone
OF018-080----	OF-CLO 0003	Offaly	UWWIS	0.00	247307	223791	Gone

OF018-081----	OF-CLO 0004	Offaly	TOGHPRI	0.00	247257	223951	Gone
OF018-082----	OF-CLO 0005	Offaly	WWIS	0.00	247260	223981	Gone
OF018-083----	OF-CLO 0006	Offaly	WWIS	0.07	247244	223959	Gone
OF018-084----	OF-CLO 0007	Offaly	TOGHTER	0.00	247235	223858	Gone
OF018-085----	OF-CLO 0008	Offaly	WWIS	0.00	247175	223916	Gone
OF018-086----	OF-CLO 0009	Offaly	TOGHSEC	0.00	247184	223871	Gone
OF018-087----	OF-CLO 0010	Offaly	WWIS	0.00	247183	223871	Gone
OF018-088----	OF-CLO 0011	Offaly	TOGHTER	0.00	247176	223852	Gone
OF018-089----	OF-CLO 0012	Offaly	UWWIS	0.00	247174	223852	Gone
OF018-090----	OF-CLO 0013	Offaly	TOGHPRI	0.00	247254	223929	Gone
OF018-091----	OF-CLO 0014	Offaly	WWIS	0.00	247110	223898	Gone
OF018-092----	OF-CLO 0015	Offaly	WWIS	0.00	247003	223957	Gone
OF018-093----	OF-CLO 0016	Offaly	WWIS	0.00	246191	224525	Gone
OF018-094----	OF-CLO 0017	Offaly	WWIS	0.11	246287	224293	Gone
OF018-095----	OF-CLO 0018	Offaly	WWIS	0.00	247244	223854	Gone
OF018-096----	OF-CLO 0019	Offaly	WWIS	0.56	245953	225085	Gone
OF018-097----	OF-CLO 0020	Offaly	WWIS	0.00	245940	225071	Gone
OF018-098----	OF-CLO 0021	Offaly	TOGHTER	0.00	245926	225080	Gone
OF018-099----	OF-CLO 0022	Offaly	TOGHTER	0.20	247379	223802	Gone
OF018-100----	OF-CLO 0023	Offaly	UWWIS	0.00	247247	223886	Gone
OF018-101----	OF-CLO 0024	Offaly	TOGHTER	0.00	247134	223885	Gone
OF018-107----	OF-CLO 0025	Offaly	WWIS	0.00	247181	223842	Gone
OF018-103----	OF-CLO 0026	Offaly	WWIS	0.00	247193	223848	Gone
OF018-104----	OF-CLO 0027	Offaly	COMP	0.00	247240	224054	Gone
OF018-105----	OF-CLO 0028	Offaly	WWIS	0.15	247251	224030	Gone
-	OF-CLO 0029	Offaly	FIND	0.00	247000	223947	Gone
OF018-106----	OF-RFN 0001	Offaly	WWIS	0.67	247159	223765	Gone
OF018-107----	OF-RFN 0002	Offaly	WWIS	0.00	247158	223773	Gone
OF018-108----	OF-RFN 0003	Offaly	WWIS	0.00	246647	223795	Gone
OF018-109----	OF-RFN 0004	Offaly	TOGHTER	0.00	246646	223783	Gone
-	OF-RFN 0005	Offaly	FIND	0.00	246650	223753	Gone
OF018-110----	OF-RFN 0006	Offaly	TOGHTER	0.50	246589	223750	Gone
OF018-016----	OF-RFN 0007a-u	Offaly	TOGHPRI	0.00	246516	223762	Extant
OF018-111----	OF-RFN 0008	Offaly	TOGHTER	0.80	246466	223855	Gone
OF018-112----	OF-RFN 0009	Offaly	TOGHSEC	0.92	246431	223957	Gone
OF018-113----	OF-RFN 0010	Offaly	WWIS	0.45	246405	223999	Gone
OF018-114----	OF-RFN 0011	Offaly	TOGHTER	0.00	246400	224048	Gone
OF018-115----	OF-RFN 0012	Offaly	WWIS	0.00	246645	223778	Gone

Table 1. List of sites recorded by IAWU in Clonad Bog with SMR concordance.

