# BORD NA MÓNA

# Cutaway Bog Decommissioning and Rehabilitation Plan

## Screening Report for Appropriate Assessment

## Cavemount Bog,

## Co. Offaly

**April 2021**

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# ***DOCUMENT APPROVAL***

| | | |
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| | **Prepared by** | **Reviewed by** | **Approved by** |
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| Date<br>April 2021 | Signature | Signature | Signature |

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# 1. SCREENING REPORT FOR APPROPRIATE ASSESSMENT

Bord na Móna have in recent years permanently ceased industrial peat production on a significant area of bog. In line with Bord na Móna's accelerated decarbonization strategy, the company has also committed to ambitious enhanced peatland decommissioning and rehabilitation improvements.

This strategy has been developed to optimise benefits of peatland rehabilitation and restoration for climate action. In addition, it will also have benefits for biodiversity, water (catchment management) and other ecosystem services. These improvements are in line with the Government Climate Action agenda and will bring with it, significant natural capital benefits. It will also create a stable natural landscape for the benefit of neighbours and local communities in former peat production areas.

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen-Clonsast Bog group (Ref. P0503-01). As part of the condition 10.2 of the IPC license, decommissioning and rehabilitation of cutaway boglands is required. Cavemount bog, located within the above group, is also to be subject to the above referenced improvements as part of a scheme titled the Peatland Climate Action Scheme (hereafter PCAS). The pertinent detail per BnM bog for both requirements under IPC license condition 10.2 and the proposed PCAS is described in a decommissioning and rehabilitation plan (hereafter 'plan' or 'the plan'), as required under Condition 10.2 of the respective IPC license. It is this plan which forms the subject of the appraisal herein.

The general objective of peatland rehabilitation is to ensure environmental stabilisation of the former industrial peat production areas. Enhanced rehabilitation focuses on optimizing suitable hydrological conditions (stable water levels close to the surface) by blocking production field drains, and other measures as described in the appended plan. This will create soggy peatland conditions that will be naturally colonised by plants and animals and will allow compatible peatland habitats to re-develop. It will also slow water movement across these bogs.

The enhanced decommissioning to be carried out on the bogs as part of the PCAS includes typically the clean-up of the bog, the cleaning of silt ponds, the management of peat stockpiles via levelling, the decommissioning and de-gassing of mobile fuel tanks, and the removal of buildings (generally porto-cabins).

This Screening Report for Appropriate Assessment has been prepared by Jennings O'Donovan and Partners Limited and contains sufficient objective scientific information to facilitate the competent public authority to determine whether the decommissioning and rehabilitation outlined in the plan referenced above requires Appropriate Assessment, or whether the potential for significant effects on any designated European Site can be excluded.

## 1.1 Appropriate Assessment Process

Under Article 6(3) of the Habitats Directive, an Appropriate Assessment of the implications of any plan or project on a European Site is required before a project is approved. This must include all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect the conservation objectives of that European Site, in the light of the best scientific knowledge in the field. The competent national authorities are to authorise a plan, project or activity only if they have made certain that it will not adversely affect the integrity of any European Site.

This current document comprises reporting to determine whether Appropriate Assessment is required. The Screening must identify whether the project, alone or in combination with other plans and projects, is likely to have significant effects on any European Site in view of the qualifying interests and conservation objectives of these sites; or whether the potential for such significant effects can be excluded. This test is completed with cognisance of emerging case law.

### 1.1.1 Stages of the Appropriate Assessment Process

Appropriate Assessment involves a number of steps and tests that are applied using a stage-by-stage approach. Each step or stage in the assessment process precedes and provides a basis for other steps. The four stages in an Appropriate Assessment (AA), are further described below.

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2009). These guidance documents identify a staged approach to conducting an AA, as shown in **Figure 1**.

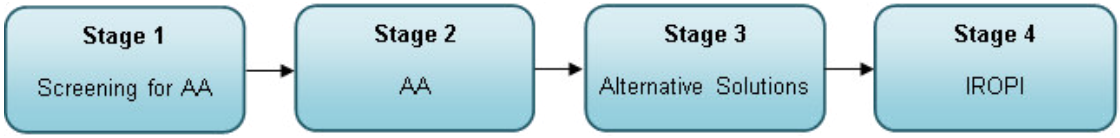


**Figure 1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DEHLG, 2009).**

#### 1.1.1.1 Stage 1 - Screening for AA

This stage examines the likely effects of a project either alone or in combination with other projects upon a European site and considers whether it can be objectively concluded that these effects will not be significant.

#### 1.1.1.2 Stage 2 – Appropriate Assessment

In this stage, the impact of the project on the integrity of the European site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.

#### 1.1.1.3 Stage 3 - Alternative Solutions

Should the Appropriate Assessment determine that adverse impacts are likely upon a European site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts. For the avoidance of doubt, no reliance is placed on Stage 3.

#### 1.1.1.4 Stage 4 - IROPI

Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the European site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass. In any event, the proponent does not purport to place any reliance on Stage 4.

## 1.2 Guidelines; Project Approach & Baseline Surveys

1.2.1 Guidelines & Project Approach

The preparation of this Screening for Appropriate Assessment Report has had regard to;

- EU Habitats Directive (92/43/EEC),
- EU Birds Directive (Council Directive (2009/147/EC)
- European Communities (Birds and Natural Habitats) Regulations 2011,
- Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission 2001,
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (2010).
- Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC, European Commission, 2018.
- *Cavemount Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021* (2021) as prepared by BnM – see Appendix B of this document.

For the avoidance of doubt, within this appraisal, no reliance is made on existing mitigation measures which form part of current or previous industrial peat production. The scope of this appraisal refers to the proposed decommissioning and rehabilitation only, as described in the Plan included as Appendix B.

1.2.2 Desktop Review

The Biodiversity baseline information presented in this report was collated from site investigations and field surveys, along with publicly available online resources including from the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Service (NPWS) online webpage, which are regularly updated. Cavemount Bog is not an IWeBs site and is not monitored by BirdWatch Ireland as part of the IWeBS network.

Records held by the NBDC for protected species relevant to European Sites (i.e. Annex 2 species, special conservation interest bird species; waterbirds) in the wider area surrounding Cavemount Bog were obtained from the four tetrads (i.e. 2km grid squares): N52E; N52J; N53A; and N53F. Protected species records held by the NPWS were also obtained for Cavemount Bog and are listed in Table 1 below.

**Table 1: Annex 1 Bird Species; Waterbirds; & Annex 2 species Recorded in the Tetrads and Hectads within which Cavemount Bog is located**

| Location | Species Group | Species |
|---|---|---|
| N52E<br>N53A | bird | Grey Heron (*Ardea cinerea*) |
| N53A | bird | Mallard (*Anas platyrhynchos*) |
| N53A | bird | Mute Swan (*Cygnus olor*) |
| N53F | bird | Common Sandpiper (*Actitis hypoleucos*) |
| N53F | bird | Whooper Swan (*Cygnus cygnus*) |
| N52E<br>N52J<br>N53A<br>N53F | terrestrial mammal | European Otter (*Lutra lutra*) |

1.2.3 Baseline Surveys

**1.2.3.1 Habitats & Fauna**

A range of baseline surveys have previously been completed at Cavemount Bog by Bord na Mona. As part of the formulation of the Cavemount Bog Rehabilitation Plan ecological field surveys were completed between 2010 and 2020. Habitat and fauna surveys were completed on the 13th august 2010; during October 2013; and again during 2017. Targeted winter bird surveys were completed throughout the 2012 – 2013 non-breeding season; 2013 – 2014 non-breeding season; 2013 breeding season; and 2014 breeding season.

Surveys to inform the current Appropriate Assessment reporting were completed by JOD on the following dates: 21st February 2021; 30th March 2021, and 13th April 2021.

The habitat and fauna surveys completed between 2010 to 2017 were based on an Extended Phase 1 Habitat Survey which involved walking the bog, identifying and mapping habitats, recording all birds seen and heard and recording all signs of non-volant protected mammals during the survey.

The non-breeding and breeding season surveys completed between 2012 and 2014 were detailed bird surveys that involved multiple visits to Cavemount Bog during each month of the non-breeding and breeding season (Biosphere Environmental Services, 2013, 2014 & 2015)).

The field surveys completed in 2021 involved a transect of the bog to record bird species, and particularly wetland birds and bird species that are listed as special conservation interest bird species of European Sites . The 2021 surveys also involved a survey of all silt ponds on site, and the section of the Esker Stream flowing through the site, for the presence of otter holts, couches and field signs.

Habitats were identified and mapped during the 2012 – 2020 field surveys and a detailed description of the field survey results is provided as Appendix III Ecological Survey Report to the Cavemount Rehabilitation Plan 2021. Figure 4 provides a habitat map of Cavemount Bog. Following the completion of these surveys the most common habitats present at Cavemount Bog identified as:

- Bare peat.
- Pioneer dry heath communities
- Emerging birch scrub
- Small patches of open water
- Dry heath
- Gorse scrub
- Silt Ponds with associated habitats such as scrub, Bracken, rank grassland, dry calcareous grassland and typical pioneer communities of disturbed areas.

The most common habitats present around the margins at this site include:

- Conifer plantation
- Birch woodland
- Scrub (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog
- Dense bracken
- Cutover bog (several small fragments)
- Improved grassland
- Depositing river

Bird species, that are listed on Annex 1 of the Birds Directive and waterbirds, recorded during the non-breeding season surveys of 2012 and 2013 are summarised in Table 2 below.

**Table 2: Annex 1 Birds Species & Waterbirds Recorded during Non-Breeding Season Surveys**

| 2012/2013 | 2013/2014 |
|---|---|
| Whooper swan (peak no. of 129 recorded – one short of the threshold for national importance | Whooper swan (peak no. of 259 recorded – exceeded the threshold for international importance which is 210) |
| Mute Swan (peak no. of 2) | Hen harrier (flying over the site) |
| Greylag Goose ((peak no. of 1) | Merlin (flying over the site) |
| Grey heron ((peak no. of 2) | Peregrine (flying over the site) |
| Mallard (peak no. of 6 | Golden plover (flying over the site) |
| Teal (peak no. of 5) | Lapwing (peak no. of 58) |
| | Mute Swan (peak no. of 9) |
| | Greylag Goose ((peak no. of 6) |
| | Grey heron (peak no. of 2) |
| | Mallard (peak no. of 35) |
| | Teal (peak no. of 5) |
| | Wigeon (peak no. of 60) |
| | Pintail (peak no. of 2) |
| | Little Grebe |
| | Black-headed Gull (peak no. of 28) |

Bird species, that are listed as special conservation interest bird species of SPAs, recorded during the breeding season surveys of 2013 and 2014 are summarised in Table 2 below.

**Table 3: Annex 1 Birds Species & Waterbirds Recorded during Breeding Season Surveys**

| 2013 | 2014 |
|---|---|
| Merlin (non-breeding) | Mute Swan (1 pair) |
| Redshank (1 pair) | Greylag Goose (1 pair) |
| Mute Swan (2 pair) | Teal (1 pair) |
| Teal (1 pair) | Wigeon (1 pair) |
| Little Grebe (1 pair) | Tufted Duck (1 pair) |
| Water Rail | Little Grebe (3 pair) |

| | |
|---|---|
| Ringed Plover (7 pair) | Peregrine (non-breeding) |
| Lapwing (9 pair) | Moorhen (2 pair) |
| | Coot (3 pair) |
| | Ringed Plover (5 pair) |
| | Lapwing (6 pair) |
| | Redshank (2 pair) |
| | Greenshank (non-breeding) |
| | Black-headed Gull (160 pair) |

The results of the non-breeding surveys in 2012/2013 and 2013/2014 found that Cavemount is of significant importance for whooper swan, while the breeding season surveys found the bog to be of significant conservation importance for breeding birds with a breeding colony of Black-headed Gull being of particular significance.

During the 2021 surveys in February and March no whooper swans were observed in the flooded areas of the eastern section of the bog where they were previously observed during the 2012/2013 and 2013/2014 non-breeding seasons. Mallards were recorded in the western section of the bog, with 2 recorded on flooded bog and a maximum number of 3 recorded from silt pond No. 124; a maximum of 2 recorded from silt pond No. 125; and a maximum of 3 were recorded from silt pond no. 127 (Figure 2 shows the location of the mallard observations and silt ponds).

The silt ponds and the Esker Stream flowing through the project site offer suitable foraging habitat for kingfisher. There is no suitable nesting habitat for kingfisher occurring within the project site. Kingfisher have not been recorded at the project site during field surveys and there are no previous records for this species in the wider area surrounding the project site.

The following mammal species (or their field signs) have been recorded at Cavemount Bog between the 2010 and 2021 surveys:

- Badger
- Fox
- Rabbit
- Hare
- Mink
- Otter

Within the boundary of Cavemount Bog the onsite silt ponds and the Esker Stream represent suitable habitat for supporting otters and their holts and couches. During the 2021 surveys at

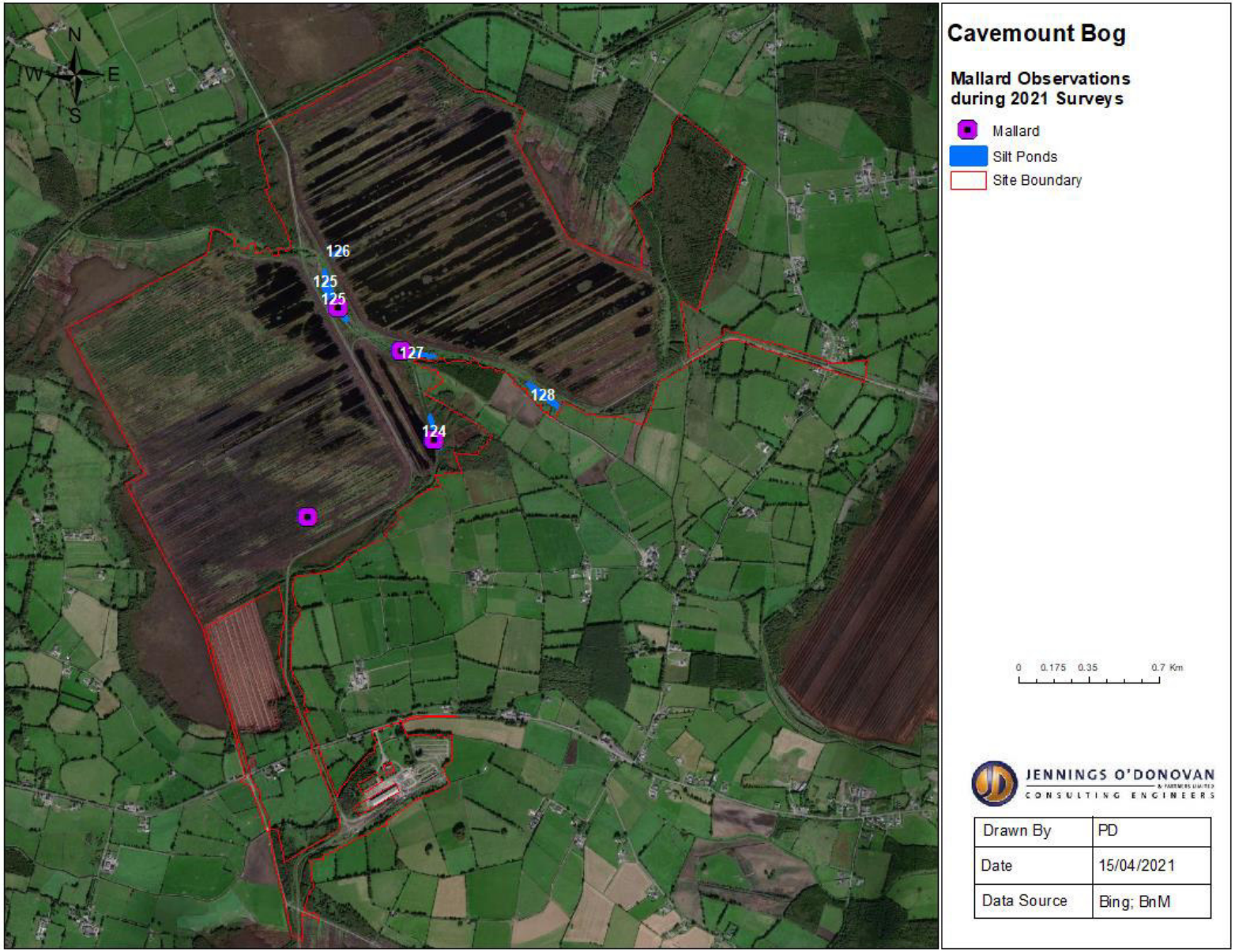


**Figure 2: Mallard Observations during 2021 surveys**

Cavemount Bog, each of the 5 silt ponds on site were surveyed for the presence of otter holts and couches as well as field signs indicating the presence of otters. The section of the Esker Stream flowing through the site was also surveyed for field signs indicating the presence of otters. No definitive signs of otters were recorded at any of the 5 silt ponds occurring at the Cavemount Bog.

The Esker Stream is located at the head of the River Barrow catchment. The upstream reaches of the River Barrow catchment where Cavemount Bog is located do not support spawning fish species such as Atlantic salmon and lamprey species due to the presence of artificial barriers blocking the upstream migration of these species. There are no records for white-clawed crayfish within the Esker Stream. White-clawed crayfish have been recorded from the Philipstown River approximately 3.5km downstream from Cavemount Bog.

Cavemount Bog is located in a catchment that has been identified as a freshwater pearl mussel sensitive catchment. However, there are no records for freshwater pearl mussel occurring within the Barrow catchment. Freshwater pearl mussel occur within the River Nore catchment, which drains into the River Barrow catchment.

#### 1.2.3.2 Cavemount Bog Silt Pond Water Quality

In accordance with the existing Integrated Pollution Control licence for Cavemount Bog, all drainage water is discharged via an appropriately designed silt pond treatment arrangement as required in Condition 6.6. of the licence.

There are 5 silt ponds at Cavemount Bog and each of these are inspected and maintained in accordance with the licence. Cavemount bog surface water outlets discharge to the Esker Stream.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 1.42 mg/l and COD 100mg/l.

An analysis of monitoring over the past 5 years of the IPC licence environmental monitoring at discharge points from this bog indicate that results were under the ELV for SS and trigger level for ammonia and COD. See Table 1 below.

**Table 4: EPA Monitoring data (EPA) for the previous five-years in relation to Cavemount Bog**

| Bog | SW | Monitoring | pH | SS | TS | Ammonia | TP | COD | Colour |
|---|---|---|---|---|---|---|---|---|---|
| Cavemount | SW-20 | Q4 18 | 7.8 | 5 | 298 | 0.02 | 0.05 | 85 | 325 |
| Cavemount | SW-22 | Q4 18 | 7.4 | 5 | 252 | 0.08 | 0.05 | 73 | 270 |
| Cavemount | SW-22A | Q4 18 | 7.6 | 5 | 272 | 0.16 | 0.05 | 75 | 89 |
| Cavemount | SW-20 | Q1 17 | 8.1 | 5 | 260 | 0.07 | 0.08 | 56 | 132 |
| Cavemount | SW-20 | Q1 2020 | 7.7 | 4 | 216 | 0.063 | 0.06 | 78 | 262 |
| Cavemount | SW-22 | Q1 2020 | 7 | 2 | 137 | 0.118 | 0.06 | 84 | 297 |
| Cavemount | SW-22A | Q1 2020 | 7.2 | 2 | 150 | 0.087 | 0.06 | 84 | 285 |

### 1.3 Certainty and Sufficiency of Data Provided

All field survey work was carried out by qualified and experienced ecologists, and in line with Best Practice.

In addition, where required, or possible, specific data requests have been made to NPWS via the online data request facility, specifically with regards to records of sensitive species.

Further sources of data which were reviewed included previously commissioned baseline reporting of Bord na Mona Bog Groups, reporting to inform Bord na Mona wind farm proposals, and any available Bord na Mona wind farm monitoring reports where it was deemed there was overlap with the current scope of PCAS activities. Citations are provided at the end of this report for any reports which have been referenced.

For the avoidance of doubt, due regard has been given to the passage of time & any changes to the baseline environment in the interim period were considered by a suitably qualified ecologist; visits to inform the current appraisal were used as ground-truthing exercises to confirm the relevance or not of any previously defined baseline.

In the most part, due the continuation of industrial Peat Extraction by Bord na Mona up to and including the year 2015, it was considered that habitats at many of the bogs under consideration remained relatively unchanged from the point at which many prior baseline surveys were undertaken, and therefore, it is considered that data presented in prior baseline reporting was of relevance.

# 2. STAGE 1 SCREENING

## 2.1 Screening Evaluation Process

The Screening process examines the likely effects of the described Cavemount Bog decommissioning and rehabilitation, as described in the appended 'plan' (Appendix B), either alone or in combination with other projects or plans, upon any European Site and considers whether it can be objectively concluded that these effects will not be significant. The Screening evaluation comprises four steps, as outlined in the diagram below:

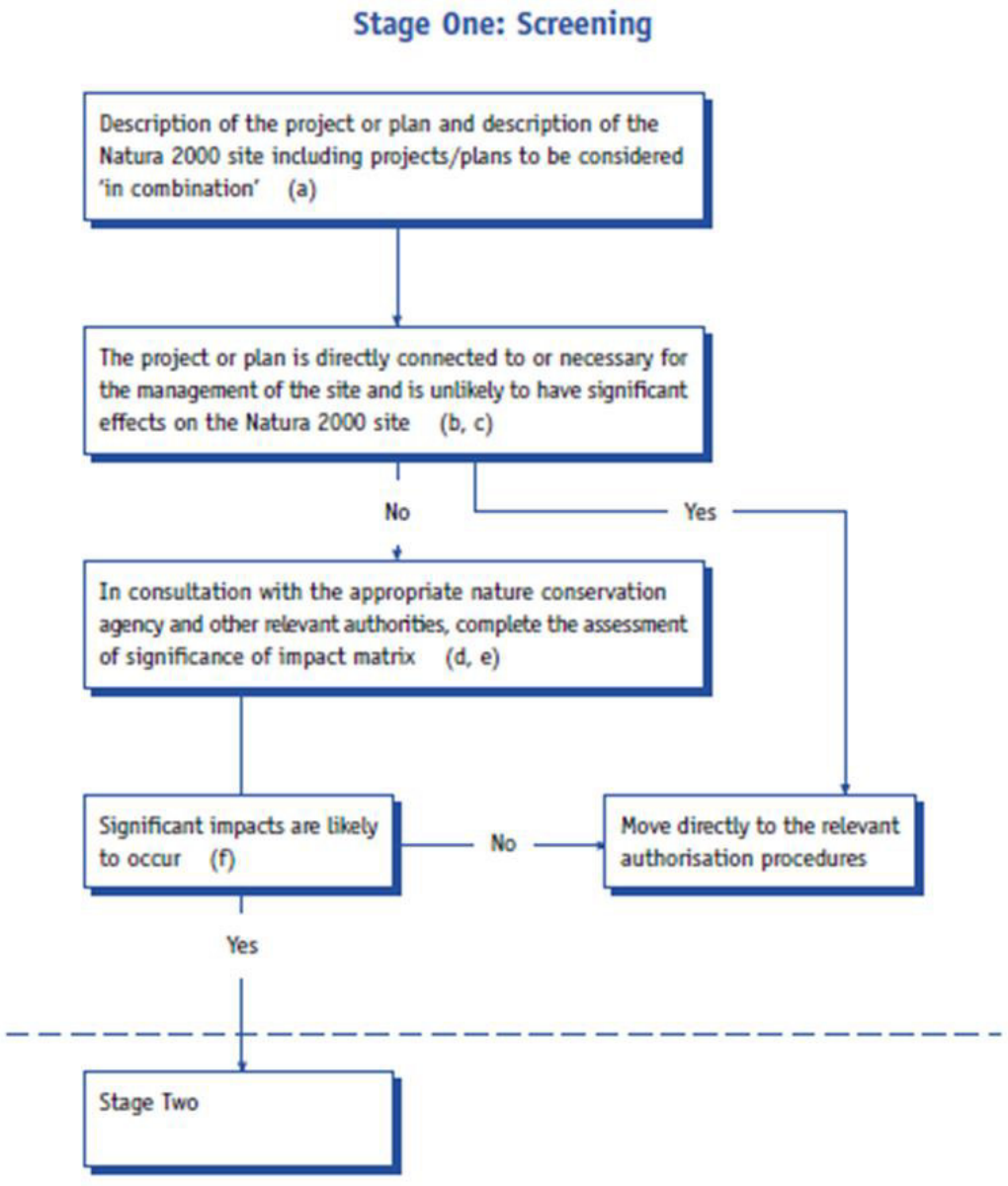


**Figure 3: Stage 1 Screening**

## 2.2 Overview of Cavemount Bog Decommissioning and Rehabilitation

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen-Clonsast Bog group (Ref. P0503-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the cutaway bog lands within the licensed area. Cavemount bog is part of the Allen-Clonsast bog group. Cavemount Bog is located in Co. Offaly.

A document titled '*Cavemount Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021'* has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at Cavemount Bog and is appended to this document as Appendix B.

It is proposed by Government that Bord na Móna carry out a PCAS on peatlands previously used for energy production. The additional costs of the proposed Scheme will be supported by Government through the Climate Action Fund. Bord na Móna have identified a footprint of 33,000 ha (a subset of the BnM estate that has been used for energy production) as peatlands suitable for enhanced rehabilitation – including Cavemount Bog. This proposed Scheme will significantly go beyond what is required to meet rehabilitation obligations under existing EPA IPC licence conditions.

**Decommissioning** seeks to address condition 10.1 of license Ref. P0503-01, which 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.*

Decommissioning must take place at each bog prior to or concurrent with rehabilitation – the scale of decommissioning per bog varies dependant on the items/ infrastructure previously in place to facilitate prior peat extraction.

Enhanced decommissioning as part of the PCAS will enhance the future after use of the bog for amenity value, security against access for illegal and unsocial activities and general State and community benefit.

**Rehabilitation** seeks to address the requirements of Condition 10.2 of IPC License Ref. P0503-01, and is based on a reference document prepared by BNM per Bog for which the IPC license is applicable. See the following extract from 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."*

Cavemount Bog was originally developed for peat production in the 1970's. Industrial peat production completely ceased at Cavemount Bog in 2015. The peat was harvested for use in Edenderry Power Station and Derrinlough Briquette Factory, Co. Offaly. The primary rehabilitation goal and outcome for Cavemount Bog is **environmental stabilisation** of the bog. Enhanced Rehabilitation interventions supported by the above referenced 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.

## 2.3 Screening Evaluation: Is the Project Directly Connected to or Necessary for Management of a European Site?

For a project or plan to be 'directly connected with or necessary to the management of the site', the 'management' component must refer to management measures that are for conservation purposes, and the 'directly' element refers to measures that are solely conceived for the conservation management of a site and not direct or indirect consequences of other activities.

**Finding: No, the proposed Cavemount Bog Decommissioning and Rehabilitation is not directly connected to or necessary for the management of a European Site.**

## 2.4 Description of the Proposed Decommissioning and Rehabilitation

### 2.4.1 Location, Size, Scale and Landover

#### 2.4.1.1 Location

Cavemount Bog is located in Co. Offaly, approximately 3km north east of the village of Daingean and 2km south west of the village of Rhode. The bog lies adjacent to the south side of the Grand Canal pNHA (see Figure 4). The surrounding landscape is a mosaic of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting.

The Esker Stream flows south through the centre of the bog, acting as a dividing boundary between the eastern and western sections. The Tobardaly River flows southwards around the eastern bog boundary before joing the Esker River south of the site. The Esker River then joins the Daingean River approximately 4.5km south east of Cavemount Bog.

The majority of the eastern section of the bog remains flood throughout the winter season, while much of the western section is also inundated throughout the winter season. Figure 5 indicates the extent of surface water flooding at the bog during the 2015/2016 winter season, while Plate 1 & 2 shows widespread flooding at the site during 2008 and again during 2021 winter seasons.

See **Figure 4: Site Location of Cavemount Bog.**

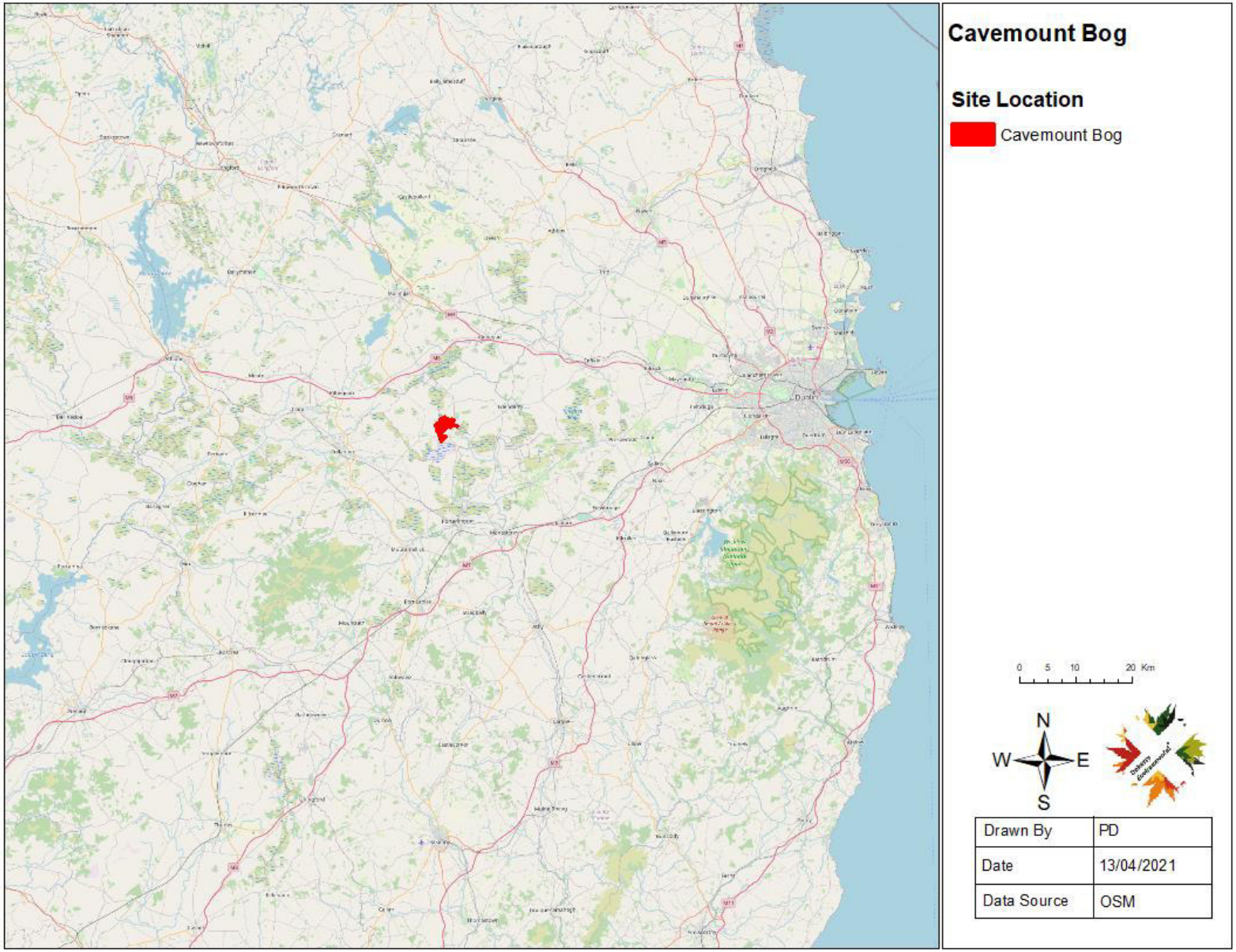


**Figure 4: Site Location of Cavemount Bog**

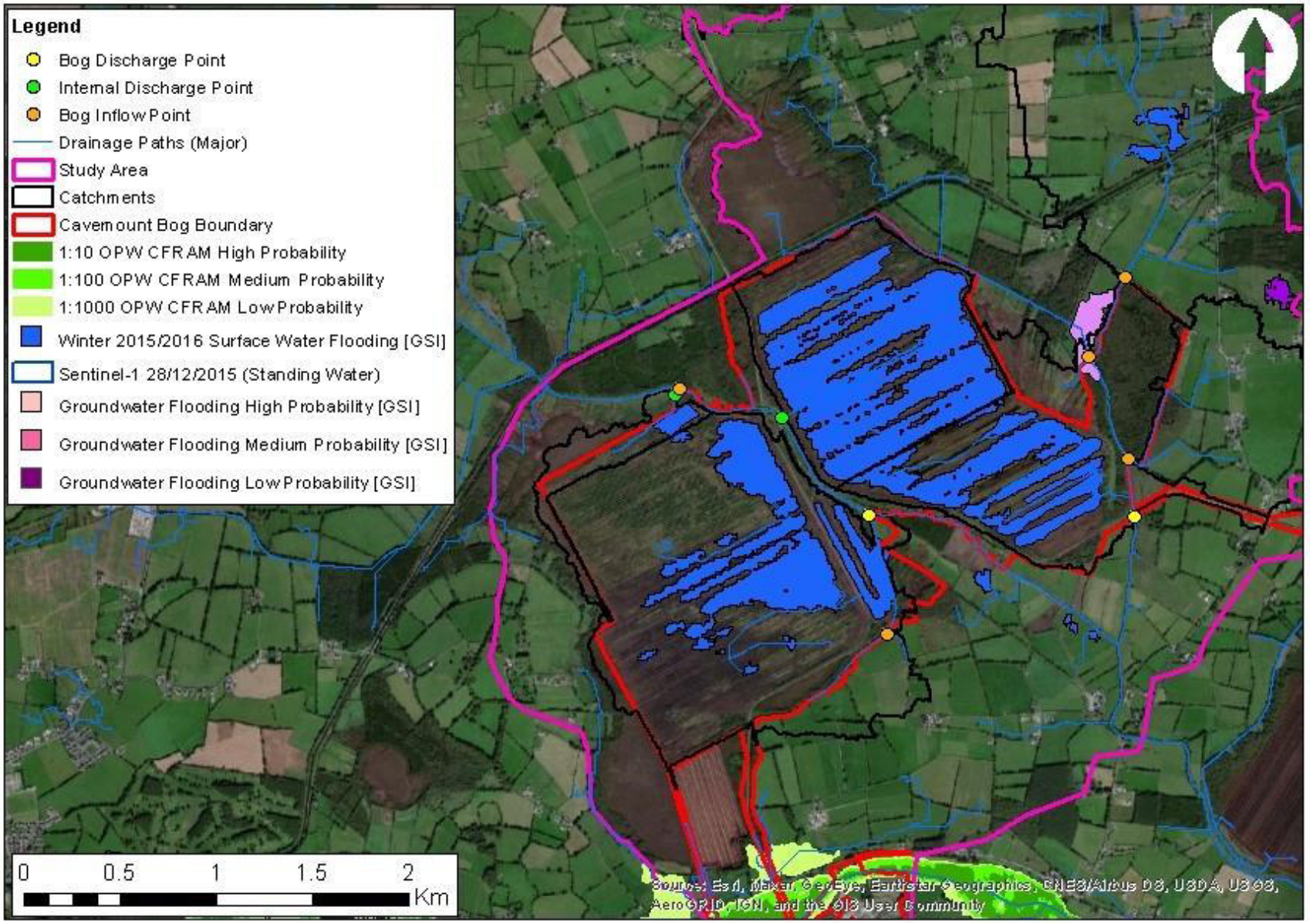


**Figure 5: Views of mapped extent of flooding during the 2015/2016 winter season**

**Plate 1: View of Flooding during 2008 winter season**

**Plate 2: View of flooding during 2021 season**

#### 2.4.1.2 Size, Scale, Landcover

**Size and Scale**: The area of Cavemount Bog, including Annaghbeg bog, comprises 518Ha in total.

Cavemount Bog (production area) is mainly composed of bare peat as the entire bog was in active peat production until very recently (See Appendix B). There are some remnant sections of raised bog still present but these are generally small. Due to the seasonally flood nature of the bog a mosaic of wetland habitats is now developing on the bog since the cessation of peat production activities.

There is a section of land located on the east of Cavemount Bog used by Coilte for forestry. This land parcel is outside the scope of this rehab plan.

The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner. Cavemount has been selected to part of the EPA-funded and TCD-led SmartBog Research Project.

A small area on the site was designated as a Birch woodland development compensatory area as part of a Forest Service Felling Licence that was granted for the clearance of Birch woodland and scrub at Mountlucas Windfarm. Birch woodland is developing naturally in this area.

The underlying geology at Cavemount Bog Dark Limestone and Shale, Thick Limestone and Oolithic Limestone[1]. The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'.

The majority of Cavemount Bog has been cutaway. Fen peat and exposed underlying sub-soil are now exposed across the site. Peat depths (2015) generally vary across the site. Approximately 75% of the site has a peat depth of <1m. A small proportion of the site has deeper residual peat (> 2 m) and is located at western part of the site.

In terms of size and scale, **decommissioning** at Cavemount Bog includes:

- The clean up of the bog
- the cleaning of existing silt ponds (five no.)
- the decommissioning and Removal of a Porto-cabin tea centre and a further materials store
- decommissioning and de-gassing mobile fuel tanks
- peat stockpile management via levelling
- the de-sludging of an existing septic tank

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

- restricting access to the bog.

Enhanced decommissioning measures at Cavemount Bog will include the removal of rail lines, where feasible the decommissioning of railway level crossing and where feasible the remocal of high voltage power lines.

The total area of Cavemount Bog is 513.6Ha. All lands occurring within Cavemount Bog will be subject to **enhanced rehabilitation** measures/activities.

