

Article 6(3) Appropriate Assessment Screening Report

Begnagh Bog, Co Longford
Decommissioning and
Rehabilitation 2022





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1. INTRODUCTION

1.1 Background

McCarthy Keville O'Sullivan Ltd. (MKO) has been appointed to provide the information necessary to allow the undertaking of an Article 6(3) Screening for Appropriate Assessment for the decommissioning and rehabilitation of Begnagh Bog, Co Longford.

The current project is not directly connected with, or necessary for the management of any European Site, consequently the project has been subject to the Appropriate Assessment Screening process.

The assessment in this report is based on a desk study and field surveys between 2009 and 2021 by Bord na Móna ecologists and on a site visit on the 14th of January 2022 by Inga Reich of MKO. It specifically assesses whether the proposed rehabilitation works will have any impact upon European Sites.

This report has been prepared in accordance with the European Commission guidance document 'Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC' (EC, 2021) and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1. *DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government,*
2. *European Communities (2018) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
3. *European Communities (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
4. *Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
5. *EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC - Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission,*
6. *EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission,*
7. *OPR (2021) Appropriate Assessment Screening for Development Management. Practice Note PN01, Office of the Planning Regulator.*

1.2 Appropriate Assessment

1.2.1 Screening for Appropriate Assessment

Screening is the process of determining whether an Appropriate Assessment is required for a plan or project. Consultants or project proponents may undertake a form of screening to establish if an Appropriate Assessment is required and provide advice or may submit the information necessary to allow the Screening to be undertaken. Where it cannot be excluded beyond reasonable scientific doubt, that a proposed plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European Site, an Appropriate Assessment (Natura Impact Statement) of the plan or project is required.

1.2.2 Appropriate Assessment (Natura Impact Statement)

The term Natura Impact Statement (NIS) is defined in legislation¹. An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to 1) the implications of the plan or project, alone or in combination with other plans and projects, for a European Site in view of its conservation objectives, and 2) whether there will be adverse effects on the integrity of a European Site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

1.2.3 Statement of authority

The site visit was undertaken by Inga Reich (Honours degree in Biology, Ph.D. in Applied Ecology). The report was written by Inga Reich and reviewed by Pat Roberts (B.Sc. (Env.) MCIEEM) who has over 15 years' post graduate experience in ecological consultancy and impact assessment.

¹As defined in Section 177T of the Planning and Development Act, 2000 as amended, an NIS means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own and in combination with other plans and projects, for a European site in view of its conservation objectives. It is required to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for the European site in view of its conservation objectives

2. DESCRIPTION OF THE PROJECT AND BASELINE ENVIRONMENT

2.3 Site location

Begnagh Bog is located approximately 1.2km southeast of Cloondara and 5km west of Longford town in Co Longford (ITM Grid Ref. X 607160 Y 773714). The N5 runs about 350m to the north of the site. The site location is shown in Figure 2-1.

2.4 Site description

Begnagh Bog comprises 265.08 Ha in total. It is drained by the Fallan River which flows northward along the eastern site boundary and which flows into the Camlin River, which in turn discharges into the River Shannon (Upper). The Fallan River flows through the Lough Forbes Complex SAC and Ballykenny Fisherstown Bog Complex SPA approximately 400m to the north of the site. The Royal Canal is located adjacent to part of the southwestern section of the site and is separated from this by a narrow band of birch woodland, however, there is no hydrological connection between the bog and the canal. Begnagh Bog is linked by an industrial railway line and a machinery travel path to two further Bord na Móna (BnM) properties, Knappoge Bog to the west and Clooneeny Bog to the east. The railway line, which is still maintained to facilitate access through BnM properties, runs from east to west and divides Begnagh into two main sections, namely; the larger north and smaller southern section.

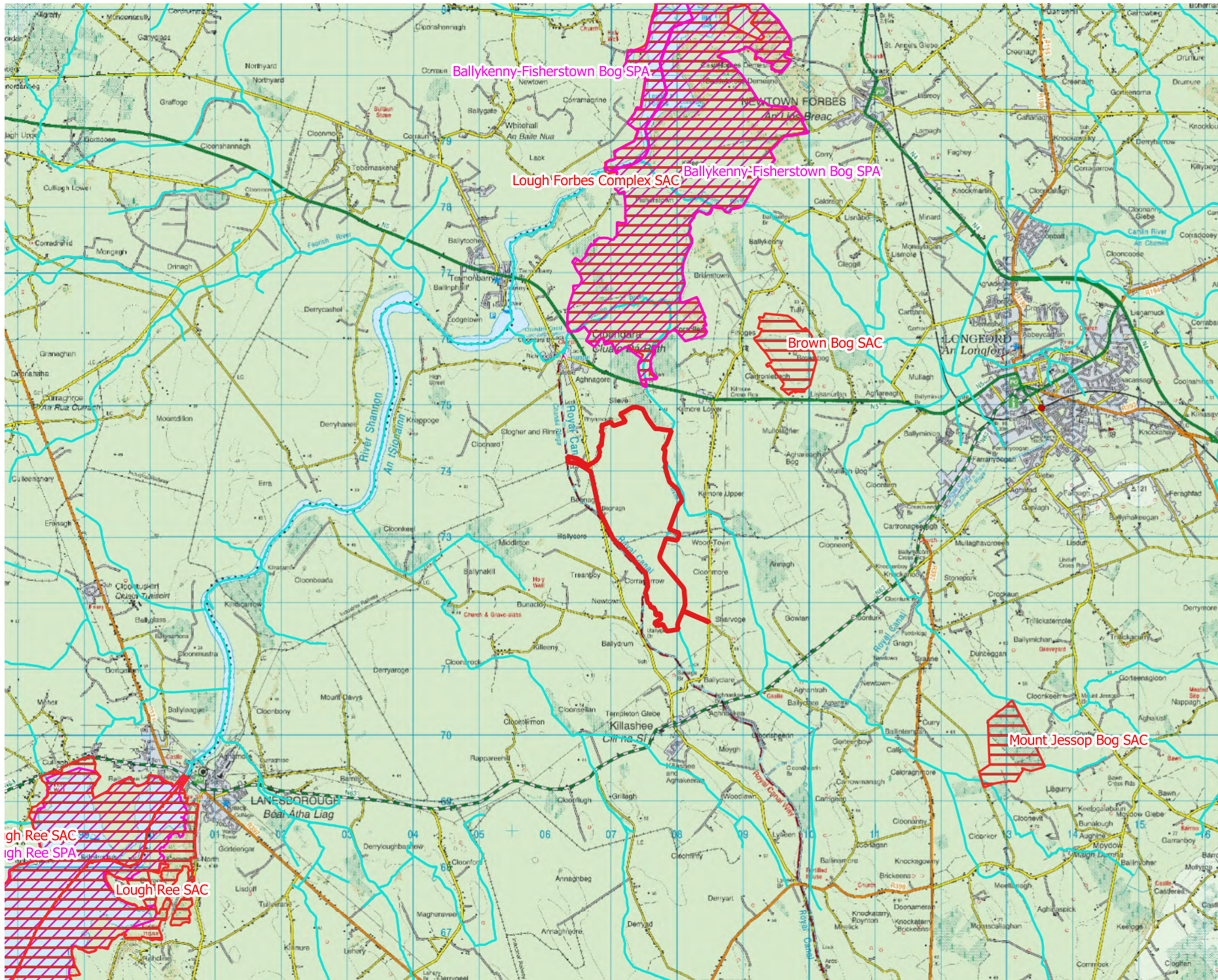
Begnagh Bog has a pumped drainage regime and commercial milled peat extraction was undertaken at Begnagh Bog between 1977 and 2020. As a result of the harvesting programme in place at Begnagh, peat depths are varied across the site. Much of the southern section contains shallow peat reserves. Peat depths of 0-1m occur over approximately 75% of the southern section. However, some areas of deeper peat, 1.1-2.6m in depth, still persist. The northern section contains deeper peat reserves, particularly within the west. Approximately 80% of the peat reserves in the northern section are 1-2.5m in depth. The remainder of the northern portion of Begnagh Bog contains peat reserves of 0-1m in depth, much of which is associated with a gravel ridges that runs southeast to northwest.

The underlying geology at Begnagh Bog is limestone (Waulsortian limestones)². The underlying soils and sub-soils are classed as 'Raised Bog Cutover Peat'. The peat is underlain by glacial deposits, lacustrine clays and green plastic clay. The glacial deposits generally consist of grey gravelly clay/silt and are exposed as gravel mounds and ridges in places. Gravel has also been exposed at several locations through the bog where there are ridges and mounds. The lowest lying areas (below 39.5m OD) are underlain by marl and lacustrine clay, while one main ridge of more elevated material (rising to 43.5m OD) is likely underlain by glacial till.





The future key land-use for the site is amenity and there are proposals for part of the Mid-Shannon Wilderness Park Greenway to utilise the existing railway corridor through the site. Any proposed enhancement measures (ie. targeted drain-blocking) will be positively aligned with current land-uses and will look to facilitate amenity, where possible. There are proposals to extend amenity infrastructure and rehabilitation will be positively aligned to enable any future amenity development. Re-wetting will be planned as to not to rule out potential future amenity.

The surrounding landscape primarily consists of low-lying agricultural land (pasture) interspersed with other raised bogs, many of which have also been managed by BnM for peat production with some areas utilised for domestic turf-cutting. Some small areas of plantation forestry also occur in the area, particularly to the northeast of the site.


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



Map Legend

-  Site boundary
-  Special Area of Conservation
-  Special Protection Area
-  Watercourse

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Drawing Title	
Site location Beggagh Bog	
Project Title	
Bord na Mona Bog Rehabilitation	
Drawn By	Checked By
IR	PR
Project No.	Drawing No.
211019	2-1
Scale	Date
1:75000	02.02.2022



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2.2 Characteristics of the Peatland Climate Action Scheme

2.2.1 Overview

Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Mount Dillon bog group (Ref. P0504-01), of which Begnagh Bog is part of. As part of Conditions 10.1 and 10.2 of this license, respectively, decommissioning and rehabilitation (D & R) must be undertaken to ensure the permanent rehabilitation of the cutaway bog lands within the licensed area.

A document titled ‘*Begnagh Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2022*’ has been prepared specifically to describe the proposed D & R measures at Begnagh Bog and is appended to this document as Appendix 1.

It is proposed by Government that Bord na Móna (BnM) carry out a Peatland Climate Action Scheme (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 and Ireland’s National Recovery and Resilience Plan. 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 Begnagh 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. P0504-01, 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 dependent 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. P0504-01 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. P0504-01:

“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.”

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.

2.2.2 Decommissioning and rehabilitation stage

The proposed **decommissioning** at Begnagh Bog includes:

- clean-up of bog,
- cleaning of existing silt ponds,
- peat stockpile management via levelling,

- decommissioning and removal of porto-cabin tea centre and materials store
- decommissioning and de-gassing of mobile fuel tanks,
- de-sludging of septic tanks.

Enhanced measures include:

- removal of railway lines,
- decommissioning of existing level crossings,
- measures to restrict access to areas of the bog e.g., around silt ponds).

Of the 265.09 Ha, 229.1 Ha or 86.4% of the present landcover will be subject to **rehabilitation** measures. These are bespoke interventions designed to stabilise the existing baseline and meet compliance with the requirements of the existing EPA, IPC License and the proposed PCAS (Plate 2-1). Prescriptive measures are unique to the existing baseline habitats and comprise 3 no. broad categories, 1) those associated with dry cutaway (Table 2-1), 2) measures associated with deep peat cutover bog (Table 2-2) and 3) those associated with wetland cutaway (Table 2-3). 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).

The proposed Begnagh rehabilitation will be undertaken using standard best practices in peatland restoration. These are based on published information in the Irish context, methodologies developed through rehabilitation trials, best practices employed elsewhere in Europe on peatland rehabilitation and restoration but also the experience of 40 years of research on the after-use development and rehabilitation of the BnM cutaway bogs (Clarke & Rieley 2010), including examples such as the BnM Raised Bog Restoration Project (Bord na Móna 2014).

Access during the D & R phase will be from the existing entrance on the Cloonmore Road at the east of the site, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction. An additional access point is found at the Knappoge to Clonkeel Road to the south-west of the site.

In terms of rehabilitation, the ecological and site information collected during BnM ecological baseline surveys, additional site visits, stakeholder input, and monitoring and desktop analysis forms the basis for the planning of peatland rehabilitation at Begnagh Bog, along with:

- Significant international engagement during this period with other countries in relation to best-practise regarding peatland rehabilitation and after-use through the International Peatland 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;
- Hydrological modelling.

2.2.2.1 Methodology

Decommissioning

Decommissioning at Begnagh 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. P0504-01. 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 Begnagh. 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 Begnagh 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, BnM will utilize the appropriate waste hierarchy to identify waste that can be reused or recycled ahead of disposal.

The validation of the success of condition 10.1 is carried out through an Independent Closure Audit (ICA), followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the license. Decommissioning may also include measures to restrict access to the bog or silt ponds.

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 be stored and/or disposed of, in line with IPC license conditions.

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 the 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.

