4. DESCRIPTION OF THE DEVELOPMENT

4.1 Introduction

This chapter of the rEIAR provides a description of the activities at the Application Site from 1950 at the onset of site preparation works up to July 1988, a description of the baseline as of July 1988, a description of activities from 1988 to the cessation of peat extraction in June 2020, the management of the Application Site since June 2020 and the activities intended to be carried out at the Application Site into the future. The elements of the Project as described in this chapter are the baseline as of July 1988, the activities from July 1988 to the cessation of peat extraction in June 2020, the management of the Application Site since June 2020, and the activities relating to historic peat extraction intended to be carried out into the future. As described in Chapter 1, July 1988 is taken as the baseline assessment year for this rEIAR as this is the latest date that the EIA Directive (Council Directive 85/337/EEC) was required to be transposed into Irish legislation. This approach has been taken on a precautionary basis and strictly without prejudice, as EIA may not have been a legal requirement at that time. The assessment period for the rEIAR is from July 1988 to the present day.

Section 177E of the Planning and Development Act 2000, as amended, permits an application to be made for substitute consent in respect of development which has been carried out where an Environmental Impact Assessment (EIA), screening for EIA and/or Appropriate Assessment (AA) was or is required.

Neither the EIA Directive (Directive 85/337/EEC repealed by Directive 2011/92/EU and codified by Directive 2014/52/EU) nor the Habitats (Directive 92/43/EC) has retrospective effect; neither Directive imposes legal requirements to have been carried out prior to assessments of projects which had already commenced or been completed. There was, therefore, no legal requirement for EIA, screening for EIA or Appropriate Assessment in respect of *any* project prior to the latest dates for transposition of the Directives. In the case of the EIA Directive, the latest date for transposition was 3rd July 1988. In the case of the Habitats Directive, the latest date for transposition was 10th June 1994.

Accordingly, this application for substitute consent is, of necessity confined to the development which took place after those dates. The baseline against which the environmental effects of the development required to be assessed has therefore been identified as being the position as of July 1988 (being the earlier of the transposition dates of the relevant Directives).

However, as the Project formed part of a development which commenced many years prior to those dates, in order to facilitate as complete an assessment as is possible of the Project since July 1988, a description of the Application Site and the peat extraction and ancillary activities which took place there up to July 1988 are included in this chapter.

Although no EIA or AA can be required of development which took place prior to the latest date for transposition of the Directives, it is clear that in considering cumulative or in combination effects of development to which the Directives do apply, it is necessary to consider the effects of that development cumulatively or in combination with existing development, even development which took place before the Directives came into force: see Case C-142/16, *Commission v Germany*. Moreover, where an application for consent relates to development which is functionally interdependent on another development such that they should be considered part of the same project, it is necessary to carry out a cumulative assessment of the separate parts of that project: see *O'Grianna v An Bord Pleanála* [2014] IEHC 632; *Fitzpatrick v An Bord Pleanála* [2019] 3 IR 617.

In this case, therefore, in carrying out any EIA or AA, it will be necessary to consider the cumulative or in-combination effects of the development which has taken place since July 1988 with that which had already taken place prior to that date in order to properly consider those cumulative or in-combination effects. The development which took place before and after that date are part of a single project. It is

necessary and appropriate, therefore, that the development which took place before July 1988 is adequately described to enable that cumulative or in-combination assessment to be completed.

The historic activities described below include: the peat extraction processes, the construction, operation, and maintenance of supporting infrastructure and a description of ancillary activities undertaken. It also describes the current onsite activities and infrastructure as well as the proposed future remedial measures which will be implemented at the site in the form of a Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, subject to the agreement of the Environmental Protection Agency (EPA), and as required under Condition 10 of its Integrated Pollution Control (IPC) Licence P0500-01. Please see Appendix 4-1 for a copy of the licence.

Peat extraction and ancillary activities are historic, with a considerable number of activities and site preparation works pre-dating both the commencement of the formal Irish planning system (i.e., were first carried out prior to the establishment of the *Planning & Development Act 1963* (which was enacted on 01 October 1964)) as well as both the EIA and Habitats Directive transposition dates in 1988 and 1994 respectively. Other infrastructure such as workshops were also developed prior to the commencement of the formal planning system, while other ancillary services and infrastructure such as the erection of a harvester repair bay at Lemanaghan Works, as well as 3 no. rail underpasses and 2 no. level crossings were previously granted their own respective planning consents. This infrastructure is included below and considered within the overall rEIAR assessment.

4.1.1 Statement of Authority

This section of the rEIAR has been prepared by Catherine Johnson and Susan Doran, and reviewed by Ellen Costello and Sean Creedon, of MKO.

Catherine is an Environmental Scientist at MKO with over 3 years' consultancy experience in climate and sustainability. Prior to joining MKO in 2022, Catherine worked as an Environmental Social Governance (ESG) analyst for Acasta in Edinburgh. Catherine has expertise in international climate law and policy, earth science, and sustainability/ESG processes. Catherine has a BSc in Earth and Ocean Science and an LLM in Global Environment and Climate Change Law.

Susan Doran is an Environmental Scientist with MKO with over 3 years' experience in consultancy and conservation. Susan holds BSc (Hons) in Ecology and Environmental Biology from University College Cork. Prior to her role as Environmental Scientist, Susan was an Ornithologist and Coordinator for the MKO Ornithology Team. Susan has been involved with several large-scale onshore windfarms as assistant Project Manager through the EIA process.

Ellen Costello is a Senior Environmental Scientist with MKO with over 5 years' experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs.

Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of project delivery. He is a member of the MKO senior management team responsible for developing the business, mentoring

team members, fostering a positive culture and promoting continuous employee professional development. Prior to joining MKO Sean fulfilled several project and program management roles within Bord na Móna. Sean has over 23 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

4.1.2 Project Description Information Sources

- Integrated Pollution Control Licence (IPC) Licence Boora Bog Group (Ref. P0500-01) Environmental Protection Agency (included as Appendix 4-1);
- Bord na Móna Lemanaghan Bog 2024 Draft Cutaway Bog Decommissioning and Rehabilitation Plan (included as Appendix 4-2):
- Bord na Móna Living History website[1];
- IPC Licence (Ref. P0500-01) Annual Environmental Reports 2001 – 2024 (included as Appendix 4-3 (2018 to 2024 are also publicly available[2]));
- Clarke, Donal, *Brown Gold, A History of Bord na Móna and the peat industry in Ireland* (2010);
- Inspection of production records from Lemanaghan Works;
- IPC Licence P0500-01 Application 1999 (Available at EPA Headquarters on request);
- Aerial imagery for the years 1973, 1988, 1995, 2004 and 2020 (included as Appendix 4-4);
- Bord na Móna IPC Licence Training Programme (included as Appendix 4-5);
- Personal communications with former Bord na Móna Employees;
- Silt Control Study No. 1 –Internal Bord na Móna Report 1983 (included in Appendix 4.14)
- Silt Committee Interim Report Recommended Measures 1976 (included as Appendix 4-6);
- Silt Committee Excavator records 1984 (included as Appendix 4-7);
- Silt Committee Meeting Records Derrygreenagh 1984 (included as Appendix 4-8);
- Silt Control Report for Peat Energy Division Jim Harkins Bord na Móna Report 1991 (included as Appendix 4-9);
- Bord na Móna Peat Development in Ireland 1954 (included as Appendix 4-10);
- Bord na Móna Environmental & Operational Procedures for the Protection of Surface Water (included as Appendix 4-11);
- Planning Drawing Pack (included as Appendix 4-12); and
- Irish Engineers Journal Supplement 1970 (p.13-15).
- Bord na Móna Biodiversity Action Plan 2016-2021 (included as Appendix 4-13)
- Drainage Study with Particular Reference to Pumping – Internal Bord na Móna Report 1984 (included as Appendix 4-15)
- Peco Harvester Tests – Internal Bord na Móna Report 1986 (included as Appendix 4-16)
- Distribution and Nature of Mineral 'Ash' Material in a Milled Peat Stockpile – Internal Bord na Móna (included as Appendix 4-17)
- Regional Administration in Relation to Milled Peat Operation – Internal Bord na Móna Report 1988 (included as Appendix 4-18)
- Industrial Cutaway Bog Land-Use Studies (Clonsast) – Internal Bord na Móna Report 1978 (included in Appendix 4-19)

[1] *Available at:* https://www.bordnamonalivinghistory.ie/
[2] *Annual Environmental Reports 2018-2024 available at: https://leap.epa.ie/licence-profile/P0500*

4.1.3 Information Required for the Description of the Project

Article 5(1) of Annex IV of Directive 2014/52/EU and amending Directive 2011/92/EU outlines the items that should be included in an EIAR when assessing the effects of certain public and private projects on the environment. Item 1 of Annex IV is reproduced in Table 4-1 and lists what should be included in the description of the Project. These items are described in detail in this chapter and associated appendices. They can also be found in more detail in their respective chapters.

Table 4-1 Information referred to in Article 5(1) Annex IV of Directive 2014/52/EU, 2011/92/EU to be included in the description of the Project.

1) Description of the Project, including in particular:		Relevance to application	Location In rEIAR
a)	*a description of the location of the project;*	The Application Site, Lemanaghan Bog, forms part of the Boora Bog Group and is located in Lemanaghan and surrounding townlands, north-east of Ferbane, County Offaly. Lemanaghan Bog is located approximately 3.5 kilometres (km) northeast of Ferbane and approximately 2.5 km southwest of the village of Ballycumber in Co. Offaly	› Chapter 1 Introduction › Chapter 4 Description
b)	*a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*	Site baseline description (as of July 1988), site preparation works pre-commencement of industrial peat extraction, drainage implementation, supporting infrastructure	› Chapter 4 Description › Chapters 5 to 15
c)	*a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*	Peat extraction and ancillary activities from July 1988 – June 2020, including peat volumes extracted, peat extraction methods, machinery requirements, scale of operational areas, required peat extraction methods, supporting activities, vegetation clearance, habitat removal, peat volumes extracted, energy used	› Chapter 4 Description › Chapter 6 Biodiversity › Chapter 7 Land, Soils and Geology › Chapter 8 Hydrology and Hydrogeology › Chapter 9 Air Quality › Chapter 10 Climate › Chapter 14 Material Assets › Appendix 4-3 Annual Environment Reports
d)	*an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat,*	Silt run off, waste management, noise and vibration emissions, dust and CO_2 emissions	› Chapter 4 Description › Chapter 7 Land Soil and Geology › Chapter 8 Hydrology and Hydrogeology

1) Description of the Project, including in particular:		Relevance to application	Location In rEIAR
	radiation) and quantities and types of waste produced during the construction and operation phases.		› Chapter 9 Air Quality › Chapter 10 Climate › Chapter 11 Noise and Vibration › Chapter 14 Material Assets › Appendix 4-3 Annual Environment Reports

4.2 Project Description

This rEIAR is prepared in support of an application for substitute consent for peat extraction and ancillary activities carried out by Bord na Móna at the Application Site since July 1988.

Peat extraction and ancillary activities undertaken at the Application Site, which comprise the Project for which substitute consent is being sought, and for which this rEIAR is prepared, consists of the following:

- Industrial scale peat extraction (milled peat) at the Application Site from 1988 to June 2020;
- Installation, use and maintenance of surface water drainage infrastructure (drains, silt ponds, pumps) at the Application Site to facilitate peat extraction activity from 1988 to present day;
- Provision of a welfare facility building and associated septic tank, 2 no. storage containers;
- Use and maintenance of pre-existing ancillary supporting infrastructure and services to facilitate peat extraction (e.g., railway infrastructure), from 1988 to present day;
- Control Measures associated with the above, inclusive of the IPC Licence measures (Ref. P0500-01) which commenced from May 2000 onwards to the present day; and,
- All associated site development and ancillary works.