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 10th of March 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 42 monuments entered in the SMR in the proposed rehabilitation area. The monuments are indicated in Table 2 and Fig. 2 below. These are all sightings identified by the Irish Archaeological Wetland Unit survey in 2001 and the Re-assessment Survey 2013 that were notified to the Archaeological Survey of Ireland with no additions.

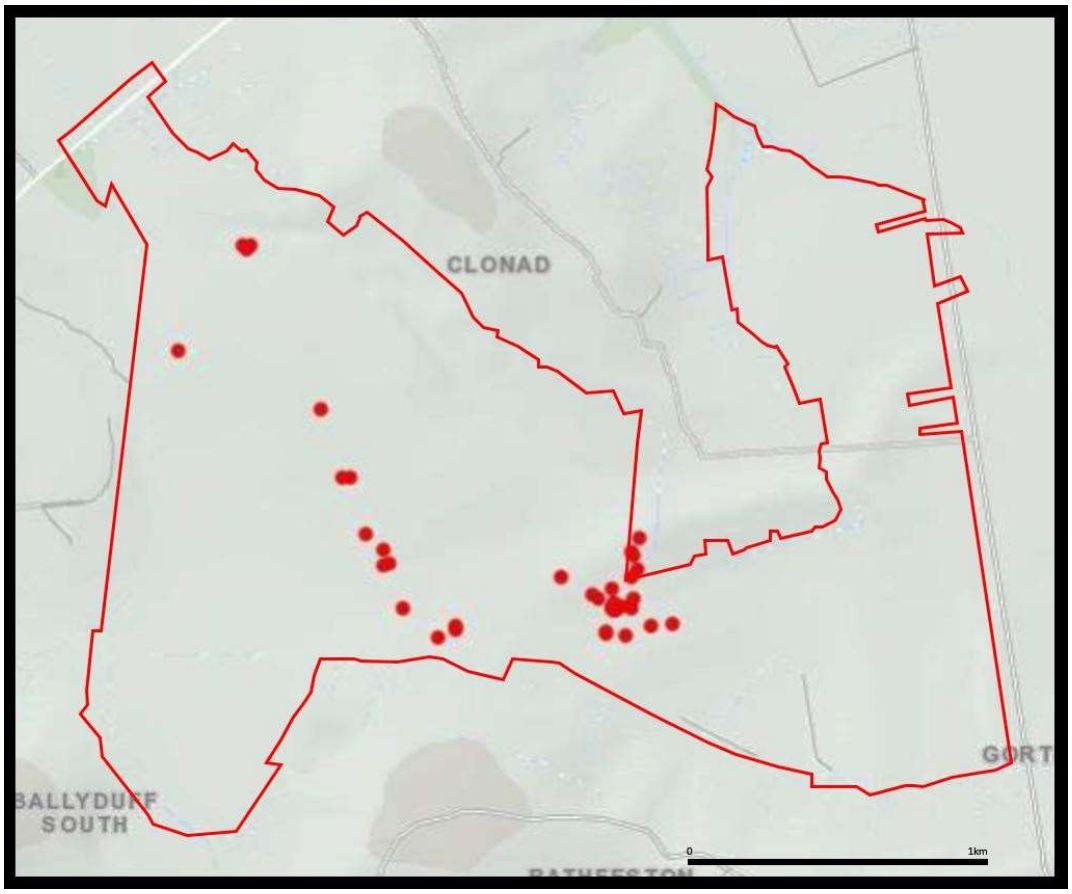

Fig. 2. Clonad Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the red line. There are a 42 SMRs in the area.