**Landcover**

Existing:

Cavemount bog is divided into two main cutaway sections by the Esker River, each forming a shallow basin. Habitats present on the former production area of Cavemount Bog are listed here in order of dominance; poor fen mosaics dominated Bog Cotton, poor fen dominated by Bottle Sedge and Soft Rush, wet scrub, emerging Birch scrub, open water with surrounding emergent poor fen vegetation, Reed swamp and bare peat. The marginal habitats include: conifer plantation (Coillte plantation), Birch woodland, scrub (gorse and Birch scrub developing of dry high bog around margins), raised bog, cutover bog, improved grassland (minor areas along boundaries where boundary overlaps adjacent fields) and depositing river (Esker Stream).

A habitat map of Cavemount Bog is shown in Figure 6.

Extent of Landcover requiring Decommissioning: Decommissioning will be applicable across all of Cavemount Bog.

Extent of Landcover requiring Rehabilitation: The total area of Cavemount Bog that will be subject to the PCAS is 513.6Ha which represents the entirety of the landcover within the bog site.

Future Landcover: Future land-use at Cavemount has not been defined by Bord na Móna. Biodiversity and ecosystem services have been identified as the current primary land use at Cavemount Bog. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Cavemount Bog will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of the Cavemount Bog PCAS.

The enhanced rehabilitation measures at Cavemount Bog are expected to result in the development of 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.

The proposed rehabilitation will mean that environmental stabilization is achieved (meaning IPC obligations are met) and, in addition, significant other positive quality effects particularly for climate action will be accrued.

In general, the key rehabilitation objectives for Cavemount Bog are **environmental stabilisation** of the site via **optimising climate action benefits**. This is defined as:

- Carrying out intensive rehabilitation with the application of a combination of enhanced rehabilitation measures (including drain-blocking, re-profiling, cell-bunding, fertiliser application, seeding of vegetation &, inoculation of *Sphagnum*).
- Optimising hydrological conditions for the development of embryonic *Sphagnum*-rich vegetation communities and eventually naturally functioning wetland and peatland habitats.
- Stabilisation or reduction in water quality parameters (e.g. suspended solids).
- Environmental stabilisation.
- Setting the site on an appropriate trajectory to enable the development of *Sphagnum*-rich raised bog vegetation communities and naturally functioning peatland and wetland habitats over time. It is not expected that the bog 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). 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 such as bog woodland will develop in a wider mosaic that relates to underlying conditions. It will take some time for stable naturally functioning habitats to fully develop at Cavemount Bog.

**Hydrology**

Cavemount Bog has a gravity drainage regime. Part of Cavemount West had part-pumped drainage at the end of its production life. This pumping was stopped and the pump removed when peat extraction stopped in 2015.

Initial hydrological modelling indicates that Cavemount East is a large basin that has capacity to develop wetland habitats. Cavemount West has areas that are modelled as re-wetting along with drier more elevated areas. It is likely that a portion of these basins will re-wet with deeper water, creating a mosaic of wetland habitats, and the site will be prone to seasonal inundation. Anecdotally, Cavemount Bog has always had a significant spring influence and was difficult to drain in places. There is likely to be alkaline influence on the water chemistry of the ground water of a portion of this bog due to exposed underlying marls that are highly alkaline or sub-soils that are limestone-based. This is particularly prevalent in Cavemount East, where there are also frequent ecological indicators of alkaline water chemistry (some rich fen indicators).

Cavemount Bog is located in the River Barrow Catchment. It is located within the Figile sub-catchment and this sub-catchment as well as the Barrow_SC_040 sub-catchment separate it

from the main channel of the River Barrow and the River Barrow & River Nore SAC downstream. The bog had field drains running in a approximate east- west orientation. The drains directed water flow toward six onsite silt ponds. Field drains on the east side of the site are now largely non-functional while some field drains on the west side of the site have been blocked. Silt ponds are present on site to manage discharges to neighbouring watercourses. After filtration/silt reduction is complete, water is discharged into the central channel of the Esker Stream.

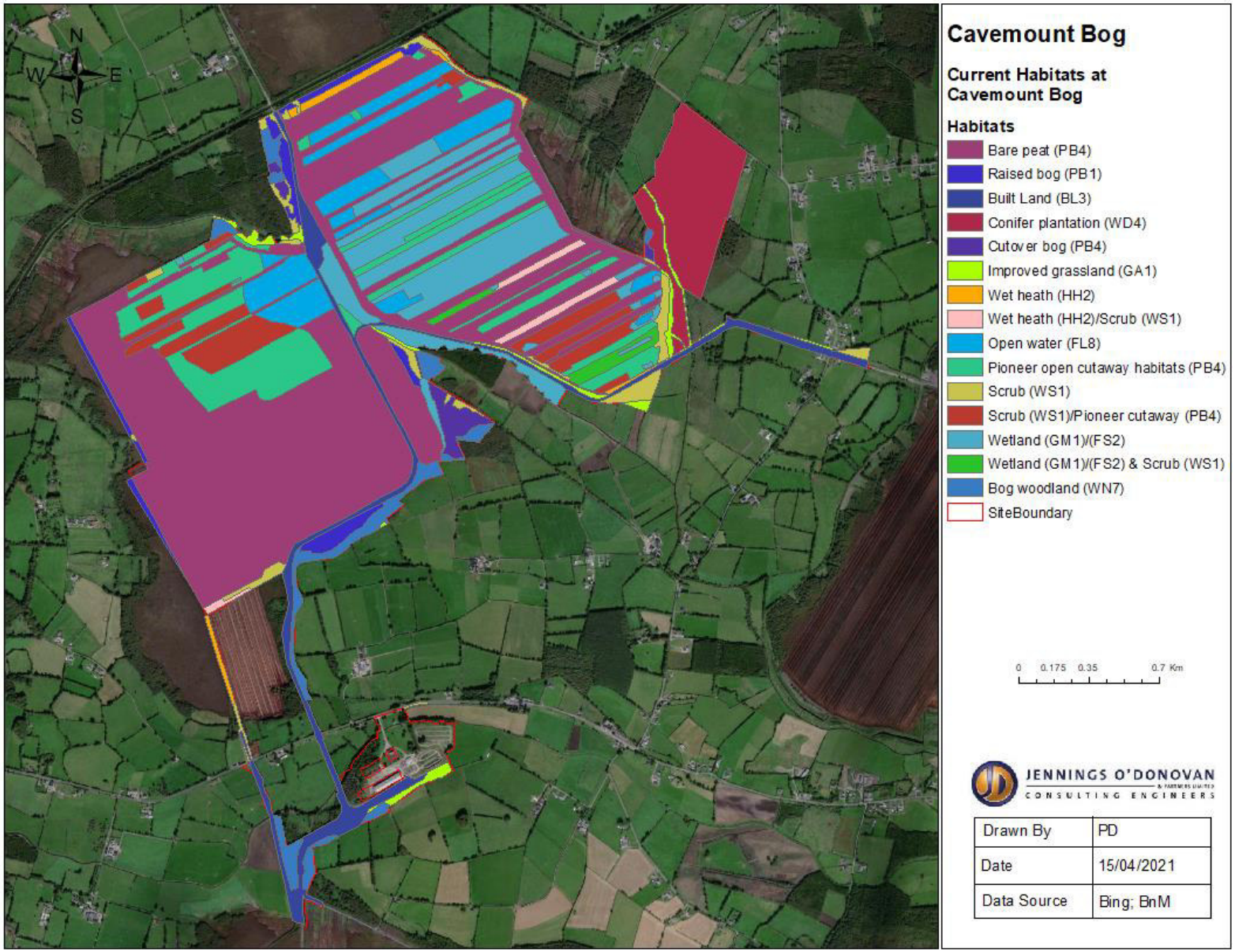


**Figure 6: Current Habitats at Cavemount Bog**

2.4.2 Application of Protective Measures in the Screening Evaluation

The Screening evaluation to inform the AA process, presented in Section 2.8 below, has been carried out in the absence of any protective measures or mitigation measures considered to avoid harmful effects on European Sites.

2.4.3 Decommissioning and Rehabilitation Stage

The proposed **decommissioning** at Cavemount Bog includes the cleaning of existing silt ponds, the decommissioning and removal of a Porto-cabin tea centre and a further materials store, decommissioning and de-gassing mobile fuel tanks, and peat stockpile management via levelling. Further measures may include the lifting of the existing rail line, decommissioning of existing level crossings and measures to restrict access to the bog.

The proposed Cavemount Bog rehabilitation comprises a series of bespoke (to Cavemount Bog) interventions designed to stabilise the existing baseline and meet compliance with the requirements of the existing EPA, IPC License and the proposed PCAS. Prescriptive measures are unique to the existing baseline habitats and comprise 3 no. broad categories, 1) those associated with (exposed) Deep Peat; 2) measures associated with the creation of wetland habitats, along the former route of the stream through the centre of the bog, and 3) measures associated with marginal lands, such as access roads, improved grassland around the periphery of the bog and lands on which private turbary is currently practised. The aim of Rehabilitation is as much as possible to place existing peatlands on a trajectory towards a naturally functioning peatland system (Renou-Wilson 2012).

#### 2.4.3.1 Decommissioning and Rehabilitation Access

Access will be through the existing entrance at Cavemount, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction. Alternative access to the bog is available at Cavemount. No change to baseline conditions to facilitate access for either decommissioning or rehabilitation is required.

#### 2.4.3.2 Standard Methodology for Decommissioning

**Decommissioning** at Cavemount will involve the deployment of a work crew to collect and oversee the removal of any remaining plant or potentially contaminating waste left *in situ* in line with Condition 7 of License Ref. P0503-01. This condition specifically requires that BnM's procedures for the 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 the IPC license 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 EPA. Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the EPA, 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.

A full record, which shall be open to inspection by authorized persons of the EPA at all times, shall be kept by the licensee (BnM) on matters relating to the waste management operations and practices at Cavemount. This record shall as a minimum contain details of the following:

- The names of the agent and transporter of the waste
- The name of the persons responsible for the ultimate disposal/recovery of the waste
- The ultimate destination of the waste
- Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site
- 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
- Details of any rejected consignments

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for Cavemount Bog. As required by the license, these waste items will be removed for recycling or disposal, using external contractors with the required waste collection permits, with waste records maintained as required. Where possible, Bord Na Móna will utilize the appropriate waste hierarchy to identify waste that can reused or recycled ahead of disposal.

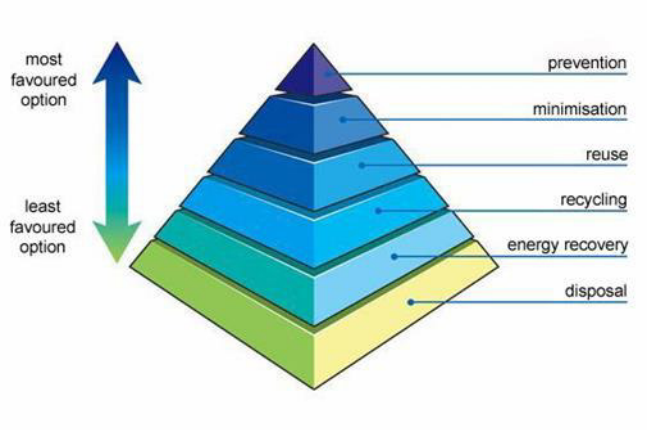


**Figure 7: Waste Hierarchy**

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 license.

Decommissioning may also include measures to restrict access to the bog or silt ponds.

Regarding the lifting of rail lines this will be facilitated by a manual work crew either a) loading rail line components onto a trailer and removing a) direct to contractor, b) to a consolidation area via tractor, prior to disposal, or c) utilizing the rail line itself to remove the components in reverse order onto a locomotive trailer, with again, the parts being delivered up the rail line to to be stored and/or disposed of, in line with IPC license conditions.

Peat stockpiles: Any existing peat stockpiles that are unsalable will be required to be decommissioned and rehabilitated into the adjoining fields ('levelling'), from where it was originally harvested. This process first involves the associated silt pond being cleaned if necessary, the stockpile field drains blocked to capture any run-off, with blockages every 100m. The peat is then deposited by dozer onto the adjoining field and blocked drain, where it is cambered and compacted.

Decommissioning and De-Gassing Mobile Fuel Tanks: These tanks are first emptied of any usable fuel and then degassed using a suitable hazardous waste contractor, with appropriate certification provided. The tank is then either removed for reuse or recycling or retained within the bund as a site asset. In addition, the concrete bund is cleaned and any hazardous wastes generated are removed by hazardous waste contractor. Any remaining concrete bunds, once cleaned and deemed as an infrastructural asset to the site will be retained.

Decommission and Removal of Porto-cabin tea centre and materials store: Tea-centres were used to provide canteen and welfare facilities for bog operations and are either a concrete building, a portacabin or older prefabricated older bee hive units and typically contain tables and chairs, a fridge, lockers, cabinets, sinks and other fixtures and fittings. All basic fixtures and fittings will be retained with all other general waste or unused items removed and disposed to skips for removal off-site.

Regarding the (porto-cabin) materials store onsite once all oil barrels and associated bunded trays have been removed, this store is decommissioned in line with the above.

De-sludging of Septic Tanks: The septic tank at the bog will be desludged by a licenced contractor. All sludge material will be transported off-site for treatment and disposal at an appropriately licenced facility.

Bog area clean up: These bog areas include the parking spaces for production plant and equipment, locations for storing rail line, drainage pipes and stockpile covering. All remaining or unconsolidated old and unused polythene will be collected for recycling or disposal, depending on condition. Any remaining older and immobile plant will be brought in from bog and removed off site. Any remaining hazardous waste oils, fluids and batteries will be removed off site by qualified appropriate hazardous waste contractors. All remaining unused drainage pipes will be

gathered up for reuse, recycling or disposal. All remaining, unconsolidated unused rail line sections will be collected from the bog and stored at the main access location for dismantling.

#### 2.4.3.3 Standard Methodology for Rehabilitation Activities

The rehabilitation plan for Cavemount Bog 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 guidance issued by the EPA in November 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 site visits and monitoring and desktop analysis forms the basis for the development of the rehabilitation plan for the bog, along with:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016)
- Significant international engagement during this period with other counties in relation to best-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
- The development of a **Methodology Paper (draft) outlining the proposed Scheme (PCAS)**. The rehabilitation plan (provided as Appendix B to this report) 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 Cavemount Bog, in particular, optimising **climate action benefits**.
- **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.
- 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-Clonsast Bog Group Integrated Pollution Control Licence
- Allen-Clonsast Bog Group Annual Environmental Reports

- Review of the National Biodiversity Data Centre (NBDC) webmapper
- Inland Fisheries Ireland (IFI) Reports
- Environmental Protection Agency database (www.epa.ie)
- EPA Guidance on Requests for Alterations to a Licensed Industrial or Waste Activity
- BirdWatch Ireland online data (including I-WeBS and CBS datasets; www.birdwatchireland.ie)
- Geological Survey of Ireland - National Draft Bedrock Aquifer map
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie)
- 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

See the Rehabilitation plan included as Appendix B

- **Consultation**

A number of stakeholders were identified and contacted during the rehabilitation planning process for their views. See Appendix B.

- **Field Surveys**

See Section 1.1.1 above for an overview of the field surveys completed at Cavemount Bog that are used to inform this screening report for PCAS at Cavemount Bog.

Rehabilitation Packages

The key interventions to be applied for the restoration/rehabilitation of Cavemount Bog is re-wetting peat to encourage natural colonisation of typical vegetation and the development of *Sphagnum*-rich peat-forming vegetation communities. This requires managing water-levels close to the surface of the peat for most of the year (100mm ± 50mm). Several different approaches can be taken to this type of restoration/rehabilitation, and 10 rehabilitation prescriptions types with different rehabilitation/restoration intensities to implement the PCAS at Cavemount Bog are proposed (see Table 5 which lists the rehabilitation prescriptions types that will be implemented at Cavemount Bog): Figure 8 shows the locations at Cavemount Bog where these prescription types will be applied.

**Table 5: Rehabilitation Categories**

| Type | | Enhanced Rehabilitation Measure | Extent (Ha) |
|---|---|---|---|
| Deep peat | DPT4 | Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation | 16.7 |
| Wetland | 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 | 7.8 |
| Wetland | 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 | 252.5 |
| Wetland | WLT4 | More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes | 41.7 |
| Marginal land | MLT1 | No work required | 116.0 |
| Silt ponds | MLT1 | Silt ponds | 1.0 |
| Dry Cutaway | DCT1 | Blocking outfalls and managing water levels with overflow pipes | 12.1 |
| Dry Cutaway | DCT2 | Regular drain blocking (max 3/100m) +blocking outfalls and managing water levels with overflow pipes+ targeted fertiliser treatment | 58.0 |
| Archaeology | ARCH | Areas with archaeology | 0.1 |
| Constraint | Constraint | Other Constraints (ROW/pNHA) | 7.6 |
| **Total** | | | **513.6** |

The constituent methodologies which combine to form each respective rehabilitation package are further described below, namely:

1. Regular Drain Blocking (3/100m) (Speed Bump method using Dozer–DCT2)
2. Modifying Outfalls (DPT4, DCT1, DCT2, Riparian) & Managing Water levels (Overflow pipes/raised pipe culverts/blocking outfalls)
3. Field Reprofiling (DPT3 variations and variant on DPT4)
4. Berms and field reprofiling (45m x 60m cell) (Variant on DPT4)
5. Drainage channels
6. Sphagnum Inoculation (DPT4)

In addition, PCAS activities will include:

7. Riparian Measures
8. Silt Pond Cleaning
9. Retention of Hydraulic Breaks (DMP measure)

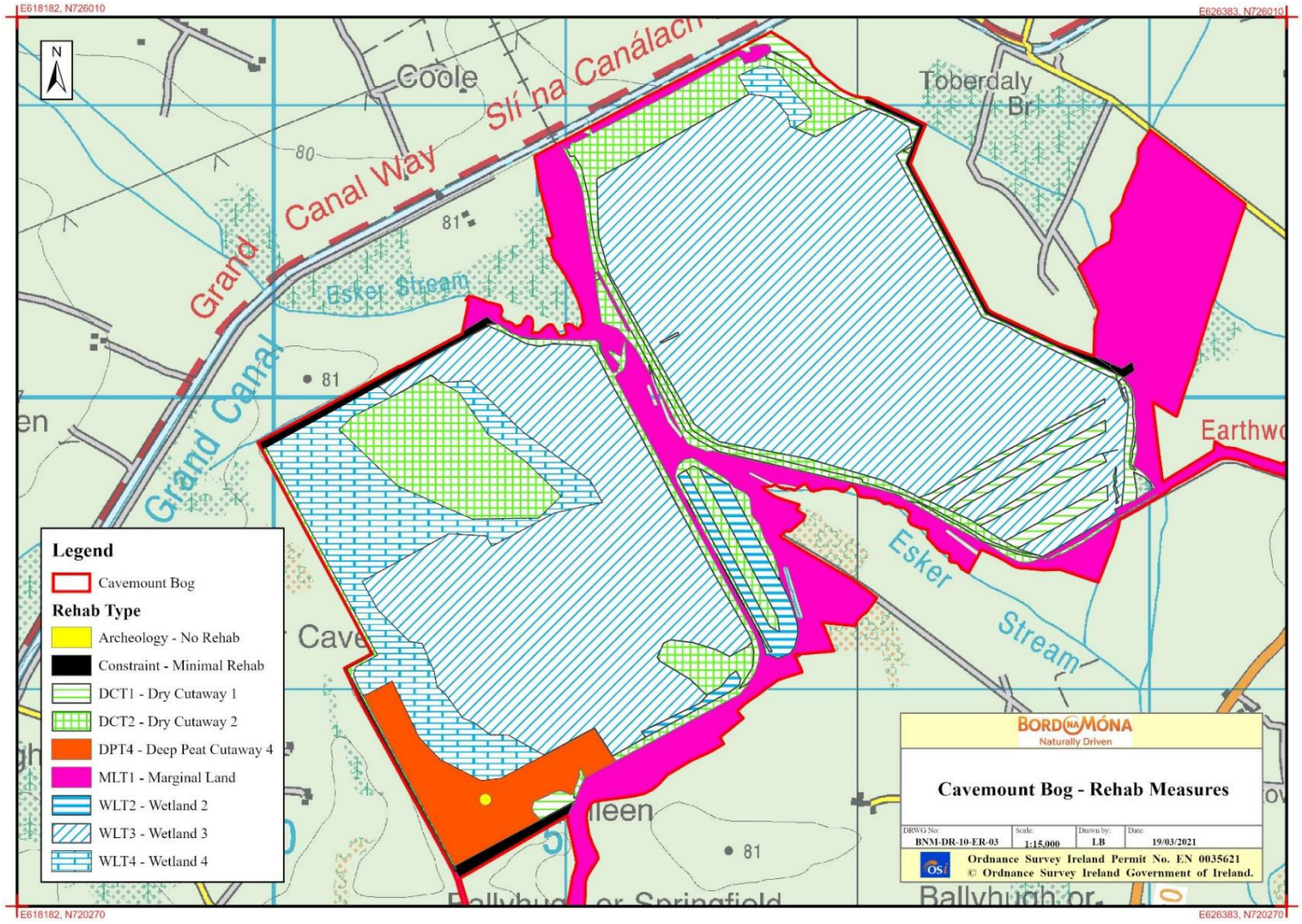


**Figure 8: Proposed Enhanced (PCAS) Rehabilitation Plan**

A suite of methodology drawings is further provided as Appendix C and should be read in conjunction with the following text.

Regular Drain Blocking (3/100m)

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog. 'Speed Bumps' allow for peat subsidence and to prevent water from flowing over the drain block and eroding it before it becomes stabilised.

Phase 1 begins with the creation of a 'key' on either side of the drain. The dozer cuts down and pushes out peat 0.5-1m from the edge of the drain, with an equivalent section on the other side of the drain.

The next step comprises forming the 'Speed Bump' itself. A strip of peat is taken from the central camber of the field, pushed into the drain and keyed area and compacted by a bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.

Fields are then completed with Speed Bumps (at an approximate ratio of 3 Per 100m). Speed bumps are profiled to ensure that the overall field profile is lower in the centre and higher over the drain blocks.

See Methodology Drawing PCAS-0100-001/ PCAS-0100-008 in Appendix C provides further details on the approach to peat blockages.

2 Modifying Outfalls and management of Water levels

The key objective from targeted blocking of outfalls within a bog is to re-wet peat but to manage water-levels at an appropriate level for the development of wetland and peatland vegetation. This measure optimises re-wetting of cutaway. This measure also has additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

Targeted blocking of outfalls is suitable for bogs or portions of bogs that have already had a period of natural colonisation, minimising disturbance to pioneer habitats that are already developing. It is also appropriate for locations where there is establishing habitats and where former drainage infrastructure is already starting to break down. Hydrological modelling and an understanding of site drainage is required to identify appropriate locations for targeted drain-blocking to maximise re-wetting. Drains are blocked at these locations using an excavator by lifting pipes and filling holes with peat or local sub-soils.

A description of a number of techniques in respect of outfall modification and management of water levels follows. Some, such as blocking of outfalls, are applicable across multiple rehabilitation prescriptions, whilst techniques such as the cutting of 'taps' are more applicable to those bogs which are subject to periodic inundation e.g. through rainfall or flooding and where water needs to be diverted from one part of the bog to another by way of management, or to create wetland areas.

The cutting of what is colloquially called a 'tap' in a high (production) field is described first. This is effectively a method for diverting standing water from one side of a high field to another, to manage the water level in both fields and eventually direct excess surface water towards an outfall. The blocking of outfalls is a measure to prevent water discharge from a bog through a pre-existing pathway or drainage feature, whilst the raising of pipes works similarly to produce water flow at a higher invert level, within specified areas of the pre-existing drainage network. Both of these measures are essential to the management of water levels.

**'V' Tap Across High Field to Control Water Levels**

An excavator is used to Create a 'V'-Shaped Tap across a high field to allow water pass from a field with water to a field with little or none. The excavator approaches the proposed 'tap' location along the surface of the high field. It then proceeds to excavate a V-shaped trench or drain to the desired depth to permit water to flow between the fields to either side.

**Blocking of Outfall**

An Excavator is used to form a key on either side of the drain which forms the outfall from the bog or field. A strip of peat is taken from the centre of the adjacent field, pushed into the drain and compacted by the bull-dozer tracking over the drain block from the opposite side of the drain to the excavator. The approximate width of the block is 3-5 times the width of the drain. Blocks have to be wide enough to prevent water moving around the blockage and to prevent further leakage when the block subsides. Where possible and available, vegetation is used to cover the peat forming the outfall blockage. This measure is strongly linked with the next in respect of water level management.

**Raise Piped Culverts to control water levels**

The first step is to block the existing drain where the pipe exits to stop flows. A new transverse field drain and pipe is then placed above the route of the previously blocked and now redundant pipe, to a specified invert level. The drain holding the new, raised pipe, is filled in using an excavator or bulldozer as appropriate. See Methodology Drawing PCAS-0100-014, Appendix C.

**Managing water levels with overflow pipes**

This prescription is associated strongly with the blocking of outfalls. Following the blocking of outfalls, some high fields may require overflow pipes to be installed to manage water levels at the required height above peat surface and/or in instances where a series of high fields have been flooded using the cascade effect, the lowermost field may require the outfall to be piped and managed to facilitate access for example. Overflow pipes will typically be new, 100mm plastic pipes. Overflow pipes are installed using an excavator.

**Plate 3: Examples of installed overflow pipes**

3. Field Reprofiling

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water at the required depth. Field re-profiling is developed as a technique to slow the surface water loss from the bog and to retain as much water as possible on the bog, at the required depth.
Field Reprofiling is described as a measure DPT4.

**DPT4**

This variation of the process, which uses a screw-leveller and bulldozer, can be described as a number of distinct phases.

Phase 1: Re-Profiling of Field Surface

The first operation in the re-profiling process begins with using a Screw-Leveller to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field. The Screw-Leveller, with a level axis, will run up the first side of the production field and down the other side close to the edge of the drain, resulting in some of the peat being tipped into the drain.

Phase 2: Infilling of Drains

Next the Bull-dozer will run up the first side of the production field and down the other side with the front blade at an angle placing the peat in the drain.

Phase 3: Final Levelling of Drains & Field

Next the Bull-dozer will track over the first of the infilled drains and then back down the other drain compacting and levelling the peat. It will also make a pass down the middle of field flattening any peat mounds left between Screw Leveller and Bulldozer runs.

Phase 4: Drain Blocking

Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. A key is cut in the drain approximately 500mm deep ensuring that it is wider than the actual drain. A 500mm depth of peat is removed from bottom of drain also and placed behind the machine for replacement later.

An area behind the machine, within reach of the excavator arm, is selected is to be used as a borrow pit. Turf and degraded peat is removed from the surface. This material is placed close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket, to form the drain block. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.

The borrow pit is then back filled with the peat extracted from the bottom of the drain. The sides of the borrow pit are pressed down and graded with the excavator bucket. (If any vegetation present, it is carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.

Phase 5: Cross Berm

Next the Bull-dozer is used to form peat transverse (i.e. across the production field, and perpendicular to the drain on either side) Cross Berms approximately 5.0m wide x 300mm high at given centres along the length of the production field. This reduces sheet flow of water.

See Methodology Drawing PCAS-0100-005.

Methodology drawings are included as Appendix C.

4. Berms and field reprofiling (45m x 60m cell – variant on DPT 4)

This measure seeks to create large flat areas or cells of shallow water on bare peat, across multiple fields that are enclosed by shallow berms to retain shallow surface water. The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the cutaway.

Phase 1: Drain Blocking and Re-Profiling of Fields Surface

Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. A key is cut in the drain approximately 500mm deep ensuring that it is wider than the actual drain. A 500mm depth of peat is removed from bottom of drain also and placed behind the machine for replacement later.

An area behind the machine, within reach of the excavator arm, is selected is to be used as a borrow pit. Turf and degraded peat is removed from the surface. This material is placed close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket, to form the drain block. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.

The borrow pit is then back filled with the peat extracted from the bottom of the drain. The sides of the borrow pit are pressed down and graded with the excavator bucket. (If any vegetation present, it is carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.

The centre of the cambered field is used as one side of the cell. A bulldozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces to the appropriate levels.

Phase 2: Formation of Surface Berms and Levelling Base of Cells

Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.

The berms are constructed using a bull-dozer pushing the peat obtained from the original field camber to form mounds. The mounds of loose peat are then levelled and compacted using the machine's tracks to ensure that the berm retains shallow water in the cell. The top surface level of the berms is constructed with a high level of accuracy.

Phase 3: Final Profile

Drainage pipes are incorporated into the berm construction at specific locations to manage overflows and prevent berm erosion.

See Methodology Drawing PCAS-0100-006 provided in Appendix C.

5. Drainage channels

New drainage channels are appropriate to help manage larger volumes of water at large sites during high rainfall events. The main objective is not to drain any residual peat but to manage excess water and prevent significant flooding.

At some Bord na Móna sites, once drains and pipes are blocked water can rise to inappropriate levels due to the localised topography (basins). Permanent deeper water can inhibit the development of wetland or peatland vegetation and large open bodies of water are not encouraged, where possible. At Cavemount bog an existing drainage flow path is proposed to be retained through the bog as a recommended measure to maintain conveyance of water inflowing to Cavemount which might otherwise back up and flood upstream, neighbouring lands. This will require upgrading using an excavator.

7. Cut and fill cell bunding (30m x 30m cell)

This is an intensive engineering approach to peatland rehabilitation that looks to modify the topography substantially to optimise suitable hydrological conditions for the development of peat-forming communities. It will also have additional benefits of reducing fluvial carbon loss (via water) and also improving water quality leaving the site by reducing emissions of silt and ammonia.

The cut and fill cell bunding approach aims to create 'saucers' or flat bunded areas (cells) on peat with berms to hold shallow water at appropriate levels. Each cell is approximately 30 x 30 m and laser levels will be used on excavators and bulldozers to aid the construction of flat cells surrounded by slightly convex berms. As cells are constructed production field drains will be infilled with peat. Cells will be sized relatively small to prevent wave erosion affecting the development of moss growth.

Phase 1: Drain Blocking and Re-Profiling of Fields Surface

Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. A key is cut in the drain approximately 500mm deep ensuring that it is wider than the actual drain. A 500mm depth of peat is removed from bottom of drain also and placed behind the machine for replacement later.

An area behind the machine, within reach of the excavator arm, is selected is to be used as a borrow pit. Turf and degraded peat is removed from the surface. This material is placed close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket, to form the drain block. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.

The borrow pit is then back filled with the peat extracted from the bottom of the drain. The sides of the borrow pit are pressed down and graded with the excavator bucket. (If any vegetation present, it is carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block.

The centre of the cambered field is used as one side of the cell. A bulldozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser

levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces to the appropriate levels.

Phase 2: Formation of Surface Berms and Levelling Base of Cells

Berms are formed 30m in length and 30m across 3 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.

The berms are constructed using a bull-dozer pushing the peat obtained from the original field camber to form mounds. The mounds of loose peat are then levelled and compacted using the machine's tracks to ensure that the berm retains shallow water in the cell. The top surface level of the berms is constructed with a high level of accuracy.

Phase 3**:** Final Profile

Drainage pipes are incorporated into the berm construction at specific locations to manage overflows and prevent berm erosion.

See Methodology Drawing PCAS-0100-007.

6. *Sphagnum* Inoculation

The main objective of this enhanced rehabilitation intervention is to accelerate the rate of natural colonisation of Sphagnum moss at suitable sites by introducing donor material. The presence of Sphagnum-rich vegetation on peatlands brings significant benefits as this is considered a potential carbon sink.

There is potential to use Sphagnum inoculation to establish and diversify selected small areas on target sites with Sphagnum species, which in turn, and in combination with natural colonisation, can then naturally colonise the remaining deep peat cutover bog area. Sphagnum inoculation should only be used in appropriate environmental conditions (water-logged, deep peat with stable water levels and with more acidic water chemistry).

It is proposed to use locally sourced Sphagnum and procured donor material, sourced from older established Bord na Móna cutover bog sites where possible, to inoculate Bord na Móna deep peat cutover bogs. Small amounts (handfuls) will be distributed into the newly created cells on deep peat cutover bog. This material can be planted into the soft peat or scattered into shallow water. The use of significant volumes of Sphagnum donor material is constrained by the small amount of suitable donor material and donor sites. It is also proposed to use Sphagnum donor material developed in greenhouses (e.g. Beadaplugs), where suitable donor material can be made available, and where this is required.

There are significant benefits for climate action from establishing Sphagnum-rich peatland vegetation communities. These have been found to quickly develop as carbon sinks (> 10 year). This enhanced measure will be used in combination with some of the other enhanced re-wetting measures (cut and fill cell bunding) to accelerate and optimise the development of Sphagnum-rich vegetation on suitable deep peat cutaway sites.

7. Riparian Measure

There is a Riparian measure proposed at Cavemount which involves the blocking of an existing culvert that runs from the West to the East of the bog (containing an EPA blue line watercourse) which will be replaced with an open drain that will create a preferential surface water drainage path through the bog along the same line as the old culvert, this will be developed and maintained such that surface water flows can drain freely through the new drain and will be profiled towards the natural low point such that the runoff regime mimics the pre-drainage state. The creation of this new open drain allows the cells to connect into and establish the flow path to the discharge point.

8. Silt pond Cleaning

The cleaning procedure for Silt Ponds is as follows:

- If the silt pond system has a by-pass channel or a stand-by pond, then the drainage is diverted through these. If not, then the inlet to the pond is blocked or the supply pump switched off for the duration of the cleaning.
- If the outlet from the pond has a weir then the level is lowered to de-water the silt. If not, then the outlet pipe is blocked for the duration of the cleaning.
- The pond is cleaned from the inlet to the outlet either from one side, if the width allows or from both sides, if not.
- The silt is deposited as far back from the silt pond as possible with the excavator, or additionally with the aid of a dozer if space is limited.
- If necessary, a peat bund is left between the pond and the excavated silt to retain liquid sludge from flowing back into the pond.
- When the pond has been cleaned, the inlet is opened and the pond allowed to fill before lowering the outlet weir.
- If the drainage was diverted during the maintenance, then it is redirected back into the pond.
- Once cleaned, the date is entered on to the inspection log.

9. Retention of Hydraulic Breaks

To sustain hydrological continuity through the margins of the proposed rehabilitation and decommissioning site and to avoid flooding of adjacent lands, it is proposed to retain/create certain key hydraulic breaks (drains) along the margins of the bog site. These works will be completed to retain peripheral surface water drainage around the margins of the bog rehabilitation sites allowing hydrological flow from lands upstream of the site to areas downstream of the rehabilitation site. These works may require localised instream excavation, widening and regrading of existing drains with tracked excavators, and the removal of debris.

#### 2.4.3.4 Decommissioning and Rehabilitation Timescale and Resource Requirements

Duration

**Decommissioning** activities will be completed within a period of 12 months and are scheduled to be completed before the end of 2021.

**Rehabilitation** activities will be completed within a period of approximately 7 months. Due to the seasonal flooding at Cavemount Bog over the winter period no rehabilitation works can be progressed between the months of November to March inclusive. As such rehabilitation activities will be carried out between the months of April and October inclusive.

The duration of activities provided are approximate and may be slightly shorter or longer, depending on weather conditions and progress on rehabilitation prescriptions. In any case, the rehabilitation period will not be longer than 1 year.

##### 2.4.3.4.1 Hours of Work

Normal Decommissioning and Rehabilitation times will be daylight hours between 08.00 and 17.30hrs Monday to Friday.

#### 2.4.3.5 Use of Natural Resources

**Land Requirement:** There is no land requirement in respect of **decommissioning**. In total **rehabilitation** activities will take place on 280.8 hectares of land (note 121.2 hectares that will be treated as MLT1 will not require any rehabilitation activities. As rehabilitation through stabilisation and land cover change is the primary objective, no 'negative quality' land take is associated with Rehabilitation. No land take is required for e.g. the storage of vehicles – vehicles are typically left in situ at points of work or on 'headlands'.

**Water:** No additional water is required for either decommissioning or rehabilitation.

**Soils/Peat:**

Regarding **decommissioning** some peat or topsoil material which is contaminated may be removed in line with Schedule 2 of the IPC license. This is considered negligible in magnitude.

During **rehabilitation**, minor quantities of existing peat will be excavated from drainage trenches and/or an immediately adjacent borrow pit at peat block locations and immediately used to form peat blocks. Borrow pits are re-instated, as the final step in block creation, by the excavator driver profiling the surrounding peat/scraw into place over the excavated borrow pit. In each instance the magnitude of extracted peat is negligible. Similarly, the installation of overflow pipes may require excavation of minor quantities of peat, and/or subsoil dependant on location (Insertion of peat blockages/overflow pipes may interact with underlying subsoils where peat depths are

shallow). All material used will be from the immediate vicinity and no transport of material will be required.

Existing bare peat surfaces will be re-profiled in line with pre-defined 'levels' where required to 'rewet' areas of currently dry peat. This may be through use of a dozer or a screw leveller. Dozers will be used to create 'speed bumps' or blocks across existing drainage channels adjacent to re-profiled areas, by 'dozing' peat displaced in re-profiling into place at pre-defined block locations. Dozers may also be used to infill drains with peat displaced by screw levelling. For any prescriptions such as the creation of bunded 'cells', certain fields will be re-profiled into a succession of tiered cells with separating bunds or blocks; in some instances, these may be 'keyed', to avoid sub-surface water flow, and ensure cells retain the target depth of water.

Peat will also be utilised to infill any blocked outfalls or raised drainage pipes.

**Hydrocarbons** will be used on-site during decommissioning and rehabilitation activities and will be limited to the diesel or petrol fuel and mechanical oils used by any onsite site machinery and equipment.

#### 2.4.3.6 Emissions & Wastes during Rehabilitation

**Dust, Noise, Vibration:** Dust, noise and localised vibration along access routes arising from the arrival and departure of **decommissioning** vehicles or **rehabilitation** machinery will be localised to the access tracks or rail line, occur in low volumes and last for a negligible duration – it is common practice on BnM working bogs to leave vehicles *in situ* once on site, therefore daily trips into and out of the bog are not expected. Dust and noise limits are currently set on IPC licenses.