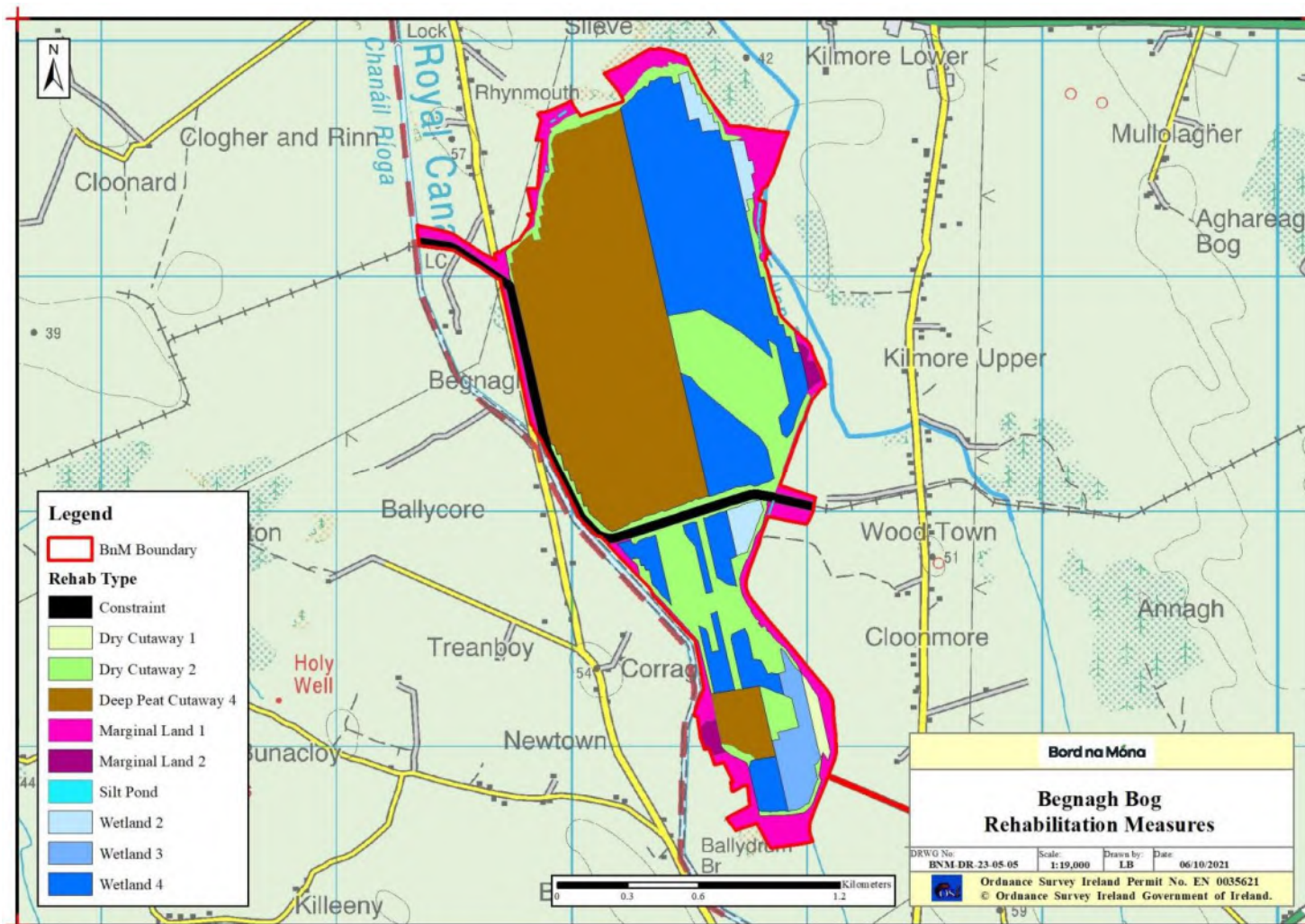


Plate 2-1: Indicative Enhanced Rehabilitation Plan for Begnagh Bog (extracted from Rehab Plan Mapbook)

Rehabilitation

Dry cutaway rehabilitation packages

The key intervention to be applied to dry cutaway is re-wetting of 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 three rehabilitation packages with different intensities to managing suitable hydrological conditions are proposed (Table 2-1).

Table 2-1: Extent of dry cutaway rehabilitation proposed at Begnagh.

Dry Cutaway		Extent (Ha)
DCT1	Blocking outfalls and managing water levels with overflow pipes	1.84
DCT2	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	63.66
DCT3	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing water levels with overflow pipes + targeted fertiliser treatment	N/A

The constituent prescriptions which combine to form the dry cutaway rehabilitation packages DCT1 and DCT2 at Begnagh Bog are further described, namely:

1. Blocking outfalls
2. Managing water levels with overflow pipes
3. Regular drain blocking (3/100m)
4. Targeted fertiliser treatment

1. Blocking outfalls (Appendix 2, PCAS-0100-014)

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.

Again, the key objective is to manage water-levels at 0-0.1m above the peat surface for as much of the year as possible. Some deeper water is inevitable due to heterogenous topography of the cutaway. This measure can be particularly effective as outfall pipes generally run perpendicular to field drains to catch and transport water off the bog. The outfalls have been piped through high fields. Blocking pipes at the high fields means that the high fields can be converted to natural berms or embankments, creating a compartmented wetland.

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.

2. Managing water levels with overflow pipes (Plate 2-2; Appendix 2, PCAS-0100-014)

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.

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.



Plate 2-2: Examples of installed overflow pipes

3. Regular drain blocking (3/100m) (Appendix 2, PCAS-0100-008)

This measure can be applied to cutover bog, cutaway bog and drained raised bog with different environmental characteristics. It can be applied to residual peat of various depths including deep cutover peat. The main objective is to place peat blockages in drains to raise water levels, re-wetting peat and slowing water movements through the site. Slowing water movement will 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 number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at on average 3 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin et al., 2017) and in line with methodologies originally developed by McDonagh (1997).

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.

4. Targeted fertiliser treatment

Rock phosphate will be applied to areas of bare peat on headlands, high fields and other areas to accelerate establishment of vegetation either by hand or using a tractor. The application rate will be kept to a minimum.

Deep peat cutover bog rehabilitation packages

The key intervention to be applied to deep peat cutover bog is re-wetting of 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 (0.1m ± 0.05m). Several different approaches can be taken to this type of restoration/rehabilitation, and five rehabilitation packages with different intensities to managing suitable hydrological conditions are proposed (Table 2-2).

Table 2-2: Extent of deep peat cutover bog rehabilitation proposed at Begnagh.

Deep peat cutover bog		Extent (Ha)
DPT1	Regular drain blocking (3/100 m) + blocking outfalls and managing water levels with overflow pipes	N/A
DPT2	More intensive drain blocking (max 7/100 m) + blocking outfalls and managing water levels with a controlled weir outfall + <i>Sphagnum</i> inoculation	8.41
DPT3	More intensive drain blocking (max 7/100 m) + field reprofiling & blocking outfalls and managing water levels with overflow pipes + <i>Sphagnum</i> inoculation	N/A
DPT4	Berms and field reprofiling (45m x 60m cell) + blocking outfalls and managing water levels with overflow pipes + drainage channels for excess water + <i>Sphagnum</i> inoculation	105.41
DPT5	Cut and fill cell bunding (30m x 30m cell) + blocking outfalls and managing overflows + drainage channels for excess water + <i>Sphagnum</i> inoculation	N/A

The constituent prescriptions which combine to form the deep peat cutover bog rehabilitation packages DPT2 and DPT4 at Begnagh Bog are further described below, namely:

1. More intensive drain blocking (max 7/100m)
2. Blocking outfalls (see *dry cutaway rehabilitation* for details)
3. Managing water levels with overflow pipes (see *dry cutaway rehabilitation* for details)
4. *Sphagnum* inoculation
5. Berms and field reprofiling (45m x 60m cell)
6. Drainage channels for excess water

1. More intensive drain blocking (max 7/100m) (Appendix 2, PCAS-0100-002)

This measure can be applied to cutover bog, cutaway bog and drained raised bog with different environmental characteristics. It can be applied to residual peat of various depths including deep cutover peat. The main objective is to block drains with peat barriers to raise water levels, re-wetting peat and slowing water movements through the site. Slowing water movement will 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 number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at a maximum of 7 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin et al., 2017) and in line with methodologies originally developed by McDonagh (1997). The increased number of peat blockages (compared with the standard measures) will benefit re-wetting and trapping silt on cutaway with slightly greater slopes and will further slow the movement of water from these sites.

1. Before building of dams, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact. If any vegetation is present, it is carefully removed and left aside for replacement at the end of the process.

2. A 'key' is then cut in either side of the drain approximately 500mm deep, and it is ensured that the width is wider than the actual drain. Approximately 500mm depth of peat is removed from the bottom of the drain also and placed behind the machine for replacement later.

3. An area is opened behind the machine to be used as a borrow pit. Using the surface layer of peat (i.e. the top 100-200mm) is avoided, as it is likely to be very permeable. Only the deeper, more compacted peat is used to build the dam. (again, if any vegetation is present, it is carefully removed and left aside for replacement at the end of the process).

4. Peat is then dug out from the borrow pit and placed into the drain compacting it in 300mm layers. The peat is compacted firmly using the excavator bucket before laying more peat from the borrow pit.

5. The dam is built up to a height at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries. Any vegetation taken in step 1 or step 3 is then placed on the top of the dam, to help bind and stabilise the drain block.)

6. The borrow pit is backfilled with the peat extracted from the bottom of the drain in step 2. The sides of the peat borrow hole are firmly pressed with the excavator bucket to grade the sides of the borrow pit. This enhanced measure's main objective is to block drains with peat dams to raise water levels, re-wetting peat and slowing water movements through the bog.

4. 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.

5. Berms and field reprofiling (45m x 60m cell) (Appendix 2, PCAS-0100-006)

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 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.

6. Drainage channels for excess water (Appendix 2, PCAS-0100-014)

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.

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.

This measure will allow greater management of water levels across the cutaway, the benefits of which are listed above and will help protect newly created infrastructure (cell bunds). Hydrological modelling will be key to design these new drainage channels.

Wetland cutaway rehabilitation packages

The key intervention to be applied to wetland cutaway is re-wetting of peat and maximisation of water retention to aid the development of wetland habitats comprising e.g., reed beds. This requires managing water-levels to reach depths of < 0.5m during the summer so wetland vegetation can develop. Several different approaches can be taken to this type of restoration/rehabilitation, and five rehabilitation packages with different intensities to managing suitable hydrological conditions are proposed (Table 2-3).

Table 2-3: Extent of wetland cutaway rehabilitation proposed at Begnagh.

Wetland Cutaway		Extent (Ha)
WLT1	Turn off or reduce pumping to re-wet cutaway + blocking outfalls and managing water levels with overflow pipes	N/A
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	5.64

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	9.1
WLT4	More intensive drain blocking (max 7/100 m), + blocking outfalls and managing water levels with overflow pipes + transplanting reeds and other rhizomes	35.04
WLT5	More intensive drain blocking (max 7/100 m), + field reprofiling + blocking outfalls and managing water levels with overflow pipes + transplanting reeds and other rhizomes	N/A

The constituent prescriptions which combine to form the Wetland Rehabilitation packages WLT2, WLT3 and WLT4 at Begnagh Bog are further described, namely:

1. Turn off or reduce pumping (no explanation required)
2. Blocking outfalls (see *dry cutaway rehabilitation* for details)
3. Managing water levels with overflow pipes (see *dry cutaway rehabilitation* for details)
4. Blocking outfalls (targeted) (see *dry cutaway rehabilitation* for details on blocking outfalls)
5. Constructing larger berms to re-wet cutaway
6. Transplanting reeds and other rhizomes
7. More intensive drain blocking (max 7/100m) (see *deep peat rehabilitation* for details)

5. Constructing larger berms to re-wet cutaway (Appendix 2, PCAS-0100-010)

This measure can be applied to cutover bog, cutaway bog and drained raised bog with different environmental characteristics. It can be applied to residual peat of various depths including deep cutover peat. The main objective is to block drains with peat barriers to raise water levels, re-wetting peat and slowing water movements through the site. Slowing water movement will 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.

Typical existing production 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 cross berms is to slow the water movement through the bog and promote the creation of enclosed areas of wetland habitat with shallow water levels - in particular in areas where shallow peat depths remain.

The typical approach can be described as a number of phases.

Phase 1: Forming Key and Initial Drain Block

An excavator is used to form a key in the Drain where the berm crosses. 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 from the opposite side of the drain to the excavator. A key is also formed similarly on the opposite side of the production field at the end of the proposed berm.

Phase 2: Forming Peat Berm

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 500mm High Cross Berm.

6. Transplanting reeds and other rhizomes

Rhizomes will be collected from a donor area and transported to the site where they will be distributed throughout the respected area and replanted using an excavator. Through the other measures in this package, water levels will be kept high enough to encourage the development of reedbeds. This option may likely not be required as there has already been significant natural colonisation.

The number of peat blockages per 100m is determined by the topography of the site, but an allowance has been estimated at a maximum of 7 blocks per 100m of field drain. The methodology follows NPWS guidelines published by the National Parks and Wildlife Service (Mackin *et al.*, 2017) and in line with

methodologies originally developed by McDonagh (1997). The increased number of peat blockages (compared with the standard measures) will benefit re-wetting and trapping silt on cutaway with slightly greater slopes and will further slow the movement of water from these sites.

Peat blocks are constructed efficiently by excavator and bulldozer generally operating at a perpendicular direction to the field drains. The process involves clearing the drain by removing dry degraded peat/vegetation and creating a 'key' (wider than the drain and approximately 0.5m deep) in the drain sides in order to ensure a tight seal is maintained. The drain is subsequently blocked with peat taken from a nearby 'borrow pit' (avoiding the top 0.1-0.2m) and involves placing layer after layer (about 0.3m each) of peat which are compacted in the drain using the bucket of the excavator. The blockage will be built up at least 0.3-0.5m above the ground level of the bog to allow for subsequent shrinkage that occurs during peat drying. If vegetation was removed from the drain before clearing it, this should be placed on top of the blockage. The 'borrow pit' will be filled in with the peat that was extracted from the bottom of the drain and the sides of the pit should be pressed down and graded.

2.2.2.2 Timescale

- Decommissioning activities will be completed within a period of 12 months but may be phased across 2 calendar years and are scheduled to be completed before the end of 2022.
- Rehabilitation activities will be completed within a period of approximately 7 months. In general, activities will be carried out between the months of April and October inclusive.
- The decommissioning stage may overlap rehabilitation activities.
- The duration of activities provided are approximate and may be slightly shorter or longer, depending on weather conditions and progress on rehabilitation prescriptions. Activities may cease for the winter months due to rainfall and poor ground conditions. In any case, the rehabilitation period will not be longer than 1 year.
- Normal working times will be daylight hours between 08.00 and 17.30hrs Monday to Friday.