SMR No.	Catalogue Code	Site Type	Depth below surface	N.G.R. E	N.G.R. N
OF018-106----	OF-CLO 0001	FIND	0.00	246671	223999
OF018-079----	OF-CLO 0002	TOGHPRI	0.00	247295	223857
OF018-080----	OF-CLO 0003	UWWIS	0.00	247307	223791
OF018-081----	OF-CLO 0004	TOGHPRI	0.00	247257	223951
OF018-082----	OF-CLO 0005	WWIS	0.00	247260	223981
OF018-083----	OF-CLO 0006	WWIS	0.07	247244	223959
OF018-084----	OF-CLO 0007	TOGHTER	0.00	247235	223858
OF018-085----	OF-CLO 0008	WWIS	0.00	247175	223916
OF018-086----	OF-CLO 0009	TOGHSEC	0.00	247184	223871
OF018-087----	OF-CLO 0010	WWIS	0.00	247183	223871
OF018-088----	OF-CLO 0011	TOGHTER	0.00	247176	223852
OF018-089----	OF-CLO 0012	UWWIS	0.00	247174	223852
OF018-090----	OF-CLO 0013	TOGHPRI	0.00	247254	223929
OF018-091----	OF-CLO 0014	WWIS	0.00	247110	223898
OF018-092----	OF-CLO 0015	WWIS	0.00	247003	223957
OF018-093----	OF-CLO 0016	WWIS	0.00	246191	224525
OF018-094----	OF-CLO 0017	WWIS	0.11	246287	224293
OF018-095----	OF-CLO 0018	WWIS	0.00	247244	223854
OF018-096----	OF-CLO 0019	WWIS	0.56	245953	225085
OF018-097----	OF-CLO 0020	WWIS	0.00	245940	225071
OF018-098----	OF-CLO 0021	TOGHTER	0.00	245926	225080
OF018-099----	OF-CLO 0022	TOGHTER	0.20	247379	223802

OF018-100----	OF-CLO 0023	UWWIS	0.00	247247	223886
OF018-101----	OF-CLO 0024	TOGHTER	0.00	247134	223885
OF018-107----	OF-CLO 0025	WWIS	0.00	247181	223842
OF018-103----	OF-CLO 0026	WWIS	0.00	247193	223848
OF018-104----	OF-CLO 0027	COMP	0.00	247240	224054
OF018-105----	OF-CLO 0028	WWIS	0.15	247251	224030
-	OF-CLO 0029	FIND	0.00	247000	223947
OF018-106----	OF-RFN 0001	WWIS	0.67	247159	223765
OF018-107----	OF-RFN 0002	WWIS	0.00	247158	223773
OF018-108----	OF-RFN 0003	WWIS	0.00	246647	223795
OF018-109----	OF-RFN 0004	TOGHTER	0.00	246646	223783
-	OF-RFN 0005	FIND	0.00	246650	223753
OF018-110----	OF-RFN 0006	TOGHTER	0.50	246589	223750
OF018-016----	OF-RFN 0007	TOGHPRI	0.00	246516	223762
OF018-111----	OF-RFN 0008	TOGHTER	0.80	246466	223855
OF018-112----	OF-RFN 0009	TOGHSEC	0.92	246431	223957
OF018-113----	OF-RFN 0010	WWIS	0.45	246405	223999
OF018-114----	OF-RFN 0011	TOGHTER	0.00	246400	224048
OF018-115----	OF-RFN 0012	WWIS	0.00	246645	223778
OF018-200----	CND001a-c	Road - class 2 togher		245693	224737
OF018-202----	Cnd005	Platform - peatland		246341	224102
OF018-201----	Cnd006	Platform - peatland		247271	224088

Table 2. List of SMRs in Clonad Bog.

Re-assessment Peatland Survey 2013

The Re-assessment Survey of Clonad Bog was carried out in September 2013 (Whitaker 2014). 26 sightings of archaeological material were identified in 2013. 19 of the sightings were part of a single Road - class 1 togher OF-CND004a-s, originally identified in 2001 and catalogued by the IAWU as OF- RFN007a-u. The remainder were a Road-class 2 togher and Road-class 3 togher, a structure and platform – possible (see Table 3). The majority of sightings made by the IAWU 2001 survey were no longer extant in 2013 and only OF-CND004a-s (SMR OF018-106 and OF- RFN007a-u) survived. The majority of the monuments from 2013 are included in the SMR but not the individual sightings.