Regarding rehabilitation, the extent of dust, noise and localised vibration from individual machines creating peat blocks to block drains or blocking outfalls is momentary in duration and therefore considered negligible in magnitude. Reprofiling the surfaces of exposed peat using a 'dozer' or 'screw leveller' and creating 'speed bump' blockages or infilling drains produces a higher potential for the release of dust in drier periods, however the duration of this is expected to be brief (i.e. with effects lasting less than a day). Enhanced measures where bunded cells are created may take longer duration.
Durations overall are expected over a 12-month period at Cavemount Bog or until rehabilitation is complete.

Fuel and some pipes may require to be delivered. No blasting or piling is required.

**Wastes:** General waste will arise from the presence of staff. Very small quantities of chemical waste will be generated, this waste is limited to solid waste oil, such as oily rags.

**Welfare Facilities:** Welfare facilities are available at Cavemount Bog in the form of an existing tea centre. Portaloos will be provided for site operatives during decommissioning and rehabilitation works. All wastewater generated at portaloos will be held within the portaloos tanks and will be regularly serviced by a licenced contractor. All wastewater from the portaloos will be collected from the site and treated and disposed of at a suitably licenced facility.

2.4.4 Operational Stage

**Duration:** Once constructed and commissioned, the proposed Decommissioning and Rehabilitation will remain permanently in place.

**Operational Activities:** Operational activities will mainly comprise non-intrusive environmental & ecological monitoring (including surface water monitoring, vegetation monitoring but also the use of drones to provide catalogues of aerial photography), and may also include minimal works such as repairs to existing peat blockages, adjustment of overflow pipes (where required) and or fertilisation to increase successional rates. Maintenance of existing silt ponds to reduce emissions to local water bodies, as conditioned by the existing IPC license, will still be required. Monitoring of adjacent land will be undertaken during the operation phase and where required boundary drain maintenance and upgrades may be required beside low and moderate vulnerability land as identified in the Cavemount Bog Drainage Management Plan (RPS, 2021)

**Operational Access:** Operational access will be through the Cavemount Bog, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction.

**Timing of Operational Activities**: It is expected that scheduled inspection and maintenance activities will be carried out by a 2-4 person team, typically for 1 day per month, for the foreseeable future.

**Use of Natural Resources:** During the Operational Stage, there is limited requirement for the use of natural resources – negligible quantities of peat or subsoil may be used to repair existing or create additional drain blocks.

**Emissions & Wastes:** During the Operation Stage of Rehabilitation there will be negligible exhaust fumes, dust and noise emitted by maintenance vehicles and or other equipment such as drones during occasional maintenance works, such as to outflows.

Fugitive emissions to air

Collectively, ceasing industrial peat production, re-wetting and re-vegetating will minimise any risk of emission to air from dust. During the operational stage of Peatland Rehabilitation, typical emission of dust from exposed peat to air is expected to cease.

Carbon Emissions

Following rehabilitation and into the early operational stage Cavemount Bog may continue to be a carbon source, however as habitats stabilise following intervention, the bog is expected to, over time, become a carbon sink in part.

2.4.5 Other Projects and Plans with Potential to Cause In-Combination Effects

The location of the proposed Cavemount Bog decommissioning and rehabilitation does not overlap the footprint of any other existing projects or plans.

A planning search of the National Planning Database found a number of proposed or consented developments within the vicinity of Cavemount Bog, including private dwellings or amendments to private dwellings Planning Reference No. 2096; 20141; 19392; 17398). One application for the retention of a biomass facility by Bord na Mona (Planning Reference No. 20331).

#### 2.4.5.1 Other BnM Bog Group Decommissioning and Rehabilitation

Other BnM bogs within the larger Allen-Clonsast group and or the wider River Barrow catchment that have been subject to decommissioning and rehabilitation to meet the various, pertinent, IPC license conditions, are Esker Bog; Mountlucas Bog; and Ummeras Bog. The construction phase of decommissioning and rehabilitation at these bogs has been completed and there will be no potential for the decommissioning and rehabilitation activities at Cavemount Bog to overlap with these three bogs.

The Operational stage of Cavemount Bog Decommissioning and Rehabilitation will overlap the Rehabilitation stage of other bogs within the Allen-Clonsast group however the expected magnitude of any effects from Cavemount Bog at this lifecycle stage are evaluated as insufficient to result in in-combination effects. The possibility of likely significant in-combination effects can reasonably be excluded on this basis.

The decommissioning and rehabilitation of any other bogs within the greater Allen-Clonsast Group will be subject to Appropriate Assessment and it is assumed the requisite mitigation will be in place should the potential for any adverse effects on European site integrity be identified as part of the Appropriate Assessment process. This should also identify the potential for any sequential in-combination pathways, in particular should temporal overlap exist.

#### 2.4.5.2 Turbary

There is no known or licenced turbary activities being undertaken in the wider area surrounding Cavemount Bog.

#### 2.4.5.3 Agricultural Activity

Given the presence of the Esker Stream flowing through Cavemount Bog there is potential for agricultural activities and their respective emissions to air (noise as a source of disturbance) and water (sediment, runoff, deleterious materials) to combine with source effects from decommissioning and rehabilitation at Cavemount Bog to this watercourse. Most of these activities are not subject to Appropriate Assessment, and form part of the existing baseline environment.

#### 2.4.5.4 Local Authority Development Plans

The following development plans have been identified:

- Offaly County Development Plan 2015-2021
- Offaly County Biodiversity and Heritage Plan 2017-2022

It is assumed that the above, or any other plans including those currently at draft status, will be subject to the requirement for Appropriate Assessment which can reasonably be assumed to provide mitigation to avoid adverse effects on European Sites.

#### 2.4.5.5 Other Projects or Activities

The likelihood of cumulative interaction with other plans or projects is considered low, due to limited temporal or spatial overlap; the absence of hydrological connectivity or shared hydrological catchment with many of the other plans or projects described; the separation distance or setback buffers between the described plans or projects and European Sites; the overall small scale of other projects occurring in the wider surrounding area; and the requirement for Appropriate Assessment for other plans or projects, which can reasonably be assumed to provide mitigation to avoid adverse effects on European Sites.

## 2.5 European Sites under Consideration

2.5.1 Distance of the Project to European Sites

For the proposed Cavemount Bog decommissioning and rehabilitation, a limited zone of potential impact is predicted, due to the relatively small scale, duration and localised nature of the activities proposed.

Nevertheless, a precautionary 15km distance was chosen to evaluate the potential for effects (alone and in-combination) on European Sites.

There are **4 European Sites** - 4 Special Areas of Conservation (SAC) - **within 15km of Cavemount Bog.** The locations of these European Sites are illustrated in **Figure 9: SACs within 15km of Cavemount Bog.**

**Table 6 lists the 4 SACs occurring within 15km of Cavemount Bog, specifies the distances to each of these European Sites and provides a comment on the presence or absence of hydrological connectivity between Cavemount Bog and each of the European Sites listed.**

**Table 6: Proximity of the proposed Cavemount Bog to European Sites**

| European Site (SAC or SPA) | Site Code | Distance from the Development* | Hydrological Connectivity (Y/N: If Yes Downstream or Upstream connectivity relative to Cavemount Bog) |
|---|---|---|---|
| Raheenmore Bog SAC | 000582 | 5.6km WNW | N |
| River Barrow & River Nore SAC | 002162 | 14.5km S | Yes – approximately 30km downstream |
| Split hills and Long Hill Esker SAC | 001831 | 13.2km NW | N |
| The Long Derries, Edenderry SAC | 000925 | 11.6km E | N |

*All distances cited are the closest straight line distance as measured using GIS.

The Qualifying Interests/Special Conservation Interests and locational context for each of the fourteen European Sites examined in this Screening Report are provided in **Table 5.**

The Site Synopsis and Conservation Objectives for each site are available in full on the National Parks & Wildlife Service website at https://www.npws.ie/protected-sites and references including date of access, are included in Section 3. Conservation Objectives were reviewed to inform the current appraisal – in particular to identify any possible sensitivities and resultant pathways for likely significant effects.

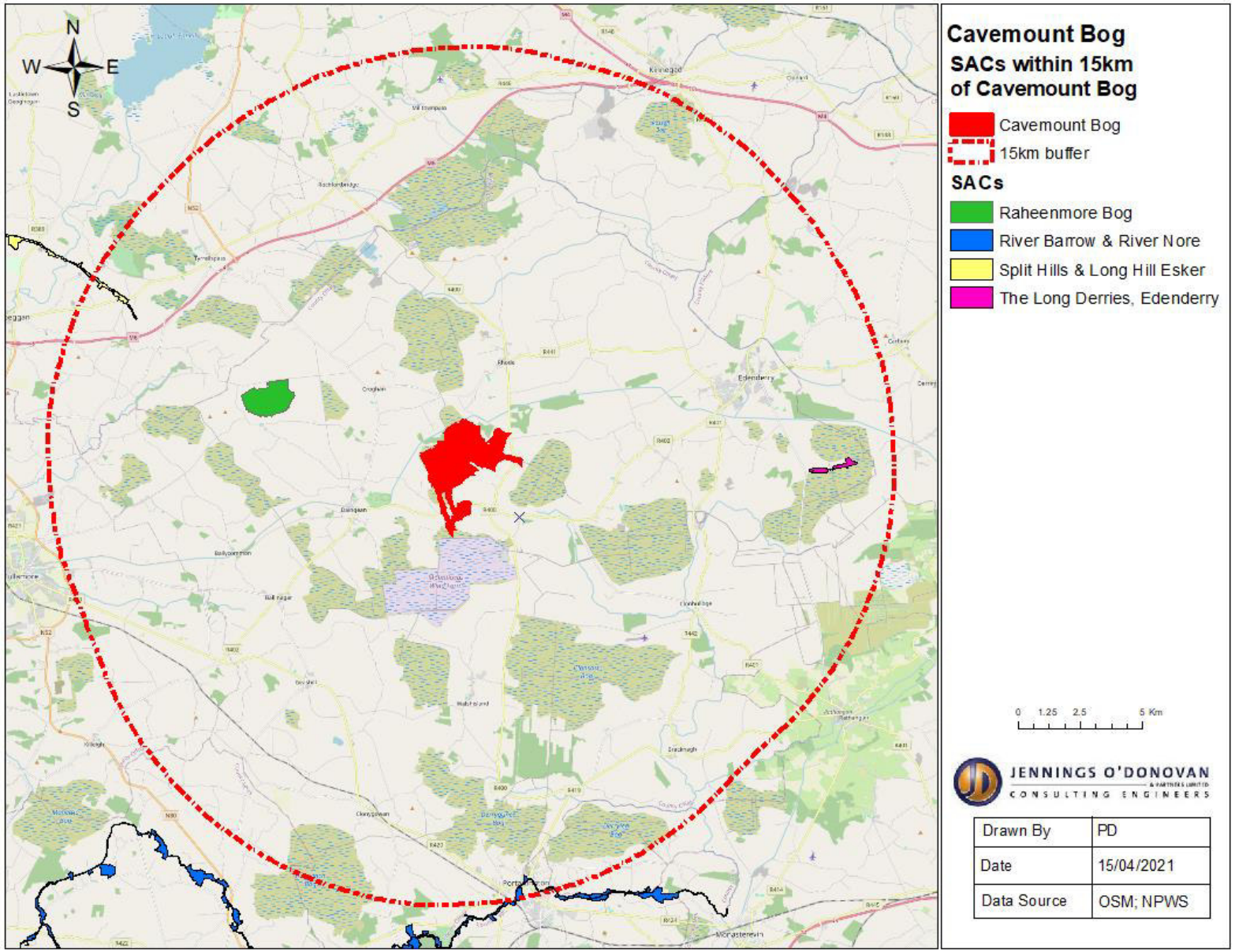


**Figure 9: SACs within 15km of Cavemount Bog**

**Table 5: Description of European Sites within a 15km radius of Cavemount Bog**

| No. | European Site Name and Code | Qualifying Interest / Special Conservation Interest and Code<br>*denotes a priority habitat | Summary Description (from Site Synopsis) | Data Source |
|---|---|---|---|---|
| 1 | Raheenmore Bog SAC (Site Code 000582) | [[7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation | This raised bog developed in a small basin in the catchment of two major river systems i.e. the Brosna and the Boyne. The peat is very deep, up to 15 m in places. The bog has a well-developed hummock and hollow system. Active raised bog comprises areas of high bog that are wet and actively peat forming, where the percentage cover of bog mosses (Sphagnum spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, Sphagnum lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (Rhynchospora alba) and/or Brown Beak-sedge (R. fusca) | NPWS (2013) Raheenmore Bog SAC (Site Code 000582). Version dated 02.09.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 15/04/2021 |
| 2 | River Barrow & River Nore SAC (Site Code 002162) | [1130] Estuaries [1140] Tidal Mudflats and Sandflats [1170] Reefs [1310] Salicornia Mud [1330] Atlantic Salt Meadows [1410] Mediterranean Salt Meadows [3260] Floating River Vegetation [4030] Dry Heath [6430] | This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains, and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, | NPWS (2016) River Barrow & River Nore SAC (Site Code 002162). Version dated 09.02.2016. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 15/04/2021 |

| No. | European Site Name and Code | Qualifying Interest / Special Conservation Interest and Code<br>*denotes a priority habitat | Summary Description (from Site Synopsis) | Data Source |
|---|---|---|---|---|
| | | Hydrophilous Tall Herb Communities [7220] Petrifying Springs*<br>[91A0] Old Oak Woodlands<br>[91E0] Alluvial Forests*<br>[1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1092] White-clawed Crayfish (*Austropotamobius pallipes*) lowland blanket bog<br>[1095] Sea Lamprey (*Petromyzon marinus*)<br>[1096] Brook Lamprey (*Lampetra planeri*)<br>[1099] River Lamprey (*Lampetra fluviatilis*)<br>[1103] Twaite Shad (*Alosa fallax*) [1106] Atlantic Salmon (Salmo salar)<br>[1355] Otter (*Lutra lutra*) [1421] Killarney Fern (*Trichomanes speciosum*) [1990] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*) | Tipperary, Wexford and Waterford. Good examples of alluvial forest are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. The best examples of old oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow. Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the floodplain of the river is intact. Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. Dry heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. Salt meadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House. Glassworts (Salicornia spp.) and other annuals colonising mud and sand are found in the creeks of the | |

| No. | European Site Name and Code | Qualifying Interest / Special Conservation Interest and Code<br>*denotes a priority habitat | Summary Description (from Site Synopsis) | Data Source |
|---|---|---|---|---|
| | | | saltmarshes and at the seaward edges of them. The estuary and the other E.U. Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. The site is very important for the presence of a number of E.U. Habitats Directive Annex II animal species including Freshwater Pearl Mussel (both Margaritifera margaritifera and M. m. durrovensis), White-clawed Crayfish, Salmon, Twaite Shad, three lamprey species – Sea Lamprey, Brook Lamprey and River Lamprey, the tiny whorl snail Vertigo moulinsiana and Otter. | |
| 3 | Split hills and Long Hill Esker SAC (Site Code 001831) | [6210] Orchid-rich Calcareous Grassland* | Split Hills and Long Hill Esker is a 5 km long site which crosses the main GalwayDublin road mid-way between Kilbeggan and Tyrrellspass in Co. Westmeath. It is a prominent feature on the local landscape. The main habitat at this site is semi-natural woodland dominated by Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*) and Hawthorn (Crataegus monogyna). Pedunculate Oak (*Quercus robur*), Wych Elm (*Ulmus glabra*) and Irish Whitebeam (Sorbus hibernica) are other important constituents. The scarce woodland grass, Wood Fescue (*Festuca altissima*), is present, and the scarce Bird's-nest Orchid (*Neottia nidusavis*) has also | NPWS (2013) Split hills and Long Hill Esker SAC (Site Code 001831). Version dated 13.11.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 15/04/2021 |

| No. | European Site Name and Code | Qualifying Interest / Special Conservation Interest and Code<br>*denotes a priority habitat | Summary Description (from Site Synopsis) | Data Source |
|---|---|---|---|---|
| | | | been recorded here. Several areas of species-rich calcareous grassland occur, with typical calcicole species such as Yellow-wort (*Blackstonia perfoliata*), Carline Thistle (Carlina vulgaris), Mountain Everlasting (*Antennaria dioica*) and Early-purple Orchid (*Orchis mascula*). Narrow-leaved Bitter-cress (*Cardamine impatiens*) occurs among the woodland flora at this site. It is an annual or biennial, whose populations are known to 'disappear' in some years only to 'reappear' again. The species is protected under the Flora (Protection) Order, 1999, and this is its only known location in Ireland. Another legally protected species, Red Hemp-nettle (*Galeopsis angustifolia*), occurs on more open ground on the esker. Split Hill and Long Hill Esker is one of the finest and longest wooded eskers in the country. The site also supports some excellent examples of calcareous grassland which is rich in orchids. | |
| 4 | The Long Derries, Edenderry SAC (Site Code 000925) | [6210] Orchid-rich Calcareous Grassland* | The Long Derries is located approximately 5 km south-east of Edenderry in Co. Offaly and is part of a low esker ridge running from Edenderry to Rathdangan. It consists primarily of glacial gravels interspersed with loam and peat soil. The dominant habitat at the Long Derries is dry calcareous grassland. This can be observed towards the north-western end where Carline Thistle (*Carlina vulgaris*), | NPWS (2013) The Long Derries, Edenderry SAC (Site Code 000925). Version dated 24.09.2013. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Accessed online 15/04/2021 |

| No. | European Site Name and Code | Qualifying Interest / Special Conservation Interest and Code<br>*denotes a priority habitat | Summary Description (from Site Synopsis) | Data Source |
|---|---|---|---|---|
| | | | Marjoram (*Origanum vulgare*), Wild Thyme (*Thymus praecox*) and Cowslip (*Primula veris*) grow. An interesting feature is a number of used and unused gravel pits which are host to plants such as Mountain Everlasting (*Antennaria dioica*) and the rare Fineleaved Sandwort (*Minuartia hybrida*), among others. An important aspect of this site is the presence of the rare, Red Data Book species Blue Fleabane (*Erigeron acer*) and Green-winged Orchid (*Orchis morio*), as well as the legally protected (Flora (Protection) Order, 1999), Basil Thyme (*Acinos arvensis*). he Long Derries is of botanical importance due to the presence of good quality dry, calcareous grassland, an interesting gravel pit flora and the presence of three rare plant species, two of which are legally protected. | |

## 2.6 Sources of Information & Consultation

2.6.1 Consultation

To inform the current Rehabilitation Plan, both national and local stakeholders, including neighbours whose land adjoins Cavemount 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 Cavemount Bog. See Section 4 of the Rehabilitation Plan included as Appendix B for a full consultation report.

A process of engagement and Informal consultation was undertaken with NPWS regarding proposed Decommissioning and Rehabilitation Techniques. Due cognisance was given to

information available on the NPWS website at: https://www.npws.ie/development-consultations#2. Consulting NPWS about environmental assessments.

2.6.2 Sources of Information

Other sources of Information, which were considered during this Screening evaluation, included both desktop studies and fieldwork:

- Review of the Conservation Objectives, Site Synopsis and Site boundary information for the European Sites within with study area;
- Review of OSI Discovery Mapping for the 15km study area around Cavemount Bog;
- Review of EPA online mapping for watercourse features (https://gis.epa.ie/EPAMaps/);
- Review of location and layout mapping for proposed Rehab;
- Review of the detailed description of proposed Decommissioning and Rehabilitation measures, including methodologies specific to the main categories of land types under consideration, which occur in cutaway bogs;
- Review of other plans and projects within 15km
- Review of the results of previous Ecological Surveys of Cavemount Bog, along with recent confirmatory site visits; and
- Additional on-line resources were also incorporated into the desk study, including:
- 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 I datasets; www.birdwatchireland.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- 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 2019;
- Spatial data in respect of Article 17 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17.
- Spatial data in respect of Article 12 reporting, available online at https://www.npws.ie/maps-and-data/habitat-and-species-data/article-12-data.
- Available data on Greenland White-fronted Geese such as annual reporting by the Greenland White-fronted Goose Study and National Parks and Wildlife Service.

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## 2.7 Potential impacts, sources & pathways to SACs

### 2.7.1 Direct Impacts to Qualifying Habitats within SACs

There is no spatial overlap between Cavemount Bog and any of the SAC's under consideration. It can therefore reasonably be concluded that there is no potential for interactions and associated direct impact/effects (such as habitat loss, or loss of habitat connectivity) on any SAC's from the proposed decommissioning and rehabilitation of Cavemount Bog.

### 2.7.2 Indirect Impacts to Qualifying Habitats within SACs

All SACs are located at significant distance from the Cavemount Bog (the nearest being Raheenmore Bog SAC, located approximately 5.6km to the west, northwest). There will be no potential for the project to result in emissions to air, noise emissions or visual disturbance to the four SACs occurring in the wider surrounding area. As such the consideration of indirect impacts to restricted to emissions to the aquatic environment.

#### 2.7.2.1 Sources (all outside SAC boundaries):

The following processes/elements associated with rehabilitation works have the potential to represent sources of perturbation to water quality along and downstream of the Esker Stream that receive drainage water from Cavemount Bog: Movement of soil or peat; machinery; earthworks; excavations; unforeseen events such as the failure of drain blocks and berms resulting in the release of silt-laden water to waterbodies; temporary overburden storage; works in or near water; re-grading of a boundary drains (where required); changes in local hydrological and hydrogeological conditions; cleaning of silt ponds; removal of waste and/or raw material; lifting of rail; use of fuels; chemicals or fertiliser.

**Pathway:** water runoff flow paths, watercourses, flooding/changes to hydrological regimes, air

**Pathway Connectivity between Cavemount Bog and SACs**

There are no pathways connecting Cavemount Bog to Raheenmore Bog SAC; Split hills and Long Hill Esker SAC; or The Long Derries, Edenderry SAC,

Cavemount Bog is located within the River Barrow catchment and there is a hydrological pathway between Cavemount Bog and the River Barrow & River Nore SAC. This is a distant pathway with the nearest point of the SAC located approximately 30km downstream from Cavemount Bog.

2.7.3 Indirect or ex-situ disturbance or displacement to Qualifying Species

Cavemount Bog is located at a remote distance from any of the four SACs occurring in the wider area. River Barrow & River Nore SAC is the only SAC in the wider surrounding area that is designated for its role in supporting Annex 2 qualifying species. With the exception of Killarney fern the Annex 2 qualifying species of this SAC are dependent on the aquatic environment. There are no pathways connecting Cavemount Bog to the terrestrial habitats supporting populations of Killarney fern within the SAC and therefore consideration of indirect or ex-situ disturbance or displacement is restricted to the Annex 2 qualifying species of the SAC that are reliant on the aquatic environment.

**Sources (all outside SAC boundaries):** The following processes/elements associated with rehabilitation works have the potential to represent sources of perturbation to water quality along and downstream of the Esker Stream that receive drainage water from Cavemount Bog: Movement of soil or peat; machinery; earthworks; excavations; unforeseen events such as the failure of drain blocks and berms resulting in the release of silt-laden water to waterbodies; temporary overburden storage; works in or near water; re-grading of a boundary drains (where required); changes in local hydrological and hydrogeological conditions; cleaning of silt ponds; removal of waste and/or raw material; lifting of rail; use of fuels; chemicals or fertiliser.

**Pathway:** water runoff flow paths, watercourses,

**Pathway Connectivity between Cavemount Bog and SACs**

There are no pathways connecting Cavemount Bog to Raheenmore Bog SAC; Split hills and Long Hill Esker SAC; or The Long Derries, Edenderry SAC,

Cavemount Bog is located within the River Barrow catchment and there is a hydrological pathway between Cavemount Bog and the River Barrow & River Nore SAC. This is a distant pathway with the nearest point of the SAC located approximately 30km downstream from Cavemount Bog.

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2.7.4 Indirect or ex-situ mortality to Qualifying Species

Cavemount Bog is located at a remote distance from any of the four surrounding SACs. As noted above the River Barrow & River Nore SAC is the only SAC occurring in the wider surrounding area that supports Annex 2 qualifying species. Of these qualifying species only otter has been recorded at or surrounding the Cavemount Bog. Field surveys completed in 2021 have confirmed the absence of otters and their resting places at Cavemount Bog and as such there will be no potential for the rehabilitation works to result in mortality to otters outside the boundary of the River Barrow & River Nore SAC.

## 2.8 Other Projects with Potential to Cause Cumulative Impacts to SACs

Other projects occurring in the surrounding area has been identified and have been detailed in Section 2.4.5.5 above. These projects are minor in scale and will not have the potential to combine with the rehabilitation works at Cavemount Bog to result in cumulative negative impacts to the aquatic environment downstream of Cavemount Bog. It is further noted that given the requirement for Habitats Regulations pertaining to other plans or projects, it can reasonably be assumed that, where necessary, all other plans or project occurring in the wider area surrounding Cavemount Bog will be subject to mitigation to ensure adverse effects on European Sites are avoided.

## 2.9 Screening Evaluation of the Potential for Effects on European Sites (SACs & SPAs)

The Screening evaluation is based on a conceptual site model which identifies potential impact source-pathways between the described Cavemount Bog decommissioning and rehabilitation and each European Site. This allows for an assessment of any potential for significant effects on the Qualifying Interests / Special Conservation Interests and their respective Conservation Objectives. The relevant stage of the Cavemount Bog decommissioning and rehabilitation is the construction stage, no impact source-pathways are identified during the operational stage.

Section 2.7 above has identified the source-pathways-receptors arising from the rehabilitation plan. These source-pathways-receptors are summarised below and the potential for the rehabilitation works at Cavemount Bog to result in significant effects to the 4 SAC sites are evaluated in Table 7 below with respect to the following:

- Indirect loss or degradation of aquatic habitats within SAC sites, alone and in combination;
- Indirect or ex-situ disturbance or displacement of species of Qualifying Interest, alone and in combination.

As described in Section 2.7.1, there is **no potential for direct effects to habitats** within the 4 SAC sites in the wider area surrounding Cavemount Bog.

The evaluation of potential for in-combination effects with regard to Other Plans or Projects includes the plans or projects described in Section 2.4.5.

**Table 7: Evaluation of Possibly Significant Effects to the 4 SAC sites**

| | European Site | Separation Distance from Cavemount Bog | Hydrological Connection – Yes/No | Evaluation of the potential for Cavemount Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 4 SAC Sites:<br>**1**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site<br>**2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest<br>**3.** Indirect or ex-situ mortality of Qualifying Interests |
|---|---|---|---|---|
| 1 | Raheen-more Bog SAC | 5.6km WNW | No | **1: Screened Out - No likelihood for significant indirect loss or degradation of terrestrial or aquatic habitats within the SAC**<br>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.<br><br>**2: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests**<br>Qualifying Interests only relate to habitats and plant species which are not sensitive to indirect disturbance at the distance of separation from proposed activities.<br><br>**3: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**<br>Qualifying Interests only relate to habitats and plant species which are not sensitive to indirect mortality at the distance of separation from proposed activities. |
| 2 | River Barrow & River Nore SAC | 14.5km S | Yes, 30km downstream | **1: Screened Out - No likelihood for significant indirect loss or degradation of terrestrial or aquatic habitats within the SAC**<br>As identified in Section 2.7.2.1 above rehabilitation works are likely to result in the mobilisation of peat material with subsequent runoff to the Esker Stream. The loss of sediment to the Esker Stream from surface water runoff will coincide with the reprofiling of the bog surface, the blocking of drains and the creation of berms. The maintenance of silt ponds will also have the potential to mobilise sediment in ponds and result in the release of sediment downstream to the Esker Stream. These works will be completed over a short time scale and during the late spring and summer when surface water runoff will be lower (works at Cavemount Bog can only be scheduled for this time of the year due to seasonal winter flooding). The release of silt-laden waters to the Esker Stream during these works will have the potential to result in localised impacts to water quality. The presence of drain blocks and berms at Cavemount Bog subsequent to the completion of works will retard runoff from the site and minimise the volume of surface water runoff discharging from the bog to the Esker Stream. The presence of these features will over time reduce the potential for silt-laden surface water runoff to be released to the Esker Stream and the River Barrow catchment.<br><br>The rehabilitation works have also been identified as having the potential to result in changes to the hydrological regime of Esker Stream. Where such an impact is likely to occur it will be a localised impact confined to the stretch of Esker Stream immediately downstream of Cavemount Bog.<br><br>The qualifying habitats of the River Barrow & River Nore SAC that are reliant on freshwater/lotic habitats are [3260] Floating River Vegetation, which is an aquatic habitat occurring in rivers and streams and [6430] Hydrophilous Tall Herb which is a habitat that occurs along the banks of slow flowing rivers and lake margins. To a lesser extent Alluvial woodland can also be influenced by freshwater/lotic processes during spate events when the woodland floor is flood by rivers and streams. All other habitats are either terrestrial or estuarine habitats that are not connected to or at very remote distances from the Cavemount Bog, such that there will be no potential for the PCAS to result in negative effects to their conservation status.<br><br>The extent of Floating River Vegetation and hydrophilous tall herb fringe occurring within the River Barrow & River Nore SAC have not been mapped in the conservation objectives mapping. However the nearest location for an example of these habitats within the SAC is approximately 30km downstream from Cavemount Bog. The nearest location of an alluvial woodland to Cavemount Bog is located over 50km downstream to the north of Athy (NSNW Site ID: 1021).<br><br>Any potential impacts to water quality as a result of the PCAS at Cavemount Bog will be localised to the Esker Stream downstream of the project site. This will be due to the short-term and relatively small-scale nature of the rehabilitation works and the required timing of the works during the late spring and summer months when the potential for runoff will be minimised.<br><br>Given that Cavemount Bog is separated from the nearest point of the River Barrow & River Nore SAC by two sub-catchments of the River Barrow catchment (i.e. the Figile sub-catchment and the Barrow_SC_040 catchment) and the pathway of approximately 30km to the SAC which involves the Esker Stream draining to the Philipstown River, draining to the Figile River before draining to the SAC, significant dilution and attenuation of any surface water runoff from Cavemount Bog will occur within the hydrological pathway prior to the SAC. as noted above, and contaminants discharges from the bog will have the potential to result in only localised impacts along the Esker Stream and will be imperceptible further downstream. In light of the significant dilution and attenuation achievable downstream of Cavemount Bog within the Figile and Barrow_SC_040 sub-catchments there will be no potential for inputs of silt-laden surface water runoff or any other contaminants that may arise as a result of the rehabilitation works at concentrations required to result in likely significant effects to the conservation objectives of the freshwater dependent qualifying habitats of the River Barrow & River Nore SAC occurring downstream. |

| | European Site | Separation Distance from Cavemount Bog | Hydrological Connection – Yes/No | Evaluation of the potential for Cavemount Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 4 SAC Sites:<br>**1**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site<br>**2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest<br>**3.** Indirect or ex-situ mortality of Qualifying Interests |
|---|---|---|---|---|
| | | | | Given the short-term nature of the rehabilitation works, the potential for positive impacts to local water quality downstream subsequent to the completion of the rehabilitation works and the small scale nature of other projects occurring in the vicinity of Cavemount Bog, there will be no potential for the PCAS at Cavemount Bog to combine with other projects to result in cumulative negative impacts to the freshwater dependent habitats of the River Barrow & River Nore SAC downstream.<br><br>**2: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests**<br><br>The qualifying species of the River Barrow & River Nore SAC that are dependent on freshwater/lotic habitats are otters, Atlantic salmon, lamprey species, white-clawed crayfish and freshwater pearl mussel.<br><br>Field surveys completed at Cavemount Bog recorded no evidence of otters relying on the silt ponds or the stretch of the Esker Stream flowing through the bog as a resting or breeding site (no holts or couches were identified).<br><br>Atlantic salmon and lamprey species are sensitive to water quality and sedimentation of spawning beds, however due to the presence of barriers to the upstream migration along the River Barrow the watercourses occurring downstream of Cavemount Bog do not support spawning habitat for these species. Given the potential for at worst short-term localised impacts to the Esker Stream during works and the absence of any perceptible impacts to water quality further downstream within the Figile sub-catchment there will be no potential for the PCAS to result in negative impacts to the conservation objectives for the freshwater qualifying fish species of the River Barrow & River Nore SAC.<br><br>White-clawed crayfish occurs through the River Barrow & River Nore SAC and has been recorded downstream of Cavemount Bog. White-clawed crayfish are known to be tolerant of perturbations to water quality parameters (Trouilhe et al., 2007; Haddaway et al. 2015) and one of the SAC's conservation objectives for this species is for water quality of at least Q3-4. Given the potential for only localised, short-term impacts to water quality of the Esker Stream, the dilution and attenuation of any contaminants within the Figile sub-catchment there will be no potential for the PCAS at Cavemount Bog, alone or in-combination with other plans or projects, to result in negative impacts to the conservation objectives for white-clawed crayfish of the River Barrow & River Nore SAC.<br><br>Conservation objectives for the freshwater pearl mussel population of the River Barrow & River Nore SAC have yet to be published. Conservation objectives for the Nore freshwater pearl mussel population of the SAC, which is confined to the River Nore catchment have been published. Habitat for freshwater pearl mussel along much of the River Barrow catchment is currently unsuitable and it is reasonable to expect that a conservation objective of the SAC for freshwater pearl mussel will be to restore at least certain sections of rivers within this watercourse to favourable conservation condition for freshwater pearl mussel. For instance the overall conservation objectives for the Nore freshwater pearl mussel population is to restore favourable conservation condition. Nevertheless given the short-term and localised potential for water quality impacts being restricted to the Esker Stream, approximately 30km upstream from the River Barrow & River Nore SAC there will be no potential for the PCAS at Cavemount Bog to result in changes to water quality downstream within the SAC that could exacerbate the current unsuitable status of this section of the SAC to support freshwater pearl mussel. As such the PCAS at Cavemount Bog will not have the potential, alone or in-combination with other plans or projects, to result in negative impacts to the favourable conservation condition of the SAC's freshwater pearl mussel population.<br><br>**3: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**<br><br>Cavemount Bog does not support otters, which is the only qualifying species of the River Barrow & River Nore SAC that could be at risk of mortality as a result of collision with machinery.<br><br>The PCAS at Cavemount Bog will not, alone or in-combination with other plans or projects, have the potential to result in mortality to qualifying species of this SAC. |
| 3 | Split hills and Long Hill Esker SAC | 13.2km NW | No | **1: Screened Out - No likelihood for significant indirect loss or degradation of terrestrial or aquatic habitats within the SAC**<br>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.<br><br>**2: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests**<br>Qualifying Interests only relate to habitats and plant species which are not sensitive to indirect disturbance at the distance of separation from proposed activities.<br><br>**3: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**<br><br>Qualifying Interests only relate to habitats and plant species which are not sensitive to indirect mortality at the distance of separation from proposed activities. |

| | European Site | Separation Distance from Cavemount Bog | Hydrological Connection – Yes/No | Evaluation of the potential for Cavemount Bog decommissioning and rehabilitation, either alone or in combination with other plans or projects, to cause either of the following effects to the 4 SAC Sites:<br>**1**. Indirect loss or degradation of terrestrial or aquatic habitats within the SAC site<br>**2**. Indirect/ex-situ disturbance or displacement of species of Qualifying Interest<br>**3.** Indirect or ex-situ mortality of Qualifying Interests |
|---|---|---|---|---|
| 4 | The Long Derries, Edenderry SAC | 11.6km E | No | **1: Screened Out - No likelihood for significant indirect loss or degradation of terrestrial or aquatic habitats within the SAC**<br>Due to the absence of hydrological pathways and the separation distance between proposed activities and this European Site, no pathways for effects are identified.<br><br>**2: Screened Out - No potential for indirect or ex-situ disturbance or displacement of species of Qualifying Interests**<br>Qualifying Interests only relate to habitats and plant species which are not sensitive to indirect disturbance at the distance of separation from proposed activities.<br><br>**3: Screened Out - No potential for indirect or ex-situ mortality to species of Qualifying Interests**<br>Qualifying Interests only relate to habitats and plant species which are not sensitive to indirect mortality at the distance of separation from proposed activities. |

## 2.10 Screening for Appropriate Assessment: Conclusion Statement

The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Cavemount Bog, as required. There are a total of 4 European sites located within the 15km zone of consideration:

**Table 8: 4 No. European Sites**

| No. | European Site | Site code |
|---|---|---|
| 1 | Raheenmore Bog SAC | 000582 |
| 2 | River Barrow & River Nore SAC | 002162 |
| 3 | Split hills and Long Hill Esker SAC | 001831 |
| 4 | The Long Derries, Edenderry SAC | 000925 |

Following screening it can reasonably be concluded that **there is no likelihood of significant effects to these 4 European Sites** because of the proposed project, either alone or in-combination with other plans or projects. **Therefore, the potential for significant effects on these 4 European Sites has been excluded, and have been 'Screened Out' from the Appropriate Assessment process and no Appropriate Assessment is required for these European Sites.**

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## Appendix A: Finding of No Significant Effects (FONSE) Report

**Finding of No Significant Effects Report (FONSE)**

In accordance with the EC (2001) guidance document, *Assessment of plans and projects significantly affecting Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, A Finding of No Significant Effects Report has been completed for the proposed Decommissioning and Rehabilitation Plan for Cavemount Bog. The standard matrix for this report provided in Annex 2 of the guidance document was followed. Line items in italics are taken directly from the guidance document.