4.2.1 Project Phases

As detailed in Section 1.1.1, for the purposes of this rEIAR, the Project is defined under three different timeframes termed 'phases':

- **'Peat Extraction Phase':** peat extraction and ancillary activities at the Application Site from July 1988 to the cessation of peat extraction in June 2020 (July 1988 – June 2020). The Peat Extraction Phase is described in detail in **Sections 4.4 to Section 4.8.**
- **'Current Phase':** the management of the Application Site since June 2020 (June 2020 to present). The Current Phase is described in detail in **Section 4.8 and Section 4.9**.
- **'Remedial Phase':** the activities intended to be carried out at the Application Site into the future. The Remedial Phase is described in detail in **Section 4.10.**

4.2.2 General Overview of the Peat Extraction Process

4.2.2.1 Surveying and Drainage

A description of the surveying and drainage methodologies and machinery used across the Bord na Móna bogs, including at the Application Site, is outlined on the Bord na Móna Living History website[3], as taken from Irish Engineers Journal Supplement, 1970, p.13-15.

The key approach and outputs of the surveying works were as follows:

- The lateral extent of the bog deposit was determined using traditional surveying techniques;
- The peat types or the stratification to the bog floor (i.e., the degree of decomposition as expressed on an international scale of humification) was determined. This scale ranges from H.1 to H.10 (the higher the number, the greater degree of decomposition);
- Levels were taken at 100-yard (approx. 91m) intervals or closer along parallel section lines 250 yards (approx. 228m) apart on midlands bogs (the Application Site comprises midlands bogs). The depth of the bog at each level point was determined by a Swedish-type tube borer coupled in lengths of 1m. The leading tube was provided with a special rotating head which enabled a 0.5m sample from any particular depth to be carried to the surface;
- Midland virgin bogs, such as the Application Site, varied in depth from 10 foot (approx. 3m) to over 40 foot (approx. 12m) – the bulk of the soundings lying in the range 15 foot (approx. 4.5m) to 25 foot (approx. 7.5m); and
- Apart from the survey of the bog deposit a detailed survey of all the minor streams and minor rivers carrying waters from the bog to main rivers was also carried out.

Once the detailed survey work was completed and the site deemed suitable for peat extraction, drainage works across the bogs were initiated. The development of the drainage for the site was carried out in stages using a range of machinery. Midland virgin bogs, of which the bog associated with the Application Site was typical, would, pre-development, have had a moisture content of over 94%, which varied from 96-97% near the surface to 90% at the bog floor. The stages of drain development are outlined below:

- Initial opening of drains:
  - Drains were first opened by a plough pulled by a Bord na Móna tractor at a slow speed (approx. ½ to 1 mile per hour (0.8km/h – 1.6km/h)); and
  - The drain depth at the plough stage was 20″ (0.51m). Drains had a trapezoidal section with a top width of approximately 30″ (0.76m) and a bottom width of 12″ (0.3m) bottom width.
- Deepening of drains:
  - Following their initial opening, drains were deepened by rotating disc machines operating at speeds of 200-600 yards per hour (approx. 180-550m/hour);
  - Rotating disc machines could deepen the drains to a maximum depth of approximately 60″ (approx.1.5m), with a bottom width of approximately 12″ (approx. 0.3m); and
  - Whether further deepening of drains was required depended on the purpose of the drain was achieved by smaller-type bucket excavators and peat cutting machinery, by drag lines specially tracked to Bord na Móna's design,

[3] https://www.bordnamonalivinghistory.ie/article-detail/civil-works-in-bord-na-mona/

by several other excavator types, or by hand where it was desired that the drain should conform to certain maximum dimensions.

Arterial drainage works were not always adequate to achieve the levels of drainage required to allow the extraction of peat deposit to the bog floor. Pumping of whole bog areas or certain portions of bog areas arose where gravity drainage was impossible or achievable only at prohibitive cost. In these instances, the pumps favoured were the Archimedean screw type or the Axial flow type electrically powered, and electrode controlled. Both the screw pumps and axial flow pumps used were supplied by manufacturers in the Netherlands.

Once drained, the upper acrotelm layer (which comprises the biologically active component of the bog) was removed to facilitate peat extraction and ancillary activities and the drying of peat. The acrotelm is one of two distinct layers in undisturbed peat bogs. It overlies the catotelm. The boundary between the two layers is defined by the transition from peat containing living plants (acrotelm) to peat containing dead plant material (catotelm).

The machinery involved in drainage work on the Application Site is described in Section 4.2.2.1.1 below.

4.2.2.1.1 *Drainage and Bog Preparation Machinery*

Dragline/Shovel Excavator: Types 287 CU. Metres and 478 CU. Metres

These machines excavated the main outfalls for the bog drainage system in the early development stages and maintained main outfalls during the production life of the bog. While these excavators were generally of conventional design and were suitable to be mounted with dragline attachments, back and front acting shovels, and pile driving attachments, they were used mainly with the dragline attachment. The machines were powered by a diesel engine. All drives were mechanical with friction clutches and brake control of winches and turntables, while the track drives and steering were controlled by a claw clutch and brake arrangement.

In 1958, a new underframe for the dragline was designed to minimise surface pressure and peat compaction, thereby eliminating the need for the use of timber mats. The increased mobility and reliability of the machine resulting from the new underframe allowed the machines to move rapidly over the bog to do relatively small jobs which would earlier have been done by hand, owing to the slowness and difficulty of moving the dragline over timber mats. Additionally, the elimination of the timber mats meant that groundsmen were no longer required to move the timber mats. This meant that draglines could be operated by the driver only, with no support staff required. The 287-model excavator had caterpillar-type tracks with timber sleepers, which provide the necessary bearing area for operation on bog, without using mats. The 478-model excavator, while equipped with caterpillar track chains, was not fitted with track sleepers but was supported on timber mats where necessary. When excavating bog these machines were fitted with a special dragline bucket of light design with a capacity of 750L. Plate 4-1 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 1 Dragline/Shovel Excavator Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/draglineshovel-excavator/