2.2.2.3 Use of natural resources

- There is no land requirement in respect of decommissioning.
- In total, rehabilitation activities will take place on 229.1 Ha of land. 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'.
- No additional water is required for either decommissioning or rehabilitation.
- 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 dam locations and immediately used to form peat dams. Borrow pits are re-instated, as the final step in dam 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 dependent 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.
- Dozers may be used to infill drains with peat displaced by screw levelling. Peat will also be utilised to infill any blocked outfalls or raised drainage pipes.
- Reeds and other rhizomes will be transplanted into wetland cutaway.
- Hydrocarbons will be used on-site during rehabilitation activities and will be limited to the diesel or petrol fuel and mechanical oils used by any onsite site machinery and equipment.
- Fertilisers may be used to treat high fields and headlands to encourage natural colonisation.

Emissions and wastes

- 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 dams to block drains or blocking outfalls is momentary in duration and therefore considered negligible in magnitude. Creating 'speed bump' blockages or infilling drains produces a higher potential for the release of dust, however the duration of this is expected to be brief (i.e., with effects lasting less than a day).
- Fuel and some pipes may require to be delivered. No blasting or piling is required.
- 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.

2.2.3 Operational stage

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 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.
- Access will be from the existing entrance on the Cloonmore Road at the east of the site, where existing infrastructure is already in place via access tracks to facilitate the previous peat extraction. An additional access point is found at the Knappoge to Clonkeel Road to the south-west of the site.

Timing and duration 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.
- Once constructed and commissioned, the proposed decommissioning and rehabilitation will remain permanently in place.

Use of natural resources

- 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 and wastes

- 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.
- Collectively, 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.
- Following rehabilitation and into the early operational stage Begnagh 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.

Description of the baseline ecological environment

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

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, Begnagh Bog was surveyed in April of 2012. Habitat maps have been updated, where required. This rehabilitation plan is informed by the original baseline survey as well as subsequent confirmatory site walk-over surveys and visits, and updates to baseline data.

Habitat mapping followed best-practise guidance from Smith *et al.* (2011). 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 Atherton *et al.* (2010). A more detailed BnM classification system was previously developed for classifying pioneer cutaway habitats as Fossitt categories were deemed not to be detailed enough for cutaway bog (much of cutaway bog could be classified as Cutover Bog - PB4). Much of the pioneer cutaway vegetation is still at an early stage of its development and cannot be assigned to Fossitt Level 3 categories yet. A detailed ecological survey report for Begnagh Bog is contained in Appendix III of Appendix 1.

A walkover survey was conducted on the 14th of January 2022 by Inga Reich to confirm the ecological baseline as identified by Bord na Móna in the preceding surveys and as shown in the habitat map (Figure 2-2).

Habitats

The majority of the former production bog at Begnagh is bare peat (**ED2**) (Plate 2-3). Parts of the cutaway bog are currently developing pioneer cutaway wetland habitats (poor fen, reed swamp, birch scrub. Another area within the centre of the site, on a gravel ridge, has developed a soft rush dominated **poor fen (PF2)** with establishing birch (*Betula pubescens*) **scrub (WS1)**.

The majority of the northern section is dominated by bare peat with some sections of pioneer vegetation communities occurring where peat extraction ceased due to the shallow nature of the peat or presence of a glacial ridge. An area of exposed glacial sub-soil is also present within the southeast corner of this section that is being colonised predominantly by soft rush (*Juncus effusus*) and birch scrub. A number of small remnant cutaway bog parcels exist at the bog margins and are very degraded, now supporting establishing birch and lodgepole pine woodland.

The majority of the southern section area is dominated by bare peat pioneer vegetation communities. Reedbeds, poor fen and birch scrub are present around the edges of the site. Small areas of open water habitat occur in the southern area of this section. An area of well-established poor fen occurs within the south of the site comprising largely of common cottongrass (*Eriophorum angustifolium*), marsh arrowgrass (*Triglochin palustris*), soft rush, bottle sedge (*Carex rostrata*), common reed (*Phragmites australis*), greater reedmace (*Typha latifolia*) and reed sweet grass (*Glyceria maxima*). This area also contained some tussocks of Cyperus sedge (*Carex pseudocyperus*).

Habitats along the margins of the site include **bog woodland (WN7)**, **scrub (WS1)**, remnant sections of **raised bog (PB1)**, **canals (FW3)**, **lowland depositing river (FW2)** and **wet grassland (GS4)**. The areas of Birch woodland and scrub are dominated by birch, gorse (*Ulex europaeus*), willow (*Salix* sp.), bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus* agg.). The sections of remnant raised bog are small and dry and dominated by ling heather (*Calluna vulgaris*). The wet grassland component is managed for agriculture by local farmers.

2.3.2 Fauna

A number of species or signs thereof have been observed on the bog by BnM, including badger, otter, fox, hare and mink. Ringed plover (*Charadrius hiaticula*) and snipe (*Gallinago gallinago*) have been recorded by BnM during the breeding season on site. A number of recently fledged sparrowhawk (*Accipiter nisus*) were recorded within the north of the site in July 2021, while a number of individuals were also recorded from a small area of scrub within the southwest of the site on the same date. It is possible that kestrel could also breed on site as suitable habitat exists at the margins, however, no confirmed breeding records exist. Other more common species recorded within the site include buzzard, willow warbler, mallard, wood pigeon, swallow, long-tailed tit, green finch, hooded crow and grey heron.

2.3.3 Drainage and connection to European Sites

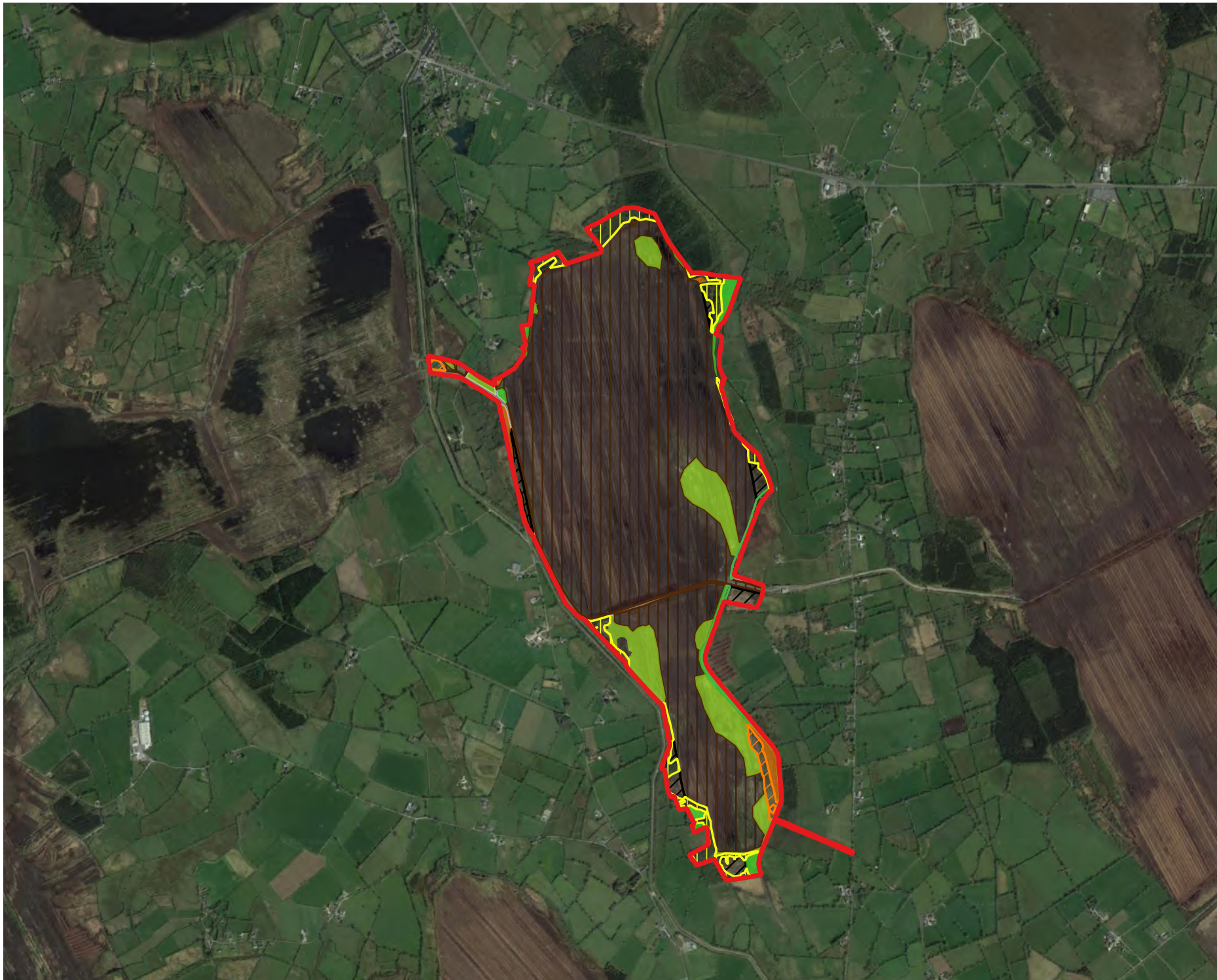
The bog contains both piped and open drainage channels (as shown on the BnM drainage map) and drains towards the Fallan River via five sets of silt ponds (Plate 2-4), mainly located within the north and east of the bog; field drains are running in a general north to south orientation. The Fallan River drains to the north to the Camlin River, which in turn, drains to the River Shannon a short distance away. The Fallan River flows through the south of the Lough Forbes Complex SAC and Ballykenny Fisherstown Bog Complex SPA approximately 400m to the north of the site. There is no hydrological connection between the Royal Canal and the bog.















Plate 2-3 Bare peat surface dominating the majority of the site.

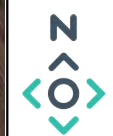


Plate 2-4 Silt pond with gorse/birch scrub and a grassland vegetation dominated by purple moorgrass in the west of the site.



Map Legend

-  Site boundary
-  bare peat
-  bog
-  built
-  grassland or agriculture
-  heath
-  pioneer open cutaway habitats
-  riparian
-  scrub
-  scrub & pioneer open cutaway habitats
-  wetlands
-  woodland



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Drawing Title

Begnagh Bog Habitat Map

Project Title

Bord na Mona Bog Rehabilitation

Drawn By	Checked By
IR	PR

Project No.	Drawing No.
211019	2-2

Scale	Date
1:25000	02.02.2022



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2.3.4 Consequences of proposed rehabilitation for current habitats

It is not expected that the site has the potential to develop active raised bog analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (ca. 50 years) and only a small proportion of the bog has potential to develop *Sphagnum*-rich habitats in this timeframe. Nevertheless, re-wetting across the entire bog, as part of the PCAS, will improve habitat conditions of the whole bog, making the overall bog wetter and other peatland habitats (e.g., fen, reed swamp, wet woodland, heath) will develop in a wider mosaic that reflects underlying conditions.

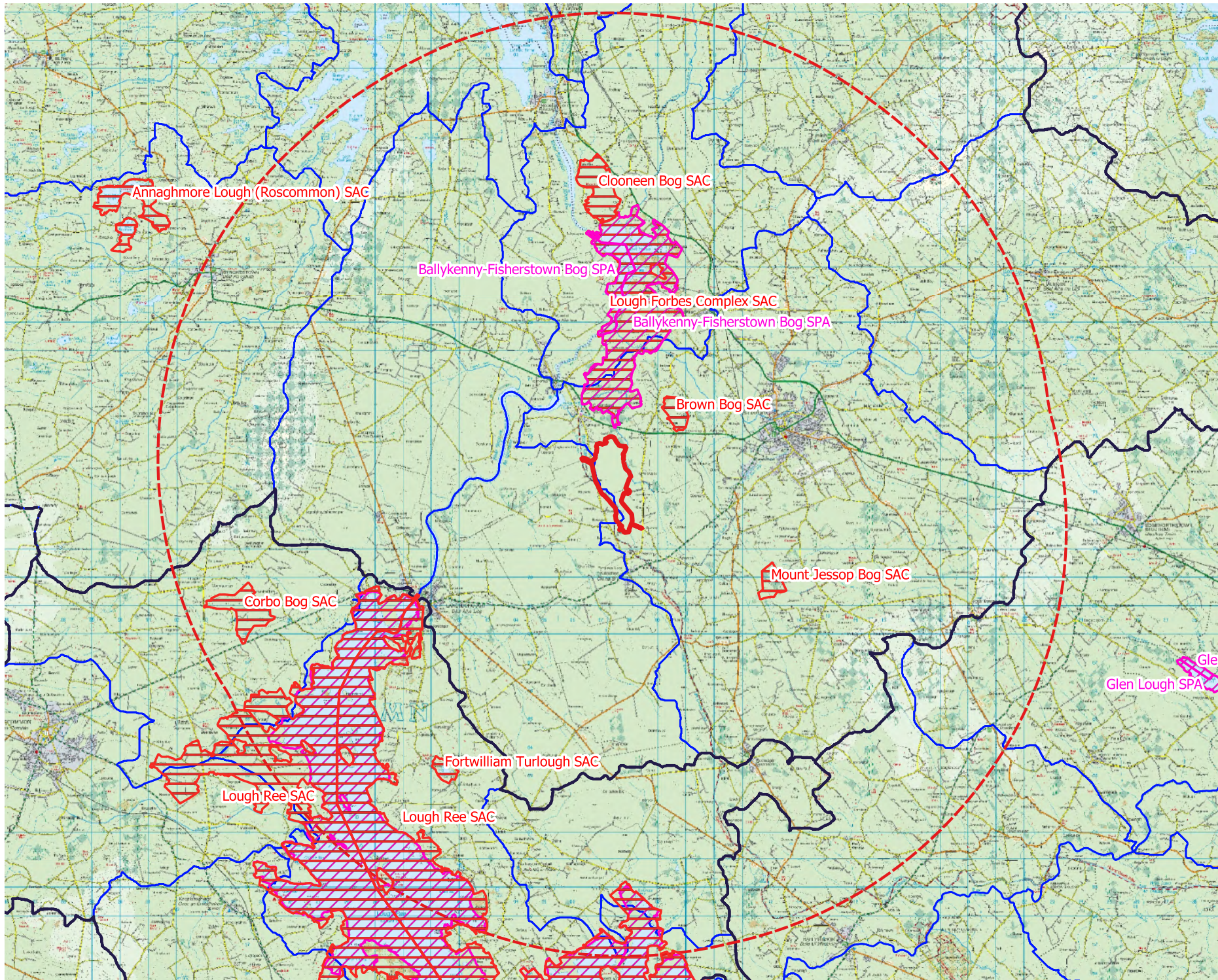
Habitats currently evaluated as not requiring rehabilitation (i.e., marginal land, railway line) will remain in line with existing baseline trends for these habitats.