<table>
<tr><th colspan="2">Finding of No Significance Effects Report</th></tr>
<tr><td>Name and location of the Natura 2000 sites</td><td>The Screening Evaluation provided herein has examined the potential for any effects arising via source pathway linkages with regard to connectivity to designated European Sites (SACs and SPAs) within the zone of influence of all predicted Project impacts. An extended buffer zone of 15km was further considered, in line with NPWS guidance (DoEHLG, 2009), for evaluation of effects on any European Site which may arise associated with the proposed decommissioning and rehabilitation of Cavemount Bog, as required. There is a total of 4 European sites located within the 15km zone of consideration:<br><br>
<table>
<tr><th>No.</th><th>European Site</th><th>Site Code</th></tr>
<tr><td>1</td><td>Raheenmore Bog SAC</td><td>000582</td></tr>
<tr><td>2</td><td>River Barrow & River Nore SAC</td><td>002162</td></tr>
<tr><td>3</td><td>Split hills and Long Hill Esker SAC</td><td>001831</td></tr>
<tr><td>4</td><td>The Long Derries, Edenderry SAC</td><td>000925</td></tr>
</table>
</td></tr>
<tr><td>Description of the project or plan</td><td><u>Overview:</u> Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen-Clonsast bog group (Ref. P0503-01). As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation must be undertaken to ensure the permanent rehabilitation of the bog lands within the licensed area. Cavemount bog is part of the Allen-Clonsast bog group. Cavemount Bog is located in Co. Offaly.<br><br>A document titled 'Cavemount Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2021' has been prepared specifically to describe the proposed decommissioning and rehabilitation measures at Cavemount Bog as appended to this document as Appendix B.<br><br><u>Purpose:</u> The decommissioning and Rehabilitation of Cavemount Bog as required under IPC license.</td></tr>
<tr><td>Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?</td><td>No</td></tr>
</table>

<table>
<tr><th colspan="4">Finding of No Significance Effects Report</th></tr>
<tr><td>Are there other projects or plans that together with the project of plan being assessed could affect the site (provide details)?</td><td colspan="3">Yes: In addition to the proposed decommissioning and rehabilitation plan the following projects were considered:<br><br>1 Other BnM Bog Group Decommissioning and Rehabilitation<br>2 Turbary<br>3 Agriculture<br>4 Local Authority Development Plans</td></tr>
<tr><th colspan="4">The Assessment of Significant Effects</th></tr>
<tr><td>Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site</td><td colspan="3">The results are that is there is no potential for the Decommissioning and Rehabilitation plan to cause any effects to the following 4 no. European Sites:<br><br>No. European Site Site Code<br>1 Raheenmore Bog SAC 000582<br>2 River Barrow & River Nore SAC 002162<br>3 Split hills and Long Hill Esker SAC 001831<br>4 The Long Derries, Edenderry SAC 000925<br><br>Therefore, these EU sites have been 'Screened Out' at Stage One of the Appropriate Assessment process.</td></tr>
<tr><td>Explain why these effects are not considered significant</td><td colspan="3">Stage 1 Conceptual Models have been presented in respect of each European Site within the extended 15km study area. Within same, potential sources of effects have been examined. In respect of the European Sites listed above, the Potential for Significant Effects can be excluded, due to an absence of impact pathways and separation distance. We refer to Section 2.8 and 2.9 of the Appropriate Assessment Report for detailed examination.</td></tr>
<tr><th>Name of Agency or Body Consulted</th><th colspan="3">Summary of Response</th></tr>
<tr><td>NPWS</td><td colspan="3">We refer Section 2.6.1 of the Appropriate Assessment Report for details.</td></tr>
<tr><th colspan="4">Data Collected to Carry out the Assessment</th></tr>
<tr><td>Who carried out the assessment</td><td>Sources of Data</td><td>Level of assessment completed</td><td>Where can the full results of the assessment be accessed and viewed</td></tr>
</table>

| Finding of No Significance Effects Report | | | |
|---|---|---|---|
| **Jennings's O'Donovan Consulting Engineers.** | A combination of consultation, desktop studies and field surveys. | Following screening it can reasonably be concluded that there is no possibility of Significant Effects on the 4 European sites in the wider surrounding area as a result of the proposed decommissioning and rehabilitation, as described in Appendix B.<br><br>With regard to the following listed EU Sites, Significant Effects, in the absence of mitigation (which is not considered at Screening Stage) are considered possible or likely via identified source-pathway linkages.<br><br>As a result, there is an obligation on the Competent Authority to carry out an Appropriate Assessment (i.e. Stage Two of the AA process) under Article 6 (3) of the Habitats Directive for this project, and in this context a Stage 2 Appropriate Assessment Report has been completed. | Bord Na Móna, Leabeg, Blueball, Tullamore, Co. Offaly, R35 P304. |

## Appendix B: Cavemount Bog: Cutaway Bog Decommissioning and Rehabilitation Plan 2021




# Cavemount 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 Cavemount 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 Cavemount 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. PO503-01, 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 Cavemount bog, activities which go 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) are 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 Cavemount 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 Cavemount 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.*

| Document Control Sheet | |
|---|---|
| Document Name: | Cavemount Bog Decommissioning and Rehabilitation Plan 2021 |
| Document File Path: | |
| Document Status: | Final |

| This document comprises: | DCS | TOC | Text (Body) | References | Maps | No. of Appendices |
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| Name(s): | AC | MMC | MMC |
| Date: | 15/03/2021 | 19/03/2021 | 19/3/2021 |

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## SUMMARY

**Name of bog: Cavemount** **Area:** 513.6ha

**Site description:**

- Cavemount Bog is located in Co. Offaly, c.2km south west of the village of Rhode and c.3km north east of the village of Daingean, and lies adjacenet to the Grand Canal pNHA.
- Cavemount Bog was drained and developed for industrial peat production in the 1970s and has been in active peat production since then. Industrial peat production ceased completely in 2015.
- Cavemount has a gravity drainage regime. The western side was part-pumped for peat extraction.
- The site has been developing a mosaic of wetland habitats since peat production ceased.
- Residal peat depths across Cavemount are in general relatively shallow. The majority of the site has been cutaway.
- Part of the site was planted with conifer forestry in the 1980s and is leased to Coillte.
- Some rehabilitation has already taken place on site to re-wet selected areas and to manage water levels across the site.
- West Cavemount was selected to be part of the INTEREG CarePeat Project. Bord na Móna are an associated partner of this project.
- East Cavemount is being used by the EPA-funded SmartBog project. A greenhouse gas flux tower is being erected at this site and a flume, to mesure dissolved carbon in water running off the site, is already in place.

**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
- Carrying out enhanced rehabilitation with the application of enhanced rehabilitation measures in selected areas to re-wet peat and slow water movement across the site. The site has already developed a mosaic of pioneer cutaway habitats.
- Optimising hydrological conditions for **climate action benefits as part of PCAS.** This will be achieved via **the development of wetlands, fen, Reed Swamp and wet woodland on shallow cutaway peat**, and eventually naturally functioning wetland/peatland habitats.
- Stabilisation or improvement in water quality parameters (e.g. suspended solids).
- 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.

**Scope of rehabilitation**

The principal scope of this rehabilitation plan is defined by:

- The area of Cavemount 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 and optimising **climate action benefits**.
- The local environmental conditions of this bog. Cavemount Bog has variable environmental characteristics with a range of residual peat depths, hydrology and topography.
- The key goals and outcomes of rehabilitation at this bog outlined above.
- To minimise potential impacts on neighbouring land, some boundary drains around Cavemount Bog will be left unblocked, as blocking boundary drains could affect adjacent land.
- Other constraints including archaeology and rights of way.

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

**Summary of measures:**

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

- Planning actions, including developing a detailed site plan and carrying out a hydrology and drainage assessment.
- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation.
- Carry out proposed measures, which will be a combination of drain blocking, peat field re-profiling, cell-bunding, wetland creation and fertiliser applications targeting 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.

**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.

**Monitoring, after-care and maintenance**

The monitoring, after-care and maintenance programme for Cavemount 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, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to additional rehabilitation, 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 can 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. It is expected that a GHG flux tower will be developed at Cavemount as part of the EPA-funded SmartBog Research Project. 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.

**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-Clonsast 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-Clonsast bog group (see Appendix II for details of the bog areas within the Allen-Clonsast Bog Group). Cavemount 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 critical success factors required for successful rehabilitation;
- Proposed rehabilitation actions;
- Proposed timeframe to implement these actions;
- Budget and Costings; and
- Associated aftercare, maintenance and monitoring.

It is proposed by Government that Bord na Móna carry out a Peatlands Enhanced Decommissioning, Rehabilitation and Restoration Scheme on peatlands previously used for energy production. Note this proposal is also known colloquially as the 'Peatlands Climate Action Scheme' (PCAS). 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 carbon sink again. (In some areas of dry cutaway this trajectory will be significantly longer and it is not feasible in the short-term to re-wet some areas. These will develop other habitats). The key to optimising climate action benefits is the restoration of suitable hydrological conditions and more intensive intervention means that the extent of suitable hydrological conditions can be optimised. These measures are designed to encourage the development of embryonic bog 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.

## 1.1 Constraints and Limitations

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

Future land-use at Cavemount has not been defined by Bord na Móna. Biodiversity and ecosystem services have been identified as the current primary land use at Cavemount Bog. Bord na Móna will continue to review the future after-use of its land-bank. Any consideration of any other future after-uses for Cavemount Bog will be conducted in adherence to the relevant planning legislation and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.

Industrial peat extraction at Cavemount Bog ceased completely in 2015. A mosaic of pioneer habitats has been developing across the site. The combination of active enhanced rehabilitation measures and natural colonisation will quickly establish further pioneer vegetation and more mature habitats and will be planned to accelerate environmental stabilisation  Nevertheless, it will take some time (30-50 years) for naturally functioning wetland and peatland ecosystems to fully re-establish.

Parts of Cavemount Bog (outside the areas owned and under the control of Bord na Móna) are currently used by domestic turf cutters to harvest peat. These areas are ecologically and hydrologically linked to the area owned by Bord na Móna where rehabilitation is planned. It is beyond the scope of this rehabilitation plan to address turf cutting issues on Cavemount 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, archaeological sites or evidence, which is present at Cavemount Bog; is similarly treated as a constraint.

# 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 enhanced rehabilitation plan also considered **recently published** guidance issued by the EPA in 2020 – **Guidance on the process of preparing and implementing a bog rehabilitation plan**.

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

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other counties in relation to best-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 Cavemount 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.
- 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, Cavemount Bog was surveyed in August 2010 with updates in 2013 and 2017. Additional ecological walk-over surveys and visits have taken place at Cavemount Bog between 2012-2020 to inform rehabilitation planning and habitat maps have been updated, where required- the latest site visit took place in May of 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 Cavemount Bog is contained in Appendix III.

# 3. SITE DESCRIPTION

Cavemount Bog is located in Co. Offaly, approximately 3km north east of the village of Daingean and 2km south west of the village of Rhode. The bog lies adjacent to the south side of the Grand Canal pNHA (see Figure 3.1). The surrounding landscape is a mosaic of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by Bord na Móna for peat production with some areas utilised for domestic turf-cutting.

The Esker River flows south through the centre of the bog, acting as a dividing boundary between the eastern and western sections. The Tobardaly River flows southwards around the eastern bog boundary before joing the Esker River south of the site. The Esker River then joins the Daingean River approximately 4.5km south east of Cavemount Bog. The site is linked by rail to Mount Lucas to the south, Esker Bog to the east and Ballybeg Bog to the North (see Fig. 3.1).

## 3.1 Status and Situation

### *3.1.1 Site history*

Cavemount Bog was originally developed for peat production in the 1970's. Industrial peat production complexly ceased at Cavemount Bog in 2015. The peat was harvested for use in Edenderry Power Station and Derrinlough Briquette Factory, Co. Offaly.

### *3.1.2 Current land-use*

Industrial peat production ceased at Cavemount Bog in 2015. Some areas of Cavemount Bog in the south, east and west is actively being cut for private turbary, however, this is outside the BnM boundary. A BnM railway bisects the site (Figure 3.5).

There is a section of land located on the east of Cavemount Bog used by Coilte for forestry. This land parcel is outside the scope of this rehab plan.

The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner.

Cavemount has been selected to part of the EPA-funded and TCD-led SmartBog Research Project.

A small area on the site was designated as a Birch woodland development compensatory area as part of a Forest Service Felling Licence that was granted for the clearance of Birch woodland and scrub at Mountlucas Windfarm. Birch woodland is developing naturally in this area.

There are no known rights of way on this bog.

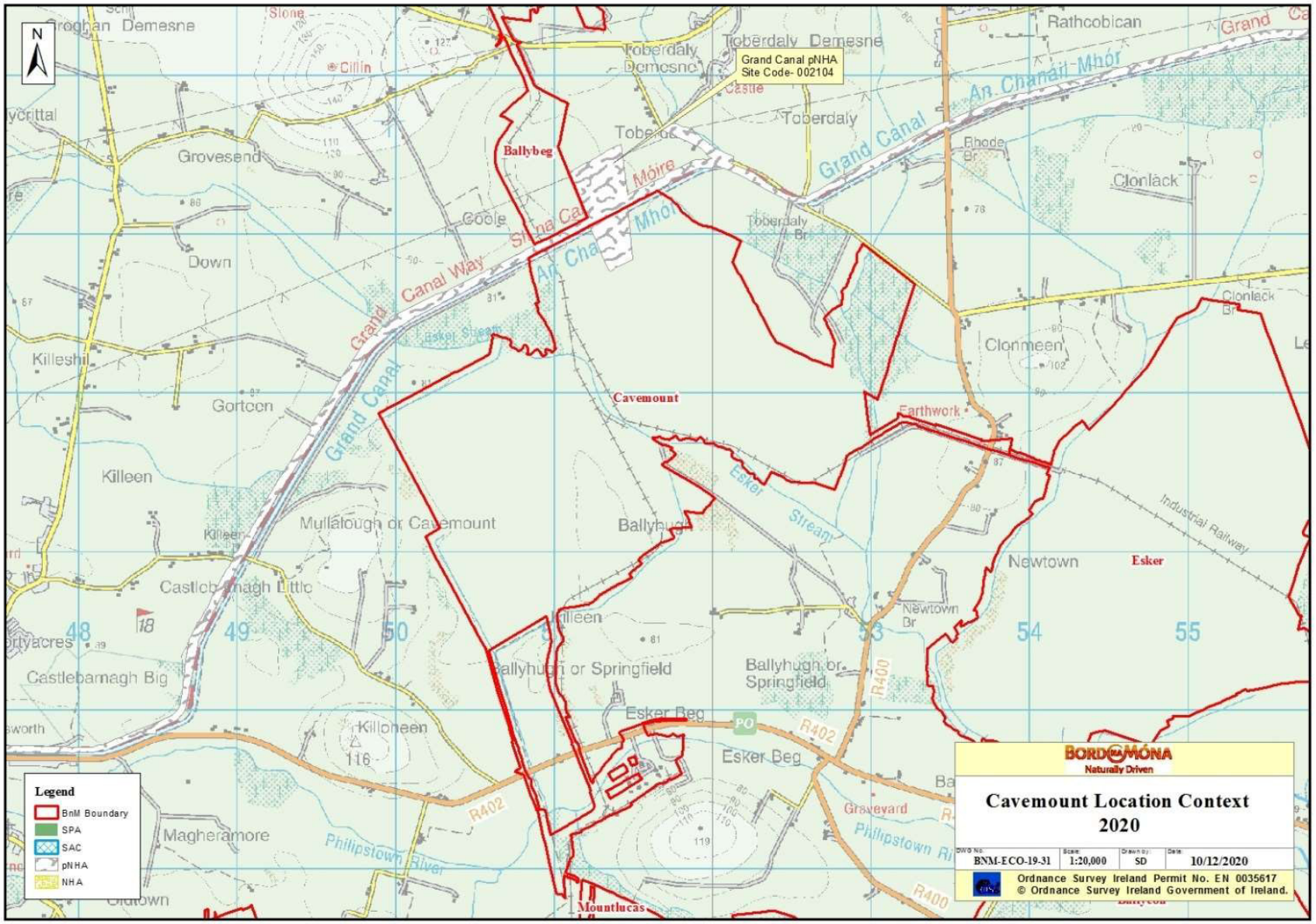


*Figure 3.1. Location of Cavemount Bog, nearby designated sites and other Bord na Móna bogs in the surrounding area.*

### *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 Cavemount 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).

## 3.2 Geology and Peat Depths

### *3.2.1 Sub-soil geology*

According to GSI, three different geological bands form the underlying bedrock layers at Cavemount Bog. The major bedrock groups are Dark Limestone and Shale, Thick Limestone and Oolithic Limestone[1]. The dominant soil type and sub-soils present at Cavemount are classed as 'Raised Bog Cutover Peat'. The main residual peat type exposed on this site is fen peat. Parts of the site are underlain with limestone tills, as these sub-soils are exposed around the margins of the site. The sub-soils along the southern margin are limestone-based sands and gravels deposited by the river. Shell marl is exposed along some drains in the cutaway area through the eastern basin.

### *3.2.2 Peat type and depths*

The majority of Cavemount Bog has been cutaway. Fen peat and exposed underlying sub-soil are now exposed across the site. Peat depths (2015) generally vary across the site (Figure 8.2). Approximately 75% of the site has a peat depth of <1m. A small proportion of the site has deeper residual peat (> 2 m) and is located at western part of the site.

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

## 3.3 Key Biodiversity Features of Interest

Cavemount Bog has now developed a mosaic of mainly wetland cutaway habitats. Much of the site is shallow open water, pioneer wetland vegetation bare peat and developing Birch scrub and woodland.

### *3.3.1 Current habitats*

Cavemount bog is divided into two main cutaway sections by the Esker River, each forming a shallow basin. Habitats present on the former production area of Cavemount Bog are listed here in order of dominance; poor fen mosaics dominated Bog Cotton, poor fen dominated by Bottle Sedge and Soft Rush, wet scrub, emerging Birch scrub, open water with surrounding emergent poor fen vegetation, Reed swamp and bare peat (see Figures 3.2 to 3.4). The marginal habitats include: conifer plantation (Coillte plantation), Birch woodland, scrub (gorse and Birch scrub developing of dry high bog around margins), raised bog, cutover bog, improved grassland (minor areas along boundaries where boundary overlaps adjacent fields) and depositing river (Esker Stream).

A habitat map of Cavemount Bog is shown in Figure 3.4.

### *3.3.2 Species of conservation interest*

Records from BnM commissioned surveys indicate that the wet areas offer a refuge to significant flocks of Whooper Swans (listed on Annex I of the EU Birds Directive). Peak numbers for Cavemount Bog in December 2013 were 259 Whooper Swans (1% flyaway threshold is 270 individuals (Crowe & Holt, 2013; Wetlands International, 2015; Crowe *et al.*, 2015). The wetland also attracted small numbers of wildfowl with mainly Mallard, Wigeon and Teal. Raptor species, including Hen Harrier *Circus cyaneus*, also use the site during Winter months (Biosphere Environmental Services 2013, 2014).

During summer wader species such as Lapwing, Redshank, Ringed Plover and Snipe have been recorded attempting to breed on site. Black Headed Gull have also been recorded breeding on site during the Summer months. There have been records of Merlin during spring but breeding, at least on site, is not considered likely due to an absence fi suitable nesting habitats.

Terrestrial mammals recorded on site include; BnM ecologists have recorded signs of Otter *Lutra lutra*, Badger *Meles meles*, Hare *Lepus timidicus hibernicus*, Rabbit *Oryctolagus cuniculus*, Fox *Vulpes vulpes*, Pine Marten *Martes martes* and Red Squirrel *Sciurus vulgaris*.

No bat species records for Cavemount Bog can be found in BnM records or on the National Biodiversity Data Centre website. This is likely due to recording deficiencies rather than lack of bat species present, as the habitat available provides suitable commuting corridors and foraging oppurtunities.

Smooth Newt *Lissotriton vulgaris*, Common frog *Rana temporaria* and Common Lizard *Zootoca vivipara* have been recorded on or close to (within 1km of site) site at Cavemount Bog.

*Figure 3.2. View of typical cutaway peat surface with revegetating drainage channel across Cavemount Bog (2018).*

*Figure 3.3.. View of east wetlands with emerging vegetation at Cavemount Bog (2018).*

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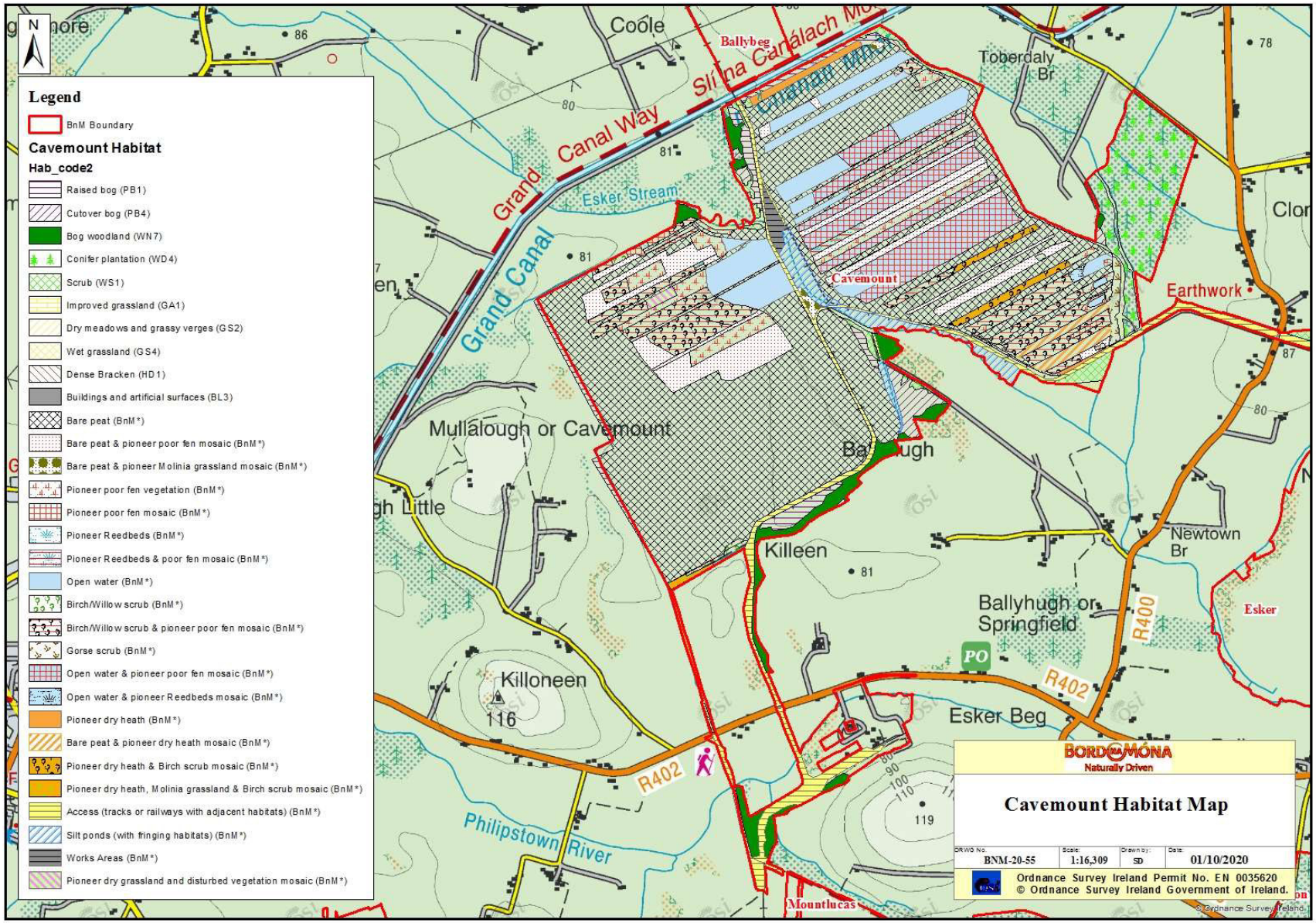



*Figure 3.4. Habitat map of Cavemount Bog showing Bord na Móna habitat categorisation*

### *3.3.3 Invasive species*

A broad range of common garden escapees/Invasive Alien Species are occasionally detected on or close to former peat production sites. All invasive alien species detected will be treated in line with Best Practice during PCAS activities, where necessary.

No other invasive alien species, as listed under Regulation (EU) 1143/2014 on the prevention and management of the introduction and spread of invasive alien species, likely to be further dispersed during or as a result of PCAS activities has been recorded at Cavemount Bog.

## 3.4 Statutory Nature Conservation Designations

No part of Cavemount Bog is designated as SAC or SPA.

The Grand Canal pNHA (NPWS site code 002104) is located adjacent to Cavemount Bog along the northern site boundary (Figure 3.1). There is some site overlap between the designated area and the BnM property. However this overlapping area mainly contains production bog, which is of no value to the NHA and was wrongly included. There is a small band of dried raised bog (high bog) (PB1) between the canal corridor and the production bog that has local ecological value.

### *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 Clooniff Bog (i.e. within 3km) The closest Ramsar Sites to Clooniff Bog include Mongan Bog and Clara Bog.

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

## 3.5 Hydrology and Hydrogeology

Cavemount Bog has a gravity drainage regime. Part of Cavemount West had part-pumped drainage at the end of its production life. This pumping was stopped and the pump removed when peat extraction stopped in 2015.

Initial hydrological modelling (Figures 8.3 & 8.4) indicates that Cavemount East is a large basin that has capacity to develop wetland habitats. Cavemount West has areas that are modelled as re-wetting along with drier more elevated areas. It is likely that a portion of these basins will re-wet with deeper water, creating a mosaic of wetland habitats, and the site will be prone to seasonal inundation. Anecdotally, Cavemount Bog has always had a significant spring influence and was difficult to drain in places. There is likely to be alkaline influence on the water chemistry of the ground water of a portion of this bog due to exposed underlying marls that are highly alkaline or sub-soils that are limestone-based. This is particularly prevalent in Cavemount East, where there are also frequent ecological indicators of alkaline water chemistry (some rich fen indicators).

Cavemount Bog is located in the River Barrow Catchment. The bog had field drains running in a approximate east- west orientation. The drains directed water flow toward six onsite silt ponds. Field drains on the east side of the site are now largely non-functional while some field drains on the west side of the site have been blocked. Silt ponds are present on site to manage discharges to neighbouring water-courses. After filtration/silt reduction is complete, water is discharged into the central channel of the Esker River (See fig. 3.6).

Cavemount bog is located in an area with a series of three separate locally important bedrock aquifers. An aquifer is an underground body of water-bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. GSIs Aquifer classes are divided into three main groups based on their resource potential, and further subdivided based on the type of openings through which groundwater flows. There are nine aquifer categories in total. Locally important aquifers are capable of supplying locally important abstractions (e.g. smaller public water supplies, group schemes), or good yields (100-400 m3/d). This data gives an indication of sub-surface deposits (bedrock and unconsolidated materials) in terms of their groundwater resource potential and dominant groundwater flow type.

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 groundwater contamination occurring at this site.

The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of grey gravelly clay/silt. 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. As such the potential for bog rehabilitation to interact or impact on underlying groundwater is very low.

## 3.6 Emissions to surface-water and water-courses

Cavemount bog has treated surface water outlets to the Esker Stream IE_SE_14E010200 which in turn feeds the Figile river IE_SE_14F010300. Peat extraction was identified as a pressure in the second cycle of the river basin management plan for the Esker Stream but is not indicated as remaining so in the third cycle, currently under preparation. However the Figile river is indicated as remaining under pressure from peat extraction.

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 in Figure 3.6.

There is a robust monitoring program to track and verify any changes in baseline water quality conditions pre and post decommissioning and rehabilitation so that the success or otherwise can be tracked and verified for the National Parks & Wildlife Service, Environmental Protection Agency and Local Authority Water Program, amongst a range of stakeholders.

The main emission limit value associated with this bog is 35mg/l suspended solids, with trigger levels for ammonia of 3.0mg/l and COD 100mg/l.

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

| Bog | SW | Monitoring | pH | SS | TS | Ammonia | TP | COD | Colour |
|---|---|---|---|---|---|---|---|---|---|
| Cavemount | SW-20 | Q4 18 | 7.8 | 5 | 298 | 0.02 | 0.05 | 85 | 325 |
| Cavemount | SW-22 | Q4 18 | 7.4 | 5 | 252 | 0.08 | 0.05 | 73 | 270 |
| Cavemount | SW-22A | Q4 18 | 7.6 | 5 | 272 | 0.16 | 0.05 | 75 | 89 |
| Cavemount | SW-20 | Q1 17 | 8.1 | 5 | 260 | 0.07 | 0.08 | 56 | 132 |
| Cavemount | SW-20 | Q1 2020 | 7.7 | 4 | 216 | 0.063 | 0.06 | 78 | 262 |
| Cavemount | SW-22 | Q1 2020 | 7 | 2 | 137 | 0.118 | 0.06 | 84 | 297 |
| Cavemount | SW-22A | Q1 2020 | 7.2 | 2 | 150 | 0.087 | 0.06 | 84 | 285 |

**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 WQ map in Figure 3.6.

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 up to 70% of a bogs 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 quarterly 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.

**Success criteria:**

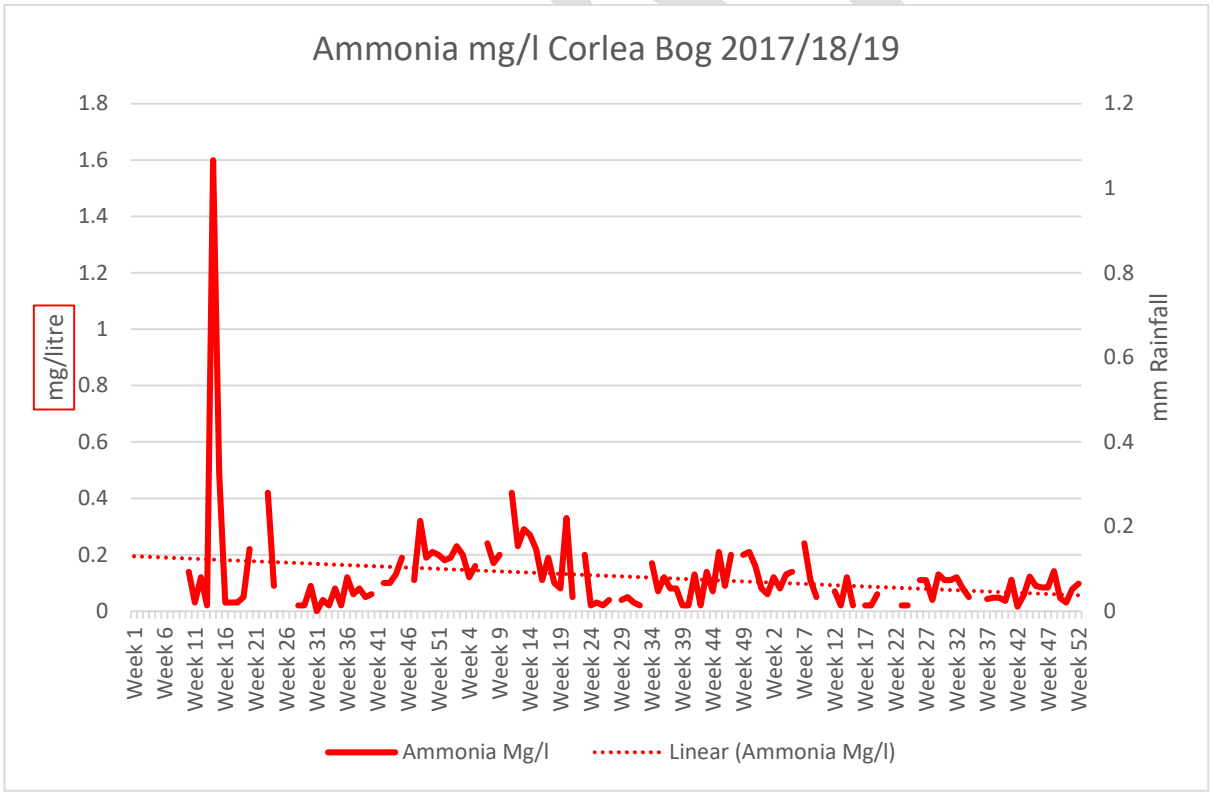
The key water quality success criteria associated with this enhanced rehabilitation are as follow:

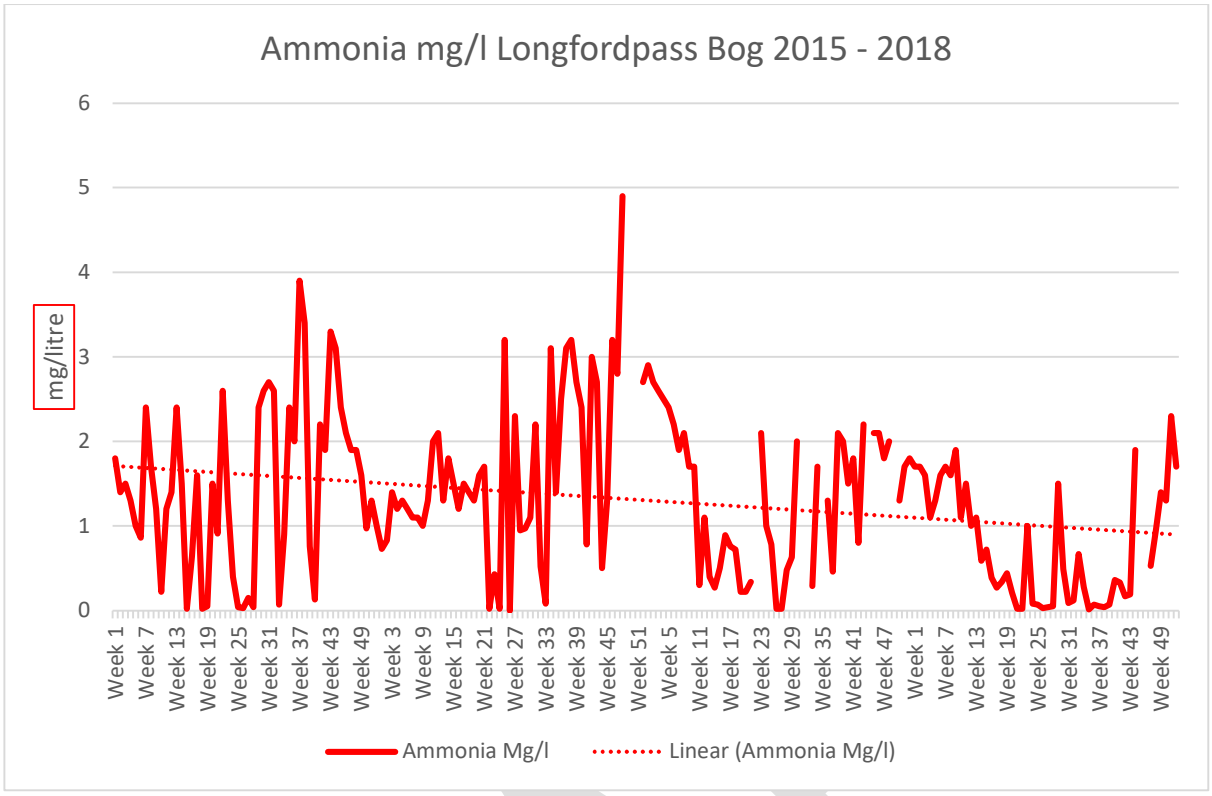
- That there is a stabilizing/improving concentration of suspended solids and ammonia in discharges from Bord na Móna sites, associated with the measures undertaken to stabilize the peat surface by the blocking of the internal drainage system and the maximized rewetting of the peat surface.
- Receiving water bodies have been classified under the River Basin Management Plan and this classification includes waters that are At Risk from peatlands and peat extraction. The success criteria will be that the At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving trajectory in the pressure from this peatland.

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

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 Cavemount 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.