Drainage Machine Type – M.P. Field Slitter

This machine was developed to cut slit drains in milled peat fields to accelerate drainage in the poorer quality areas. The drains cut to a definite pattern comprising three longitudinal slits, one central and one on either side, with cross drains giving exit to the ditches at regular intervals. The machine comprised a tractor on full tracks with a chain saw cutting attachment similar to the chain saw machine. The tractor had a special transmission to give the correct forward travel speeds in second, and third gear. The modification involved the replacement of the gearbox primary gear train and the differential crown wheel and pinion, in addition to the insertion of a special reduction gearbox. The tracks comprised flat metal cleats carried on two chains and run on the standard tractor tyre wheels with an additional jockey wheel. The attachment was carried at the rear of the tractor, pivoted on the centre of a standard power-take-off bevel box output shaft and is raised and lowered about this pivot by a hydraulic ram operated from the driving position. The cutting element was a standard transmission chain with cutting teeth secured to it by welding, running over top driving sprocket and a bottom driven sprocket, whose shaft carries a cutting impeller on either side outside the support bearings. These impellers, in conjunction with the cutting chain, excavated a tunnel of rectangular section at the bottom of the slit drain cut by the chain only. The machine had a cab with toughened glass windows, allowing good vision for manoeuvring and observing the behaviour of the attachment. Plate 4-2 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 2 Drainage Machine Type – M.P. Field Slitter. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/drainage-machine/

Ditching Attachment – Milled Peat Type – Disc

The purpose of this attachment was to cut the drains separating the milled peat fields in development bogs and deepen existing drains in production bogs. The attachment consisted of a rotating cutting disc set at an angle to the line of travel, carried on an arm from the tractor unit. The arm and disc were controlled and supported by wire ropes and a hydraulic ram passing over a mast on the tractor unit and anchored to a projecting ballast box on the other side of the tractor unit. The disc was driven by the tractor main gearbox PTO shaft via a bevel gear reduction box and universal propeller shaft. On other machines a chain drive reduction was inserted between the bevel gearbox and universal propeller shaft to achieve a slower disc speed. The disc had cutting blades and a stationary shield which deflected the flying spoil away from the machine and spread it evenly over the adjacent field. Plate 4-3 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 3 Ditching Attachment/Ditcher

Drain Cutting Attachment – Cross Drain

The purpose of this attachment was to cut small drains in milled peat fields from the centre of the field to the ditches separating the fields. The attachment consisted of a cutting boom which was mounted on the rear of the H.D. Tractor Type II on radius arms, controlled for height and level by hydraulic rams. To cut the drain, the tractor stopped, and the cutting boom started, trimmed for level if necessary and lowered into the bog, discharging the spoil to the centre of the field. The boom was of light construction using standard steel sections. The chain was carried on sprockets at the ends of the boom while it ran in a guide with the aid of welded-on cleats along the bottom horizontal portion of the boom. The drive is taken from the P.T.O. shaft of the tractor main gearbox via chain drivers and universal jointed propeller shaft. Plate 4-4 below is an image of this type of machinery operating on a Bord na Móna bog.

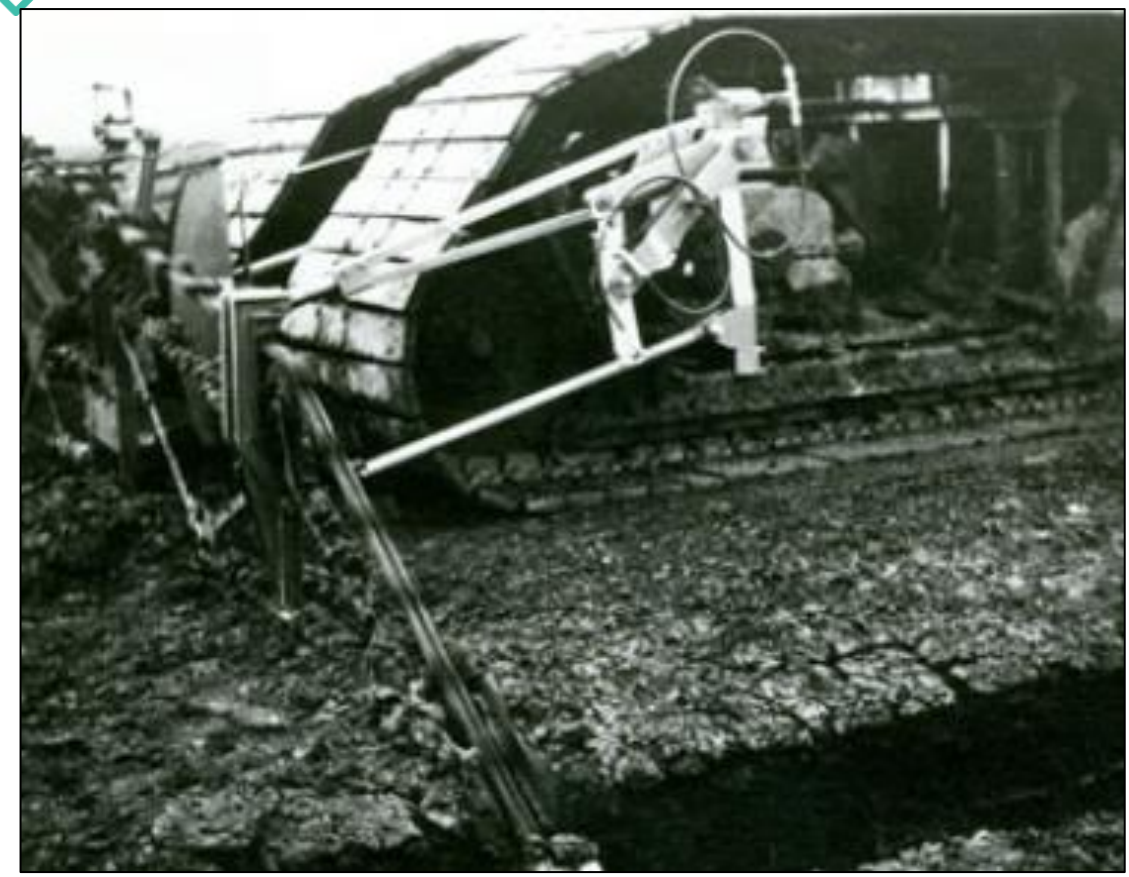


Plate 4- 4 Drain Cutting Attachment – Cross Drain. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/drain-cutting-attachment-cross-drain/