3. IDENTIFICATION OF RELEVANT EUROPEAN SITES

3.1 Identification of the European Sites within the Likely Zone of Impact

The following methodology was used to establish which European Sites are within the Likely Zone of Impact of the proposed development:

- Initially the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 04/01/2022. The datasets were utilized to identify European Sites which could feasibly be affected by the proposed development.
- All European Sites within a distance of 15km surrounding Begnagh Bog were identified and are shown on Figure 3.1. In addition, the potential for connectivity with European Sites at distances of greater than 15km from the site was also considered in this initial assessment. In this case, no potential for the proposed works to result in significant effects on sites located at a distance of over 15km from Begnagh Bog was identified.
- The catchment mapping was used to establish or discount potential hydrological connectivity between Begnagh Bog and any European Sites. The hydrological catchments are also shown in Figure 3.1.
- In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, *'Assessing Connectivity with Special Protection Areas (SPA)'* (2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
- Table 3-1 provides details of all relevant European Sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. The assessment considers any likely direct or indirect impacts of the rehabilitation works, both alone and in combination with other plans and projects, on European Sites by virtue of the following criteria: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of the works were considered in this screening assessment.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report 04/01/2022.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and considered in the Screening Assessment.



Map Legend

- Site boundary
- 15km Buffer
- Special Area of Conservation
- Special Protection Area
- Hydrological Catchment
- Hydrological Subcatchment

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Drawing Title
European Sites within 15km radius of Bognagh Bog

Project Title
Bord na Mona Bog Rehabilitation

Drawn By IR	Checked By PR
Project No. 211019	Drawing No. 3-1
Scale 1:175000	Date 02.02.2022

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Table 3-1: Identification of European Sites within Likely Zone of Impact

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
Special Area of Conservation			
<p>Lough Forbes Complex SAC [001818]</p> <p>Distance: 0.4km</p>	<ul style="list-style-type: none"> ➤ [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) 	<p>Detailed conservation objectives for this site (Version 1, May 2016) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>There is no complete source-impact-pathway for the following habitats due to their terrestrial nature and distance from the site:</p> <ul style="list-style-type: none"> ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion <p>While the Fallan River, into which the bog drains, flows through the southern part of this SAC, there is no downstream hydrological connectivity between Begnagh Bog and any of the aquatic QI habitats of this site as per the Conservation Objectives and review of aerial photography:</p> <ul style="list-style-type: none"> ➤ [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
			<p>➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Brown Bog SAC [002346]</p> <p>Distance: 1.7km</p>	<ul style="list-style-type: none"> ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion 	<p>Detailed conservation objectives for this site (Version 1, February 2016) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Mount Jessop Bog SAC [002202]</p> <p>Distance: 4.5km</p>	<ul style="list-style-type: none"> ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [910D] Bog woodland 	<p>This site has the generic conservation objective:</p> <p>‘To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p>

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
		<p>species for which the SAC has been selected.'</p> <p>(NPWS (2021) Conservation objectives for Mount Jessop Bog SAC [002202] Generic Version 8.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Lough Ree SAC [000440]</p> <p>Distance: 7.4km</p>	<ul style="list-style-type: none"> ➤ [1355] Otter (<i>Lutra lutra</i>) ➤ [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation ➤ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7230] Alkaline fens ➤ [8240] Limestone pavement ➤ [91D0] Bog woodland ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> 	<p>Detailed conservation objectives for this site (Version 1, August 2016) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>The is no complete source-impact-pathway for the following habitats due to their terrestrial nature and distance from the site:</p> <ul style="list-style-type: none"> ➤ 6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [8240] Limestone pavement ➤ [91D0] Bog woodland

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
	(Alno-Padion, Alnion incanae, Salicion albae)		<p>As such, there is no potential for indirect effects on these habitats.</p> <p>Following the precautionary principle, a potential pathway for effect on the following QI habitats and species was identified through surface water connectivity via the Fallan River into which the bog drains and which ultimately flows into Lough Ree:</p> <ul style="list-style-type: none"> ➤ [3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation ➤ [7230] Alkaline fens ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) ➤ [1355] Otter (<i>Lutra lutra</i>) <p>However, the objective of the works involved in the D & R is to stabilise the bog. These works are specifically designed to reverse the drainage of the bog and to minimise the run-off of waters from it. The works will be similar in intensity to the active production that was undertaken until recently, but will be less invasive, short term and will involve an estimated six machines/crews working at any one time on the bog for an expected period of 2 years. There is no potential for these works to result in significant effects on downstream watercourses and ecological receptors as the works primarily involve the blocking of drainage</p>

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
			<p>pathways from the bog. Following the implementation of the PCAS, there will be no possibility of further effects. As such, in the absence of any mitigation, there is no potential for any significant effect on these QI receptors as a result of water pollution or change to the hydrological regime within the SAC.</p> <p>The potential for disturbance to otter, where it occurs outside the SAC was also assessed.</p> <p>While signs of otter have been recorded at Begnagh Bog during the BnM surveys, the works will not result in any loss of otter habitat, are short term and will not be occurring over the entire bog at any one time, leaving much of the bog and potential otter habitat completely undisturbed. Hence there is no potential for the works, in the absence of any mitigation, to result in significant disturbance to this QI species.</p> <p>There is no potential for significant effects on this SAC and no further assessment is required.</p>
<p>Clooneen Bog SAC [002348]</p> <p>Distance: 7.6km</p>	<ul style="list-style-type: none"> ➤ [7110] Active raised bogs ➤ [7120] Degraded raised bogs still capable of natural regeneration ➤ [7150] Depressions on peat substrates of the Rhynchosporion ➤ [910D] Bog woodland 	<p>Detailed conservation objectives for this site (Version 1, August 2016) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-</p>

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
			<p>pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Fortwilliam Turlough SAC [000448]</p> <p>Distance: 10.2km</p>	<p>➤ [3180] Turloughs</p>	<p>Detailed conservation objectives for this site (Version 1, February 2018), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the absence of a hydrological connection and the distance from the site, no complete source-impact-pathway was identified for the QI habitat. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>
<p>Corbo Bog SAC [002349]</p> <p>Distance: 12km</p>	<p>➤ [7110] Active raised bogs</p> <p>➤ [7120] Degraded raised bogs still capable of natural regeneration</p> <p>➤ [7150] Depressions on peat substrates of the Rhynchosporion</p>	<p>Detailed conservation objectives for this site (Version 1, November 2015) were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects on this SAC as the project footprint is located entirely outside the designated site.</p> <p>Due to the terrestrial nature of the QI habitats and the distance from the site, no complete source-impact-pathway was identified. As such, there is no potential for indirect effects to occur.</p> <p>This site is not in the Likely Zone of Impact and no further assessment is required.</p>

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
Special Protection Area			
<p>Ballykenny-Fisherstown SPA [004101]</p> <p>Distance: 0.3km</p>	<p>➤ [A395] Greenland white-fronted goose (<i>Anser albifrons flavirostris</i>)</p>	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA’</i></p> <p>(NPWS (2021) Conservation objectives for Ballykenny-Fisherstown SPA [004101] Generic Version 8.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>There will be no direct effects on this SPA as the project footprint is located entirely outside the designated site.</p> <p>The Fallan River, into which the bog drains, flows through the southern part of this SPA and a potential pathway for effect on supporting habitats for Greenland white-fronted goose was identified. However, the objective of the works involved in the D & R is to stabilise the bog. These works are specifically designed to reverse the drainage of the bog and to minimise the run-off of waters from it. The works will be similar in intensity to the active production that was undertaken until recently, but will be less invasive, short term and will involve an estimated six machines/crews working at any one time on the bog for an expected period of 2 years. There is no potential for these works to result in significant effects on downstream watercourses and ecological receptors as the works primarily involve the blocking of drainage pathways from the bog. Following the implementation of the PCAS, there will be no possibility of further effects. As such, in the absence of any mitigation, there is no potential for any significant effect on supporting habitats as a result of water pollution or change to the hydrological regime within the SPA.</p>

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
			<p>The potential for disturbance to Greenland white-fronted goose, where they occur outside the SPA, was also assessed.</p> <p>No Greenland white-fronted geese have been reported from the SPA since 1991 (as per Site Synopsis) and while suitable habitat exists in the vicinity of Begnagh Bog, BnM have not recorded any specimens on site during any of their surveys. In addition, the works will not result in any loss of habitat, are short term and will not be occurring over the entire bog at any one time, leaving much of the bog completely undisturbed. Hence, there is no potential for the works, in the absence of any mitigation, to result in significant disturbance to this SCI species.</p> <p>There is no potential for significant effects on this SAC and no further assessment is required.</p>
<p>Lough Ree SPA [004064]</p> <p>Distance: 7.4km</p>	<ul style="list-style-type: none"> ➤ [A004] Little grebe (<i>Tachybaptus ruficollis</i>) ➤ [A038] Whooper swan (<i>Cygnus cygnus</i>) ➤ [A050] Wigeon (<i>Anas penelope</i>) ➤ [A052] Teal (<i>Anas crecca</i>) ➤ [A054] Mallard (<i>Anas penelope</i>) ➤ [A056] Shoveler (<i>Anas clypeata</i>) ➤ [A061] Tufted duck (<i>Aythya fuligula</i>) 	<p>This site has the generic conservation objective:</p> <p><i>‘To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA’</i></p>	<p>There will be no direct effects on this SPA as the project footprint is located entirely outside the designated site.</p> <p>Following the precautionary principle, a potential pathway for effect on all SCI species and their habitats was identified through surface water connectivity via the Fallan River into which the bog drains and which ultimately flows into Lough Ree. However, the objective of the works involved in the D & R is to</p>

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ➤ [A065] Common scoter (<i>Melanitta nigra</i>) ➤ [A067] Goldeneye (<i>Bucephala clangula</i>) ➤ [A125] Coot (<i>Fulica atra</i>) ➤ [A140] Golden plover (<i>Pluvialis apricaria</i>) ➤ [A142] Lapwing (<i>Vanellus vanellus</i>) ➤ [A193] Common tern (<i>Sterna hirundo</i>) ➤ [A999] Wetland and waterbirds 	<p>To acknowledge the importance of Ireland's wetlands to wintering waterbirds, this site has a second conservation objective:</p> <p><i>'To maintain or restore the favourable conservation condition of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.'</i></p> <p>(NPWS (2020) Conservation objectives for Lough Ree SPA [004064] Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.)</p>	<p>stabilise the bog. These works are specifically designed to reverse the drainage of the bog and to minimise the run-off of waters from it. The works will be similar in intensity to the active production that was undertaken until recently, but will be less invasive, short term and will involve an estimated six machines/crews working at any one time on the bog for an expected period of 2 years. There is no potential for these works to result in significant effects on downstream watercourses and ecological receptors as the works primarily involve the blocking of drainage pathways from the bog. Following the implementation of the PCAS, there will be no possibility of further effects. As such, in the absence of any mitigation, there is no potential for any significant effect on supporting habitats as a result of water pollution or change to the hydrological regime within the SPA.</p> <p>The potential for disturbance to the SCI species, where they occur outside the SPA was also assessed.</p> <p>There is no habitat on or adjacent to the site for the following SCI species:</p> <ul style="list-style-type: none"> ➤ [A065] Common scoter (<i>Melanitta nigra</i>) ➤ [A067] Goldeneye (<i>Bucephala clangula</i>) ➤ [A193] Common tern (<i>Sterna hirundo</i>)

European Sites and distance from Begnagh Bog	Qualifying Interests/Special Conservation Interests for which the European Site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 04/01/2022)	Conservation Objectives	Likely Zone of Impact Determination
			<p>Begnagh Bog is outside the core foraging range of Whooper swan (SNH, 2016) so it is unlikely that it will be used by birds associated with this SPA.</p> <p>The following species has been recorded at Begnagh bog during BnM surveys:</p> <ul style="list-style-type: none"> ➤ [A054] Mallard (<i>Anas penelope</i>) <p>In the absence of any significant wetlands on site, there is only limited habitat available for any other SCI species and many of the wintering or passage wildfowl species are likely to occur in the site only, when there is deep enough water on areas of the bog. This may be limited dependent on pumping regimes, rainfall, flood levels in adjacent watercourse or floodplains.</p> <p>In addition, the works will not result in any loss of habitat, are short term and will not be occurring over the entire bog at any one time, leaving much of the bog completely undisturbed. Hence, there is no potential for the works, in the absence of any mitigation, to result in significant disturbance to these SCI species.</p> <p>There is no potential for significant effects on this SAC and no further assessment is required.</p>

3.2 European Sites with the potential to be significantly affected by the PCAS activities

No European Site has the potential to be significantly impacted by the proposed works.