Ammonia mg/l Longfordpass Bog 2015 - 2018
mg/litre
0
1
2
3
4
5
6
Week 1
Week 7
Week 13
Week 19
Week 25
Week 31
Week 37
Week 43
Week 49
Week 3
Week 9
Week 15
Week 21
Week 27
Week 33
Week 39
Week 45
Week 51
Week 5
Week 11
Week 17
Week 23
Week 29
Week 35
Week 41
Week 47
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Week 25
Week 31
Week 37
Week 43
Week 49
Ammonia Mg/l
Linear (Ammonia Mg/l)

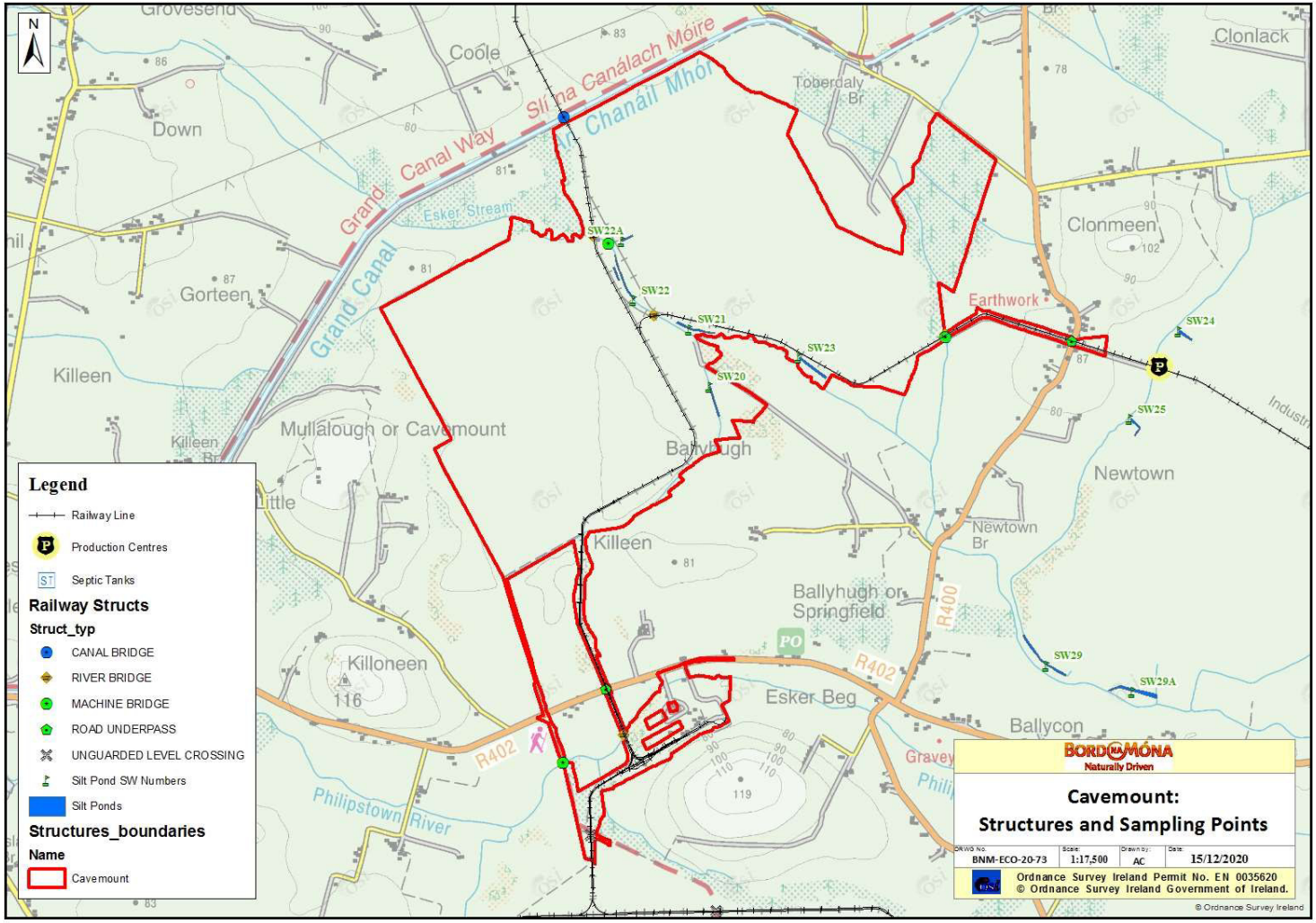


*Figure 3.5. Map of Cavemount Bog showing structures and designated emission points.*

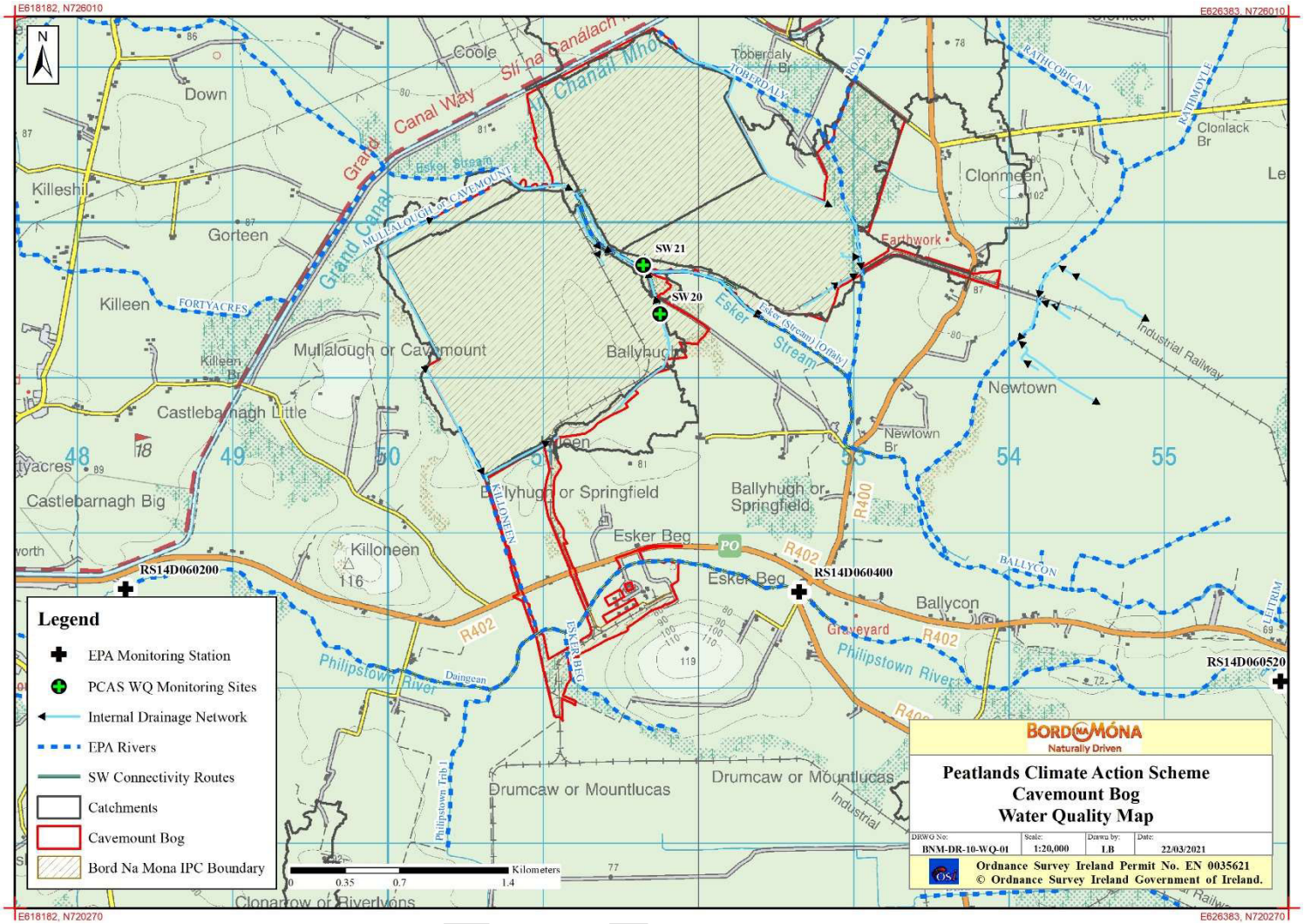


*Figure 3.6. Water quality map.*

## 3.7 Fugitive Emissions to air

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

## 3.8 Carbon emissions

Cavemount Bog is likely to be 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 C-sink function.

It is expected that Cavemount 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; Birch woodland is expected to develop on the drier mounds and peripheral headlands) and future climatic conditions.

## 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 eastern side of the site has been rated as of **National Importance** due to its usage by breeding and wintering wetland birds (Biosphere Environmental Services 2013, 2014). The western side of the site contains wetland and Birch woodland/scrub cutaway habitat and can be rated as having **Local Importance (higher value)**.

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 habitats, such as more extensive areas of fen, Reed swamp and wetland, some embryonic *Sphagnum*-rich habitat and other habitats.

## 3.10 Cavemount Bog Characterisation Summary

Cavemount is located approximately 2.5km to the south-west of Rhode and 3km north-east of Daingean in Co. Offaly. This bog comprises two main sections that are divided by the Esker River. The northern edge of the eastern section is adjacene to the Grand Canal pNHA.

Peat production permanently ceased at Cavemount Bog in 2015. Cavemount had a gravity drainage regime with part of the western section partially pumped towards the end of its peat extraction life. A wetland habitat area was created by blocking/management of water outfalls and drains on the western side of the Cavemount Bog on a suitable area of cutaway habitat in 2015.

The current character of Cavemount Bog is best distinguished as a mosaic of cutaway bog habitats. The eastern section is predominatly shallow peat comprising wetlands, with expanses of open water, pioneer poor fen habitat communities dominated by Cotton Grass with some reedbeds becoming established and drier, Birch-dominated habotats on the higher fields. This eastern area is also being used by the EPA-funded SmartBog project, and a GHG flux tower and a flume are already in place, along with monitgoring collars to study carbon emmission.

The western section has a small footprint of residual deeper peats towards the south-west corner, but the shallow peats on the eastern side also hold substantial wetland habitats much like the easterns ection. However, as the site slopes up to the deeper peats in the south-west corner lends itself towards development of embryonic peat forming habitats, whilst much of the remainder of the bog is more suitable to the development of wetlands and fen, as it now naturally contains a basin which will hold water with significant ground-water/more alkaline influence.

There are areas of former production area that are constrained from rehabilitation due to the presence of archaeological features.

# 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. All national 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 Cavemount Bog.

There has been ongoing general consultation about peatland rehabilitation, biodiversity, research and other issues over the years about Cavemount Bog with various stakeholders in relation to:

- Wintering wader and wildfowl usage through surveys of the site by Birdwatch Ireland and others (commissioned by BnM).
- Use of Cavemount as a Birch woodland compensatory area as part of a Forest Service felling licence.
- Site visit with Offaly Naturalists Field Club in 2018.
- The inclusion of Cavemount Bog within the Carepeat Intereg Project. Site visit to Cavemount with the WFD Working Group in 2019.
- Sites visits to discuss potential future rehabilitiation with NPWS 2018/2019.
- Site visit with the CarePeat Interreg Project team in 2019.
- Site visits to Cavemount wiuth the SmartBog Project Research Team in 2019/2020.

To inform the current Plan, both national and local stakeholders, including neighbours whose land adjoins Cavemount 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 Cavemount Bog (see Appendix XI).

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

## 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 Cavemount 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, including water quality, carbon sequestration and biodiversity, and how and where reporting on this monitoring would take place, was raised by the IPCC, Offaly County Council 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.

The ICMSA queried if a hydrological baseline was being established on surrounding private land in relation to assessing ex-situ impacts arising from re-wetting. Michael Fitzmaurice TD queried what monitoring was being undertaken to assess carbon emission reductions and storage within the bogs as part of PCAS.

### *4.2.4 Flooding of adjacent land*

Michael Fitzmaurice TD, IFA and ICMSA queried likely impacts arising from the proposed re-wetting associated with the rehabilitation in general, in relation to flooding on adjoining lands and, specifically, with regards to the maintenance of drains. The IFA also raised the general issue of Health and Safety in relation to raising water levels as well as possible impacts on land and property prices.

### *4.2.5 Land Management*

The ICMSA queried the long-term management of the Bord na Móna's estate, particularly in relation to maintenance of boundary fencing to exclude livestock from the bogs and maintenance of drainage.

The NARGC suggested that heather be established on large area of the cutaways as this is beneficial from biodiversity and pollinators. NARGC were also keen to minimise the spread of scrub and woodland habitats to reduce habitats from predators (such as foxes) and were keen to seek control of so-called "vermin" species on the rehabilitated bogs.

### *4.2.6 Other issues (including amenity)*

Opportunities to develop amenities on the bog to support local communities was raised by IPCC.

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.

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 Cavemount 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) is also being 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. We are doing this by including all known archaeology on our GIS from the AIA process, and either excluding or defining a buffer zone around these features, which will then be excluded from any ground works in these areas 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*

The scope of this rehabilitation plan covers the former Cavemount Bog industrial peat production area. 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 Cavemount 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 Cavemount Bog. The re-colonisation of species such as Large Heath is likely to take a longer timeframe.

Water monitoring is undertaken as part of Bord na Móna's IPC licence obligations, and this will continue until such a time as the licence can be surrendered.

### *4.3.4 Flooding of adjacent land*

It is the intention of Bord na Móna that the re-wetting of the bogs will be carried out in such a manner that does not impact on third party lands including adjoining private turf banks.

External consultants have been appointed to carry out a hydrological assessment, to identify any potential impacts to neighbouring lands and, where required, the rehab design will be amended to prevent any identified

impact. Please note that climate change is considered in the hydrological assessment. Information on these hydrological assessments will be made available through our website.

The rehabilitation measures 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 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 Land Management*

Bord na Móna will continue to have responsibilities for managing the land in their ownership as any landowner would. In addition, land still under an IPC licence will need to be managed in accordance with that licence.

It is expected that re-wetting will reduce area being colonised by Birch and other scrub species as conditions will be more suitable for wetter species. However, in drier areas that cannot be re-wetted, particularly where there is shallow (or no) residual peat, it is inevitable that drier vegetation communities, including Birch woodland will develop. Heather is not expected to be an important part of the vegetation at Cavemount as site environmental conditions (wetland conditions, alkaline/ground-water influence) do not suit this species.

However, it is expected that as some naturally functioning peatland ecosystems develop that are analogous to embryonic raised bog (SW corner of the western side), these will colonise with Heather and other ericoid species in time and typical raised bog hummocks will re-develop.

#### *4.3.6 Other issues (including amenity)*

Creating amenity such as walking tracks is not part of the direct scope of PCAS. However, PCAS will enable and support future amenity development. Future amenity proposals can be positively aligned and integrated to after-use plans following the completion of the proposed rehabilitation at Cavemount Bog. Rehabilitation measures proposed for Cavemount Bog do not need to be amended to integrate any future amenity track positioned along the margin of the former production bog or along the former bog railway.

Other issues, including after-use and management issues outside the boundary of Cavemount Bog, are acknowledged but are specifically outside the scope of this rehabilitation plan. This includes reference to the cessation of turf-cutting on private lands. Bord na Móna rehabilitation proposals will not impact on private turf-cutting and will have no impact on private turf-cutting outside Bord na Móna boundaries.

# 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).
- Optimising hydrological conditions for **climate action benefits as part of PCAS**.
- Optimising hydrological conditions for the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils.
- Optimising hydrology for the development of embryonic *Sphagnum*-rich vegetation communities on the **small area of residual deep peat**, and eventually naturally functioning peatland habitats.
- 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 Cavemount Bog. This will happen over a longer time-frame than the implementation of this rehabilitation plan.
- Re-wetting residual peat will initially maintain and enhance the carbon storage capacity of the bog. There is scientific consensus that restoration of hydrology in damaged bog can improve carbon storage, water storage and attenuation and help support biodiversity both on the site and in the catchment (See Section 3.8). This will reduce carbon emissions from the site from a larger carbon source to a smaller carbon source. In time, the site has the capacity to develop in part as a carbon sink. PCAS is expected to deliver significant contributions to Ireland's climate action.
- It is not expected that the site has the potential to develop active raised bog (ARB) analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years). Furthermore, only a proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the Scheme, will improve habitat conditions of the whole bog. Other peatland habitats will develop in a wider mosaic that reflects underlying conditions.
- Rehabilitating former industrial peat production bog will also in the longer-term support other ecosystem services such as such the development of new habitat to support biodiversity and local attenuation of water flows from the bog.

# 6. SCOPE OF REHABILITATION

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

- The area of Cavemount 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. Cavemount Bog is part of the Allen-Clonsast Bog group.
- The proposed Scheme is designed to exceed the stabilisation requirements as defined by the IPC Licence. PCAS is designed to enhance the ecosystem services of Cavemount 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 will be accrued.
- The local environmental conditions of Cavemount Bog identify wetland rehabilitiation as the most suitable rehabilitation approach for the majority of 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 Cavemount Bog as **environmental stabilisation** and **optimising suitable hydrological conditions and setting the site on a trajectory towards the development of Reed Swamp and fen on shallow more alkaline peat and other subsoils, and of embryonic peat-forming (*Sphagnum*-rich) vegetation communities on the small area of deep residual peat.**
- Rehabilitation of Cavemount Bog will support multiple National strategies of climate action, biodiversity action and other key environmental strategies such was the Water Framework Directive.
- **Time frame.** Rehabilitation measures will be carried out during the period of PCAS (2020-2025). The surrender of the licence is likely to extend beyond the PCAS timeframe.
- It is not proposed to carry out any rehabilitation in the narrow marginal raised bog remnants around the margins. Generally, these bog remnants are narrow, or are subject to turbary, and do not have positive bog restoration prospects.

## 6.1 Key constraints

- **Bog conditions.** Rehabilitation outcomes of sites are constrained by the environmental characteristics of these particular areas. 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), and there will therefore be different habitat outcomes (wetlands, fen, heathland, grassland and Birch woodland). At Cavemount Bog, a significant portion of peat has been removed leaving a largely un-vegetated surface over peat deposits of varying depth. Some previous rehabilitation efforts combned with natural colonisation has resulted in the development of pioneering scrub, open water/wetland , poor fen and grassland communities. There are local factors that will influence the future trajectory of this site (hydrological and underlying geological conditions) which need to be considered as part of the wider rehabilitation work.
- There is significant potential for development of wetland habitats in this site due to the current drainage conditions and topography of the site. The bog is also underlain by shell marl, which will have a significant

influence on water chemistry and the development of the future wetlands habitats, meaning there is potential for more extensive rich fen development.

- **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 adverse flooding impacts on adjacent land.
- **Archaeology**. The discovery of monuments or archaeological objects during peatland rehabilitation may potentially constrain the rehabilitation measures proposed for a particular area. If this occurs, rehabilitation measures will be reviewed and adapted. An Archaeological Impact Assessment (Appendix XII) was carried out to mitigate against any impact on known archaeology at Cavemount Bog. There are known archaeological features present. The proposed rehabilitation will have no impact on any known archaeological material in the application area or the vicinity. In the worst-case scenario works affecting the surface and sub-surface of the bog might disturb previously unknown archaeological deposits or artefacts without preservation by record taking place. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## 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 development of stable naturally functioning habitats to fully develop at Cavemount Bog. The plan covers the short-term rehabilitation **actions** and **an additional monitoring and after-care programme** to monitor the rehabilitation and to respond to any needs.
- This plan is not intended to be an after-use or future land-use plan for Cavemount 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.
- 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.

**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 and maximising 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 and eventually naturally functioning peatland habitats (heath, scrub, poor fen and embryonic *Sphagnum*-rich raised bog peatland communities, where conditions are suitable). These habitats will generally establish initially as pioneer vegetation. 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. 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. A GHG flux tower is expected to be developed at Cavemount to measure wetland cutaway GHG fluxes as part of the EPA Smart Bog Project. A flume has already been constructed to measure fluvial carbon and other water quality parameters.
- 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.

*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 of the drained high bog area | Delivery of planned rehabilitation measures.<br>This will be a combination of drain blocking, bunding and re-profiling | Aerial photography after rehabilitation has been completed – to demonstrate measures (drain-blocking) | 2021-2024 |
| IPC validation | Key water quality parameters<br>Ammonia, Phosphorous, Suspended solids, pH and conductivity | Stabilization Improvement 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) | At Risk classification will see improvements in the associated pressures from this peatland or if remaining At Risk, that there is an improving | EPA WFD monitoring programme | WFD schedule |

| | | | | |
|---|---|---|---|---|
| | | trajectory in the pressure from this peatland | | |
| Climate action verification | Optimising the extent of suitable hydrological conditions to optimise climate action and setting the site on a trajectory towards establishment of a mosaic of compatible peatland habitats | Optimal extent of suitable hydrological conditions<br>Indicators of establishment of compatible cutaway habitats | Aerial photography, Cutaway bog condition map and Habitat mapping to map extent of suitable hydrological conditions.<br>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.<br>Habitat establishment<br>Presence of key species – Sphagnum<br>Breeding and wintering birds<br>Pollinators | Improvement in biodiversity and ecosystem services. | Metrics that relate to selected biodiversity and ecosystem services<br>Presence of key species – Sphagnum – Walkover survey<br>Breeding birds – Breeding bird survey<br>Wintering birds – survey of wintering waterbirds<br>Pollinators – Pollinator walk<br>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. | 2021-2024 |

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 suitable ground that was previously cutaway. Different environmental conditions will have a significant impact on the rate of natural colonisation, and as a result of the combination of different environmental conditions and the application of different rehabilitation measures, there will be a variety of habitat outcomes.
- Rehabilitation measures have been designed to accelerate and work with natural colonisation and other natural processes. Bord na Móna experience of rehabilitation has shown that re-wetting improves conditions for natural colonisation and that natural colonisation is accelerated where the environmental conditions are most suitable. Rehabilitation measures have been designed to modify the conditions of areas within sites where conditions are less suitable for natural colonisation (modifying hydrology, topography, nutrient status or availability of potential seed sources).
- **Monitoring to be robust and effective.** Rehabilitation Monitoring will be established to validate the success of rehabilitation as required by Condition 10 of the IPC Licence and to verify the benefits of the proposed enhanced measures to optimise climate action. This will focus on a collecting a range of scientific data that can then quickly be adapted and into metrics that can be used to measure changes in various ecosystem services.

# 8. REHABILITATION ACTIONS AND TIME FRAME

Peatland rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling (Figures 8.1 & 8.4) will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies to maximise climate action benefits. Hydrological modelling (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 Cavemount Bog will include (see Figure 8.5)**:**

- Re-wetting the drier residual 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.
- Re-alignment of piped drainage and management of overall hydrological conditions across the site.
- Optimise water retention in wetland areas, including placement of berms where required.
- Re-wetting some drier areas of the bog through regular more intensive drain blocking using an excavator to create up to a max of seven peat dams every 100 m along each field drain, along with field re-profiling and drain infilling if required;
- Re-wetting some areas of the bog through regular field drain blocking using a dozer to create three peat blockages every 100 m along each field drain;
- Blocking drains in targeted existing pioneering vegetation mosaics, to accelerate re-wetting, and/or manage water levels to the correct height to accelerate the current trajectory towards Reed swamp and fen, using a dozer/excavator.
- Targeted fertiliser applications to accelerate vegetation establishment on headlands and high fields.
- Inoculation of *Sphagnum* on suitable deep residual peat.
- The majority of the bog has already undergone significant natural colonisation and the development of pioneer habitats is already significantly progressed in particular sections so seeding of Reeds and other vegetation is not required.
- Modifying water levels at outfalls, as it may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated. This will further slow the movement of water through and out of Cavemount Bog. It may be desirable to change and control water levels at the site over time, e.g. to increase water levels as the site becomes increasingly vegetated.

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).


*Figure 8.1. Aerial photo of Cavemount Bog. The majority of the bog is bare peat, with areas of vegetation and some areas of open water.*

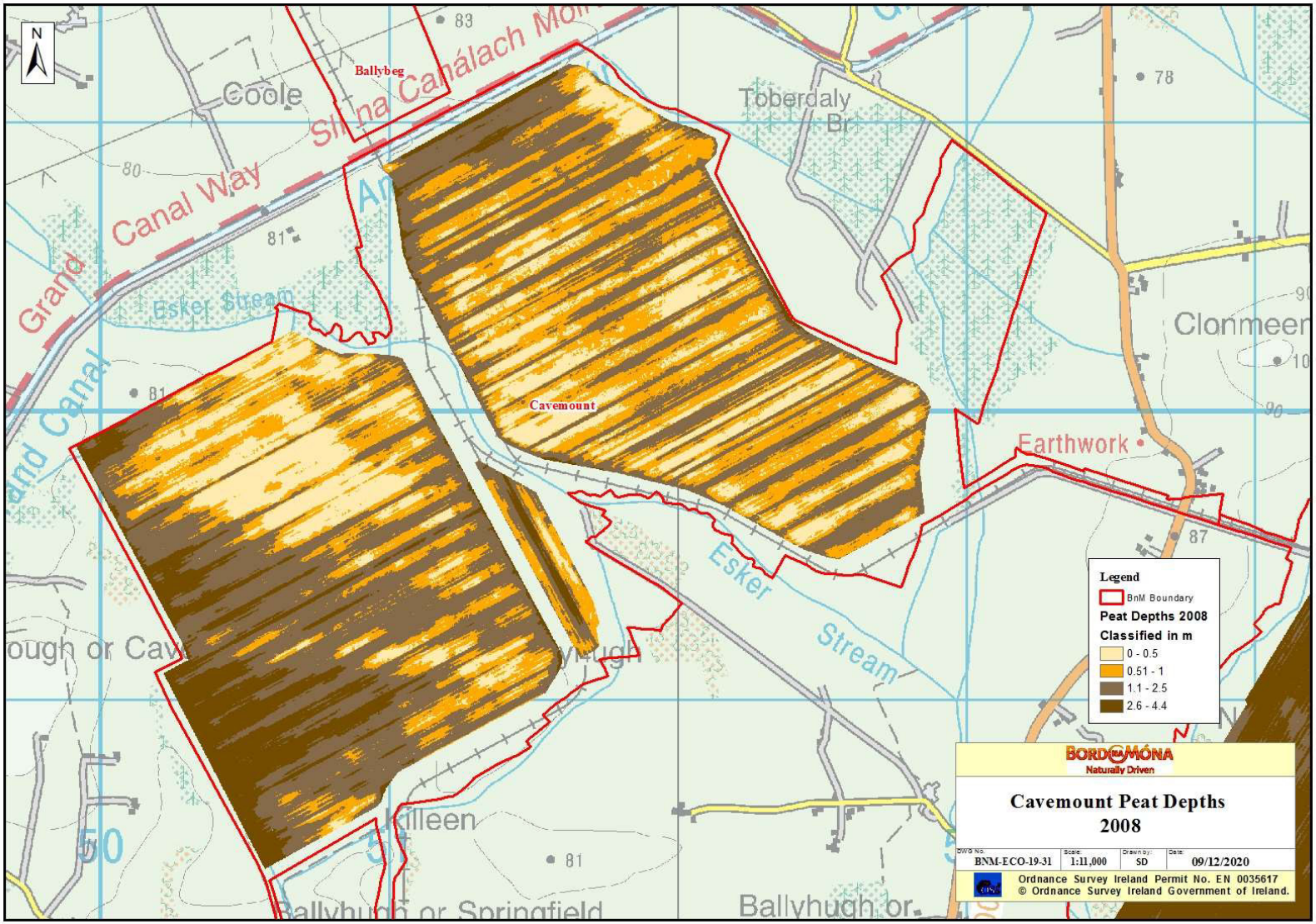


*Figure 8.2. Peat Depth Map for Cavemount Bog (2008). There are pockets of deep residual peat (western area). The remainder of the site is shallow cutaway.*

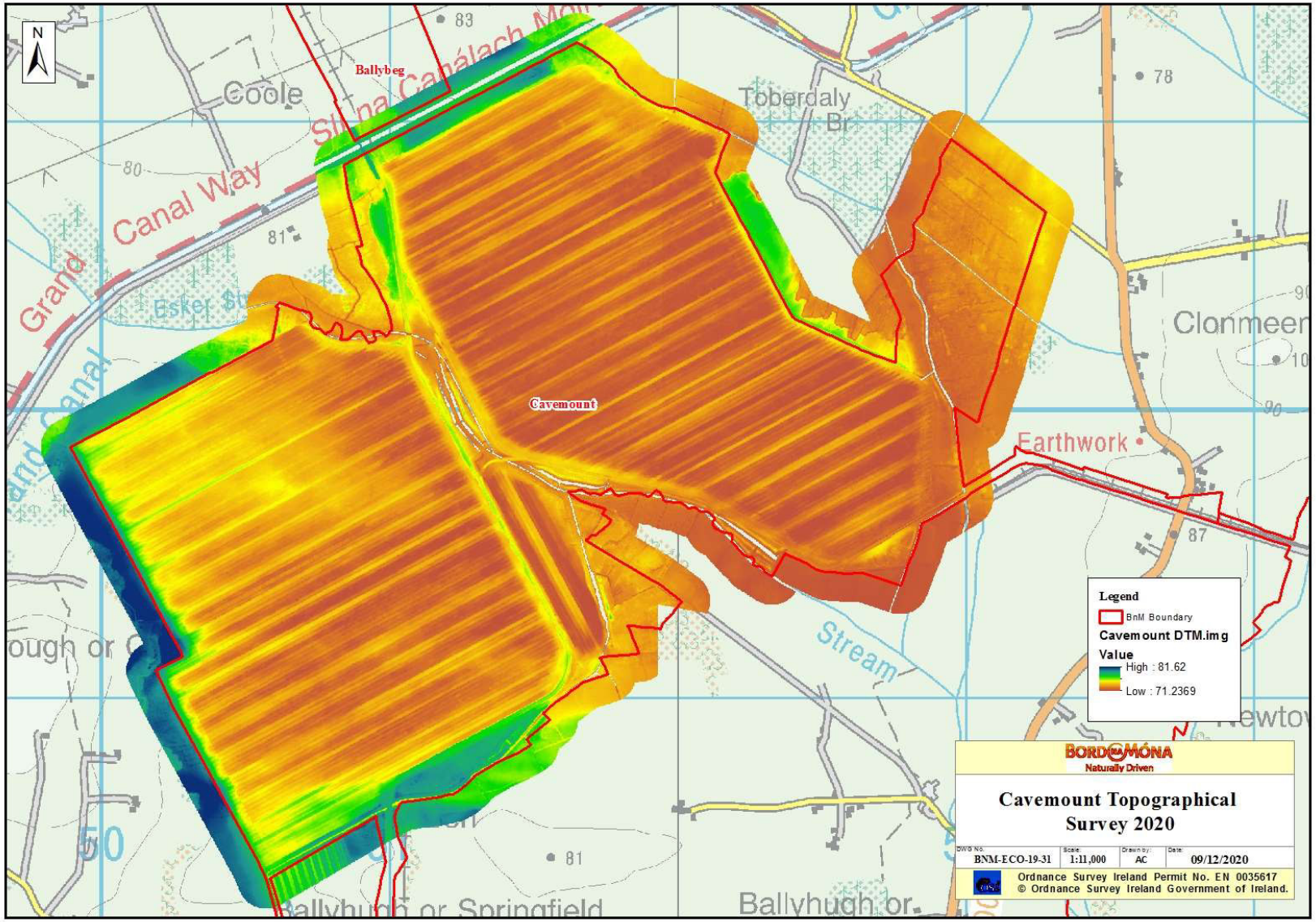


*Figure 8.3. LIDAR topography map of Cavemount Bog. Low areas and basins are orange-yellow; more elevated areas are blue-green.*

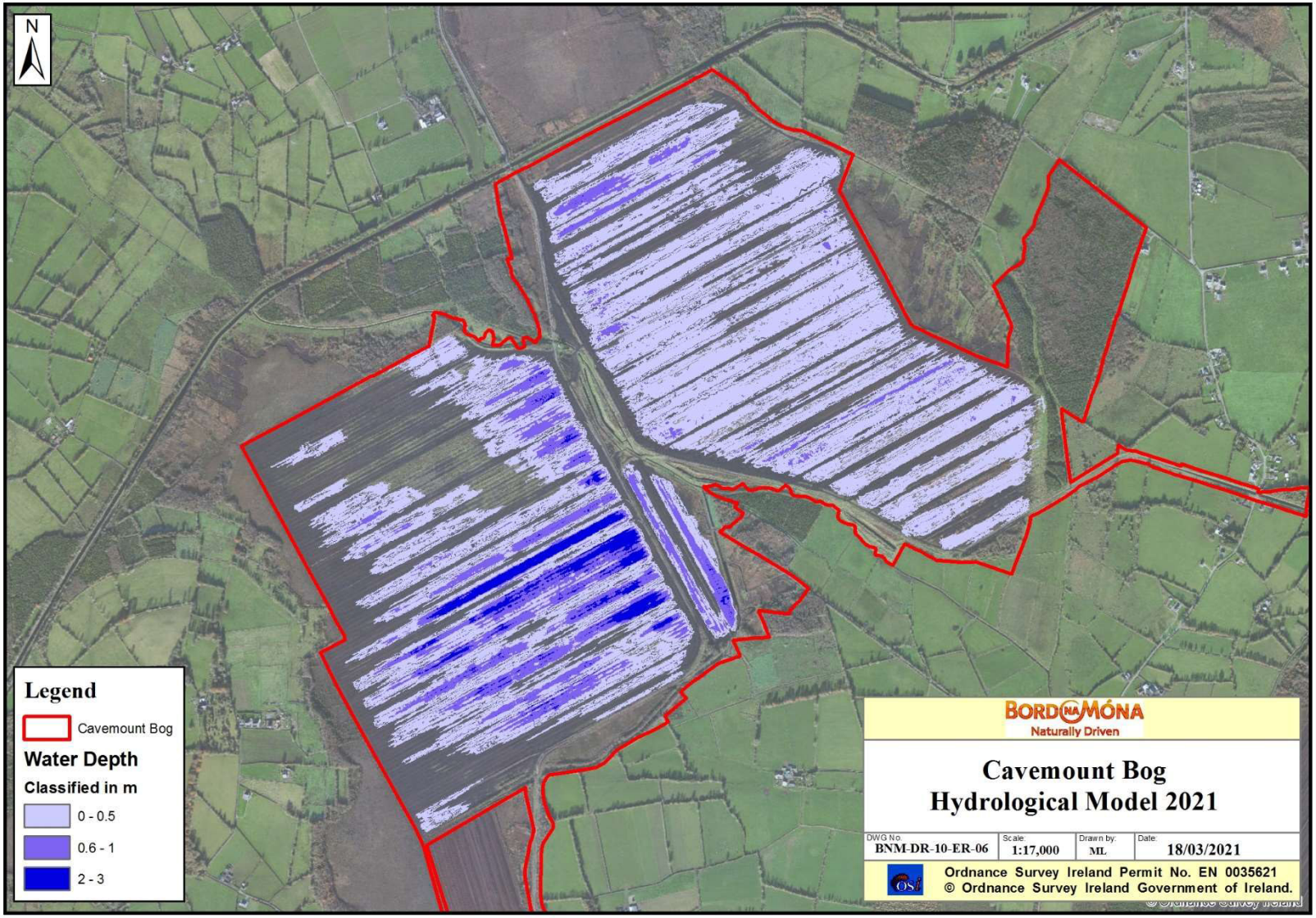


*Figure 8.4. Hydrological modelling for Cavemount Bog showing range of expected water depths based on current topography. Both Cavemount East and West are modelled as basins that have the potential to develop wetland habitats.*

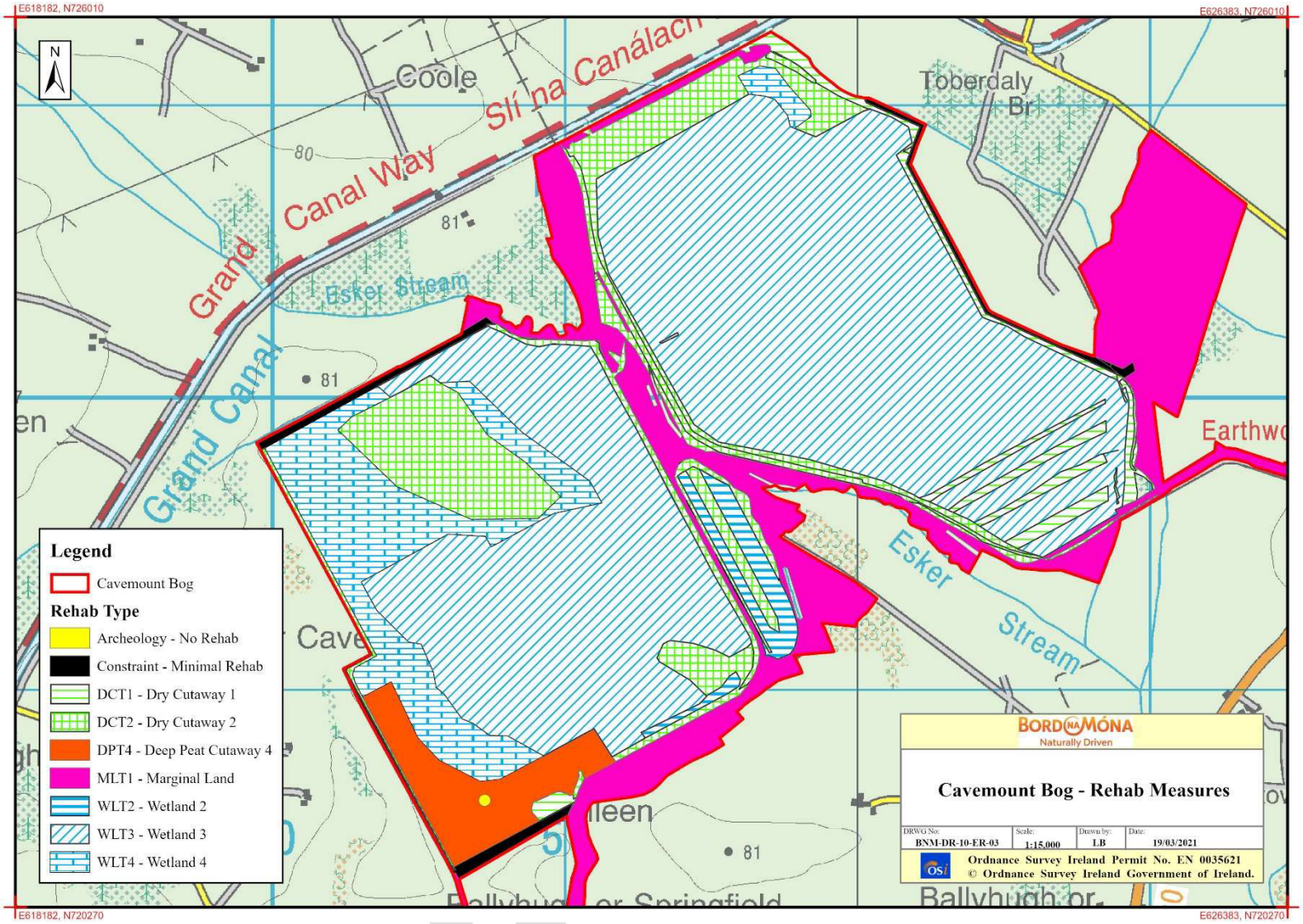


*Figure 8.5 Indicative Enhanced Rehabilitation Plan. Note that the types of rehab and areas of rehab may change in response to stakeholder consultation and refinement of the enhanced rehabilitation measures.*

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

| **Type** | | **Enhanced Rehabilitation Measure** | Extent (Ha) |
|---|---|---|---|
| Deep peat | DPT4 | Berms and field re-profiling (45m x 60m cell) + blocking outfalls and managing overflows + drainage channels for excess water + *Sphagnum* inoculation | 16.7 |
| Wetland | 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 | 7.8 |
| Wetland | 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 | 252.5 |
| Wetland | WLT4 | More intensive drain blocking (max 7/100 m), + blocking outfalls and managing overflows + transplanting Reeds and other rhizomes | 41.7 |
| Marginal land | MLT1 | No work required | 116.0 |
| Silt ponds | MLT1 | Silt ponds | 1.0 |
| Dry Cutaway | DCT1 | Blocking outfalls and managing water levels with overflow pipes | 12.1 |
| Dry Cutaway | DCT2 | Regular drain blocking (max 3/100m) +blocking outfalls and managing water levels with overflow pipes+ targeted fertiliser treatment | 58.0 |
| Archaeology | ARCH | Areas with archaeology | 0.1 |
| Constraint | Constraint | Other Constraints (ROW/pNHA) | 7.6 |
| **Total** | | | **513.6** |

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

- Seek formal approval of the enhanced plan 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 (the proposed PCAS) will be applied to Cavemount 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);
- Carry out a hydrology and drainage management assessment of the proposed enhanced rehabilitation measures;
- Carry out a review of known archaeology and an archaeological impact assessment of the proposed rehabilitation. Incorporate the results of this assessment into the rehabilitation plan to minimise known archaeological disturbance, where possible;Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. A known right of way exists along across one of the Bord na Móna margins.
- Carry out a review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements. A known right of way exists along across one of the Bord na Móna margins.