SMR	Site No.	Townland	Site Type	Depth BS m	Dept feature m	East.	North.
OF018-200----	CND001a	Knockballyboy	Road-class 2 togher	0.54	0.12	245693	224737
OF018-200----	CND001b	Knockballyboy	Road-class 2 togher	0	0.18	245707	224724
OF018-200----	CND001c	Knockballyboy	Road-class 2 togher	0	0.12	245719	224713
-	CND002	Knockballyboy	Structure	0	0.12	245695	224717
-	Cnd003	Knockballyboy	Road-class 3 togher	0	0.08	246016	224573
OF018-016----	Cnd004a	Rathfeston	Road-class 3 togher	0	0.45	246300	224217
OF018-016----	Cnd004b	Rathfeston	Road-class 1 togher	0	0.1	246334	224135
OF018-016----	Cnd004c	Rathfeston	Road-class 1 togher	0	0.18	246343	224119
OF018-016----	Cnd004d	Rathfeston	Road-class 1 togher	0	0.09	246349	224100
OF018-016----	Cnd004e	Rathfeston	Road-class 1 togher	0	0.2	246356	224094
OF018-016----	Cnd004f	Rathfeston	Road-class 1 togher	0	0.12	246366	224065
OF018-016----	Cnd004g	Rathfeston	Road-class 1 togher	0	0.08	246379	224038
OF018-016----	Cnd004h	Rathfeston	Road-class 1 togher	0	0.12	246378	224036
OF018-016----	Cnd004i	Rathfeston	Road-class 1 togher	0	0.14	246400	223994
OF018-016----	Cnd004j	Rathfeston	Road-class 1 togher	0	0.13	246417	223966
OF018-016----	Cnd004k	Rathfeston	Road-class 1 togher	0	0.06	246423	223953
OF018-016----	Cnd004l	Rathfeston	Road-class 1 togher	0.12	0.12	246430	223929
OF018-016----	Cnd004m	Rathfeston	Road-class 1 togher	0	0.45	246441	223906
OF018-016----	Cnd004n	Rathfeston	Road-class 1 togher	0	0.09	246457	223875
OF018-016----	Cnd004o	Rathfeston	Road-class 1 togher	0	0.13	246475	223843
OF018-016----	Cnd004p	Rathfeston	Road-class 1 togher	0	0.09	246487	223815
OF018-016----	Cnd004q	Rathfeston	Road-class 1 togher	0	0.2	246494	220800
OF018-016----	Cnd004r	Rathfeston	Road-class 1 togher	0	0.3	246506	223785
OF018-016----	Cnd004s	Rathfeston	Road-class 1 togher	0	0.13	246519	223762
OF018-202----	Cnd005	Rathfeston	Platform - possible	0.14	0.56	246341	224102

OF018-201----	Cnd006	Clonad	Road-class 3 togher	0.13	0.18	247212	224119

Table 3. List of sightings in Clonad Bog recorded by the Re-assessment Peatland Survey 2013.