Drain Cleaner – Screw

This attachment was used to remove slurry from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field. The attachment was a screw elevator with radial blades fitted at the top to eject the spoil through an outlet in the casing in a predetermined direction. The attachment was mounted on a cantilevered bracket from the tractor on a pivot arrangement so that the screw casing could be lifted and lowered as required by winch rope. In the working position the screw elevator is lowered into the ditch and scooped the slurry from the bottom of the ditch as the tractor advances. As the tractor progresses along the ditch or drain it accumulates the slurry; the screw elevated it into the discharge chamber and the radial blades ejected it through the outlet onto the peat field. Plate 4-5 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 5 Drain Cleaner Screw. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/drain-cleaner-screw/

Stripping Machine Type – I & II

The purpose of this machine was to cut away the top layer of bog from the section which was to be cut. This layer varied in depth from 305 mm to 762 mm and was deposited at the bottom of the face bank prior to reuse on the adjacent spread grounds. The machine had a lightly constructed main frame mounted on caterpillar type tracks and the spiral cutting/conveyor unit was carried in an off-set position at the rear. The spiral cutter/conveyor unit was pivoted to the main frame and suspended on an overhung mast on which it was raised or lowered as required. A separate trimming control, in the form of a hydraulic ram, was fitted at the cutting end.

The Type I machine was powered by diesel engine and transmission of standard manufacture incorporating a differential brake/gear steering arrangement as used on levelling machine. There were 8 forward speeds and 4 reverse speeds available through gearbox and change sprockets.

The Type II machine was powered by a diesel engine driving through an over-centre type clutch, a 'V' rope drive special worm and spur gear reduction box, and chain drives. The machine was steered by coil clutches on the track final drives. There were 6 forward speeds available using change sprockets. Plate 4-6 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 6 Stripping Machine. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/stripping-machine/

Levelling Machine Type – Scraper

The purpose of this machine was to prepare the surface of the high bog and cutaway for the efficient operation of all other machines, by levelling it. The machine consisted of a large tractor unit carrying a leveller boom in front. As the machine advanced on its long tracks, the boom cut away the high areas, losing the spoil in the hollows. The tractor unit had a rigid main frame supported on caterpillar type power driven tracks and was powered by diesel engine and gear transmission of standard manufacture. The boom had a light framework made up of standard steel sections, around which was driven two conveyor-type chains running on sprockets at each end and in guides along the bottom and top. Across these two chains, arms were fitted, projecting beyond the front of the boom. The projecting portion of the arm had a cutting knife and scraper palm. The boom was controlled for height and level by hydraulic rams. Plate 4-7 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 7 Levelling Machine Type – Scraper. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/levelling-machine/

4.2.2.2 Peat Extraction Process

Two distinct peat products were extracted at the Application Site: sod peat and milled peat. The methods by which these products were extracted varied, and each process is described in detail in the sections below. A description of the machinery used for peat extraction and ancillary activities at the Application Site is provided in Section 4.2.2.3.

4.2.2.2.1 *Sod Peat Extraction*

Sod peat was extracted at the Application Site from 1960 to 1984.

Sod peat, also sometimes referred to as 'machine turf' or 'turf', was extracted utilising technologies developed between 1910 and 1920. The sod peat was initially supplied as a fuel product for both domestic and industrial uses. Once drainage was installed and the bog surface suitable for use by machinery, the bog surface was prepared using levelling and stripping machines (Plates 4-6 and 4-7). Sod peat extraction was subsequently carried out by a range of different bagger/sod peat excavator machines.[4] The German word for both 'excavator' and 'dredger' is 'Bagger' and this was the word adopted in Ireland for machines which mixed the peat from different depths of the bog and then macerated it (Plate 4-21).

In the case of sod peat extraction, large open drainage ditches known as "trenches" were opened at widths of approx. every 240 metres across the entire width of the extraction area. These trenches served as the beginning of the face bank from which sod peat was ultimately extracted. Baggers cut a trench with a width of 2 meters and a depth of 3 to 4 meters. A chain of buckets on the bagger was then

[4] https://www.bordnamonalivinghistory.ie/equipment-detail/sod-peat-baggerexcavator/

inserted into the trench which extracted peat from all strata of peat in the trench. The extracted peat was then deposited into a macerator which pulped and mixed it. Maceration improved the quality of the sods of peat produced, as by thoroughly mixing peat from each strata of the bagger trench, the density and uniformity of the sod was increased. The macerated peat pulp was then extruded through a narrow double mouthpiece which formed it into two rows of continuous sods each of approx. 5 inches (approx. 13cm) wide by 3 ¾ inches (approx. 9.5cm) high. As they were extruded, the rows of peat were deposited on to a continuously moving chain of spreader plates, which when the spreader arm was fully loaded, tripped automatically and deposited the rows of turf onto the bog surface. Trailing discs then cut the rows into 15 inch (approx. 38cm) long sods. The standard length of the spread arm was 54 metres. The bagger/sod peat excavator machine spread the sod peat on the large area between the trenches which allowed sufficient room to dry the sod peat. A short video of the last bagger that was operational on Bord na Móna bogs can be viewed at: https://www.youtube.com/watch?v=nNcitG0WKPs.

After about two weeks on the surface of the bog, the sods were turned by a sod turning machine to allow the other side of the sod to dry. When the sods were fully dried, the density and uniform texture resulting from the maceration process made them impervious to rewetting. The dried sod peat was then collected from the surface of the bog using a sod collector. This machine was used to collect the sod peat from the sod rows into stockpiles which were often referred to as 'ricks'. A permanent 3 ft. gauge railway serviced all bog areas and facilitated connectivity to the various works centres, workshops, and fuel depots across the Bord na Móna landbank. When it was decided to move a stockpile, a temporary railway track was laid alongside from the permanent railway line. On completion of loading, the temporary track was lifted and re-laid along another stockpile as required. Please see Plate 4-8 for a Flow Chart of the Sod Peat Extraction Process produced by Bord na Móna.