- Carry out an ecological appraisal of the potential impacts of the planned rehabilitation, if needed, such as the presence of sensitive ground-nesting bird breeding species (e.g. Curlew) or larval webs of Marsh Fritillary butterfly, etc. The scheduling of rehabilitation operations will be adapted, as mitigation; and
- Ensure all activities comply with the environmental protection requirements of the IPC Licence.

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

- Carry out proposed measures as per the detailed site plan. This will include a combination of drain blocking, peat field re-profiling, cell-bunding and fertiliser applications targeting headlands, high fields and other areas (where required). 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 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 works 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 licence compliance costs of mandatory 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 'mandatory' 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 the site (See Appendix I).

# 9. AFTERCARE AND MAINTENANCE

## 9.1 Programme for monitoring, aftercare and maintenance

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

- There will be **initial quarterly monitoring assessments** of the site to determine the general status of the site, the condition of the silt-ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours land, general land security, boundary management, dumping and littering.
- The number of these site visits will reduce after 2 years to bi-annually and then after 5 years to annual visits.
- These monitoring visits will also consider any requirements for further practical rehabilitation measures.
- The **baseline condition of the site will be established** post-rehabilitation implementation by using an aerial survey to take an up to date aerial photo, when rehabilitation is completed. This will be used to verify completion of rehabilitation measures. The extent of bare peat will be assessed using this baseline data, and habitat maps will be updated, if needed.
- **Water quality monitoring** at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog.
- In order to assist in monitoring surface water quality from this bog, it is planned to increase the existing licence monitoring requirements to sampling for the same parameters to every month during the scheduled activities and for a period up to two years. post rehabilitation, depending on the period required to confirm that the main two parameters, suspended solids and ammonia are remaining compliant with the licence emission and trigger limit values and there is an improving trajectory in these two parameters i.e. reduction in concentration.
- 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 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 and this includes the installation of a flux tower on Cavemount Bog as part of the SmartBOG Project. This means that GHG emissions can be determined from the site, identfying carbon savings as the site continues along its trajectory towards a naturally functioning peatland ecosystem.
- It is proposed to monitor the improvement of some biodiversity ecosystem services. A breeding bird and Pollinator monitoring programme will be established. Specific pollinator indicators will be monitored (Bee and Butterfly). To be defined in relation to monitoring of the overall proposed Scheme and after consultation with stakeholders.

## 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:

- 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. Cavemount Bog is part of the Allen - Clonsast Bog group.
- The key objective of rehabilitation, as defined by this licence, is **environmental stabilisation** of the bog.
- The area of former industrial peat production at Cavemount Bog as defined by Figure 3.1.
- Minimising potential impacts on neighbouring land. Some boundary drains around Cavemount Bog will be left unblocked as blocking boundary drains could affect adjacent land.

**Rehabilitation goals and outcomes**

The key rehabilitation goal and outcome for Cavemount Bog is environmental stabilisation of the site via wetland creation and residual 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 wetland/peatland 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 water body associated with surface water from this bog continues to be excluded in the EPA's list of peat pressure water bodies as reported in the River Basin Management Plans. Where the water body 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 indicators**

- Demonstrating the delivery of the rehabilitation through site visits and through updated aerial photography (indicating presence of peat barriers, elevated water levels and re-wetting).
- Stabilising potential emissions from the site (e.g. silt). The key target will be 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.

**Rehabilitation measures: (see Figure Ap-1)**

- Blocking field drains in parts of the former industrial production area using a dozer/excavator to create regular peat blockages (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage to manage water levels across the site.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- No measures are planned for the surrounding marginal peatland habitats.
- No measures are proposed for areas that have already stabilised.
- Silt ponds will continue to be maintained during rehabilitation and decommissioning.
- 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 with dozer/excavator.
- 2021. 2nd phase. Further realignment of piped drainage and other re-wetting measures dependent on success of 1st phase re-wetting, as determined by ongoing monitoring of water levels and re-vegetation.
- Other enhancement measures such as fertiliser treatment will be carried out, if required. 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.

Table AP-1. Rehabilitation measures and target areas.

| Type | Code | Description | Area (Ha) |
|---|---|---|---|
| Dry Cutaway | DCT1 | Blocking outfalls and managing water levels with overflow pipes | 71.4 |
| Deep peat cutaway | DPT1 | Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes | 15.7 |
| Wetland | WLT1 | Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes | 300.7 |
| Marginal land | MLT1 | No work required | 111.0 |
| Silt ponds | | Silt-ponds | 7.5 |
| Constraints | | Archaeology | 0.1 |
| | | Other constraints | **7.1** |
| **Total** | | | **513.6** |

**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, asses the progress of natural colonisation, monitoring of any potential impacts on neighbouring land and general land security. The number of site visits will reduce after 2 years to bi-annually. These site visits will assess the need to any 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 appropriate 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.
- The site has been environmentally stabilised.

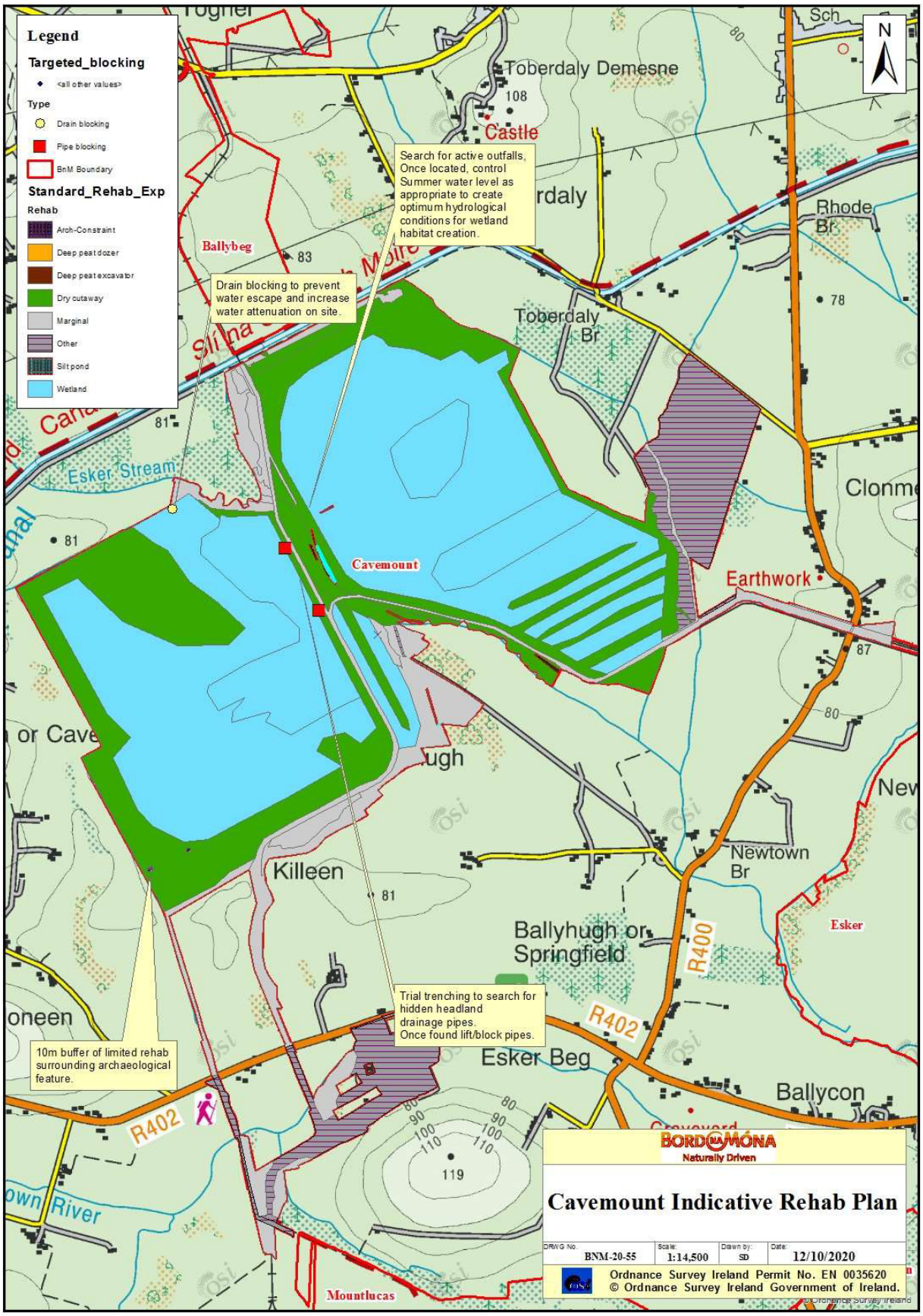


Figure Ap-1. Indicative Standard rehabilitation plan for Cavemount Bog.

## 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. P0503-01, 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<br>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.<br>The site is now a mosaic of cutaway wetland and woodland habitats and is a Biodiversity Area.<br>BnM has also operated a workshop on site.<br>Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte.<br>There is a rail transport link along the southern boundary of the site. | 2001 | Draft 2020 |
| Ballykeane | 451 | Cutaway Bog<br>Ballykeane Bog was developed for industrial peat production in the 1970's. Ballykeane is a shallow peat cutaway bog. | Part of the site is cutaway and has started to develop pioneer vegetation.<br>The majority of the bog is still bare peat.<br>Part of Ballykeane Bog is being used as a herb production trial. | 2020 | Draft 2017 |

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| Cavemount | 499 | Cutaway Bog<br>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.<br>A portion of the site still has bare peat but is vegetating.<br>Part of the site was developed for conifer forestry in the 1980s and is leased to Coillte.<br>Flux tower and GHG monitoring onsite as part of the SmartBOG project.<br>The site is a location for the CarePeat InterReg Project, of which BnM is an associated partner.<br>There is a rail transport link through the site. | 2015 | Draft 2020 |
| Clonad | 447 | Cutaway Bog<br>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.<br>There is a rail transport link through the site.<br>The proposed Irish Water pipeline crosses this bog. | 2020 | Draft 2017 |
| Cloncreen | 1,009 | Cutaway Bog<br>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.<br>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.<br>There is a rail transport link through the site.<br>The proposed Irish Water pipeline crosses this bog. | 2018 | Draft 2017 |
| Clonsast | 1,534 | Cutover Bog<br>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.<br>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.<br>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).<br>BnM carried out a re-wetting trial in 2018.<br>This site is largely stabilised.<br>There is a rail transport link through the site. | 1980's | Draft 2017 |
| Clonsast Bulge | 379 | Cutover Bog<br>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.<br>Part of the site is undeveloped (Clonavoe Bog remnant).<br>This site is largely stabilised. | 1960's | Draft 2017 |

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| Clonsast North | 191 | Cutaway Bog<br>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.<br>The site was partially re-wetted in 2018.<br>There is a rail transport link through the site. | 2000's | Draft 2017 |
| Daingean Derries | 277 | Cutover Bog<br>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.<br>Some bog restoration on part of the site completed in 2017-2018.<br>There is a rail transport link through the site. | 2020 | Draft 2017 |
| Daingean Rathdrum | 367 | Cutover Bog<br>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.<br>There is a rail transport link through the site.<br>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)<br>There is a rail transport link through the site.<br>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.<br>This site is largely stabilised.<br>Transport link. | N/A | N/A |
| Derrylea | 665 | Cutover Bog<br>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.<br>There is a rail transport link through the site. | 2020 | Draft 2017 |
| Derryounce | 389 | Cutover Bog<br>Derryounce Bog was first developed prior to 1975. Derryounce is considered a deep peat cutover bog. Peat production at Derrycricket ceased in the 1980's. | Coilte have developed 80% of the former production area as conifer forestry.<br>Rehabilitation was carried out to create a lake and wetland habitats in the 1990s.<br>Derryounce Lake Amenity area is leased to Portarlington Community Development Association.<br>This site is now largely stabilised.<br>There is a rail transport link through the site. | 1980's | Draft 2017 |
| Esker | 567 | Cutover Bog<br>Esker Bog was first developed in 1975. Peat production at Esker ceased in the 2020. There is deep peat remaining on the | The majority of the site is bare peat. The eastern portion is establishing cutaway habitats.<br>There is a rail transport link through the site. | 2020 | Draft 2021 |

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| | | western side of the former production area but the eastern area is considered cutaway. Esker Bog is a deep peat cutover bog. | The proposed Irish Water pipeline crosses this bog. | | |
| Garryhinch | 814 | Cutover Bog<br><br>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<br><br>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.<br><br>The former production area is bare peat. | 2020 | Draft 2017 |
| Mount Lucas | 1225 | Cutover Bog<br><br>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.<br>Mountlucas windfarm is now operational (since 2014).<br>Some rehabilitation was carried out in association with windfarm construction, specifically the creation of small wetland features.<br>A public amenity walking route was developed on the existing windfarm. This was opened in 2015.<br>BnM have developed an aquaculture project in partnership with Bord Iascaigh Mhara and have developed herb production trials on site.<br>There is a rail transport link through the site.<br>The proposed Irish Water pipeline crosses this bog. | 2020 | Draft 2021 |
| Total | 9687 | | | | |

# 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.*

| | | | |
|---|---|---|---|
| **Bog Name:** | **Cavemount** | **Area (ha):** | 503.5 ha (1243.8 acres) |
| **Works Name:** | Derrygreenagh | **County:** | Co. Offaly |
| **Recorder(s):** | MMC & DF | **Survey Date(s):** | 13/08/2010, 1013, updated 2017 |

**Habitats present (in order of dominance)**

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

- Bare peat (BP) (Codes refer BnM classification of pioneer habitats of production bog.
- Pioneer poor fen communities dominated by Marsh Arrowgrass and Bog Cotton (pTrig, pEang) in northern section, frequently in mosaic with bare peat. Smaller amounts of poor fen dominated by Bottle Sedge and Soft Rush (pRos, pJeff) on the site.
- Emerging Birch scrub (eBir)
- Small patches of open water (OW) with surrounding emergent poor fen vegetation (pEang, pRos) and some Reedbeds with Reedmace (pTyph).
- Dry heath (dHeath) dominated by Heather
- Gorse scrub (eGor)
- Silt Ponds (Silt) with associated habitats such as scrub (WS1), Bracken (HD1), rank grassland (GS2), dry calcareous grassland (gCal) and typical pioneer communities of disturbed areas (disTuss).

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

- Conifer plantation (WD4) (Coillte conifer plantation) (Codes refer to Heritage Council habitat classification, Fossitt 2000)
- Birch woodland (WN7)
- Scrub (WS1) (Gorse scrub and Birch scrub developing of dry high bog around margins)
- Raised bog (PB1) (several fragments)
- Dense Bracken (HD1)
- Cutover bog (PB4) (several small fragments)
- Improved grassland (GA1) (minor areas along boundaries where boundary overlaps adjacent fields)
- Depositing river (Esker Stream) (FL2)

**Description of site**

Cavemount is located 3 km south-west of Rhode in Co. Offaly. Croghan Hill is located 3 km to the north-east of the site and the Grand Canal is situated adjacent to its northern boundary. Cavemount is situated in a group of BnM bogs that form part of the Derrygreenagh group with Ballybeg to the north, Mount Lucas to the south and Esker to the east.

Cavemount is divided into three main sections by the natural topography if the site. The two main areas of production bog are bisected by the Esker Stream, which flows south-east through the site and creates a South-

western section and North-eastern section. The third section is located to the north-east of the site and is a conifer plantation planted by Coillte. The Cavemount BnM property also includes a series of travel paths, tracks and railways that connect the site to adjoining Esker and Mount Lucas bogs. Part of this peatland to the south of the site is leased to Klasmann-Deilmann from BnM but was not surveyed as part of this property.

**Eastern section of production bog**

This section is a mixture of fields that are recently out of production and developing pioneer poor fen communities intermingled with high fields, and some more established cutaway towards the southern end. The natural topography of the site and its production status has had a significant effect on the landscape and habitat development of this section. Wetland with open water and pioneer emergent vegetation (pRos, pPhrag, pEang) has now developed across the majority of this area. High fields are also now re-vegetating with pioneer vegetation (pJeff & DisCF/DisWill, gAn-Ho).

The lowest ground towards the southern end has the most established cutaway vegetation. The central zone has a fairly regular pattern of several (2-4) fields in production and bare peat separated by groups of several fields that are developing pioneer poor fen communities. Pioneer vegetation is at an early stage and is represented by Marsh Arrowgrass and or clumps or swards of Bog Cotton. Both these communities may dominate on their own or may be found in mosaic with each other and frequently with bare peat, depending on how long they have been out of production. Some of these fields are wet and somewhat quaky in places. Reedmace appears along some of the drains but is generally quite minor in cover. There are several small patches of Common Reed also developing in these fields. Some fields that were vegetated previously have gone back into production but more and more fields seem to be coming out of production.

The southern portion of this section contains the most established cutaway vegetation. This area is classified as production-related cutaway on the land-use maps. This portion contains groups of high fields being vegetated by dry heath (dHeath) with scattered Heather cover. Some of the edges of these high fields are being vegetated by Purple Moorgrass-dominated grassland. The high fields are separated by groups of low fields that contain a range of poor fen communities and Birch scrub. Habitat development within these groups of low fields generally features drier habitats towards the west (River) side) and gradual transition to wetter habitats and some open water towards the eastern (conifer plantation) side. The drier vegetation generally contains Birch scrub (eBir, oBir) in mosaic with poor fen (pEang, pRos) and some dry grassland (pioneer *Anthoxanthum-Holcus-Equisetum* community). Within these low fields there are some drains where shell marl is exposed. The edges of these drains, where it is dry, are being vegetated with a Yellow Sedge-dominated community (similar to a potential poor fen community but without brown mosses). There is generally a gradual transition from dry vegetation with Birch scrub to poor fen without scrub that merges with the large pools of open water. These pools are surrounded by emergent poor fen (mainly Bottle Sedge and Bog Cotton) and also some patches of Reedbeds with Reedmace. The ends of these fields are being vegetated by Gorse scrub (eGor) and some Birch and Heather. Notable species found in this area include Greater Tussock-sedge and Star Sedge (in and along drains) and may be an indication that some of this wetland vegetation will further diversify into rich fen.

The area separating the two main section of production bog contains a mixture of disturbed habitats associated with silt ponds, flood defences along the Esker Stream and with access routes. There are several embankments created with spoil that are vegetated with rank grassland and Bracken. There is potential for Otter and Kingfisher along the river, although no signs of either species were noted during this survey.

The northern margin contains a small band of high bog that acts as a buffer between the production bog and the adjacent Grand Canal. This high bog is quite dry and is dominated by heather. Some of it may have been harvested in the past and there are still some signs of old fields present on it, although it has since revegetated. Scrub, Birch woodland and small fragments of disturbed high bog with Heather make up most of the other marginal zones.

**Western section of production bog**

This section of the bog is now cutaway. A raised area of marl has been exposed as a result of peat production, this raised area is becoming revegetated with Birch and Soft Rush and these species are also becoming established in many of the drains in this area. Cutaway on both sides of this raised ridge has re-wetted and contains open water and some pioneer poor fen (Rushes) and other emergent vegetation.

The northern section has more established vegetation dominated by Birch scrub and poor fen (pJeff). Wetlands have developed along the railway embankment.

An area of raised bog, Birch woodland, scrub and railway line is located along the southern boundary of the site. The woodland is mature with Birch, Scots Pine and Willow with a ground flora of Bramble and Bracken. The small section of remnant raised bog is dry and degraded and has been burned in recent years. Some areas of Gorse scrub, Birch Scrub, dry heath and Molinia dominated grassland were also located along the southern boundary of the site.

The northern boundary was a mosaic of habitats such as wet grassland (GS4), Birch woodland (WN7) along with pioneer poor fen habitats on cutaway (pEang, pPhrag, pRos and pJeff). The Esker stream flows along a section of the northern boundary of the site, this stream has been heavily modified in the past but did contain sections of riffles and pools, coarse fish, most likely Roach, were observed in this stream.

The eastern boundary of the site contained some thin sections of raised bog remnant. These sections of remnant raised bog were dry and degraded and were dominated with tall leggy heather.

**Access route to the south**

A long stretch of railway line connects this site to the Mount Lucas site further south. This section of railway line is bordered on both sides by narrow fringes of Birch woodland (WN7), Oak Ash Hazel woodland (WN2) and wet grassland. The railway line is still in active use but did not contain any rare plant species such as Blue Fleabane of Basil Thyme.

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

The Grand Canal pNHA (NPWS site code 002104)

This designated area is located along the northern site boundary. There is some site overlap between the designated area and the BnM property. However this overlapping area mainly contains production bog, which is of no value to the NHA and should be excluded. There is a small band of dried raised bog (high bog) (PB1) between the canal corridor and the production bog that does have limited ecological value.

**Adjacent habitats and land-use**

The surrounding landscape is typically low-lying and is dominated by farmland with improved grassland. Adjacent habitats include those of reclaimed cutover bog such as conifer plantation (WD4), improved grassland (GA1) and wet grassland (GS4). There are also some high bog (PB1) remnants and active cutover bog (PB4) around the margins that are not in ownership by BnM. A large area of peatland towards the southern end of the site is leased from BnM to Klasmann-Deilmann and is harvested for horticultural peat. The Grand Canal is located adjacent to the northern boundary. The margins around the production bog are typically dominated by scrub (WS1) and Birch woodland (WN7) developing on peat remnants.

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

- The Esker Stream (river) flows through the centre of the site and divides the site into two main sections.
- The bog and this river are within the River Barrow catchment.
- A tributary of The Esker Stream flows along the eastern boundary and through the conifer plantation. This stream is in poor condition and is filled with emergent vegetation.

**Peat type and sub-soils**

The main peat type exposed on this site is fen peat. The site is likely to be underlain with limestone tills, as these sub-soils are exposed around the margins of the site. The sub-soils along the southern margin are limestone-based sands and gravels lain down by the river. Shell Marl was exposed along some drains in the cutaway area of the northern section. Extensive pioneer poor fen dominated by Marsh Arrowgrass was found over much of the northern section and this community is also associated with sites with shell marl.

**Fauna biodiversity**

**Birds**

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

- Swallow
- Snipe (2)
- Heron
- Other more common species included Swallow, Wren, Coal Tit, Blue Tit, Meadow Pipit, Reed Bunting and Finches

**Mammals**

- Signs of Fox, Rabbit and Badger were noted on the site.
- A Hare was observed on the site and there are frequent signs of Hares around the site.
- Mink and Otter have been noted on the site in the past, particularly along the Esker Stream and its tributary.

**Other Species**

- Green-veined White
- Wall Brown

**Activities on the site**

Activities on the site include:

- Maintenance of the BnM railways and other infrastructure.

**References**

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

## APPENDIX IV: ENVIRONMENTAL CONTROL MEASURES TO BE APPLIED TO BOG REHABILITATION

- Bog restoration/rehabilitation measures will be restricted to within the footprint of the proposed rehabilitation area.
- The proposed rehabilitation will have due regard to noise limits and hours of operation (i.e. dusk and dawn) to minimise any potential disturbance on resident and local fauna that utilise the site and immediate environs.
- All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).
- The proposed activities will be restricted to daylight hours and there will be no requirement for artificial lighting.
- Silt ponds will be inspected and maintained as per the IPC Licence.
- During periods of heavy precipitation and run-off increasing risks of siltation, 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 plant species likely to be spread by PCAS activities have been recorded at Cavemount 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'.

For a list of the invasive alien species recorded at Cavemount Bog see section 3.3.3. of the main text. American Mink, Fallow Deer, Jenkins' Spire Snail and Sycamore have all been recorded close to Cavemount Bog but are considered unlikely to proliferate or spread as a direct result of PCAS Activities. Japanese Knotweed and Zebra Mussel have also been recorded (information on NBDC website) in habitats close to Cavemount Bog. All activities during the PCAS will adhere to Best Practice with regard to these species for the duration of the project.

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 inspecting and washing vehicles prior to entering sites.

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] and Zebra Mussel will be adhered with throughout all rehabilitation 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/Clonsast bog group (Ref. PO-503 SB). 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/Clonsast 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 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, under the proposed Scheme, and supported by the Climate Action Fund across a footprint of 33,000 ha. 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 additional costs associated with the additional and enhanced rehabilitation, i.e., those activities which go beyond the existing decommissioning and rehabilitation requirements arising from Condition 10 will be eligible for support under the proposed Scheme.

## 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.

## 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.

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

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

- BNM must ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.
- BNM must ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.
- BNM must ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.
- Bord na Móna will 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 is being 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 Cavemount 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. 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 2021 (Draft)

The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2021 (Draft). 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 license under section 95 of the EPA Acts. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in the bog to enable the development and production operation at the site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stock pile covering, pumps, septic tanks and fuel tanks.

In relation to this bog, the list and tasks would be as follows:

| Item | Description | Cavemount Decommissioning Plan |
|---|---|---|
| **1** | Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices | Clean-up of Bog |
| **2** | Cleaning Silt Ponds | Cleaning Silt Ponds |
| **3** | Decommissioning Peat Stockpiles | Peat Stockpile Management via Levelling |
| **4** | Decommissioning or Removal of Buildings and Compounds | Decommission and Removal of Porto-cabin tea centre and materials store |
| **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 license 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.

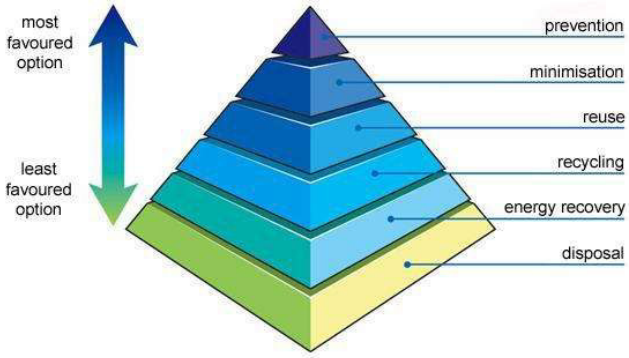
7.3.5 The tonnages and EWC Code for the waste materials listed in *Schedule 2(i) Hazardous Wastes for Disposal/Recovery* and *Schedule 2(ii) Other Wastes for Disposal/Recovery* sent off-site for disposal/recovery.

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 license. 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 | Cavemount Decommissioning Plan |
|---|---|---|
| **1** | Removal of Railway Lines | Removal of Railway Lines |
| **2** | Decommissioning Bridges and Underpasses | Where feasible |
| **3** | Decommissioning Railway Level Crossing | Decommissioning Railway Level Crossing |
| **4** | Restricting Access (bogs and silt ponds) | Restricting Access to Bog. |
| **5** | Removal of High Voltage Power Lines | Where feasible |

## 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.*

**Environmental stabilisation**: The key objective of peatland rehabilitation is **environmental stabilisation** of the former industrial peat production areas and the stabilisation of any potential emissions from the bog that related to the former industrial peat extraction activities.

Environmental stabilisation is defined as:

- Carrying out planned peatland rehabilitation.

- Setting former bare peat industrial peat production areas on a trajectory towards naturally functioning peatland habitats, via planned peatland rehabilitation, the restoration of wetter hydrological conditions and encouragement of natural colonisation.
- Stabilisation or downward trajectory of key water quality parameters (e.g. suspended solids, ammonia),
- Meeting IPC Licence conditions.

**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 may also 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, Clonsast Group of Bogs in Counties Offaly and Kildare.

**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 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:**
Lough Ree Power Ltd screens the peat from the bogs 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 P0503-01 IPPC Licence Extractive Waste Conditions**

**2.1 Condition 7.5 Extractive Waste Management**
The licensee shall draw up a Waste Management Plan (to be known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste. This Plan shall meet the requirements of regulation 5 of the Waste Management (Management of Waste from the Extractive Industries) Regulations,2009. The Plan shall be submitted for agreement by the Agency by the 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 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 Clonsast IPPC Licence P0503-01.

# 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 APX -1 Consultees contacted**

| Bog Name | Contact Organisation | Contact Name | Date of Issue | Communication Format | Date Response Received | Response format |
|---|---|---|---|---|---|---|
| Cavemount | Offaly County Council - Chief Executive | Anne-Marie Delaney | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Council - Senior Planner | Andrew Murray | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Council - Heritage Officer | Amanda Pedlow | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Council | Mary Hussey | 08/01/2021 | Email | 11/02/2021 | Email |
| Cavemount | Offaly County Councillors - Edenderry District | Cllr. Mark Hackett | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Councillors - Edenderry District | Cllr. Noel Cribbin | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Councillors - Edenderry District | Cllr. Eddie Fitzpatrick | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Councillors - Edenderry District | Cllr. John Foley | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Councillors - Edenderry District | Cllr. Robert McDermott | 08/01/2021 | E-mail | | |
| Cavemount | Offaly County Councillors - Edenderry District | Cllr. Liam Quinn | 08/01/2021 | E-mail | 24/01/2021 | E-mail |
| Cavemount | TD Laois/Offaly | Barry Cowen | 08/01/2021 | E-mail | | |
| Cavemount | TD Laois/Offaly | Charlie Flanagan | 08/01/2021 | E-mail | | |
| Cavemount | TD Laois/Offaly | Sean Fleming | 08/01/2021 | E-mail | | |
| Cavemount | TD Laois/Offaly | Carol Nolan | 08/01/2021 | E-mail | 25/01/2021 | E-mail |
| Cavemount | TD Laois/Offaly | Brian Stanley | 08/01/2021 | E-mail | | |
| Cavemount | Eastern and Midland Regional Assembly | | 08/01/2021 | E-mail | | |

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|---|---|---|---|---|---|---|
| Cavemount | Environmental Protection Agency | Brian Meeney | 08/01/2021 | E-mail | | |
| Cavemount | National Parks and Wildlife Service | Brian Lucas | 08/01/2021 | E-mail | | |
| Cavemount | NPWS Regional Network | District Conservation Officer | 12/01/2021 | E-mail | | |
| Cavemount | Dept of the Housing Local Government and Heritage | Malcom Noonan (Minister of State at the Department of Housing, Local Government and Heritage) | 08/01/2021 | E-mail | | |
| Cavemount | National Monuments Service | Margaret Keane | 08/01/2021 | E-mail | | |
| Cavemount | National Museum of Ireland (Irish Antiquities Division) | Isabella Mulhall | 08/01/2021 | E-mail | | |
| Cavemount | Minister for Environment, Climate and Communications | Minister - Eamon Ryan | 08/01/2021 | E-mail | | |
| Cavemount | Minister of state for Agriculture with responsibility for Land use and Biodiversity | Pippa Hackett Minister of State for Land Use and Biodiversity | 08/01/2021 | E-mail | | |
| Cavemount | Inland Fisheries Ireland | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Waterways Ireland | General e-mail contact | 08/01/2021 | E-mail | 24/01/2021 | E-mail |
| Cavemount | The Heritage Council | Lorcán Scott | 08/01/2021 | E-mail | 04/01/2021 | E-mail |
| Cavemount | An Forum Uisce (The Water Forum) | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | An Taisce | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Friends of the Earth | Oisin Coughlan | 08/01/2021 | E-mail | | |
| Cavemount | Friends of the Irish Environment | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Birdwatch Ireland | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Irish Peatlands Conservation Council | General e-mail contact | 08/01/2021 | E-mail | 25/01/2021 | E-mail |
| Cavemount | Irish Wildlife Trust | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Bat Conservation Ireland | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Woodlands of Ireland | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Butterfly Conservation Ireland | Jesmond Harding/info email | 08/01/2021 | E-mail | 12/01/2021 | E-mail |
| Cavemount | Community Wetlands Forum (part of Irish Rurallink) | General e-mail contact | 08/01/2021 | E-mail | | |

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|---|---|---|---|---|---|---|
| Cavemount | Offaly Public Participation Network (PPN) | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Sustainable Water Action Network (SWAN) | http://www.swanireland.ie/ | 08/01/2021 | E-mail | | |
| Cavemount | Irish Farmers Association (Laois Offaly and Westmeath Office) | General e-mail contact | 08/01/2021 | E-mail | 23/01/2021 | E-mail |
| Cavemount | Irish Farmers Association (Head Office) | General e-mail contact | 08/01/2021 | E-mail | 23/01/2021 | E-mail |
| Cavemount | National Association of Regional Game Councils | Email - nargc@nargc.ie | 08/01/2021 | E-mail | | |
| Cavemount | Midlands National Shooting centre | General e-mail contact | 08/01/2021 | E-mail | 24/01/2021 | E-mail |
| Cavemount | ICMSA (Irish Creamery Milk Suppliers Association) | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | ICSA (Irish Cattle and Sheep Farmers Association | General e-mail contact | 08/01/2021 | E-mail | | |
| Cavemount | Midlands & East Regional WFD Operational Committee | Ray Spain Co-ordinator Local Authority Water Programme | 08/01/2021 | E-mail | | |
| Cavemount | Shannon Flood Risk State Agency Co-ordination Working Group | Jackie Stewart - Flood Risk management Policy | 08/01/2021 | E-mail | | |
| Cavemount | CARO (Climate Action Regional Office) Eastern and Midlands | Alan Dunney | 08/01/2021 | E-mail | | |
| Cavemount | Dr. Catherine Farrell Trinity College | General e-mail contact | Contact Initiated by Stakeholder | | 22/01/2021 | E-mail |
| Cavemount | Francis Kenna OPW | General e-mail contact | Contact Initiated by Stakeholder | | 22-23/01/2021 | E-mail |
| Cavemount | Dr. John Connolly Trinity College | General e-mail contact | 15/01/2021 | E-mail and virtual meeting | 24/01/2021 | E-mail |
| Cavemount | Irish Raptor Study Group | General E-mail contact | 12/01/2021 | E-mail | | |

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

| Organisation | Summary of Response by Stakeholder | BnM Response |
|---|---|---|
| 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 Cavemount on 22/02/2021. Key points raised were;<br>1) Requested that details of security fencing to be identified and detailed on plans.<br>2) Long term rehabilitation plan to be provided addressing above areas of consideration post 2024 if required.<br>3) Public Rights of Way access locations are to be maintained with relevant stakeholders and marked on drawings.<br>4) A number of technical issues with draft rehabilitation plans.<br>5) Advised BnM to carefully consider after use of bogs as part of PCAS<br>6) Request that the impact of PCAS on surrounding roads be considered as part of rehabilitation plans.<br>7) Advised that long term management (post 2024) is considered by BnM.<br>8) Advised that Appropriate assessment and the habitats directive are taken into account by BnM.<br>9) Advised that BnM consider management of flooding & water pollution, fire risk, invasive species and waste management 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.<br>BnM provided further PCAS documentation on request, via e-mail on 27/01/2021.<br>Refer to Section 4 for response on issues raised. Dialogue with Offaly County Council is ongoing. |
| Irish Peatlands Conservation Council | Responded to consultation regarding Cavemount and the PCAS project at large to express support for the project and list a number of comments on how the project might be improved;<br>1) Potential for inclusion of local environmental groups in species specific conservation plans<br>2) Requested that a map of potentially suitable areas for such projects should be included in rehab plans<br>3) Promoted the idea of creating a biodiversity action plan that considers the use of site by all relevant stakeholders<br>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 taken into account in future drafts of plan. Also advised that;<br>1) We have included DOC as an additional parameter on our suite of water monitoring analysis.<br>2) BnM are working with Lawco and WFD to align the BNM monitoring programme with the EPA's 2021 Monitoring programme<br>3) BnM have an extensive community consultation process ongoing with a dedicated Community Liaison Officer communicating to affected and interested parties |

| | | |
|---|---|---|
| Butterfly Conservation Ireland | Responded to consultation via e-mail on 11/12/2020 with submission on Castlegar. Concerns raised were:<br>1) Alterations to the text of the rehab plan.<br>2) Request for all turf cutting on BnM land to end.<br>3) Suggest monitoring for Large Heath Butterfly or food plant Hare's-tail Cottongrass.<br>4) Suggested alterations to habitat design in rehab plan to further connect regional high bog habitats.<br>5) Raised concerns over future land use. | BnM acknowledged via e-mail; Phone conversation with Jesmond Harding 19/01/2021. |
| 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 11/01/2021 discussed biodiversity and rehabilitation measures on PCAS bogs including Cavemount. |
| National Museum of Ireland (Irish Antiquities Division) | Responded through e-mail 28/12/2020 in relation to all PCAS bogs. Issues raised were;<br>1) The request that due diligence be taken during works to protect any archaeologically significant findings or areas<br>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 Cavemount Bog.<br>A virtual meeting on PCAS between BnM and NMI was held on 18/01/2021 |
| Irish Farmers Association | Responded to consultation regarding Cavemount and the PCAS project at large on multiple dates throughout ongoing discourse. Specific submission on Cavemount Bog received from Westmeath, Offaly and Laois IFA Office. Concerns raised were:<br>1) Potential for flooding on adjacent lands.<br>2) Health and Safety<br>3) Perceived potentially detrimental impact of PCAS on property value<br>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. |
| Dept. of Agriculture, Food & the Marine (DAFM) | Submission by e-mail to express support for PCAS in general. Submission recommended;<br>1) That local landowners and stakeholders be considered as part of the consultation process.<br>2) EIA assessment be carried out prior to PCAS works.<br>3) Hydrological assessments are carried out with a view to protecting adjoining lands from adverse impacts. | BnM acknowledged and responded via e-mail on 02/03/2021to assure that all points raised within the submission will be considered. A virtual meeting/PCAS presentation was held for DAFM on 11/12/2020. |

| | | |
|---|---|---|
| OPW | Submission received specifically including Cavemount Bog. Noted that the Brosna ADM Scheme is approximately 6km to the west and the Boyne ADM Scheme is approximately 4km to the north of Cavemount Bog. There is no overlap with ADM activities and no likely impacts from these plans to ADM or impacts on OPW ADM activities. The River Barrow DD drains the lands around the bog but the bog area is not within the benefiting lands of the Barrow DD. Any plans for the proposed bog restoration will or should provide natural water retention measures within the Barrow catchment and will have the potential to reduce flood risk in the catchment, which should be supported by the OPW | BnM acknowledged and will give due cognisance to all points within the rehabilitation plan for Cavemount Bogs. BnM raised responded via e-mail. |
| Trinity College | Trinity College, Dublin, made a submission by e-mail 24/01/2021. The following points were raised;<br>1) Advised that the consultation phase of the project should be given more time<br>2) Advised that there is little evidence of pre-project and post-project measurement<br>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 within the rehabilitation plan for Cavemount Bogs. BnM raised responded via e-mail. |
| NUI Galway | Sent email to say that would follow-up with submission (not yet received); interested in *Sphagnum* inoculation trials as part of ongoing researcghproject. | BnM acknowledged and will give due cognisance to all points within the rehabilitation plan for Cavemount 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 | 13/09/2020 | First release | EMcD |
| 2 | | | |

**Archaeological Impact Assessment of Proposed Bog Rehabilitation at Cavemount Bog, Co. Offaly. Dr. Charles Mount. Nov 2020.**

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

## Report For

## Bord Na Móna Energy Ltd.

## Author

**Dr. Charles Mount**

**Bord Na Móna Project Archaeologist**

## Introduction

The EPA (2020) *Guidance on the process of preparing and implementing a bog rehabilitation plan* notes that the licensee should characterise the bog prior to embarking on detailed planning and implementation. This characterisation should detail how the land is classified in terms of statutory protections, e.g. as European sites, world heritage sites, RAMSAR sites, National Heritage Areas, national monuments, archaeological heritage, etc. This archaeological impact assessment report was prepared by Dr. Charles Mount for Bord na Móna Energy Ltd to fulfil this characterisation in relation to archaeological heritage. It represents the results of a desk-based assessment of the impact of proposed bog rehabilitation of c.513 hectares at Cavemount Bog, Co. Offaly on the known archaeological heritage of the bog. The proposed rehabilitation actions will be a combination of measures to create wetlands and re-wet deep peat as outlined in the draft Methodology Paper for the proposed Bord na Móna Decommissioning, Rehabilitation and Restoration Scheme. These enhanced measures for Cavemount Bog will include:

- Blocking field drains in parts of the former industrial production area using a dozer/excavator to create regular peat blockages (three barriers per 100 m) along each field drain.
- Re-alignment of piped drainage to manage water levels across the site.
- Realignment of gravity outfalls (where needed).
- Fertiliser treatment of high fields and headlands (typically slow to naturally re-colonise) to encourage natural colonisation, if needed. (It is noted that the application of fertiliser may need additional assessment and approval as per the IPC Licence).
- No measures are planned for the surrounding marginal peatland habitats.
- No measures are proposed for areas that have already stabilised.
- Silt ponds will continue to be maintained during rehabilitation and decommissioning.
- Evaluate success of short-term rehabilitation measures and enhance where necessary.
- Decommissioning of silt-ponds will be assessed and carried out, where required.