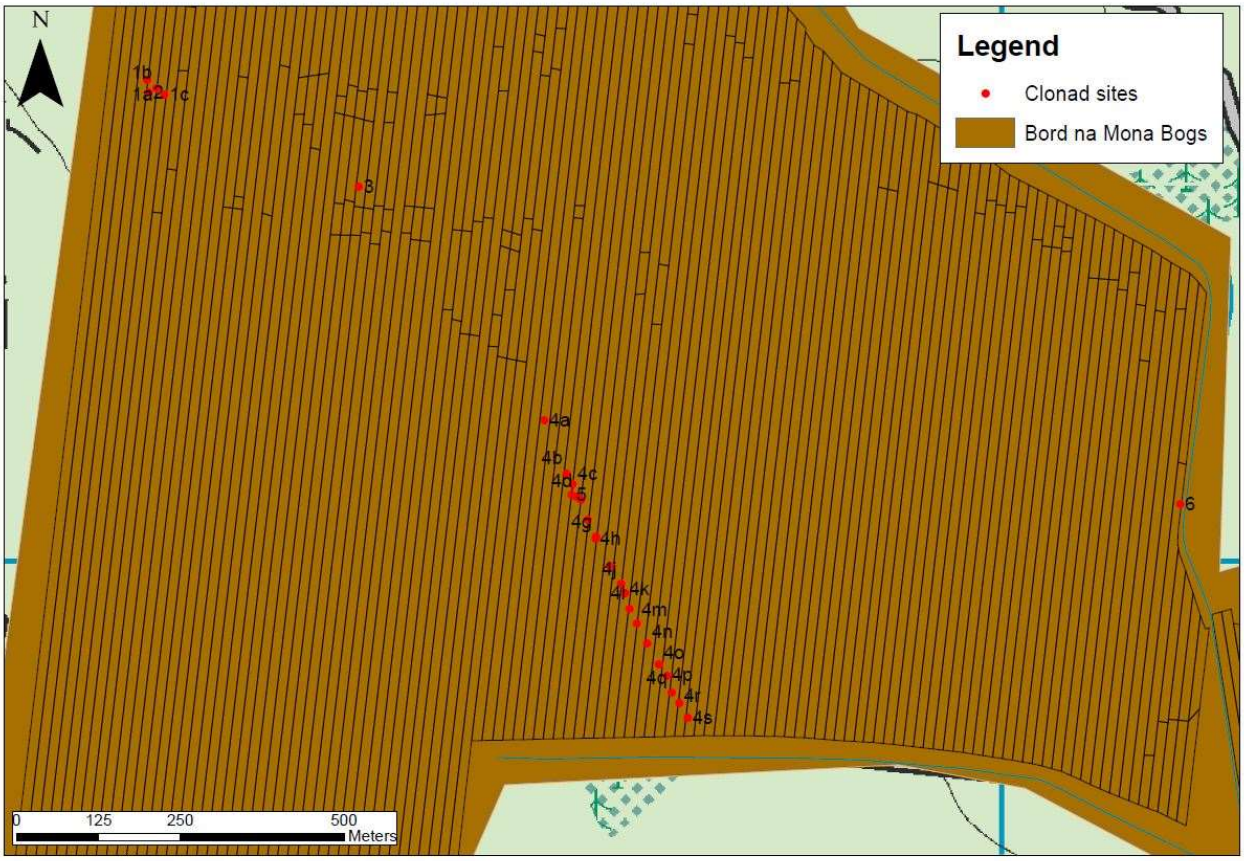

Fig. 3. Clonad Bog, Co. Offaly, map showing the locations of the sightings of archaeological material made by the Re-assessment Peatland Survey 2013.

Archaeological investigations

In 2004 seven of the sightings identified in the Irish Archaeological Wetland Unit in 2001 were investigated by Eoin Corcoran of ADS Ltd under eight licences (04E0723, 04E0724, 04E0725, 04E0726 04E0727 and 04E0729) (see Table 4). An eighth sighting, OF-CLO0024 (Licence 04E0729), was found when investigated to no longer exist (Whitaker and Corcoran 2019). In 2014 four of the sightings identified in the Re-assessment Peatland Survey 2013 were investigated by Jane Whitaker of IAC Ltd under three licences (14E0353, 14E0354 and14E0355 (see Table 4) (Whitaker 2017).