3.3 Likely cumulative impact of the PCAS activities on European Sites, in-combination with other plans and projects

3.3.1 Review of other plans and projects

The potential for the rehabilitation works to contribute to a cumulative impact on European Sites was considered. The following plans and projects were considered for their potential to result in in-combination effects:

- The Planning Application Finders of Longford and Roscommon County Council were consulted on the 05.01.2022 and a number of mostly small-scale proposed or consented developments were found within 5km of Begnagh Bog. Larger projects that were considered include an application for the development of a ten year permission for a solar farm on a site of approximately 34.54 hectares consisting of the following; 184,500 m² of solar photo-voltaic panels on ground mounted steel frames; Ring main unit substation and associated hard standing; 12 no. inverter/transformer stations on 6 no. hardstandings; underground power and communication cables and ducts; boundary security fence; CCTV cameras; upgraded internal access tracks; new internal access tracks, internal bridge crossing and associated drainage infrastructure; and temporary construction compounds and all associated site services and works. The proposed development seeks to form an extension to the adjoining previously permitted "Middleton House" Solar Farm which was permitted under Longford County Council Reg. Ref 18135. Access to the proposed development is provided via the permitted "Middleton House" Solar Farm via the L-11261 local road.
- The proposal for the Mid Shannon Wilderness Park Greenway was also considered. The proposed 73km cycling & walking 'greenway' route network primarily follows the Bord na Móna industrial railway network routes through former industrial bogland south and west of Longford town, linking with the Royal Canal 4km North-West of Ballymahon. It consists of 61 km of greenway along decommissioned Bord na Móna rail lines; 6 km of greenway along existing roads; 6 km of greenway through existing cutaway bog and ancillary facilities. The AASR carried out for this proposal found that there was no potential for significant effects on European Sites.
- Bord na Móna provided a GIS shapefile of bogs where decommissioning and rehabilitation activities are scheduled to occur within the same timeframe as in Begnagh Bog. Three bogs within the Mount Dillon bog group, that share downstream connectivity to European Sites, were identified, namely Knappoge, Clooneeny and Glenlough.
- There is a current ongoing NPWS Raised Bog Restoration Project, however, there are no raised bogs within 15 km of Begnagh Bog, where restoration might overlap with the D & R activities in 2022.
- Unauthorised turbary is likely to occur at various locations within 15km of Begnagh Bog, including several locations where the pathways for downstream in combination effects on European Sites may exist, primarily via drainage to EPA blue line watercourses.
- The County Longford Heritage Plan 2019-2024, Longford County Development Plan 2021-2027, Roscommon County Development Plan 2021-2027 (Draft) and County Roscommon Heritage Plan 2017-2021 were also consulted and considered as part of this assessment. CPO 3.9 of the Longford County Development Plan 2021-2027 explicitly states 'Support collaboration between local authorities, the Midland Regional Transition Team and relevant stakeholders and the development of partnership approaches to integrated peatland management for a just transition that incorporates any relevant policies and strategies such as the

Bord na Móna Biodiversity Plan 2016-2021 and the national Climate Mitigation and Adaptation Plans. This shall include support for the rehabilitation and/or re-wetting of suitable peatland habitats.’

3.3.2 **Conclusion of in-combination/cumulative assessment**

Due to the nature, scale and short-term duration of the PCAS activities, no pathway or mechanism for the proposed works to result in any significant effect on any European Site was identified when considered on its own during the assessment process and therefore there is no potential for it to contribute to any such effects when considered in-combination with any other development or works.

The review of plans and projects that is described above did not reveal any additional potential pathways for effect on European Sites that may have arisen as a result of those plans or projects.

4.

ARTICLE 6(3) APPROPRIATE ASSESSMENT SCREENING STATEMENT AND CONCLUSIONS

The findings of this Screening Assessment are presented following the European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2001) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018) as well as the Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010).

4.1

Data collected to carry out assessment

In preparation of the assessment, the following sources were used to gather information:

- Review of NPWS Site Synopses, mapping and Conservation Objectives for the various European Sites within the Likely Zone of Impact.
- Review of 2019 EU Habitats Directive (Article 17) Report.
- Review of OS maps and aerial photographs of the site of the proposed development.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA), Water Framework Directive (WFD).
- Review of relevant databases including National Biodiversity Ireland Database (NBDC).
- Review of other plans and projects within the area.
- Review of location and layout mapping for proposed rehabilitation.
- Review of the results of previous ecological surveys of Begnagh Bog.
- Review of the detailed description of proposed rehabilitation measures, including methodologies specific to the main categories of land types under consideration.
- Review of Begnagh Bog Drainage Management Plan from RPS
- Review of BnM's Peatland Climate Action Scheme Environmental Management Plan.
- Liaison with Chris Cullen and Sorcha Cahill from Bord na Móna.
- Site visit conducted by Inga Reich on 14/01/2022.

4.2

Concluding statement

It is concluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European Sites, that the proposed works, individually or in combination with other plans and projects, will not have a significant effect on any European Site.

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APPENDIX 1

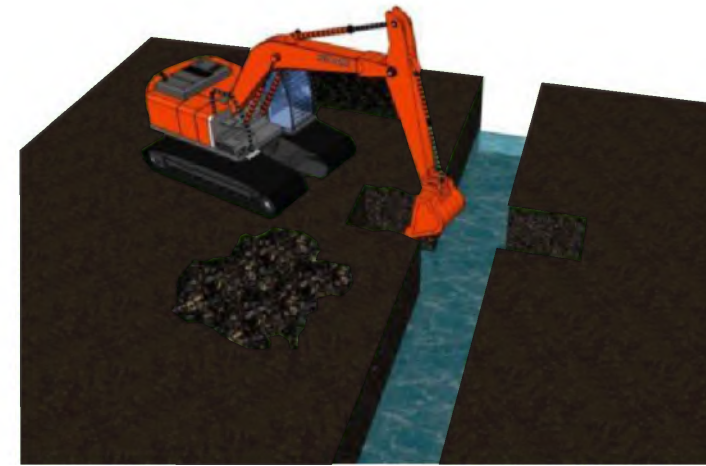
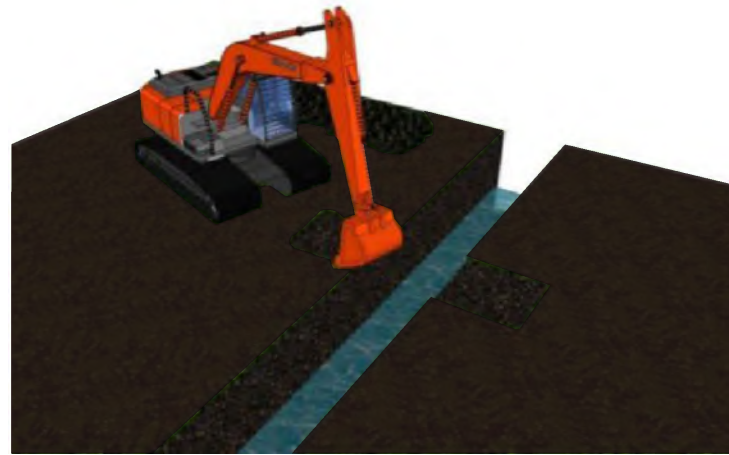
*BEGNAGH BOG -
CUTAWAY BOG
DECOMMISSIONING AND
REHABILITATION PLAN 2022*



APPENDIX 2

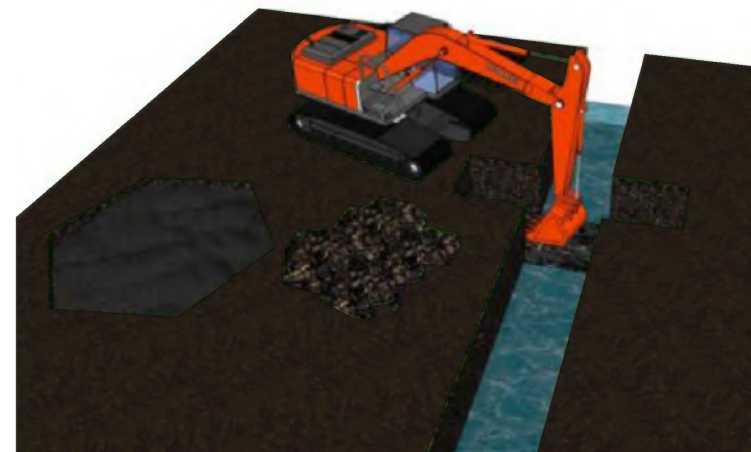
REHABILITATION METHODS

1. Before building drain block, the sides and bottom of the ditch is cleaned using the excavator to remove dry degraded peat, to ensure a good peat-to-peat contact.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)



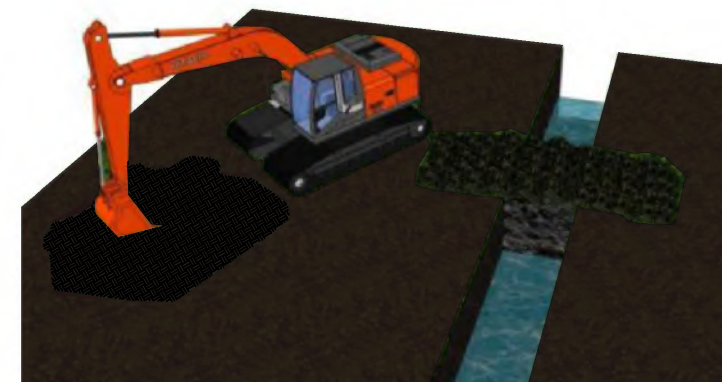
2. Cut key in either side of the drain approximately 500mm deep, and ensure that it is wider than the actual drain. Remove 500mm of peat from bottom of the drain also and place behind the machine for replacement later.

3. Open an area behind machine to be used as a borrow pit. Avoid using the surface layer of peat (top 100-200mm) which is likely to be very permeable. Only use the deeper, more compacted peat to build the drain block.
(If any vegetation present, it should be carefully removed and left aside for replacement at the end of the process.)



4. Dig out peat from the borrow pit and place into the drain compacting in 300mm layers. Compact the peat firmly using the excavator bucket before laying more peat from the borrow pit.

5. Build the drain block up at least 300mm-500mm above the ground level of the bog to allow for subsequent shrinkage of the peat as it dries.
(Take any vegetation removed in step 1 and step 3 and place on the top of the dam, to help bind and stabilise the drain block.)



6. Backfill the borrow pit with the peat extracted from the bottom of the drain in step 2. Press down on the sides of the peat borrow hole with the excavator bucket to grade the sides of the borrow pit.

This enhanced measure's main objective is to block drains with peat drain blocks to raise water levels, re-wetting peat and slowing water movements through the bog.

- NOTES:**
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 - 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.
 - REFER TO RELEVANT SITE PLAN FOR No. OF DRAIN BLOCKS SPECIFIED PER 100M DRAIN LENGTH.
 - REFER TO RELEVANT SITE PLAN FOR SPECIFIC FINISHED GROUND LEVELS TO BE ACHIEVED.
 - ALL DETAILS TO BE AGREED WITH BORD NA MONA OPERATIONS PRIOR TO CONSTRUCTION.
 - OPERATORS TO CONFORM WITH ALL STANDARD OPERATING PROCEDURES.
 - 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.

PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method DPT 2
Peat Drain Blocking

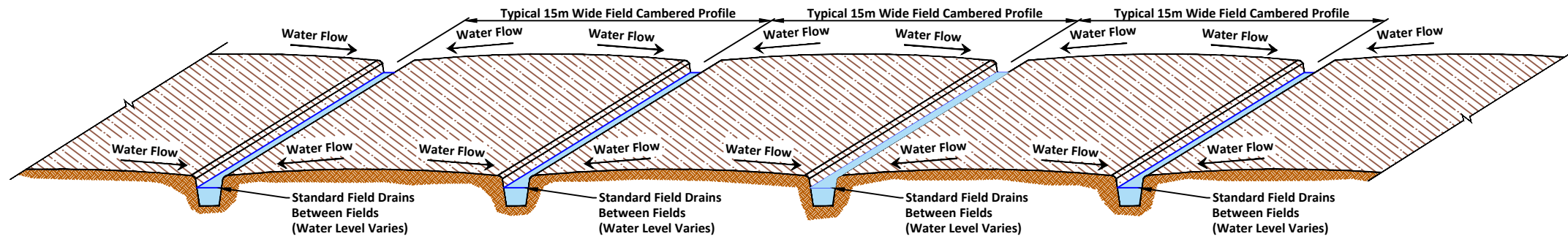
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STATUS			
b	For Approval	P.K.	03/03/21
a	Issued for Information	P.K.	18/12/20
Rev	Description	Issued By	Date

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: N.T.S.
		A3
Stage:	For Approval	
Drawing No.:	PCAS-0100-002	Rev:
		b

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.



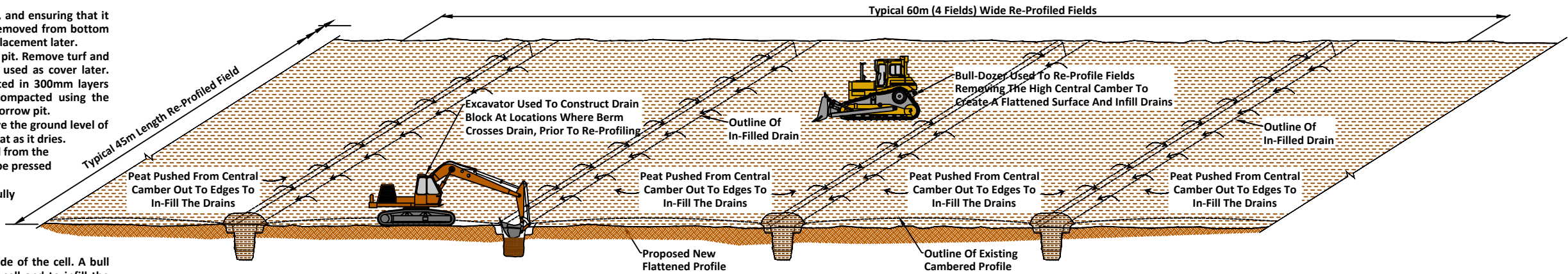
NOTES:

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

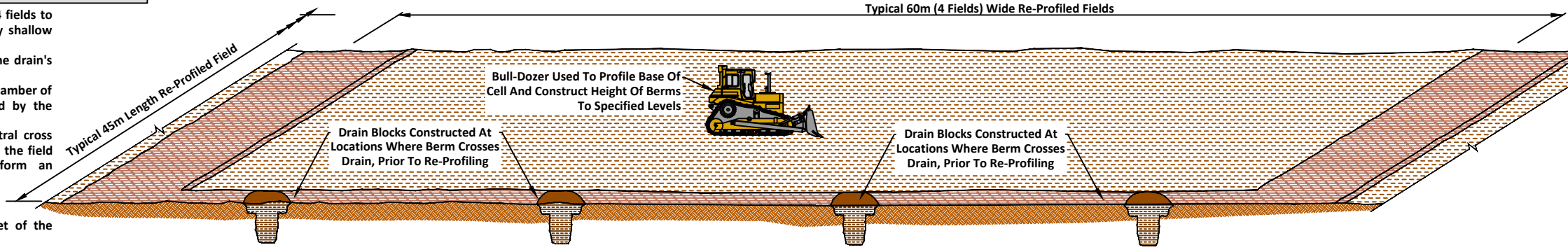
Drain blocks are constructed using an Excavator operating at a perpendicular direction to the field drains. Key is cut in the drain approximately 500mm deep, and ensuring that it is wider than the actual drain. 500mm of peat is removed from bottom of drain also and placed behind the machine for replacement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



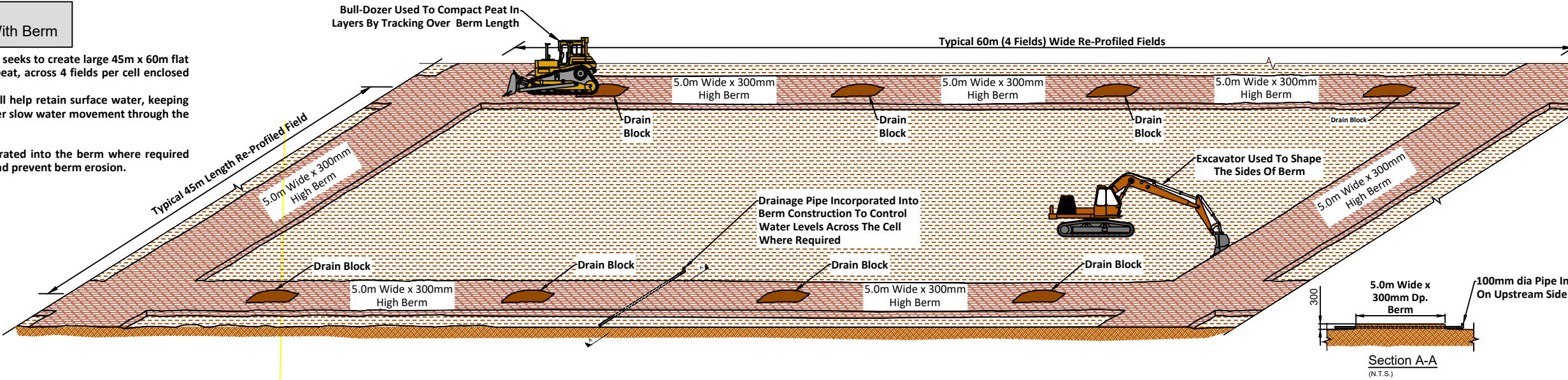
Phase 2
Formation of Surface Berms And Levelling Base of Cells

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			
Rev	Description	Issued By	Date
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

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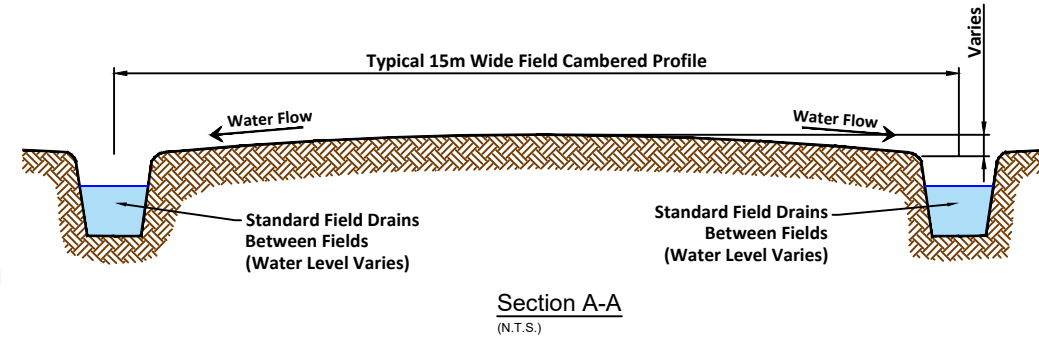
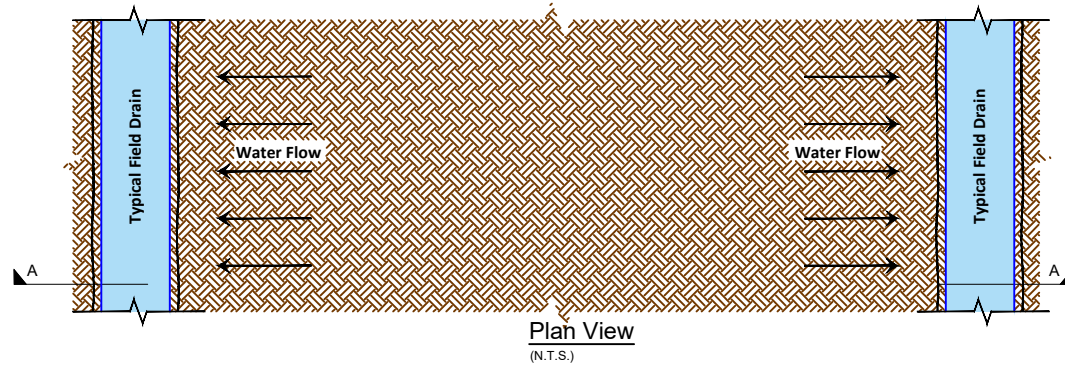
PROJECT:
Peatland Climate Action Scheme (PCAS)

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

Drawn By:	Checked By:	Approved:
CAD Designer	Discip. Lead	Design Manager
P.K.	D.K.	P.N.
Date: 22/12/20	Scale: Not to Scale	A3
Drawing No.:	PCAS-0100-006	Rev: c

Existing Layout:

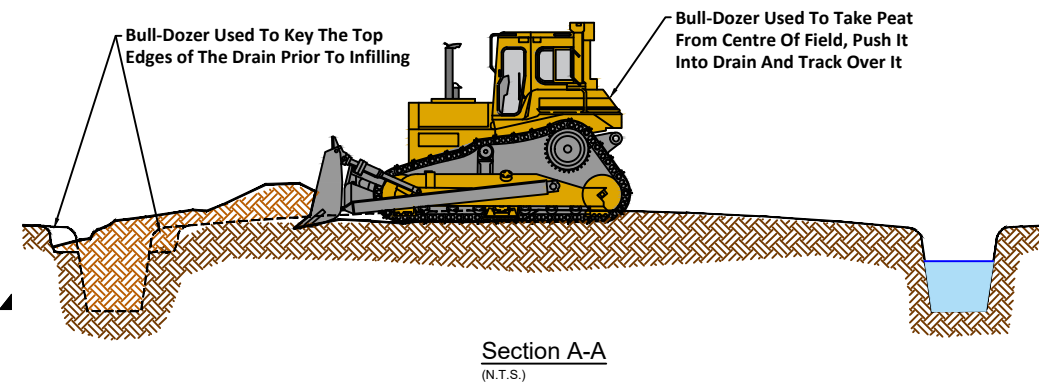
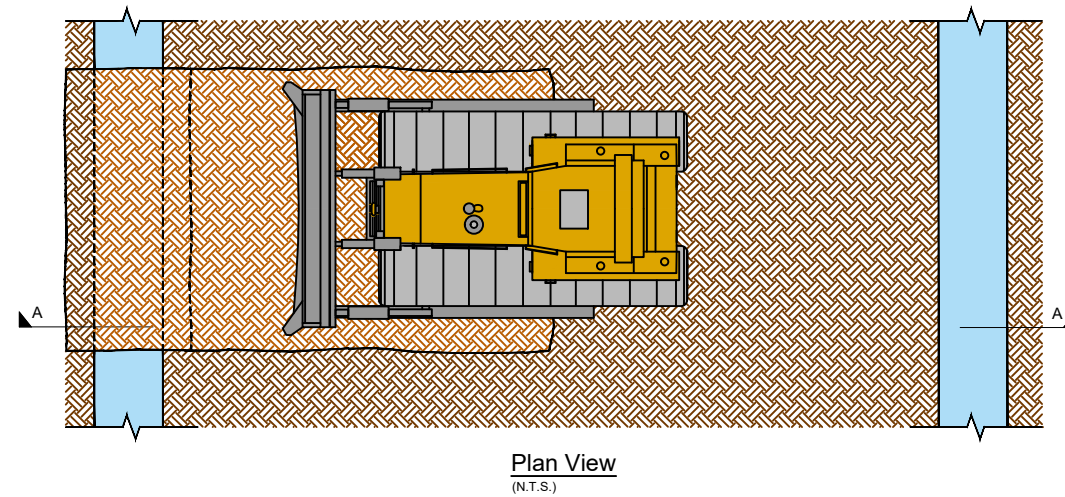
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of drain blocking is to raise the water levels in the drains to re-wet the cutaway and slow the water movement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



- NOTES:**
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 - 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.
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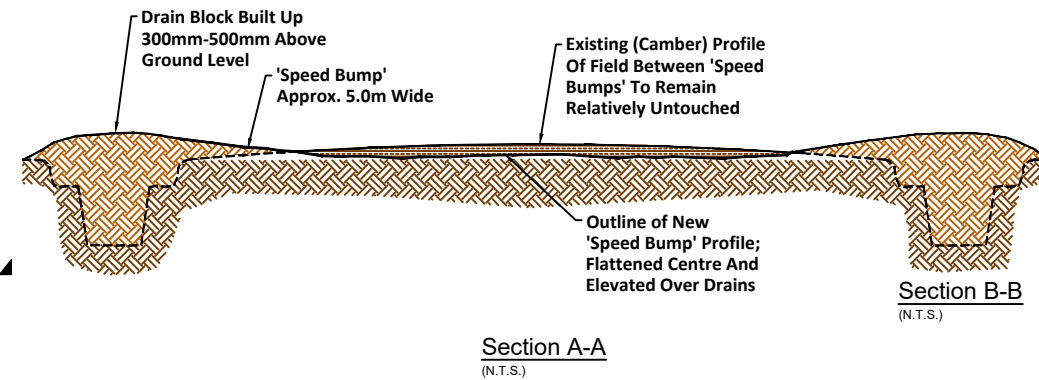
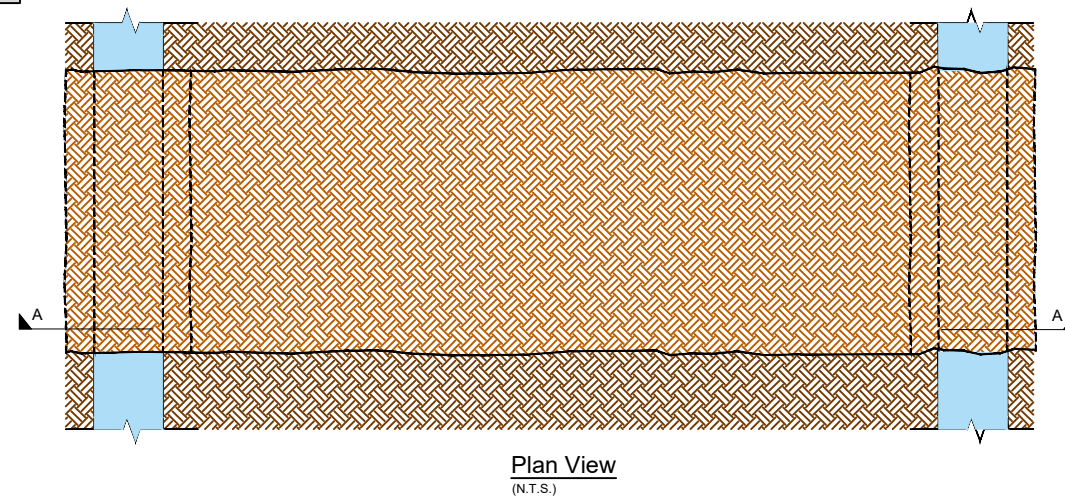
**Phase 1
Forming 'Speed Bump'**

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'.



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.