Typically, sod peat fields were between 800 to 2,000 yards long (approx. 700m to 1,800m) discharging normally to the end of the large drainage trenches. Small, piped outfalls were installed perpendicular to the drains where needed to drain low areas that formed along the sod peat field. The pipes used were either concrete or clay pipes with a small diameter of between 150mm to 300mm.

These bogs utilised screw pumps where levels did not allow for gravity drainage. As the sod peat machine (bagger) was electrically powered a power supply for the pumps was easily obtained from the existing internal electricity distribution network.

The large drainage trenches were continuously developed and have a width of between 3 to 10 metres typically and a depth of around 2-5 metres. They were maintained using mechanical excavators or draglines and were continuously deepened as sod peat was extracted from the bog to lower the drainage level.

4.2.2.2.2 *Milled Peat Extraction*

Milled Peat product was extracted at the Application Site from 1986. In the case of milled peat extraction, parallel open drains were cut at 50 ft. (approx. 15.2m) centres which divided the peat extraction area into fields 45 ft. (13.7m) wide. Typically, the field drains were from 800 to 2,000 yards (approx. 700 to 1,800m) long, discharging at either end into piped outfalls which ran at 90° to the open drains and which themselves discharged into the nearest natural outfall. Beyond the piped outfall was left a headland or turning ground 70 to 100 ft. (21 to 30m) wide which ran parallel to the piped outfall to enable production machines to turn from one field into another. When fully developed, the open field drains had a depth of approx. 4′ 6" (approx. 1.4m) and a top width of approx. 5′ 0" (approx. 1.52m). The field drains were excavated and initially maintained by machines called disc ditchers. The disc ditcher consisted of a cutting disc which was mounted on an arm offset from a tractor unit. Tractors were powered by a diesel engine, and they were mounted with timber and swamp shoes and front rollers.

Milled peat extraction requires good solar/wind drying conditions and so commenced any time from mid-April and usually ran until mid-August, once suitable drying conditions prevailed. Following drainage, there were four stages to the production of milled peat:

1. **Milling** - During the milling process the top 10-15 mm of the surface of each field was broken into peat crumbs by powered milling drums towed behind agricultural tractors. This layer of crumbed or milled peat is called a crop and has a moisture content of about 80% when milled. Please see Plate 4-9 below for details.
2. **Harrowing** - After milling, the peat crop was dried. To assist in this drying, the loose peat was harrowed or turned over. The harrow consisted of a series of spoons which are towed behind an agricultural tractor. The spoons on the harrow were fitted with special base plates which prevented the scraping of wet particles from below the milled peat layer. Harrowing was usually required 2 to 5 times per peat crop, depending on drying conditions, the water table level in the peat extraction fields, the initial moisture content of the peat at milling, and peat quality. If rain interrupted the drying process, more harrowing may have been needed. Please see Plate 4-10 below for details.
3. **Ridging** - When the milled material was dried to a moisture content of between 45% and 55%, it was gathered into ridges in the centre of each peat extraction field. The ridger consisted of a pair of blades towed in an open V behind an agricultural tractor. The open V blades rest on the bog and channel the loose crop into a triangular ridge in the centre of each peat extraction field. Please see Plate 4-11 and Plate 4-12 below for details.
4. **Harvesting** - Harvesting is the final stage of the milled peat extraction process. Each individual ridge was lifted mechanically by a machine called a harvester, transferred and dropped on top of the adjoining field's ridge, until five ridges had been accumulated into a single large ridge. This ridge forms the final lift into the peat storage stockpile. Please see Plate 4-13 and Plate 4-14 below for details.

Typically, every 11th field was used to stockpile the peat from the output of five fields either side; this is referred to as the 'Peco' method and the peat in these stockpiles was removed by rail. The Peco method was used on the Application Site. Weather permitting, the miller followed the harvester and the production cycle recommenced in the emptied fields. The extraction-stockpiling cycle is referred to as a 'harvest' and each group of eleven fields generally produced 12 No. harvests per year. When the extraction season was over, the stockpiles were covered to keep the peat dry unless the peat was scheduled for immediate transportation from the site. Peat was stored in these stockpiles (up to 25 m wide, 10-15 m high) until required for use. Please see Plate 4-15 and 4-16 below for details.

Once stockpiles of milled peat were established, they were rolled and covered with polythene sheeting. The purpose of the polythene covering was to keep stock dry, to protect it against wind erosion, and to inhibit spontaneous combustion in certain types of peat by the exclusion of as much air as possible. A reel of polythene sheeting would be mounted on a single bale spike-type attachment on an excavator. The excavator would drive alongside the stockpile, and the polythene would be unrolled across it. There were generally 8 no. workers on the ground outside the excavator to undertake the work of unrolling the polythene and laying it across the stockpile (4 no. workers each side of the stockpile). Once the polythene sheet was laid in place, a layer of high-moisture-content milled peat was distributed over the polythene to fix it in place. This was done in three passes along a stockpile by a milled peat harvester; on the first pass, a milled peat harvester which was fitted with a split cowl at the end of the jib distributed an even layer of peat across the top and sides of the stockpile (the split cowl allowed for both faces of the surface of the stockpile to be covered in the one pass). The second and third passes of the milled peat harvester facilitated the deposition of peat along the bottom edges of the stockpile, effectively anchoring the polythene sheeting to the ground, preventing the lifting of the edges in the wind (see Plate 4-15 and 4-16 below).

When it was decided to move a milled peat stockpile, the polythene sheet covering the stockpile was removed. A trained staff member would walk along the apex of the milled peat stockpile and bisect the polythene sheet at the peak of the apex with a blade. Starting at the end of the stockpile, one side of the

bisected polythene sheet was fed into the eye of an implement known as a polywrapper, which was mounted on the three-point linkage of a tractor. The eye of the polywrapper was attached to a pendulous swivel arm, which, as the tractor moved forward, oscillated from left to right to ensure that the polythene being collected was being dispensed evenly across a metal shaft on the polywrapper. This ensured an even spool of polythene was collected. Once the spool was at capacity, one side of the polywrapper was opened, which allowed the metal shaft to be removed and replaced with a plastic one. The entire spool was then removed and sent for appropriate disposal/recycling. The metal shaft was reinserted into the polywrapper, the side closed, and the process began again until the stockpile was fully uncovered and all polythene collected.