Cavemount Bog is located c.3km south-west of Rhode, Co. Offaly, directly south of the Grand canal and to the north of the R402 road and west of the R400 road. The bog occupies the townlands of Ballyhugh, Coole, Clonmeen, Killeen, Mullalough or Cavemount, Newtown and Toberdaly on OS 6 inch sheets Offaly Nos. 10 and 11.

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

- The IAWU Peatland Survey
- 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 Cavemount Bog before that date. This review established that there are no RMPs situated in the proposed rehabilitation area or vicinity (see Fig. 1). The closest RMP to the rehabilitation area, OF011-019---- are possible rectangular and circular enclosures situated on dryland in Toberdaly townland more than c.0.23km north of the rehabilitation area.

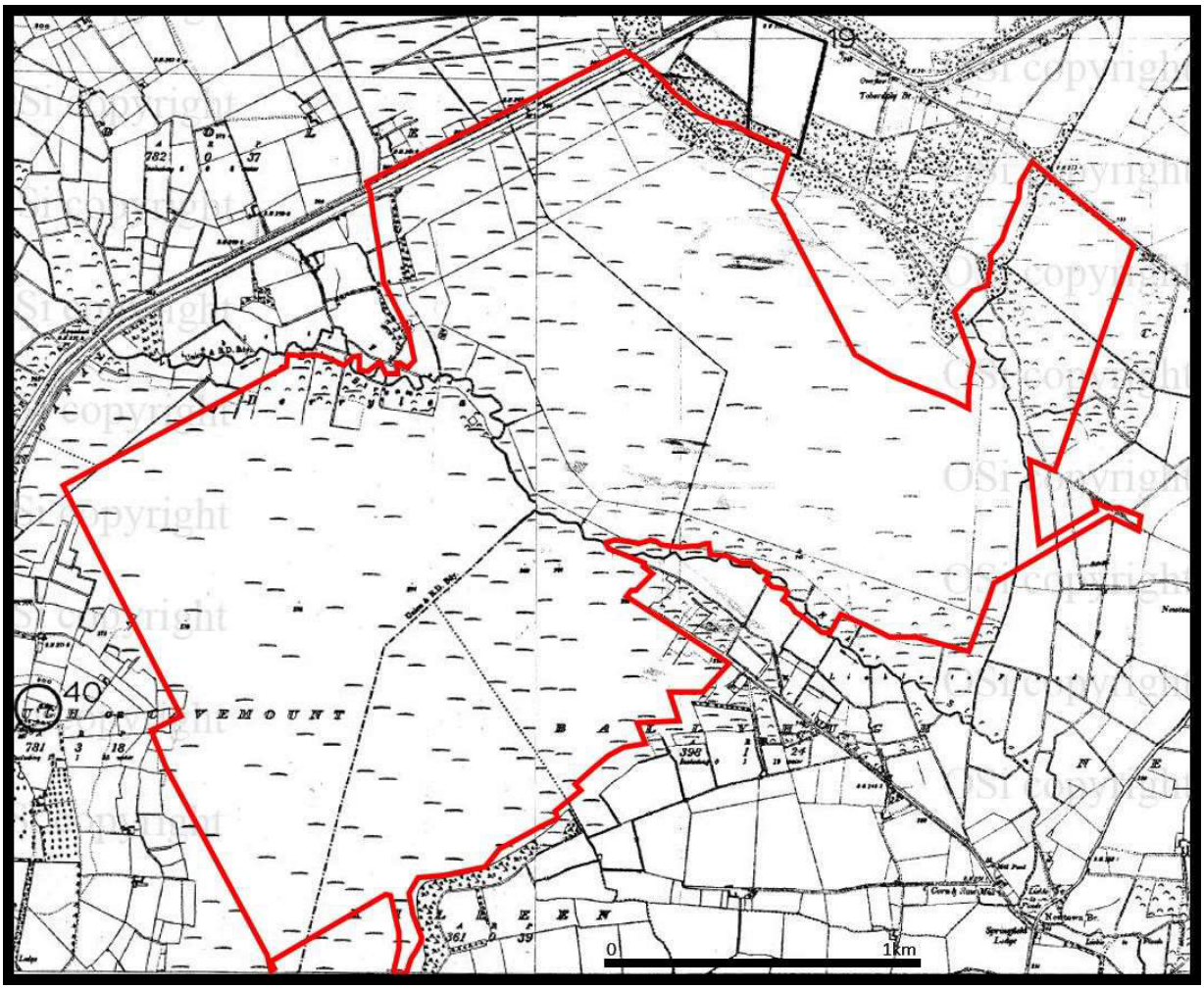



Fig. 1. Cavemount Bog, Co. Offaly, detail of the Record of Monuments and Places map sheets Nos. 10 and 11. The proposed rehabilitation area is outlined with the redline. There are no Recorded Monuments in the rehabilitation area.

### Peatland survey

Cavemount Bog was surveyed by the Irish Archaeological Wetland Unit in 2001 as part of the Archaeological Survey of Ireland Peatland Survey, Licence number 01E0476. In total, three toghers (OF-KEN 0004, OF-MLH 0003 and OF-MLH 0004) consisting of three individual sightings and six quantities of

worked and unworked wood were recorded in Killeen and Mullalough or Cavemount townlands in the very south-west part of the bog (Table 1). These archaeological sightings were all notified to the Archaeological Survey of Ireland.

| SMR_NO | IAWU Cat._No. | Site type | Townland | N.G.R. E | N.G.R. N | Depth BS |
|---|---|---|---|---|---|---|
| OF010-474---- | OF-KEN 0001 | Redundant record- Worked wood | Killeen | 250746 | 228575 | 0.00 |
| OF010-475---- | OF-KEN 0002 | Redundant record- Worked wood | Killeen | 250728 | 228619 | 0.00 |
| OF010-476---- | OF-KEN 0003 | Redundant record- unworked wood | Killeen | 250726 | 228620 | 1.00 |
| OF010-477---- | OF-KEN 0004 | Road - class 3 togher | Killeen | 250728 | 228650 | 0.00 |
| OF010-478---- | OF-KEN 0005 | Redundant record- Worked wood | Killeen | 250741 | 228627 | 0.18 |
| OF010-479---- | OF-MLH 0001 | Redundant record- Worked wood | Mullalough or Cavemount | 250532 | 228706 | 0.62 |
| OF010-480---- | OF-MLH 0002 | Redundant record- Worked wood | Mullalough or Cavemount | 250536 | 228653 | 0.60 |
| OF010-481---- | OF-MLH 0003 | Road - class 3 togher | Mullalough or Cavemount | 250558 | 228565 | 0.00 |
| OF010-482---- | OF-MLH 0004 | Road - class 3 togher | Mullalough or Cavemount | 250551 | 228561 | 0.00 |

Table 1. List of sites recorded by IAWU in Cavemount Bog.

**Archaeological investigations**

Reports of archaeological excavations and licensed monitoring in the study area listed in the excavations database at excvations.ie were examined as part of the assessment. There are no additional reports of any archaeological investigations carried out in the rehabilitation area.

**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 1st of February 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 nine monuments entered in the SMR in the proposed rehabilitation area. The monuments are indicated in Table 1 and Fig. 2 below. These are all monuments identified by the IAWU survey in 2001 that were notified to the Archaeological Survey of Ireland. Six of these sightings, described by the IAWU as worked wood or unworked wood, have been rejected as monuments by the Archaeological Survey and are now classed as Redundant records.

**Reported finds**

Bog butter in a wooden keg (1981:277) was recovered from Toberdaly townland to the north of the rehabilitation area. The precise find spot of this object is not known. It may have been recovered from either the northern end of Cavemount Bog or the southern end of Ballybeg Bog.

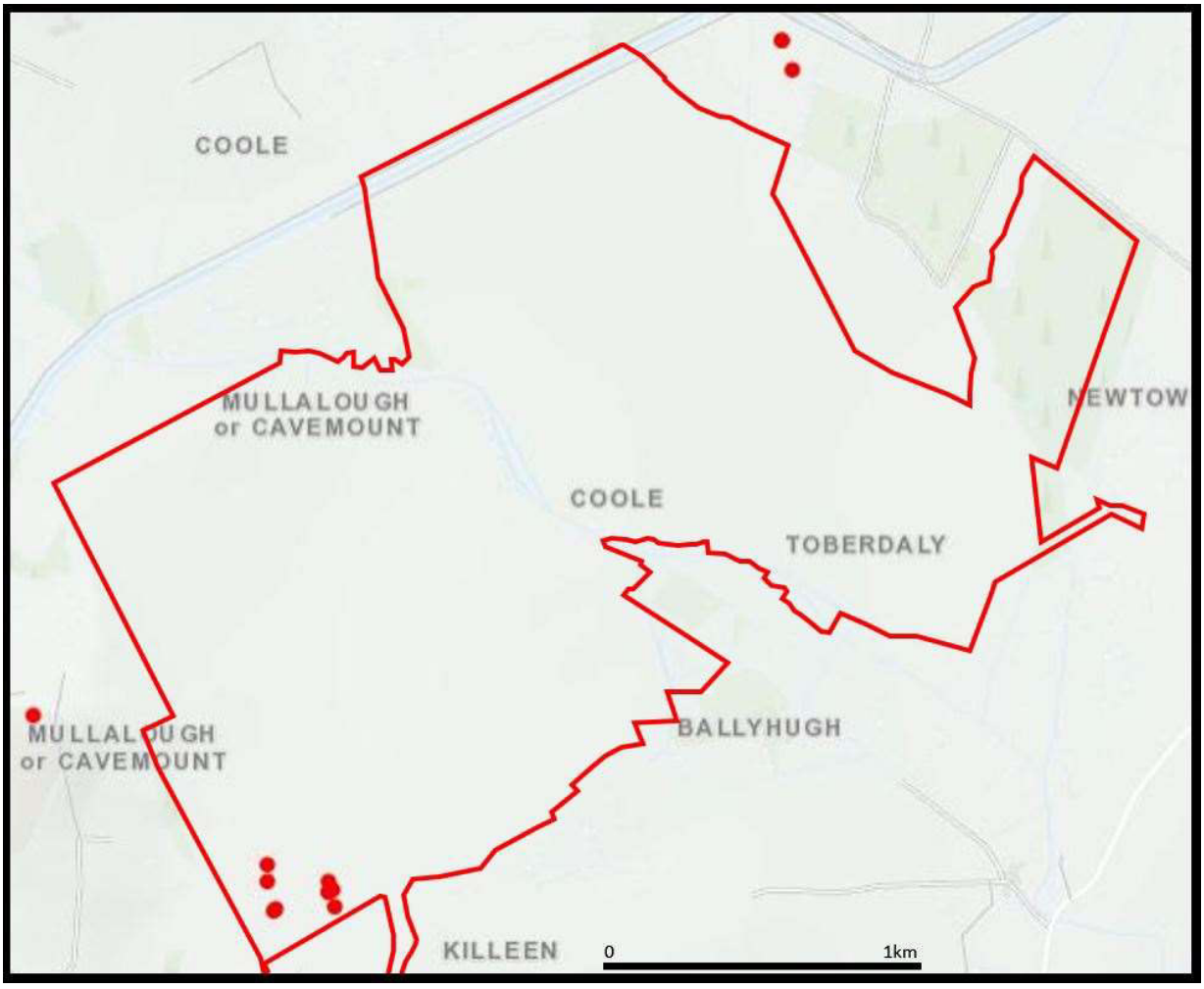



Fig. 2. Cavemount Bog, Co. Offaly, detail of the Sites and Monuments Record. The proposed rehabilitation area is outlined with the redline. There are a nine SMRs in the very south-west part of the area.

**Previous assessments**

Cavemount 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 survey in 2001 and noted that there was a moderate potential for archaeological features to be uncovered during the course of any future development works in Cavemount Bog.

## Impact assessment

There are nine known sightings of archaeology in the rehabilitation area. Estimates of the peat removed from the bog based on the results of a 2020 drone survey of the bog carried out by Bord na Móna allow the depth of bog at each sighting to be calculated for the period 2008-2020 and also the depth of bog removed calculated for each sighting (see Table 1). The depth of peat removed in the period 2002-2008

can be estimated at c.100mm per year. Combining the data indicates that eight sightings have been removed and that survives is OF010-476---- unworked wood (see Table 2).

| SMR_NO | IAWU Cat._No. | Site type | Townland | N.G.R. E | N.G.R. N | Depth feature | Depth BS | Peat removed | Peat removed since 2008 | Status |
|---|---|---|---|---|---|---|---|---|---|---|
| OF010-474---- | OF-KEN 0001 | Redundant record- Worked wood | Killeen | 250746 | 228575 | 0.02 | 0.00 | c.0.7 | 0.42 | Removed |
| OF010-475---- | OF-KEN 0002 | Redundant record- Worked wood | Killeen | 250728 | 228619 | 0.04 | 0.00 | c.0.7 | 0.52 | Removed |
| OF010-476---- | OF-KEN 0003 | Redundant record- unworked wood | Killeen | 250726 | 228620 | 0.32 | 1.00 | c.0.7 | 0.38 | Removed |
| OF010-477---- | OF-KEN 0004 | Road - class 3 togher | Killeen | 250728 | 228650 | 0.07 | 0.00 | c.0.7 | 0.05 | Removed |
| OF010-478---- | OF-KEN 0005 | Redundant record- Worked wood | Killeen | 250741 | 228627 | 0.58 | 0.18 | c.0.7 | 0.53 | Removed |
| OF010-479---- | OF-MLH 0001 | Redundant record- Worked wood Worked wood | Mullalough or Cavemount | 250532 | 228706 | 0.40 | 0.62 | c.0.7 | 0.68 | Removed |
| OF010-480---- | OF-MLH 0002 | Redundant record- Worked wood | Mullalough or Cavemount | 250536 | 228653 | 0.44 | 0.60 | c.0.7 | 0.45 | Removed |
| OF010-481---- | OF-MLH 0003 | Road - class 3 togher | Mullalough or Cavemount | 250558 | 228565 | 0.35 | 0.00 | c.0.7 | 0.11 | Removed |
| OF010-482---- | OF-MLH 0004 | Road - class 3 togher | Mullalough or Cavemount | 250551 | 228561 | 0.12 | 0.00 | c.0.7 | 0.12 | Removed |

Table 2. List of sites recorded in Cavemount Bog with depth of peat removed since 2001.

## Recommendations

There is one surviving archaeological sighting in Cavemount Bog OF010-476---- unworked wood. This should be preserved *in situ* and avoided by the rehabilitation works. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## Conclusion

This is a desk-based archaeological assessment and includes a collation of existing written and graphic information to identify the likely archaeological potential of the proposed rehabilitation area. There are nine known sightings of archaeological heritage in the rehabilitation area one of which is extant and should be avoided by the rehabilitation works. Should any previously unknown archaeological material be uncovered during the rehabilitation works, it should be avoided and reported to the Bord na Móna Archaeological Liaison Officer and the National Museum of Ireland.

## References

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

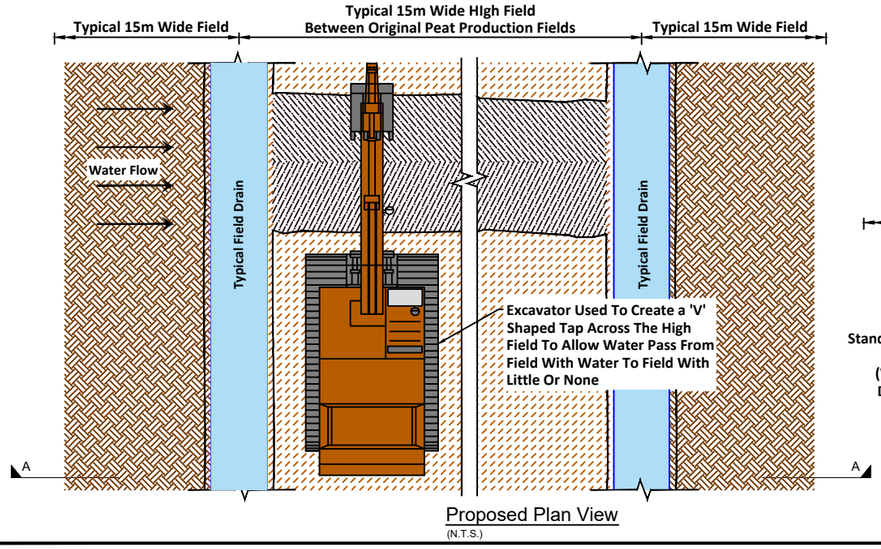
EPA 2020. Guidance on the process of preparing and implementing a bog rehabilitation plan.

Mackin *et al.* 2017. Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service.

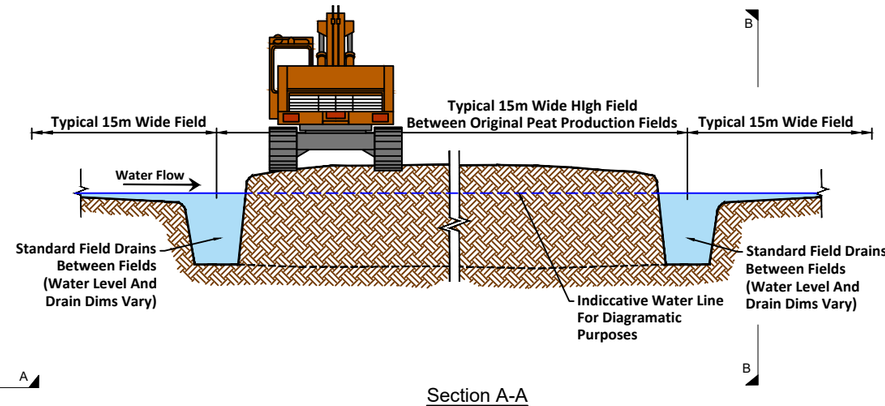
Dr. Charles Mount
2 February 2021

# Appendix C: Methodology Drawings

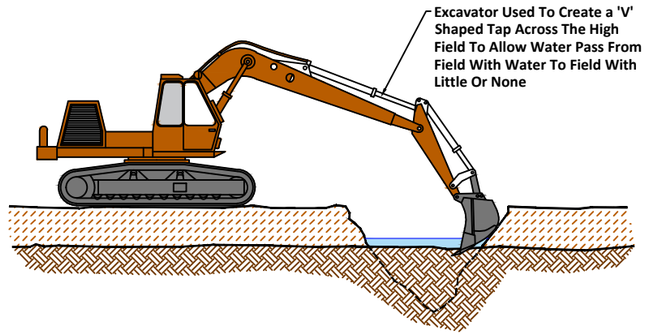
## 'V' Tap Across High Field To Control Water Levels




Proposed Plan View
(N.T.S.)



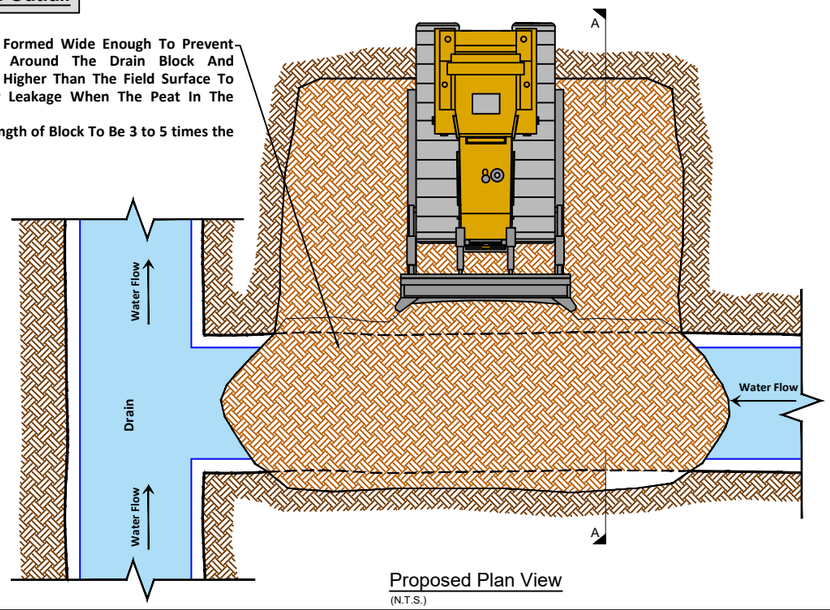

Section A-A
(N.T.S.)



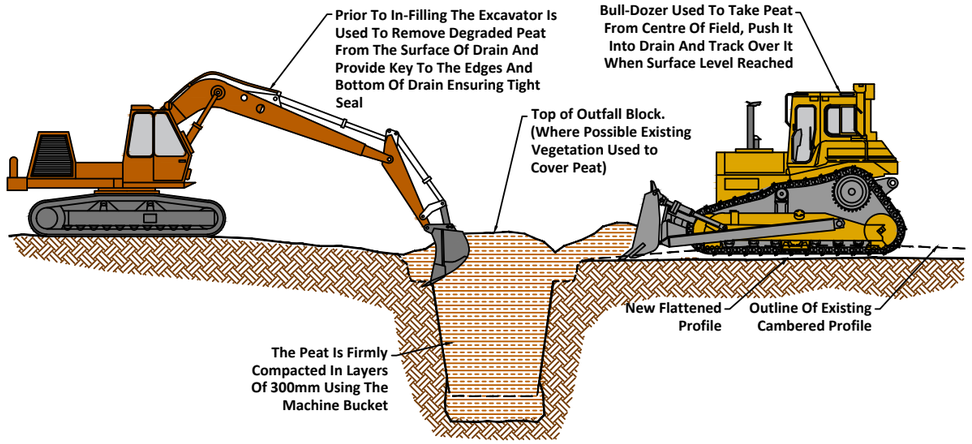

Section B-B
(N.T.S.)

## Blocking Of Outfall

The Blocks Are Formed Wide Enough To Prevent Water Moving Around The Drain Block And 300mm-500mm Higher Than The Field Surface To Prevent Further Leakage When The Peat In The Blocks Subsides.
Approximate Length of Block To Be 3 to 5 times the Width Of Drain

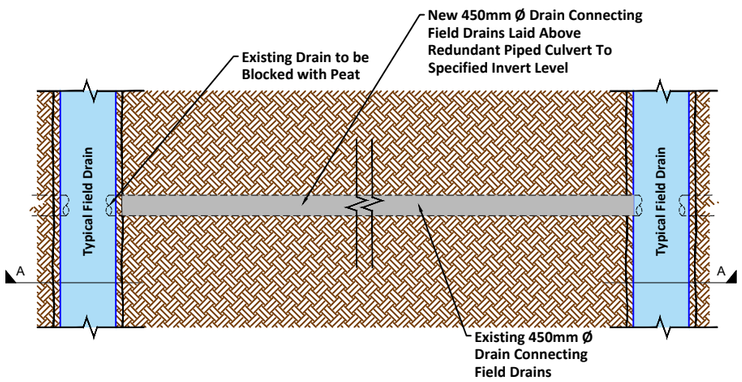



Proposed Plan View
(N.T.S.)

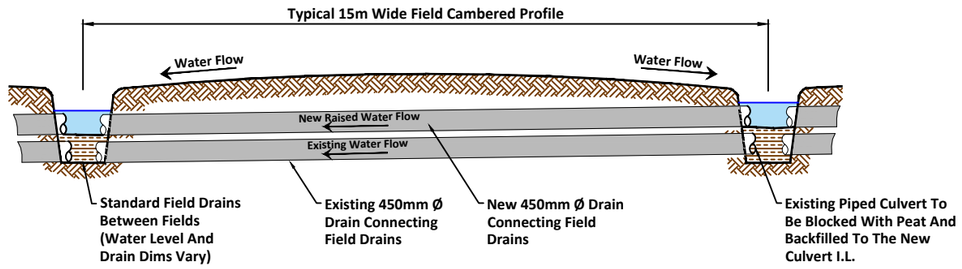



Section A-A
(N.T.S.)

## Raise Piped Culverts To Control Water Levels




Proposed Plan View
(N.T.S.)




Section A-A
(N.T.S.)

**NOTES:**

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

STATUS

| Rev | Description | Issued By | Date |
|---|---|---|---|
| . | | . | . |
| . | | . | . |
| c | 'Key' Added to Base Of Drain For Blocking Of Outfall Control Measure | P.K. | 03/03/21 |
| b | For Approval | P.K. | 25/02/21 |
| a | Issued For Information | P.K. | 29/01/21 |


BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160


PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Modifying of Outfalls
& Managing Water Levels

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |

Date: 20/01/21 | Scale : Not to Scale A3 | Stage: For Approval

Drawing No.: PCAS-0100-014 | Rev: c

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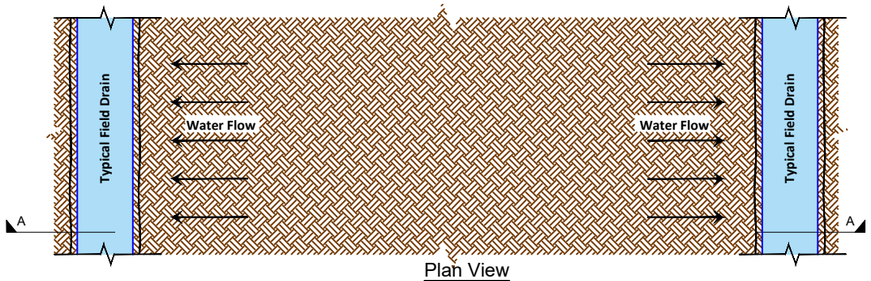
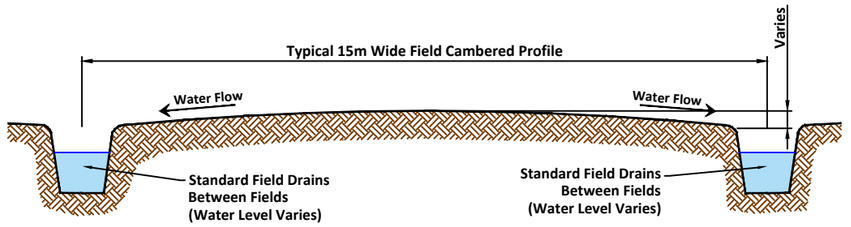
## Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog.



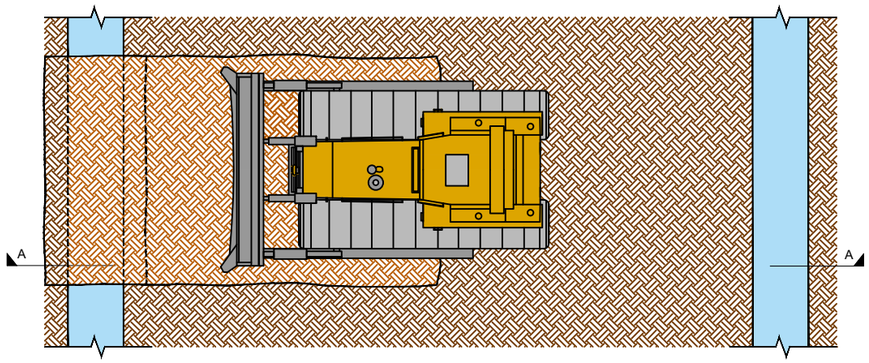

Plan View
(N.T.S.)



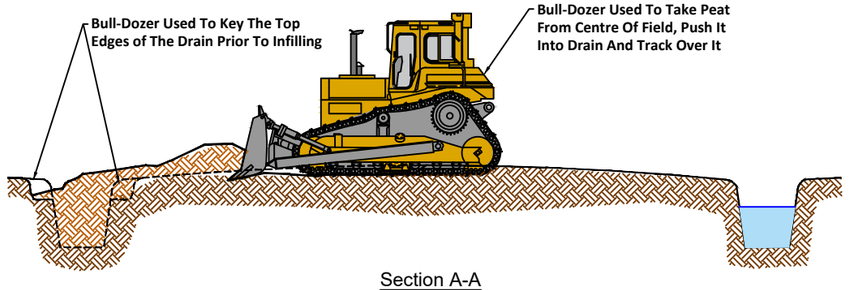

Section A-A
(N.T.S.)

## Phase 1
Forming 'Speed Bump'

The Bull-dozer is used to create a 5m Length key along both edges of the drain, approximately 500mm Wide x 500mm Deep.
Next a strip of peat is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.




Plan View

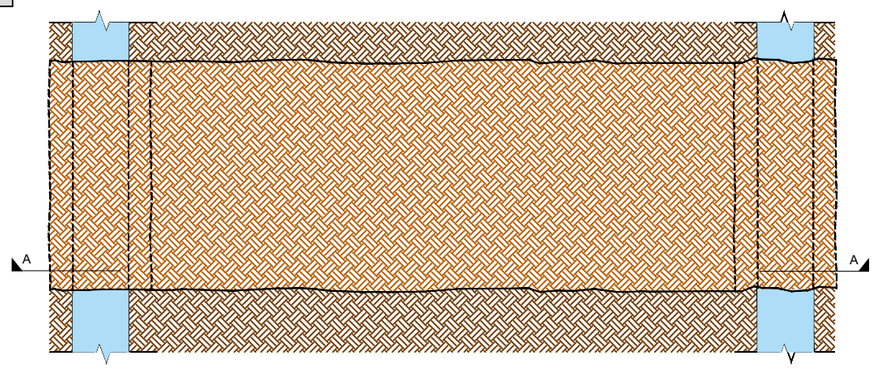



Section A-A
(N.T.S.)

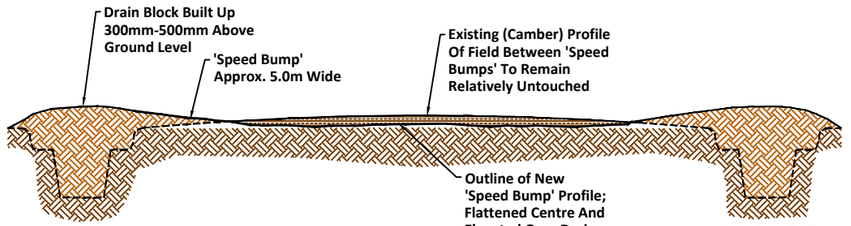
(N.T.S.)

## Complete Fields With Speed Bump (3 Per 100m)

Drain Blocks are built up at least 300mm-500mm above the existing ground level to allow for peat subsidence and to prevent water from flowing over the drain block and eroding it before it becomes stabilised.




Plan View
(N.T.S.)




Section A-A
(N.T.S.)

Section B-B
(N.T.S.)

### NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

STATUS

| Rev | Description | Issued By | Date |
|---|---|---|---|
| . | | . | . |
| . | | . | . |
| c | For Approval | P.K. | 03/03/21 |
| b | 'Key' Added To Top Edges Of Drain at Drain Block Locations | P.K. | 09/02/21 |
| a | Issued For Information | P.K. | 29/01/21 |


BORD NA MÓNA
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Fax. 057 9345160


PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DCT 2
'Speed Bump' Peat Drain Block

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |
| Date: 13/01/21 | | Scale : Not to Scale | A3 | Stage: For Approval |
| Drawing No.: PCAS-0100-008 | | | | Rev: c |

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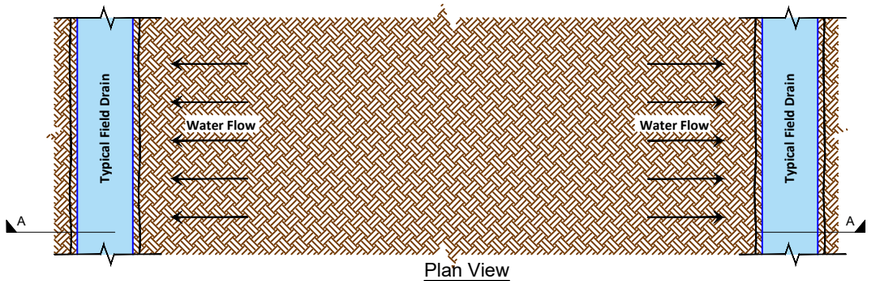
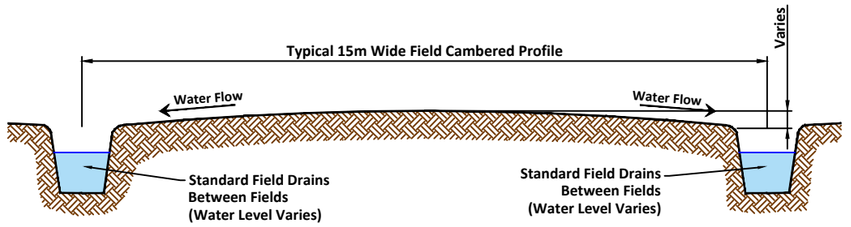
# DCT 2: 'Speed Bump' Peat Dams to Re-Wet Measure

## Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog.



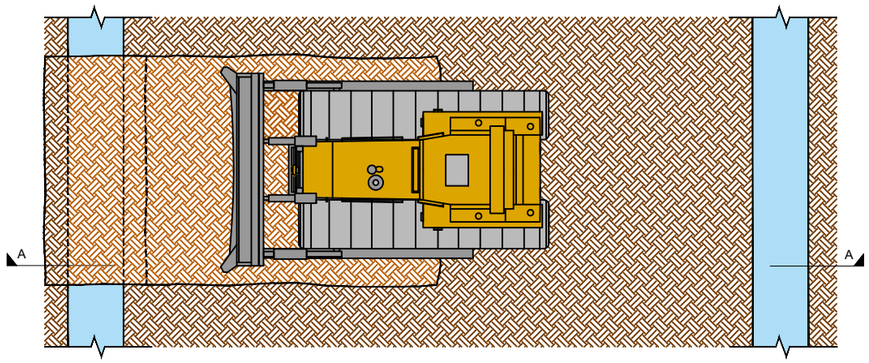

Plan View
(N.T.S.)



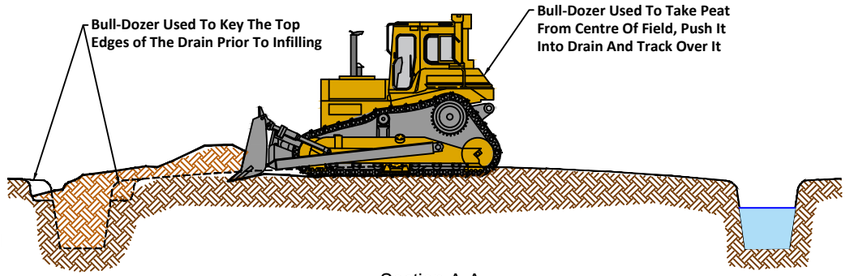

Section A-A
(N.T.S.)

## Phase 1
Forming 'Speed Bump'

The Bull-dozer is used to create a 5m Length key along both edges of the drain, approximately 500mm Wide x 500mm Deep.
Next a strip of peat is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.