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.	08/02/21
a	Issued For Information	P.K.	29/01/21

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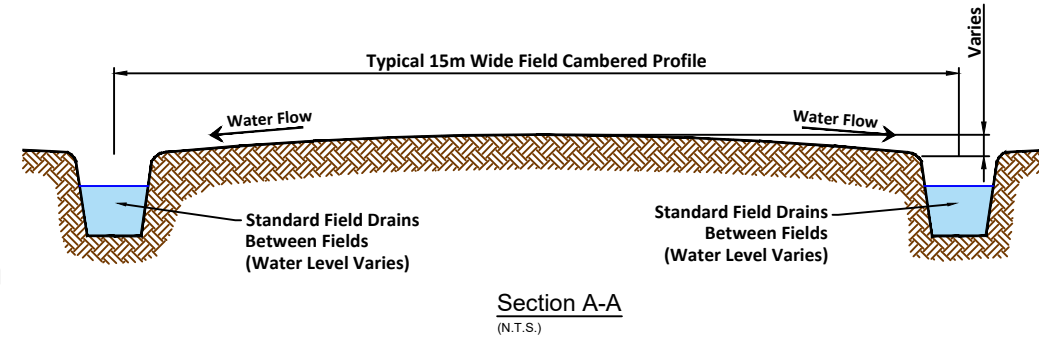
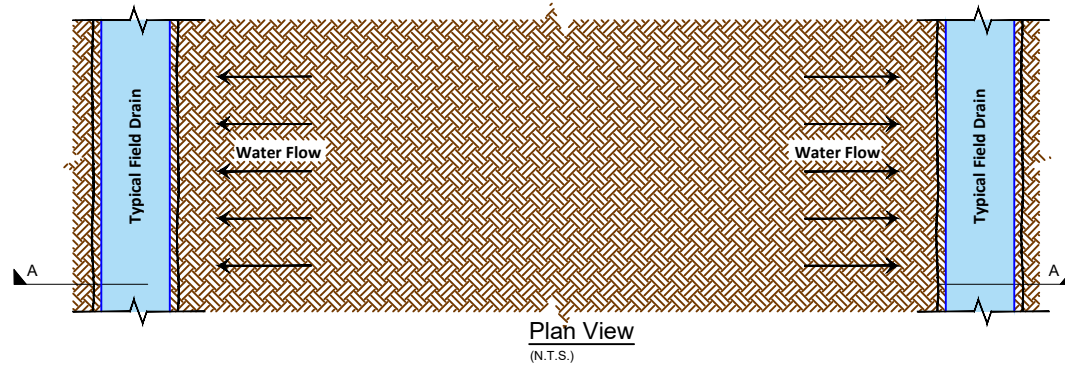
PROJECT:
Peatland Climate Action Scheme
PCAS

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

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

Existing Layout:

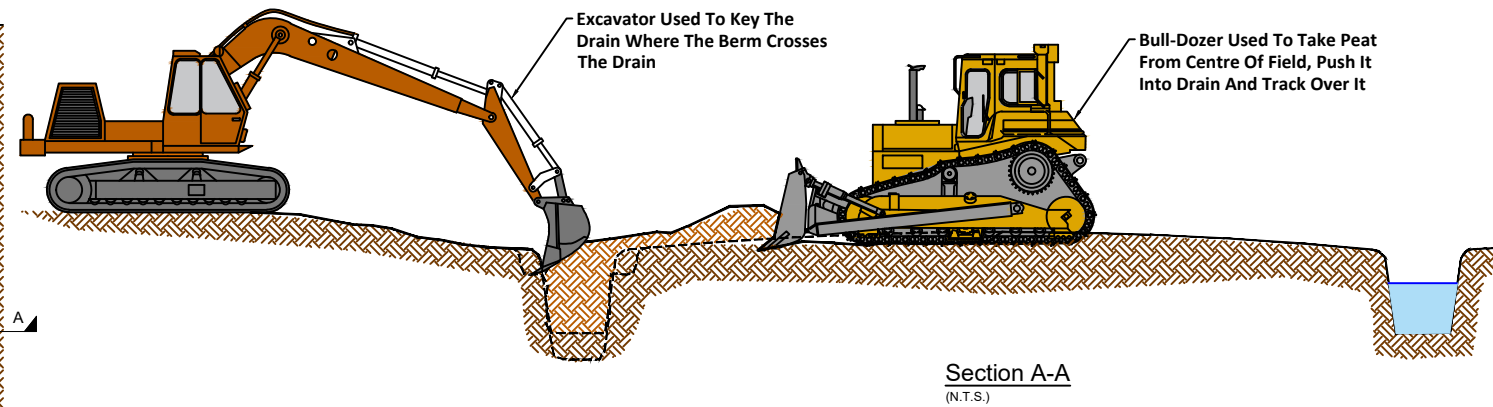
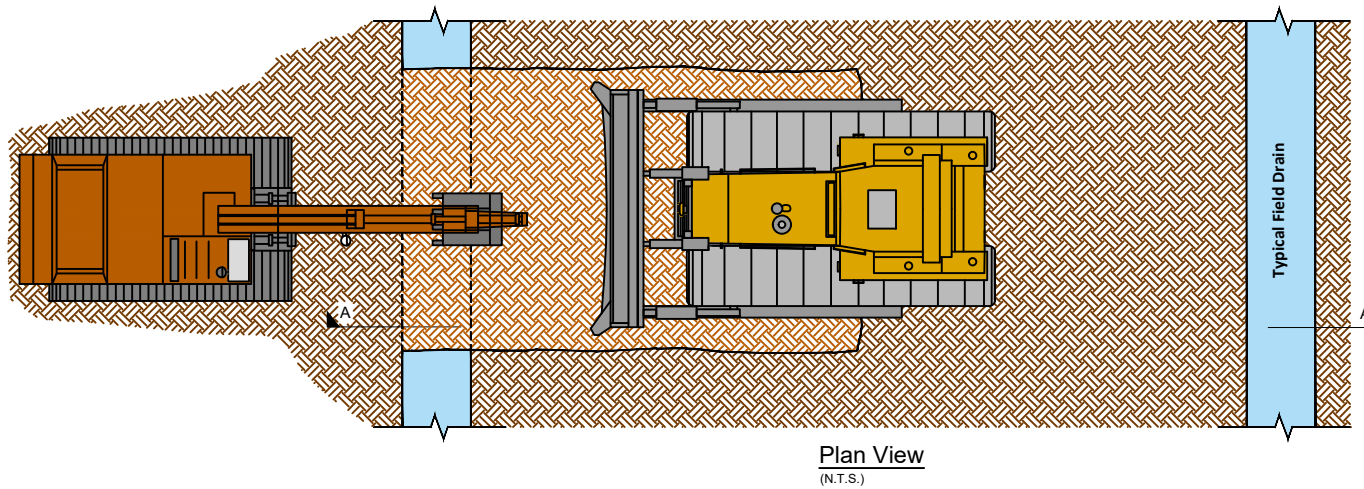
Typical existing bare peat fields are cambered (higher) in the centre and lower towards the drains, helping drainage of the fields but limiting the re-wetting of the central area. The concept of Cross berms is to slow the water movement through the bog.



- NOTES:**
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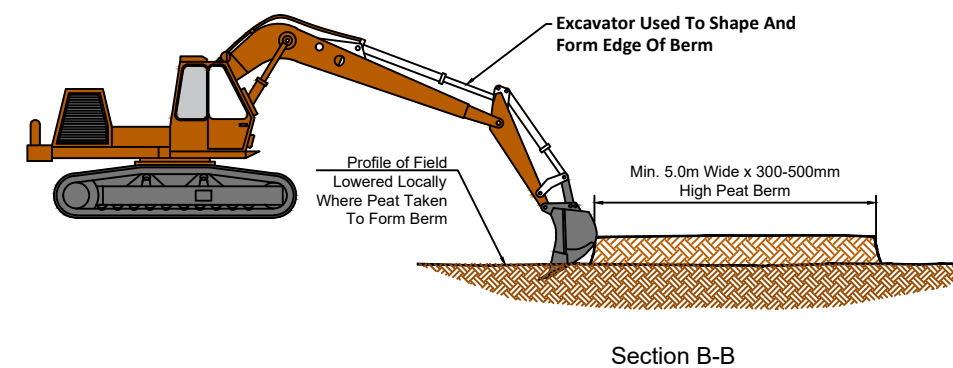
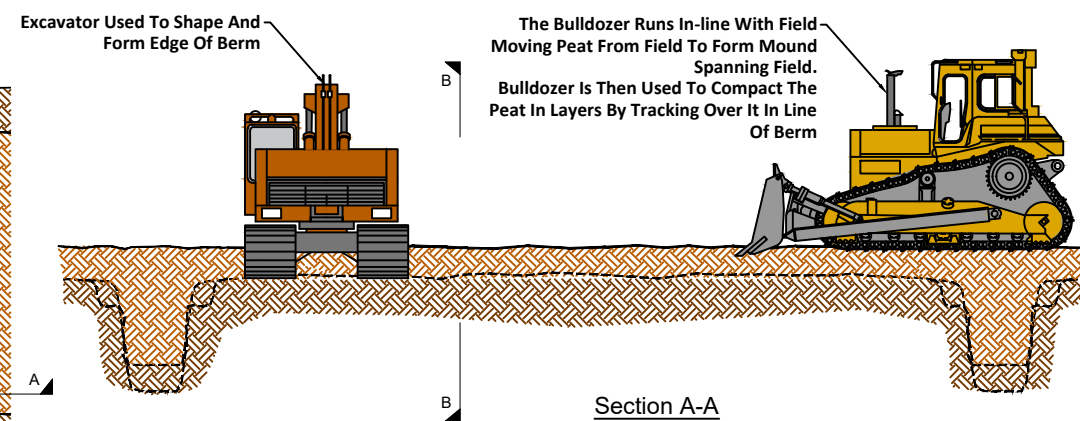
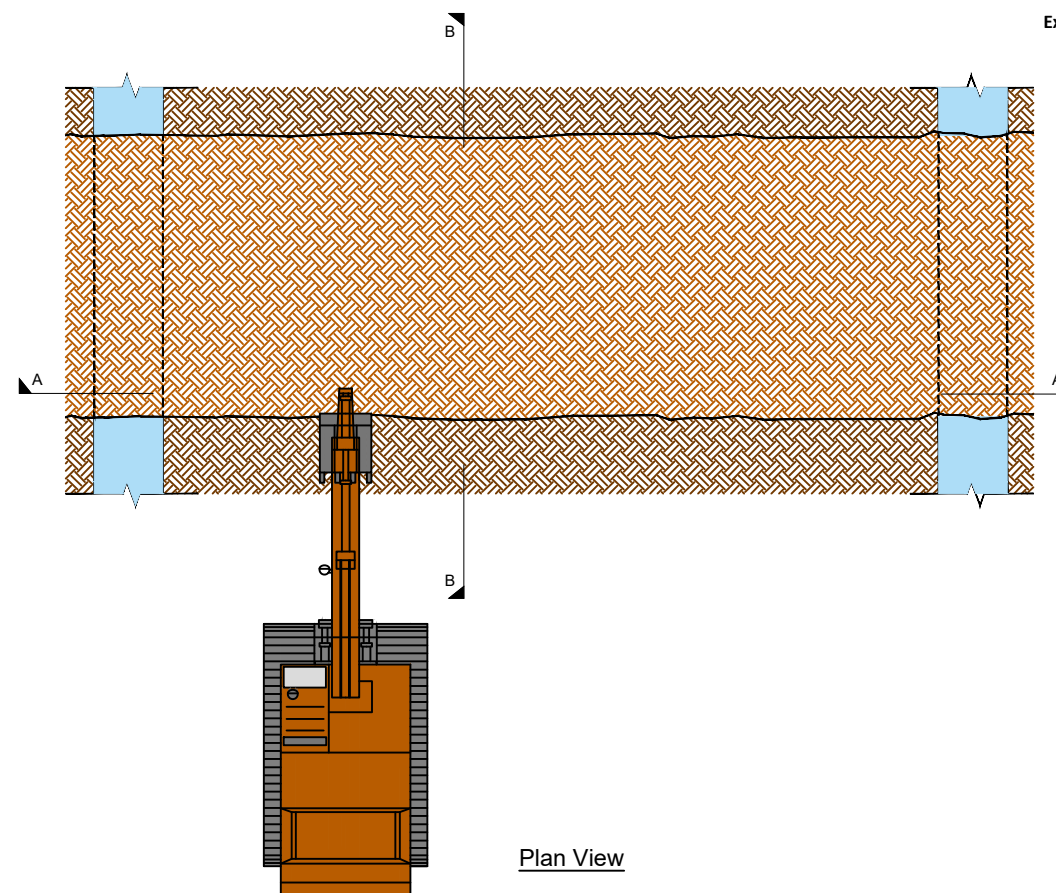
**Phase 1
Forming Peat Berm**

An Excavator is used to form a key in the drain where the berm crosses. 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.



**Phase 2
Forming Peat Berm**

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 a minimum 5m Wide x 300-500mm High Cross Berm. The peat material in the berm is compacted in layers by the dozer tracking over it. The excavator bucket is used to form and shape the edges of the compacted berm.



STATUS			
Rev	Description	Issued By	Date
c	Berm Dimensions And Details Revised	P.K.	11/03/21
b	Berm Height Increased And Trench Detail Added	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21

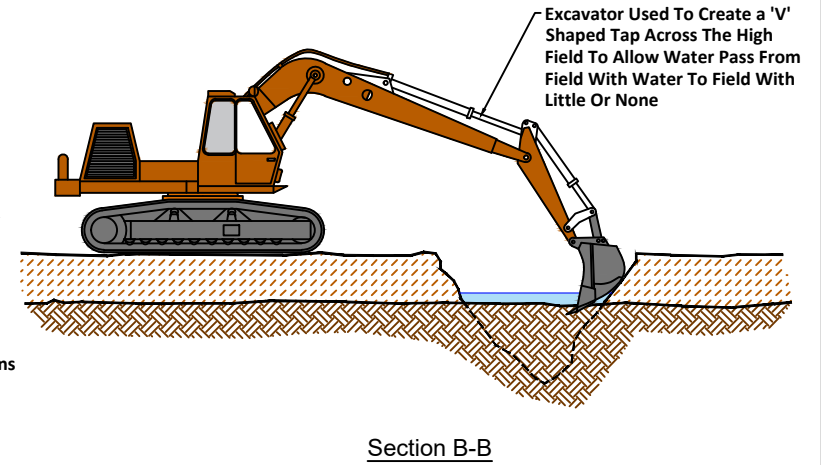
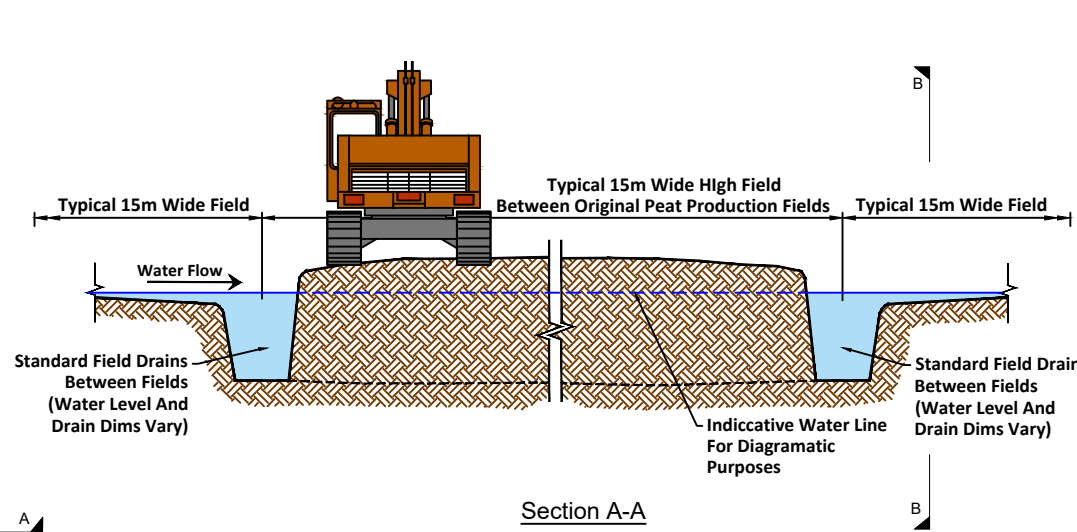
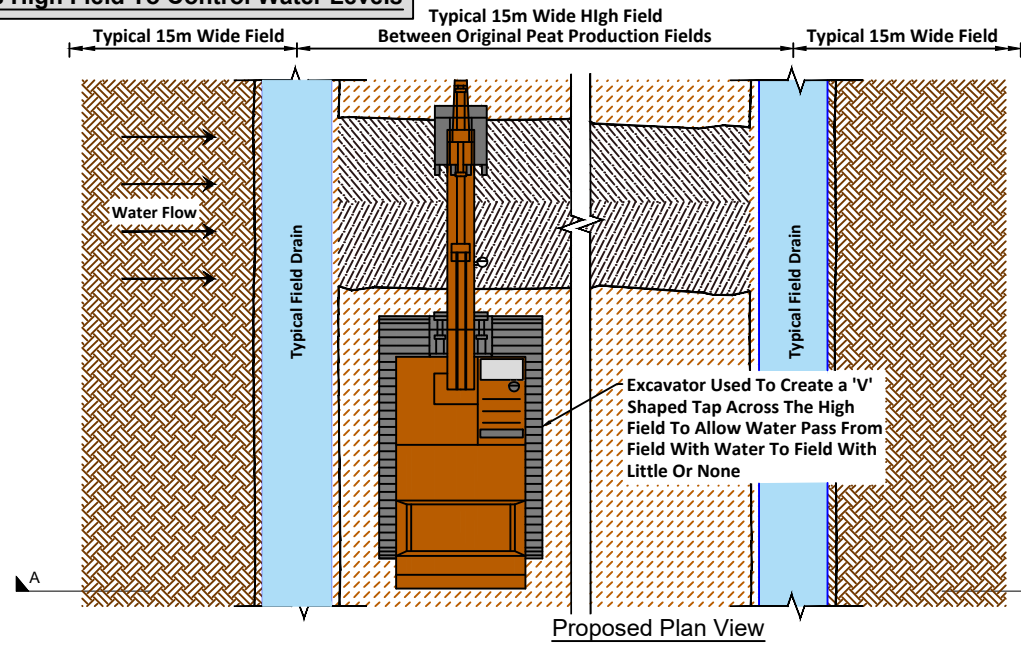
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PROJECT:
Peatland Climate Action Scheme
PCAS