A permanent 3 ft. gauge railway serviced all bog areas and facilitated connectivity to the various works centres, workshops, and fuel depots across the Bord na Móna landbank. As in the case of sod peat stockpiles, when it was decided to move a stockpile of milled peat, a temporary railway track was laid alongside from the permanent railway line. On completion of loading, the temporary track was lifted and re-laid along another stockpile as required. Please see Plate 4-8 for a Flow Chart of the Milled Peat Extraction Process produced by Bord na Móna.

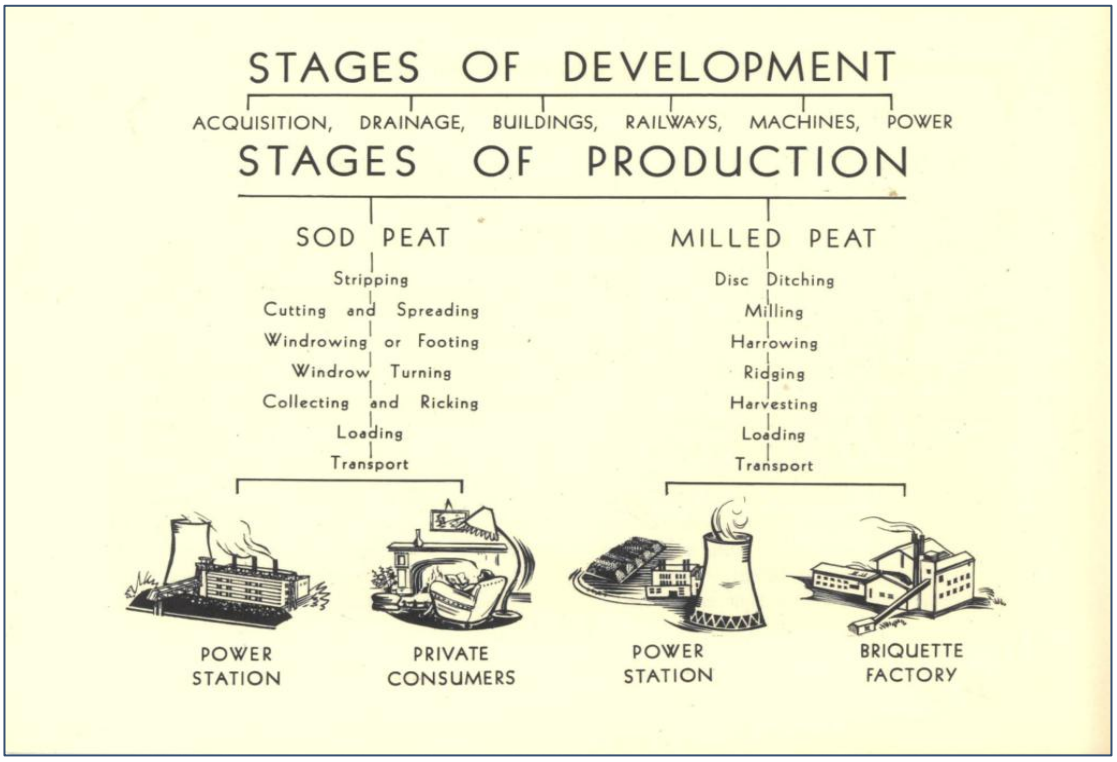


Plate 4- 8 Flow Chart of the Sod and Milled Peat Extraction Process produced by Bord na Móna in 1954

Plate 4- 9 Milling process. Image: Bord na Móna

Plate 4- 10 Harrowing process. Image: Bord na Móna

Plate 4- 11 Ridging process. Image: Bord na Móna

Plate 4- 12 Ridging process. Image: Bord na Móna

Plate 4- 13 Harvesting – Peco method. Image: Bord na Móna

Plate 4- 14 Harvesting – Peco method. Image: Bord na Móna

Plate 4- 15 Polythene covering of stockpiles

Plate 4- 16 Process of Stock Protection, showing a layer of milled peat being spread over polythene sheeting to anchor the sheeting in place (source: Bord na Móna)

4.2.2.3 Peat Extraction Machinery

The following machinery was used in the extraction process once the bogs had been cleared of vegetation and drains inserted. The type of machinery used at any given time would vary depending on machine availability, bog conditions, the type of peat being extracted (i.e. milled or sod,) and operator preference.

4.2.2.3.1 *Tractors*

A variety of tractors have been used throughout the history of peat extraction and ancillary activities on the Application Site. As with all machinery used during peat extraction and ancillary activities, the choice of tractor used for any given activity would have been based on availability, bog conditions, and activity type (which would dictate the mechanical requirements of the tractor in terms of power output drivetrain, weight, wheelbase dimensions, tyre type, PTO specifications, hydraulic requirements etc.). Throughout the decades as improvements in tractor design were made, newer more powerful and efficient tractors were employed on the Application Site. A non-exhaustive overview of the types of tractors used is provided below.

H.D. Tractor II

The H.D. Tractor II was a half-track tractor specially designed for harvesting and ditching operations in the Peco system of milled peat. The machine consisted of a robust main frame supported on caterpillar type tracks, which are exceptionally high to accommodate the attachments within them, and on large steering rollers in front. The tractor was powered by a diesel engine fitted with automotive-type clutch. The transmission consisted of a main gearbox, an auxiliary gearbox, a worm drive bevel gear differential unit and a spur gear reduction final drive contained within the back axle casting. The tracks comprised a special cast steel link type chain, with swamp shoes or sleepers bolted on, which ran on track rollers suitably spaced on the track frame. The driving sprockets were built up from steel plate discs with steel rollers between, to register with the track chain. The idler sprocket had the steel disc, with distance pieces, allowing the track link driving spuds to pass between them. Both the driver and idler sprockets are fitted with wear resisting cast steel pads where the track link driving spuds make contact with the sprocket plates. The front rollers were steel rimmed with spokes from a central cast hub. A circumferential steel angle section was fitted to obtain steering adhesion. The rollers were mounted on a swinging axle. The steering was manual through a wormbox, operating winding drums with wire ropes to the axle. The driver's platform was spacious, located at a high level over the main gearbox. For ditching operations, a protective cab was fitted over this platform to protect the driver from ditching spray and the elements. On some tractors on ditching operation, a simple hydraulic steering system was fitted. Plate 4-17 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 17 H.D. Tractor II. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/h-d-tractor-ii-2/

LHT Tractor II

This tractor was designed to operate miller and ridger attachments in accordance with the Peco system of winning milled peat. This machine consisted of a simple main frame with caterpillar-type tracks and front steering rollers. It was powered by a diesel engine fitted with an automotive type clutch. The transmission was a special speed change gearbox with P.T.O. shaft, and a worm-driven bevel gear differential unit housed in a conventional back axle. The half shafts from the differential unit are coupled to the track drive sprockets direct.