SMR No	Catalogue No.	Townland	licence	Site type
OF018-104	OF-CLO0027	Clonad	04E0729	Archaeological complex
OF018-186	OF-CLO0009	Clonad	04E0726	Road – Class 2 togher
OF018-090	OF-CLO0013	Clonad	04E0727	Road – Class 1 togher
OF018-081	OF-CLO0004	Clonad	04E0724	Road – Class 1 togher
OF018-016	OF-RFN0007	Rathfeston	04E0722	Road – Class 1 togher
OF018-079	OF-CLO0002	Clonad	04E0723	Road – Class 1 togher
OF018-084	OF-CLO0007	Clonad	04E0725	Road – Class 3 togher

OF018-101	OF-CLO0024	Clonad	04E0728	Possible Road – Class 3 togher
OF018-200----	OF-CND001	Knockballyboy	14E0355	Road – Class 2 togher
OF018-202----	OF-CND005	Rathfeston	14E0354	Platform – possible
OF018-201----	OF-CND006	Clonad	14E0353	Road – Class 3 togher

Table 4. List of licensed excavations carried out in Clonad Bog.

Reported finds

The topographical files of the National Museum of Ireland were searched for records of finds from the bog in April 2021 (thanks to Isabella Mulhall). There are a large number of finds known from the bog (see table 5).

Townland	Museum No.	Description
Ballyduff South	2013:137	Bog butter. Ballyduff South Td. OS Sheet 18. ITM co-ordinates: 645383/723729
Ballyduff South	2013:138	Large wooden roughout. Ballyduff South. OS Sheet 18. ITM co-ordinates: 645689/723731
Ballynakill	2002E839:7	Wooden Shaft
Ballynakill	2010:325	Bog butter
Ballynakill	2010:326	Bark Container
Ballynakill	2010:423	Bog butter
Ballynakill	2010:424	Plant remains
Ballynakill	2013:139	Plant remains
Clonad	2011:242	Degraded portion of cow horn. Exact find spot unknown. "From Clonad Bog".
Gorteenkeel	1972:70	Wooden plank
Gorteenkeel	1972:71	Wooden sleeper
Gorteenkeel	1972:72	Wooden sleeper
Gorteenkeel	1972:73	Wooden stake
Gorteenkeel	IA/88/1974	Bog butter
Island	2007:40	Bog butter. Island Td
Rathfeston	1944:199	Polished stone axehead. OS Sheet 18.
Rathfeston	1974:104	Decorated rotary quern fragment. Find circumstances: "surface find in boggy filed". OS Sheet 18.
Rathfeston	2000:58	Bog Butter. OS Sheet 18. 43.3 from West and 19.4 from South
Rathfeston	2000:59	Wooden vessel (associated with bog butter 2000:58 above).

Table 5. List of archaeological finds from Clonad Bog reported to the National Museum of Ireland.

Previous assessments

Clonad Bog has been the subject of an Environmental Impact Assessment Report caried 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 monuments identified in the IAWU 2001 survey and the Re-assessment Peatland Survey 2013 and noted that there was a very high potential for archaeological features to be uncovered during the course of any future development works in Mountlucas Bog.

Impact assessment

There are 68 known sightings of archaeology in the rehabilitation area. Using the 2020 Lidar data that recorded the depths of peat removed since 2008, and averaging depth of peat removed at each sighting since 2013, it has been calculated that only four of the sightings are now extant or possibly extant (see Tables 6 and 7).