TITLE:
Rehabilitation Method WLT 3
Peat Berm

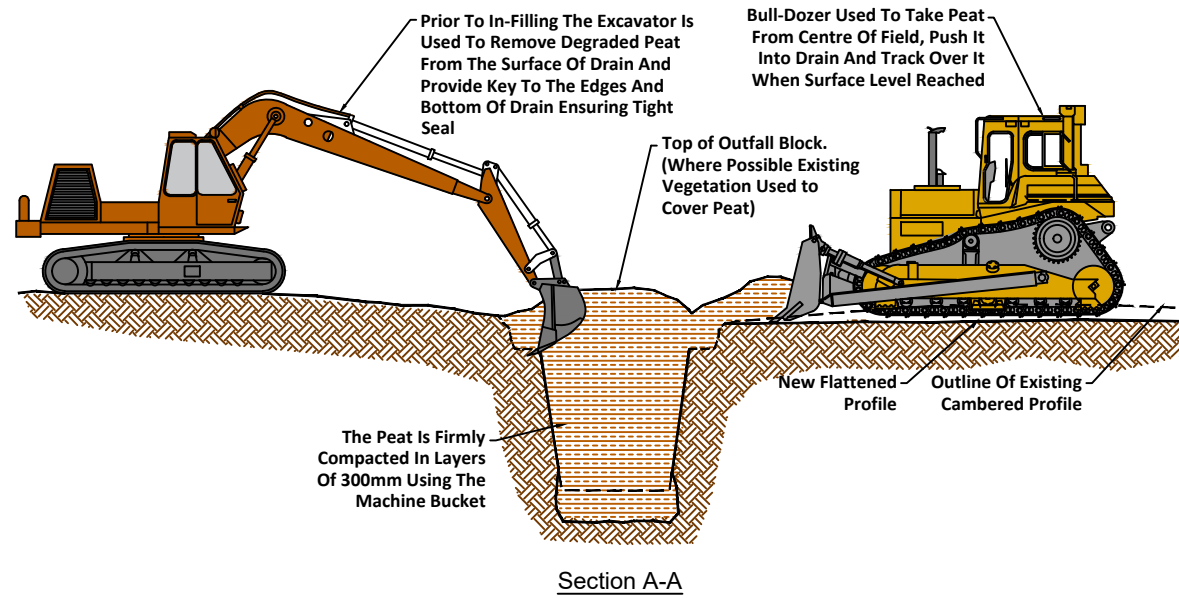
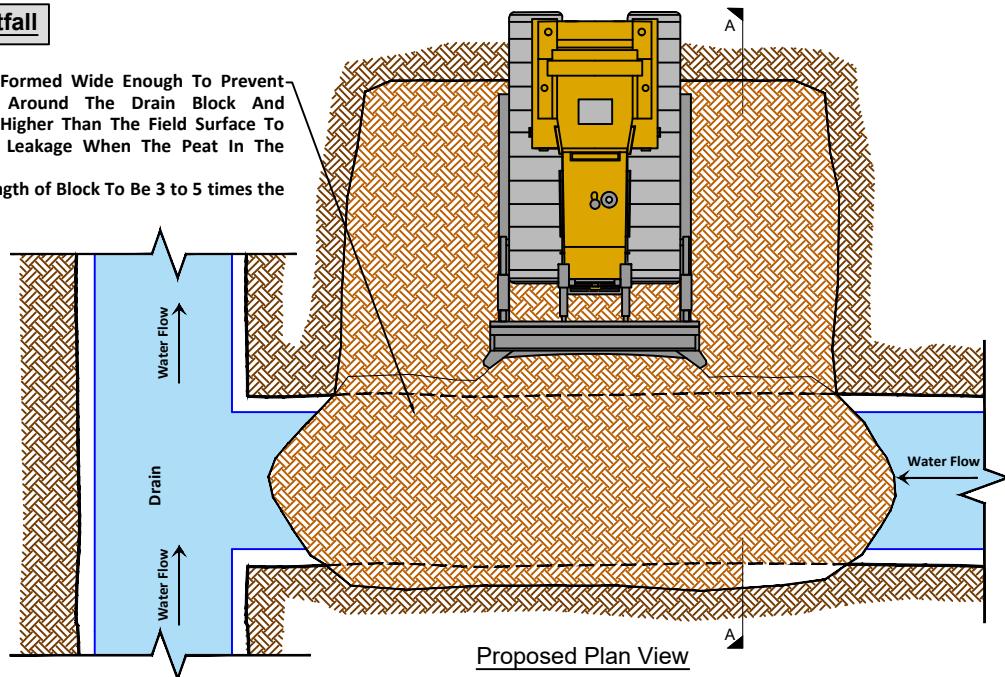
Drawn By:	Checked By:	Approved:
CAD Designer	Discip. Lead	Design Lead
P.K.	D.K.	P.N.
Date: 28/01/21	Scale: Not to Scale	A3
Drawing No.: PCAS-0100-010	Stage: Information	Rev: c

'V' Tap Across High Field To Control Water Levels



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



NOTES:

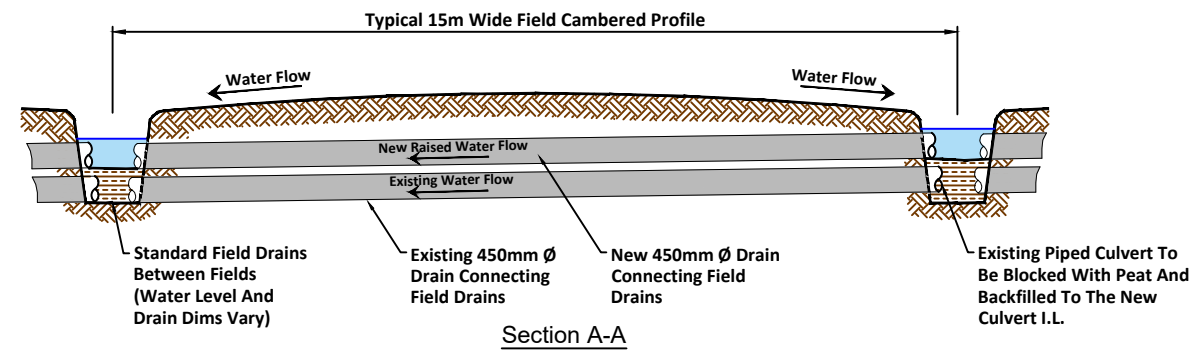
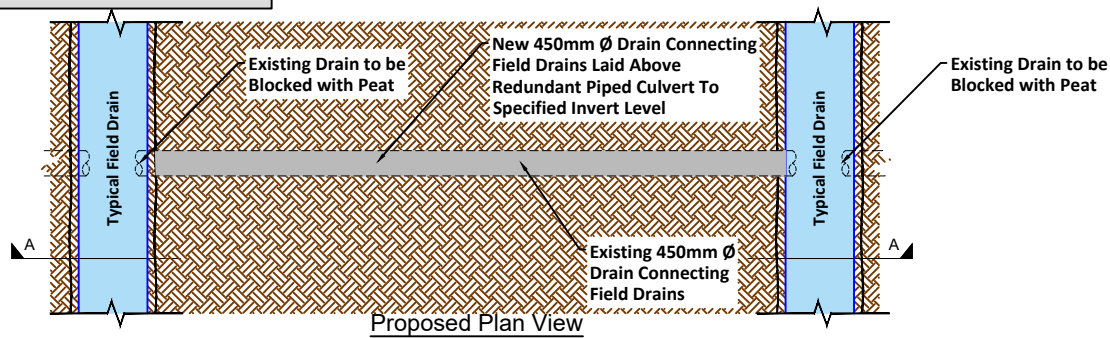
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
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STATUS

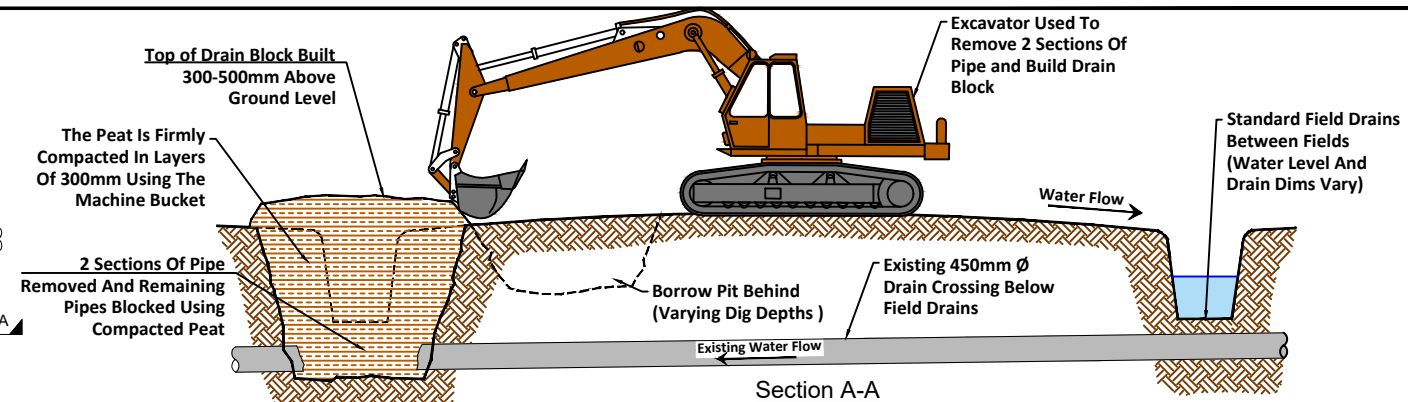
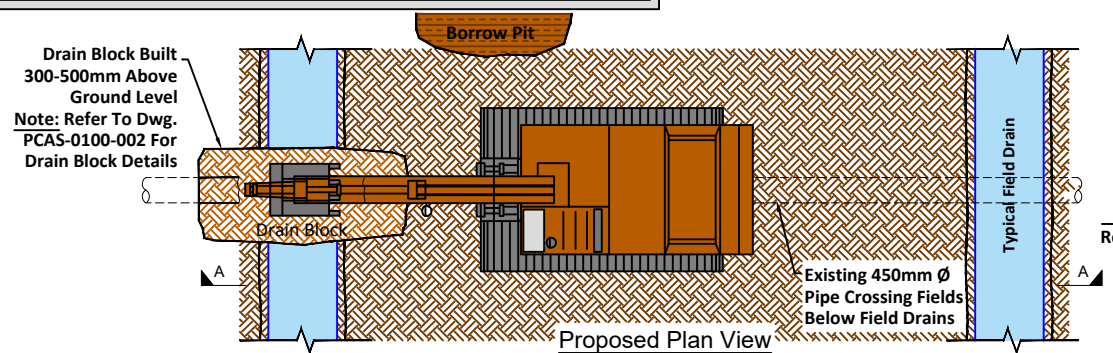
Rev	Description	Issued By	Date
d	Piped Field Drain Block Detail Added	P.K.	12/07/21
c	'Key' Added to Base Of Drain For Blocking Of Outfall Control Measure	P.K.	03/03/21
b	For Approval	P.K.	25/02/21
a	Issued For Information	P.K.	29/01/21

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Raise Piped Culverts To Control Water Levels



Blocking Of Piped Field Drain Running Below Open Field Drains



PROJECT:

Peatland Climate Action Scheme
PCAS

TITLE:

Modifying of Outfalls
& Managing Water Levels

Drawn By:	Checked By:	Approved:
CAD Designer	Discp. Lead	Design Lead
P.K.	D.K.	P.N.
Date: 20/01/21	Scale: Not to Scale	A3
Drawing No.:		Rev:
PCAS-0100-014		d