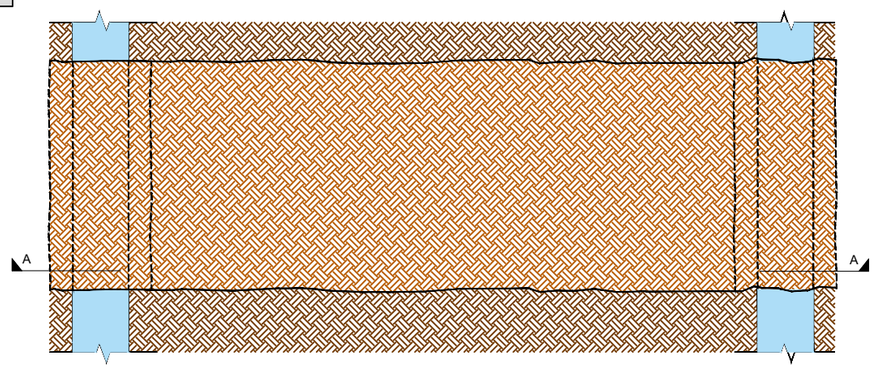

Plan View
(N.T.S.)



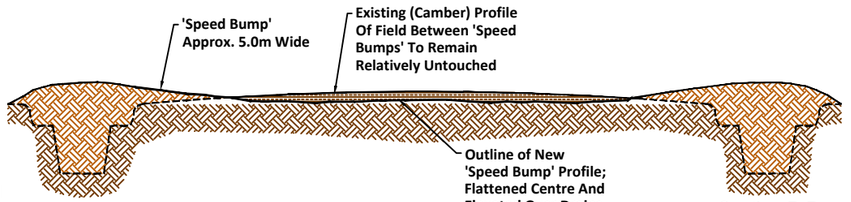

Section A-A
(N.T.S.)

## Complete Fields With Speed Bump (3 Per 100m)

'Speed Bumps' are created to allow for peat subsidence and to prevent water from flowing over the drain block and eroding it before it becomes stabilised.




Plan View
(N.T.S.)




Section B-B
(N.T.S.)

Section A-A
(N.T.S.)

## NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

DRAFT 09/02/21

STATUS

| Rev | Description | Issued By | Date |
|---|---|---|---|
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |
| b | 'Key' Added To Top Edges Of Drain at Drain Block Locations | P.K. | 09/02/21 |
| a | Issued For Information | P.K. | 29/01/21 |


BORD NA MÓNA
Naturally Driven
Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
Tel. 057 9345900
Fax. 057 9345160


PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DCT 2
'Speed Bump' Peat Dam

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |
| Date: 13/01/21 | | Scale : Not to Scale A3 | | Stage: Draft |
| Drawing No.: PCAS-0100-008 | | | | Rev: b |

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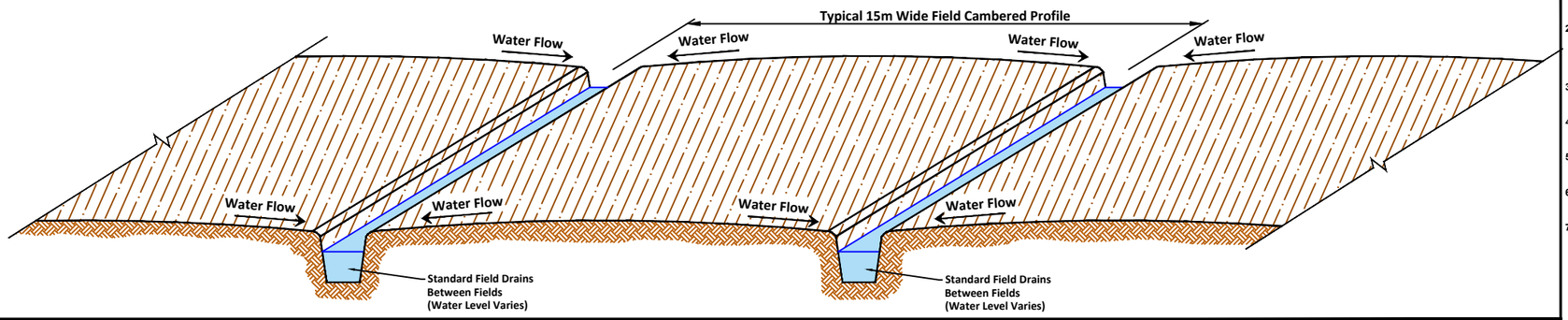
## Existing Layout:

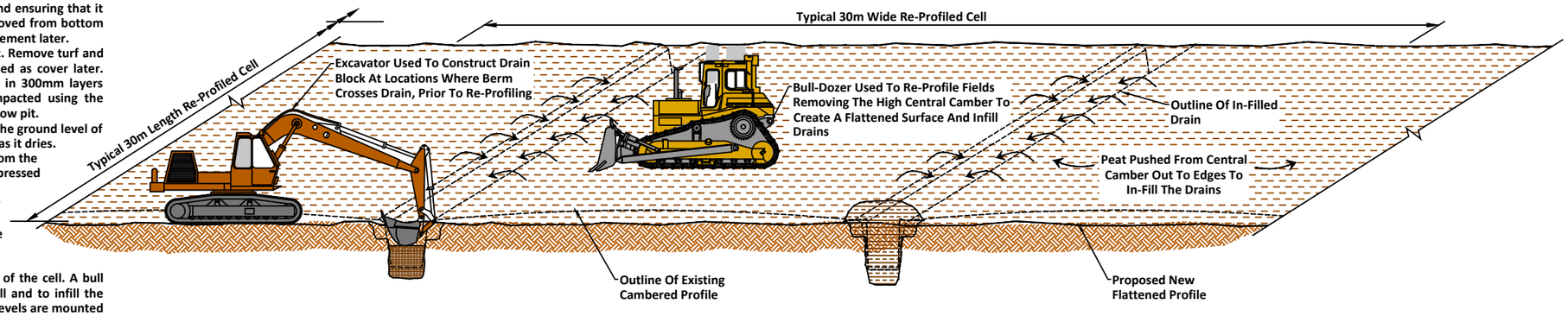
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.




## Phase 1
### Drain Blocking And Re-Profiling of Fields Surface

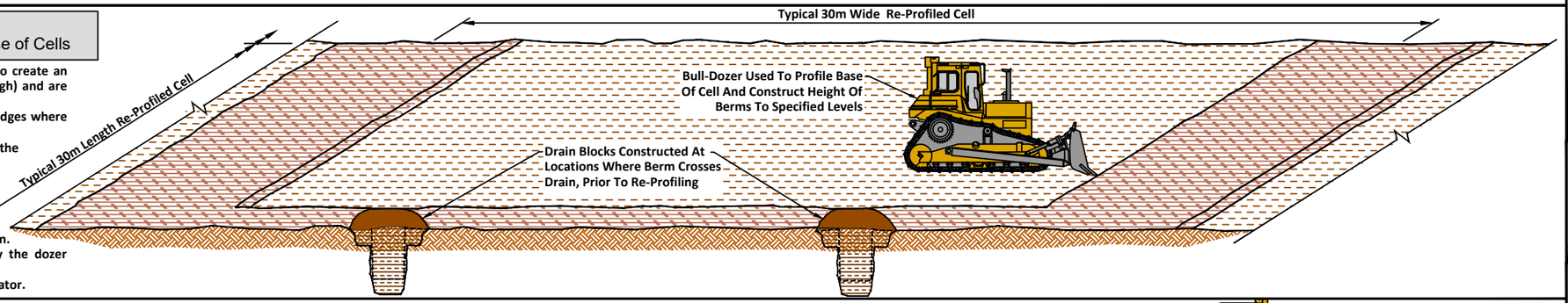
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement later.
Area behind the machine is to be used as a borrow pit. Remove turf and degraded peat. Place this material close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit.
The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
The borrow pit is back filled with the peat extracted from the bottom of drain. The sides of the borrow pit are to be pressed down and graded with the excavator bucket.
(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block. )

The centre of the cambered field is used as one side of the cell. A bull dozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces to the appropriate levels.




## Phase 2
### Formation of Surface Berms And Levelling Base of Cells

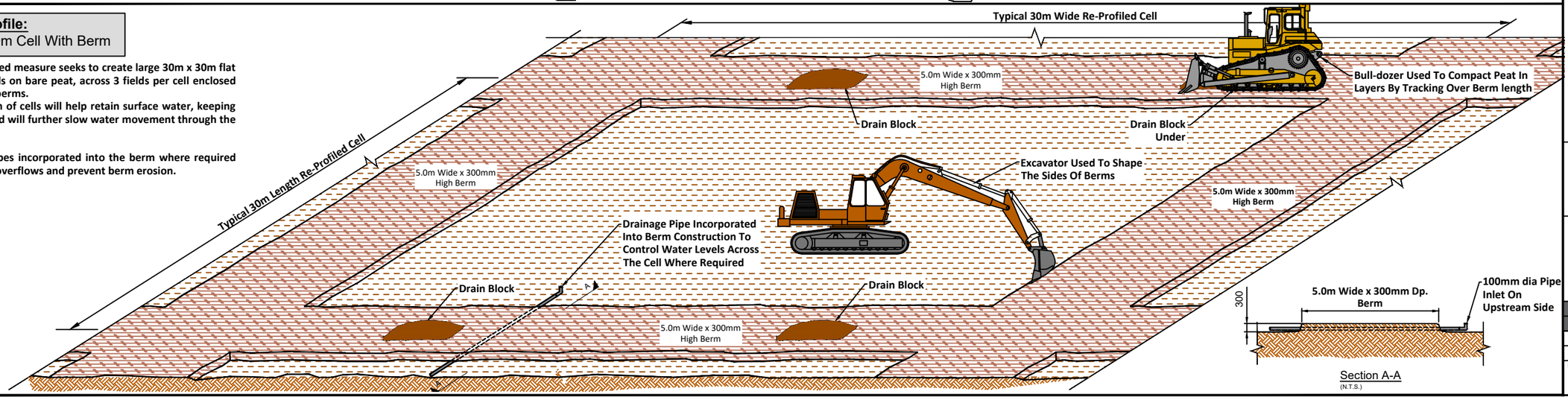
Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 300mm High Cross Berm.
The peat material in the berm is compacted in layers by the dozer tracking over it.
Berm edge profile is shaped by using the bucket of the excavator.




## Final Profile:
### 30m x 30m Cell With Berm

This enhanced measure seeks to create large 30m x 30m flat areas or cells on bare peat, across 3 fields per cell enclosed by shallow berms.
The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the bog.

Drainage pipes incorporated into the berm where required to manage overflows and prevent berm erosion.




## NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

STATUS

| Rev | Description | Issued By | Date |
|---|---|---|---|
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |
| b | For Approval | P.K. | 25/02/21 |
| a | Issued For Information | P.K. | 28/01/21 |


BORD NA MÓNA
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Bord Na Móna Engineering Department
LEABEG, TULLAMORE CO. OFFALY
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Fax. 057 9345160


PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DPT 5
30m x 30m Cell With Berms

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |

Date: 18/12/20 | Scale : Not to Scale A3 | Stage: For Approval
Drawing No.: PCAS-0100-007 | Rev: b

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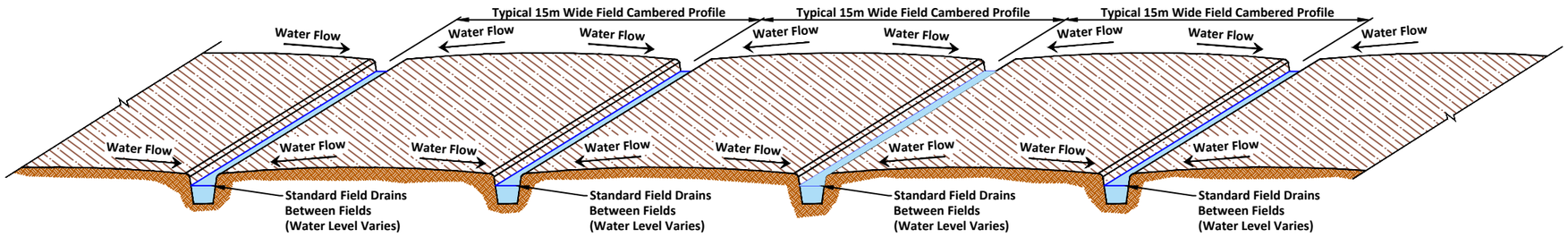
## Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.



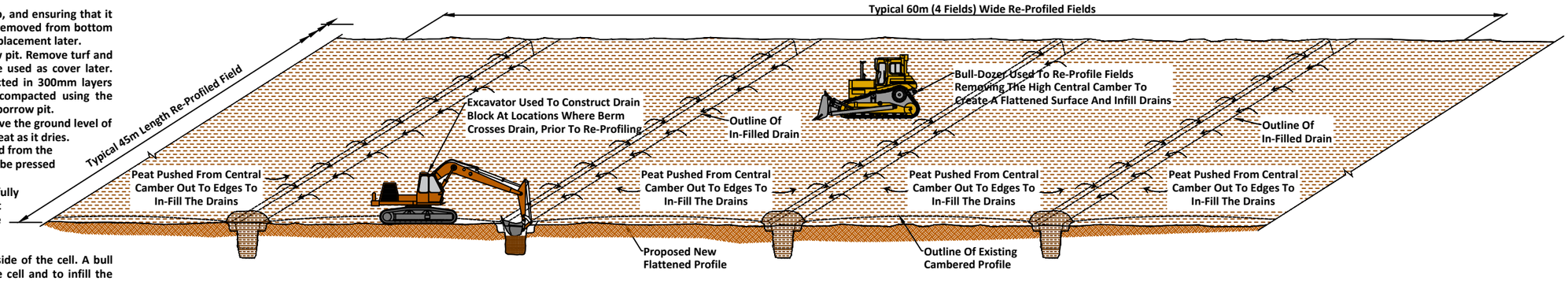

**NOTES:**

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

## Phase 1
Drain Blocking And Re-Profiling of Fields Surface

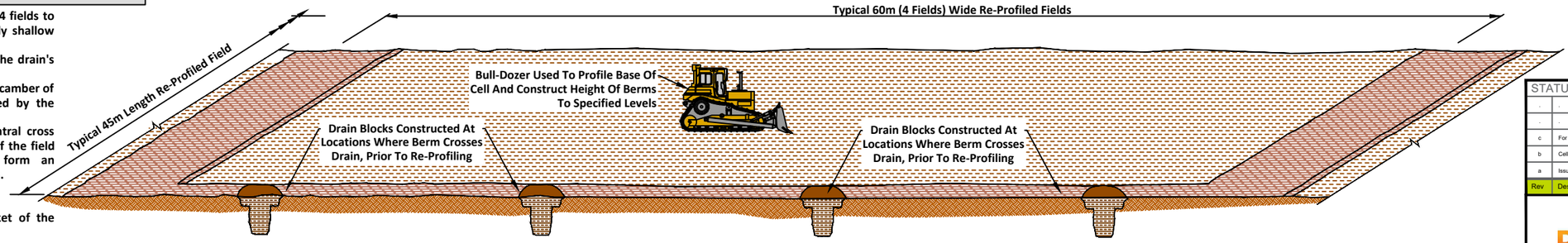
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains.
Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement later.
Area behind the machine is to be used as a borrow pit. Remove turf and degraded peat. Place this material close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit.
The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
The borrow pit is back filled with the peat extracted from the bottom of drain. The sides of the borrow pit are to be pressed down and graded with the excavator bucket.
(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block. )

The centre of the cambered field is used as one side of the cell. A bull dozer is used to level and flatten the base of the cell and to infill the drains by removing the camber from the fields. Laser levels are mounted on bull-dozers to allow the machine drivers to move peat and create flat surfaces to the appropriate levels.




## Phase 2
Formation of Surface Berms And Levelling Base of Cells

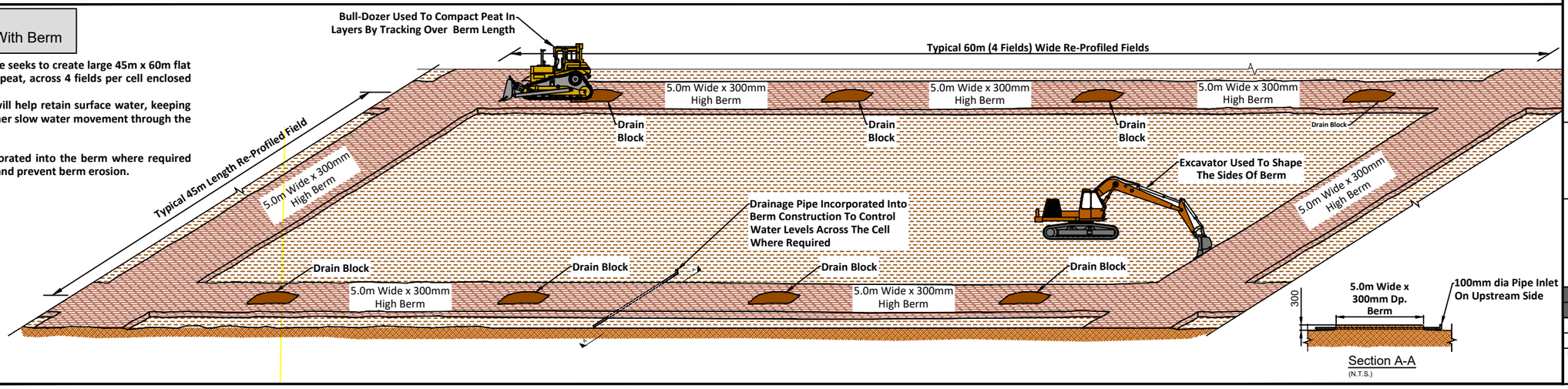
Berms are formed 45m in length and 60m across 4 fields to create an enclosed cell. The berms are relatively shallow (300mm high) and are 5.0 m wide.
An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 300mm High Cross Berm.
The peat material in the berm is compacted in layers by the dozer tracking over it.
Berm edge profile is shaped by using the bucket of the excavator.




## Final Profile:
45m x 60m Cell With Berm

This enhanced measure seeks to create large 45m x 60m flat areas or cells on bare peat, across 4 fields per cell enclosed by shallow berms.
The creation of cells will help retain surface water, keeping peat wet and will further slow water movement through the bog.

Drainage pipes incorporated into the berm where required to manage overflows and prevent berm erosion.




| STATUS | | | |
|---|---|---|---|
| . | . | . | . |
| . | . | . | . |
| c | For Approval | P.K. | 24/02/21 |
| b | Cell Size Text Amended | P.K. | 28/01/21 |
| a | Issued For Information | P.K. | 07/01/21 |
| Rev | Description | Issued By | Date |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PROJECT:
Peatland Climate Action Scheme (PCAS)

TITLE:
Rehabilitation Method DPT 4
45m x 60m Cell With Berms

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |

Date: 22/12/20 | Scale: Not to Scale A3 | Stage: For Approval
Drawing No.: PCAS-0100-006 | Rev: c

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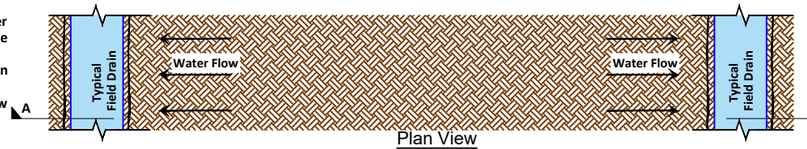
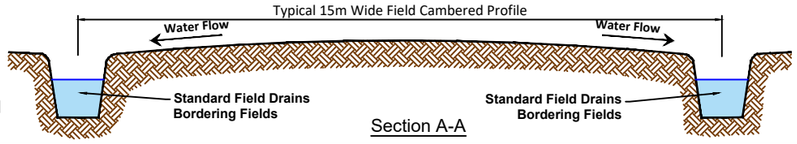
## Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of field re-profiling is to level the surface of the individual peat production fields to retain surface water at the required depth.
On peatlands with increased slopes it will be more advantageous to create shallow depressions.



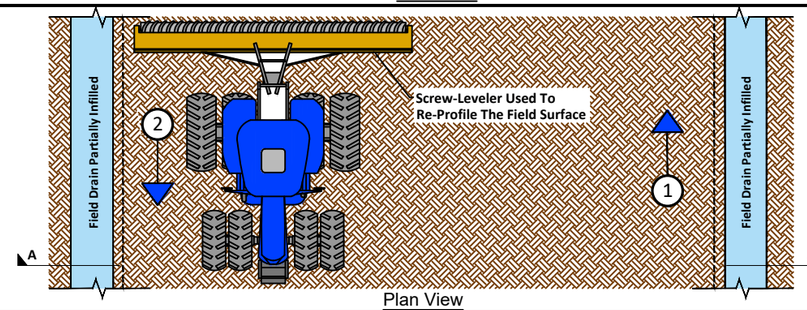
Plan View



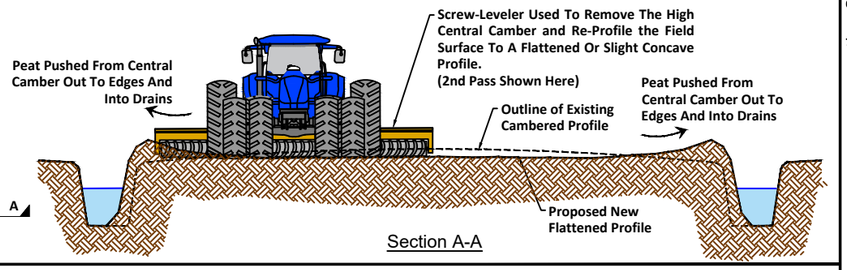
Section A-A

## Phase 1
Re-Profiling of Field Surface

The first operation in the re-profiling process begins with using a Screw-Leveler to remove the high central camber from individual production fields and deposit the peat on the lower-lying edges of the same production field.
The Screw-Leveler, with a level axis, will run up the first side ① of the production field and down the other side ② close to the edge of the drain, resulting in some of the peat being tipped into the drain.



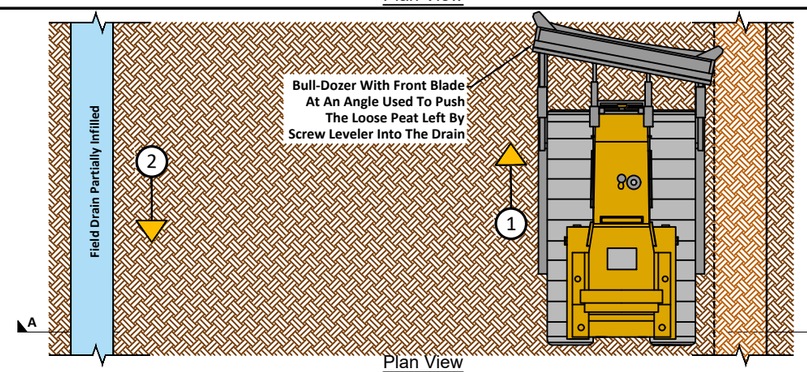
Plan View



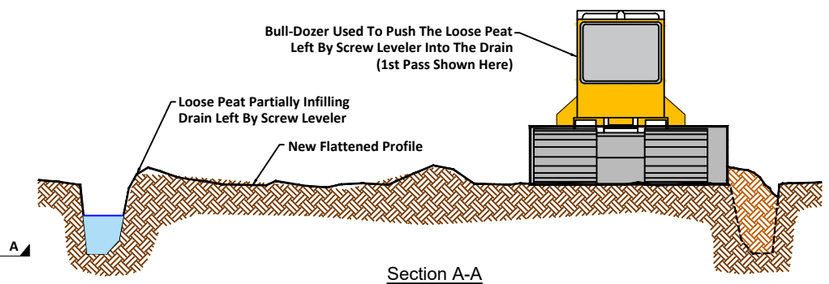
Section A-A

## Phase 2
Infilling Of Drains

Next the Bull-dozer will run up the first side ① of the production field and down the other side ② with the front blade at an angle placing the peat in the drain.



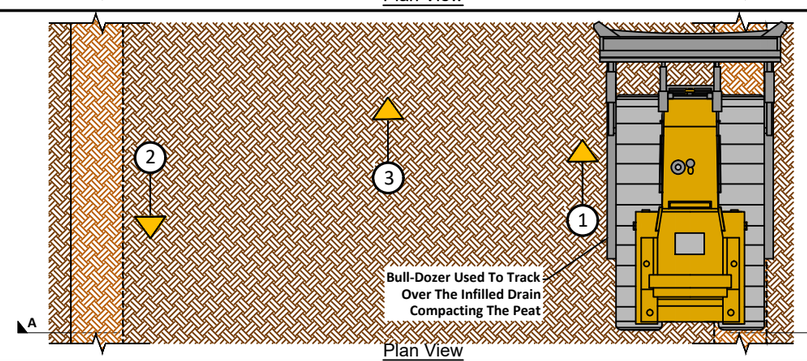
Plan View



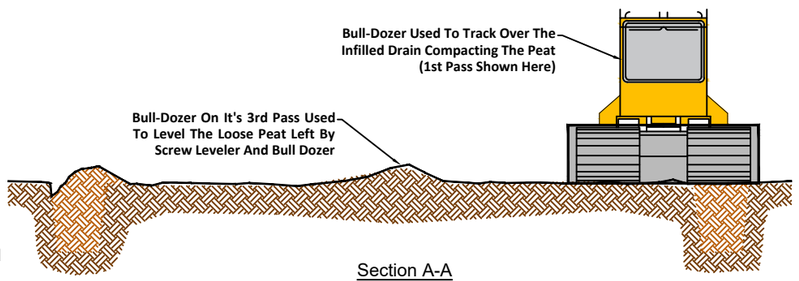
Section A-A

## Phase 3
Final Leveling Of Drains & Field

Next the Bull-dozer will track over the first of the infilled drains ① and then back down the other drain ② compacting and leveling the peat.
It will also make a pass down the middle of field ③ flattening peat mounds left between Screw Leveler and Bull dozer runs.



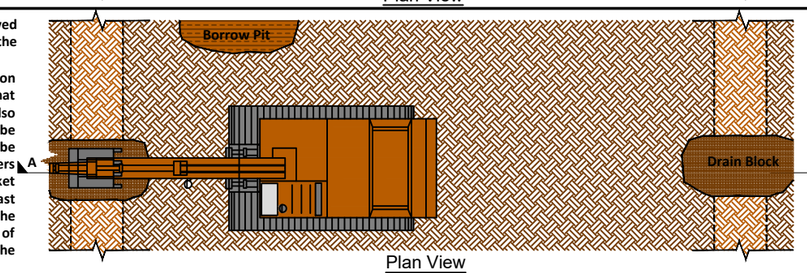
Plan View



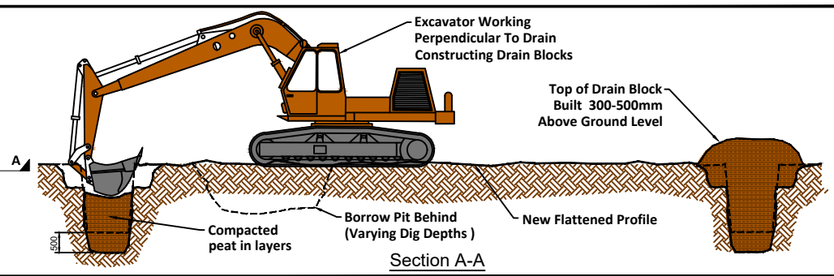
Section A-A

## Phase 4
Drain Blocking

(NOTE: If any vegetation present, it should be carefully removed at the start and left aside for replacement at the end of the process, to help bind and stabilise the top of the drain block. )
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement later. Area behind the machine is to be used as a borrow pit. Remove turf and degraded peat. Place this material close by to be used as cover later. 'Clay' like peat is extracted from pit and compacted in 300mm layers using the excavator bucket. The peat is firmly compacted using the machine bucket before laying more peat from the borrow pit. The drain block is built up at least 300-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries. The borrow pit is back filled with the peat extracted from the bottom of drain. The sides of the borrow pit are to be pressed down and graded with the excavator bucket.



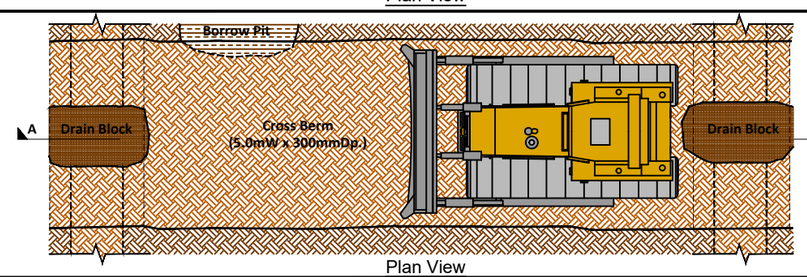
Plan View



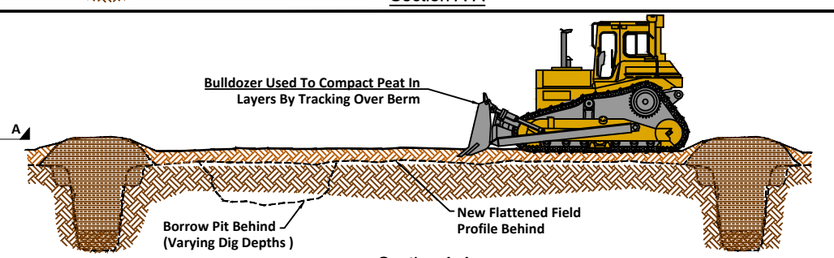
Section A-A

## Phase 5
Cross Berm

An Excavator is used to form a key(5m long) in the drain's edges where the berm crosses.
A strip of peat(5m wide) is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block.
Next the bull-dozer is used to complete the central cross section of Berm by taking peat from the centre of the field and pushing it in line with the field to form an approximately 5m Wide x 300mm High Cross Berm.
The peat material in the berm is compacted by the dozer tracking over it in layers.
Berm edge profile is shaped by using the bucket of the excavator.



Plan View



Section A-A

### NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

STATUS

| Rev | Description | Issued By | Date |
|---|---|---|---|
| . | | . | . |
| . | | . | . |
| c | For Approval | P.K. | 25/01/21 |
| b | Methodology Type Changed To 4A And Cross Berm Added | P.K. | 29/01/21 |
| a | Issued For Information | P.K. | 07/01/21 |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PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitaion Method DPT 4A
Field Re-profiling

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |
| Date: 18/12/20 | | Scale : Not to Scale | A3 | Stage: For Approval |
| Drawing No.: PCAS-0100-005 | | | | Rev: c |

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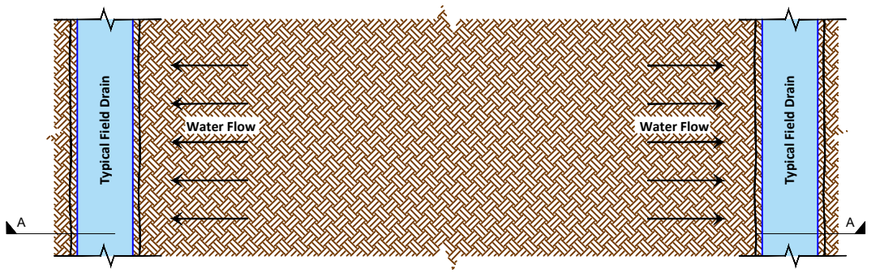
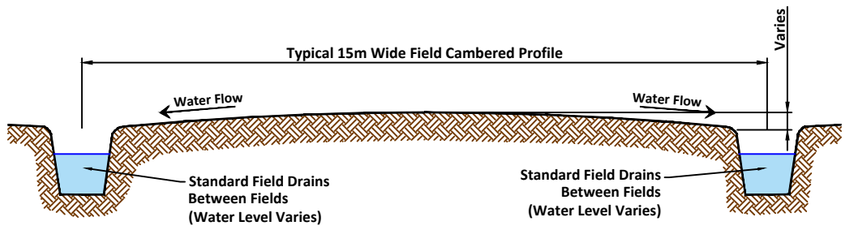
# DPT 1: 'Speed Bump' Peat Dams to Re-Wet Measure

## Existing Layout:

Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area.
The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement through the bog.



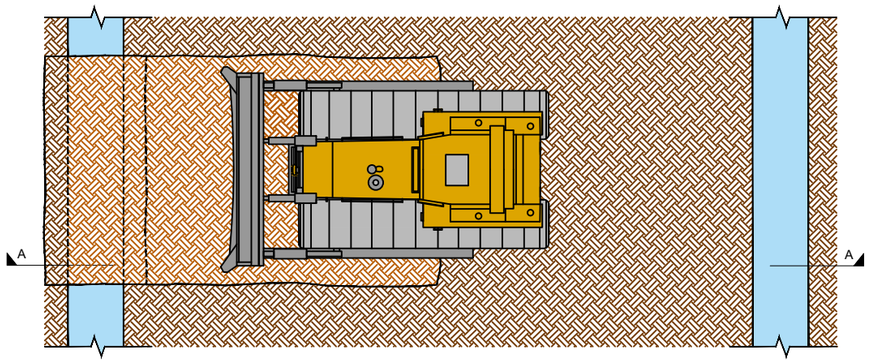

Plan View
(N.T.S.)



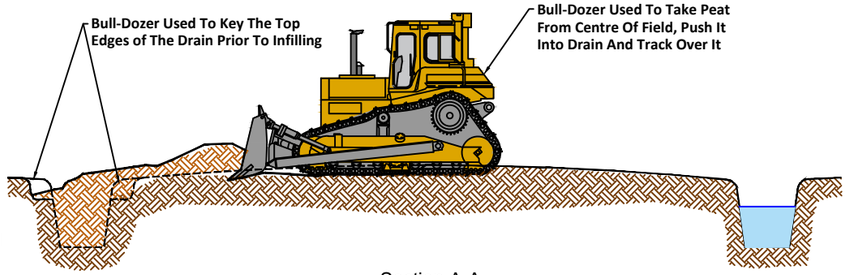

Section A-A
(N.T.S.)

## Phase 1
Forming 'Speed Bump'

The Bull-dozer is used to create a 5m Length key along both edges of the drain, approximately 500mm Wide x 500mm Deep.
Next a strip of peat is taken from the central camber of the field, pushed into the drain and compacted by the bull-dozer tracking over the drain block, to form an approximately 5m Wide 'Speed Bump'.



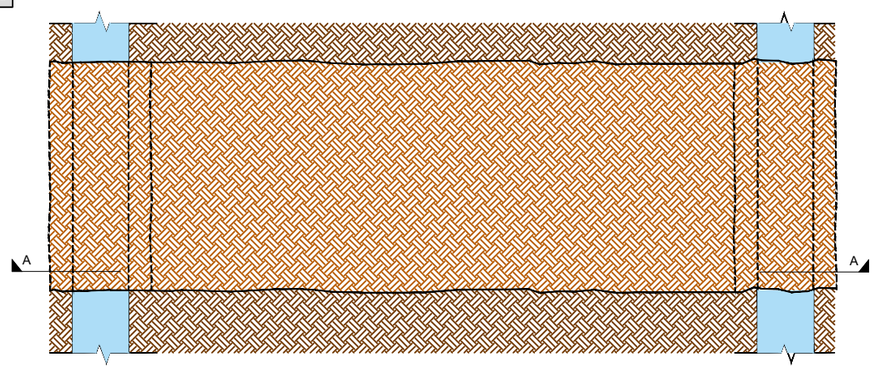

Plan View
(N.T.S.)



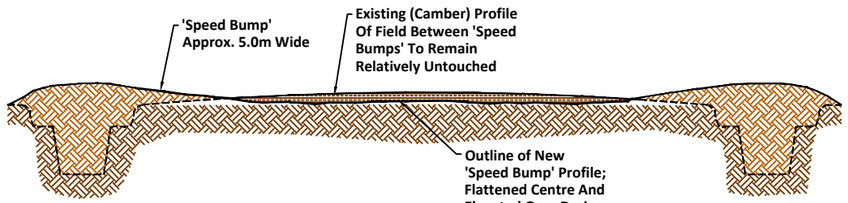

Section A-A
(N.T.S.)

## Complete Fields With Speed Bump (3 Per 100m)

'Speed Bumps' are created to allow for peat subsidence and to prevent water from flowing over the drain block and eroding it before it becomes stabilised.




Plan View
(N.T.S.)




Section A-A
(N.T.S.)

Section B-B
(N.T.S.)

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. REFER TO RELEVANT SITE PLAN TO ENSURE SPECIFIC DRAIN BLOCKS HAVE BEEN INSTALLED DOWNSTREAM PRIOR TO COMMENCING ANY RE-PROFILING WORKS, TO RETAIN ANY SILT THAT MAY ENTER THE DRAINS.
3. REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
4. REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
5. ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
6. OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
7. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR THE PARTICULAR BOG AND WITH THE REQUIREMENTS OF THE REHABILITATION PLAN, ANY NATURA IMPACT STATEMENT RECOMMENDED MEASURES IF APPLICABLE, ARCHAEOLOGY REPORTS AND ANY OTHER SPECIFIC ECOLOGICAL MEASURES OR ENVIRONMENTAL REPORTS FOR THIS BOG.

DRAFT 09/02/21

STATUS

| Rev | Description | Issued By | Date |
|---|---|---|---|
| . | | . | . |
| . | | . | . |
| c | 'Key' Added To Top Edges Of Drain At Drain Block Locations | P.K. | 09/02/21 |
| b | Intensive Drain Block Phase Removed | P.K. | 28/01/21 |
| a | Issued For Information | P.K. | 18/12/20 |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PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DPT 1
'Speed Bump' Peat Dam

| Drawn By: | | Checked By: | | Approved: |
|---|---|---|---|---|
| CAD | Designer | Discip. Lead | Design Lead | Design Manager |
| P.K. | - | D.K. | P.N. | P.N. |

Date: 18/12/20 | Scale : Not to Scale A3 | Stage: Information

Drawing No.: PCAS-0100-001 | Rev: c

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