SMR	Site No.	Townland	Site Type	Depth BS m	Depth feature m	Peat removed since Sept 2013	East.	North.	Sighting status
OF018-200----	CND001a	Knockballyboy	Road-class 2 togher	0.54	0.12	0.49	245693	224737	Extant
OF018-200----	CND001b	Knockballyboy	Road-class 2 togher	0	0.18	0.13	245707	224724	Poss. extant
OF018-200----	CND001c	Knockballyboy	Road-class 2 togher	0	0.12	0.35	245719	224713	Gone
-	CND002	Knockballyboy	Structure	0	0.12	0.60	245695	224717	Gone
-	Cnd003	Knockballyboy	Road-class 3 togher	0	0.08	0.38	246016	224573	Gone
OF018-016----	Cnd004a	Rathfeston	Road-class 3 togher	0	0.45	0.43	246300	224217	Poss. extant
OF018-016----	Cnd004b	Rathfeston	Road-class 1 togher	0	0.1	0.39	246334	224135	Gone
OF018-016----	Cnd004c	Rathfeston	Road-class 1 togher	0	0.18	0.65	246343	224119	Gone
OF018-016----	Cnd004d	Rathfeston	Road-class 1 togher	0	0.09	0.60	246349	224100	Gone
OF018-016----	Cnd004e	Rathfeston	Road-class 1 togher	0	0.2	0.68	246356	224094	Gone
OF018-016----	Cnd004f	Rathfeston	Road-class 1 togher	0	0.12	0.34	246366	224065	Gone
OF018-016----	Cnd004g	Rathfeston	Road-class 1 togher	0	0.08	0.56	246379	224038	Gone
OF018-016----	Cnd004h	Rathfeston	Road-class 1 togher	0	0.12	0.73	246378	224036	Gone
OF018-016----	Cnd004i	Rathfeston	Road-class 1 togher	0	0.14	0.53	246400	223994	Gone
OF018-016----	Cnd004j	Rathfeston	Road-class 1 togher	0	0.13	0.52	246417	223966	Gone
OF018-016----	Cnd004k	Rathfeston	Road-class 1 togher	0	0.06	0.64	246423	223953	Gone
OF018-016----	Cnd004l	Rathfeston	Road-class 1 togher	0.12	0.12	0.70	246430	223929	Gone
OF018-016----	Cnd004m	Rathfeston	Road-class 1 togher	0	0.45	0.66	246441	223906	Gone
OF018-016----	Cnd004n	Rathfeston	Road-class 1 togher	0	0.09	0.69	246457	223875	Gone
OF018-016----	Cnd004o	Rathfeston	Road-class 1 togher	0	0.13	0.80	246475	223843	Gone
OF018-016----	Cnd004p	Rathfeston	Road-class 1 togher	0	0.09	0.55	264487	223626	Gone
OF018-016----	Cnd004q	Rathfeston	Road-class 1 togher	0	0.2	0.55	246494	220800	Gone
OF018-016----	Cnd004r	Rathfeston	Road-class 1 togher	0	0.3	0.61	246506	223785	Gone
OF018-016----	Cnd004s	Rathfeston	Road-class 1 togher	0	0.13	0.64	246519	223762	Gone
OF018-202----	Cnd005	Rathfeston	Platform - possible	0.14	0.56	0.70	246341	224102	Poss. extant
OF018-201----	Cnd006	Clonad	Road-class 3 togher	0.13	0.18	0.61	247271	224088	Gone

Table 6. List of sightings in Clonad Bog recorded by the Re-assessment Peatland Survey Sept 2013 with depth of peat removed by harvesting since that date.

SMR	Site No.	Townland	Site Type	Depth BS m	Dept feature m	Amount removed since Sept 2013	East.	North.	Sighting status
OF018-200----	CND001a	Knockballyboy	Road-class 2 togher	0.54	0.12	0.49	245693	224737	Extant
OF018-200----	CND001b	Knockballyboy	Road-class 2 togher	0	0.18	0.13	245707	224724	Poss. extant
OF018-016----	Cnd004a	Rathfeston	Road-class 3 togher	0	0.45	0.43	246300	224217	Poss. extant
OF018-202----	Cnd005	Rathfeston	Platform - possible	0.14	0.56	0.70	246341	224102	Poss. extant

Table 7. List of extant or possibly extant sightings in Clonad Bog.

Recommendations

The four extant or possibly extant sightings identified in Table 7 should be avoided by the rehabilitation works. The areas of these monuments should be avoided by the regeneration works with a 20m buffer. There are a large number of finds known from the bog. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should also 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 are 68 known known sightings of archaeological heritage in the rehabilitation area of which four are extant or possibly extant. All the surviving sightings of archaeology identified in Table 7 should be avoided by the rehabilitation works with a 20m buffer. There are a large number of finds known from the 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

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

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