The main frame accommodated either of two engines, the size depending on the attachment to be used with the tractor. Steering was manual by hand wheel through a worm reduction gearbox, draglink and track rod. The front axle swung in the vertical plane to avoid undue distortion of the tractor frame. The front rollers were fitted with a circumferential ring of steel angle section to obtain steering adhesion. Plate 4-18 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 18 LHT Tractor II. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/lht-tractor/

LHT Tractor III

This tractor, fitted with attachment, is used for ridging the milled peat into the centre of the field. The tractor is the half-track type with front steering rollers. The main frame is fabricated from standard steel angle and channel sections. The tracks are single chain cast link type with timber swamp shoes bolted on and runs on cast sprockets and intermediate supporting rollers. The front steering rollers are spoked with fabricated steel rims and cast-iron hub and are mounted on stub axles on a pivoted axle beam which swings in the vertical plane. Steering is effected manually through worm reduction gearbox, drag link and track rod. The tractor is powered by a water-cooled diesel engine fitted with automotive type clutch. The transmission consists of a speed step-up primary gearbox of special design; a standard agricultural tractor change speed gearbox and differential assembly with a chain reduction final drive between the standard transmission unit half shaft and the track sprockets. Since this tractor is used only for ridging operations during daylight hours no electric generator is fitted and the engine is hand started. A hydraulic pump assembly is incorporated in the standard agricultural transmission unit and this is used to actuate the attachment hydraulic system.

Ridger Tractor (LHT IV)

A tractor specially designed to perform the milled peat ridging operation at more than twice the speed of the L.H.T. II & III by covering the full width of the field in one pass. The chassis is fabricated from standard rolled steel sections mounted on half-tracks which incorporate our manganese track links and sprockets with intermediate support rollers. Timber swamp shoes are bolted to the track links. The power unit is a diesel engine with automotive type clutch, and it drives through a heavy duty automotive type gear box and cardan shaft – the differential unit of a standard heavy duty truck back axle with epicyclic gear reduction between half shaft and wheel hubs. The track sprockets are bolted directly to the axle hubs. The tractor is carried on front rollers of generous proportions carried on stub

axles and steering is powered by hydraulics. The engine is fitted with two hydraulic pumps, one for power steering and the other for the attachment hydraulic system. The attachment consists of double blades similar to the single ridger attachment, one blade on either side of the tractor converging at the rear. The blades are supported by sturdy spars which radiate from the tractor chassis. Adjustment of the sole-plate of the blade relative to these spars is provided. The attachment is lifted and lowered hydraulically through a multi-guy rope system over the top of a central mast on the tractor. Plate 4-19 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 19 Ridger Tractor. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/ridger-tractor/

Massey Ferguson 35

The Massey Ferguson (MF) 35 would have been used from the 1961s and 1970s. It has a rated engine power of approx. 37 horsepower (hp). The MF 35 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It is commonly equipped with a 6-speed or 12-speed gearbox, depending on the model and design. It has a hydraulic system with a variable capacity. The tractor's weight is approx. 1,500kg.

Ford TW15

The Ford TW15 was used from the 1980s. It has a rated engine power of approx. 140hp, with a PTO output of approx. 120hp. The TW15 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is approx. 5,000kg

Landini 5830

The Landini 5830 was used from the 1980s. It has a rated engine power of approx. 50hp, with a PTO output of approx. 42hp. The 5830 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is approx. 2,500kg.

Ford F4630

The Ford F4630 was used from the 1990s. It has a rated engine power of approx. 60hp, with a PTO output of approx. 56hp. The F4630 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 2,350kg and 2,750kg, depending on the drivetrain.

New Holland TL70/TL70a

The New Holland TL70 was used from the late 1990s. It has a rated engine power of approx. 65hp, with a PTO output of approx. 56hp. The TL70 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 2,700kg and 3,200kg, depending on the drivetrain and cab specifications.

The New Holland TL70a was a variation of the TL70 which was used from the early 2000s. It had a higher rated engine power than the TL70, of approx. 70hp. Powered by a diesel engine, it weighed between 3,550kg and 3,850kg, depending on the drivetrain.

New Holland TM150

The New Holland TM150 was used from the late 1990s/early 2000s. It has a rated engine power of approx. 150hp, with a PTO output of approx. 120hp. The TM150 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 4,750kg and 5,250kg, depending on the drivetrain.

New Holland TM165

The New Holland TM165 was used from the late 1990s/early 2000s. It has a rated engine power of approx. 165hp, with a PTO output of approx. 135hp. The TM165 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 5,000kg and 5,500kg, depending on the drivetrain.

New Holland TM140

The New Holland TM140 was used from the early 2000s. It has a rated engine power of approx. 140hp, with a PTO output of approx. 115hp. The TM140 was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is between 5,150kg and 5,410kg, depending on the drivetrain.

John Deere 5070M

The John Deere 5070M was used from approx. 2010. It has a rated engine power of approx. 140hp, with an independent PTO. The 5070M was available in both 2WD and 4WD configurations. The tractor is powered by a diesel engine. It has a hydraulic system with a variable capacity. The tractor's weight is approx. 3,700kg

4.2.2.3.2 Sod Peat Machinery

Windrow Machine

The purpose of the machine is to pick up the partly dried sods from the spread ground and form them into windrows to accelerate drying. The machine consists of a tractor unit propelling large diameter spiked drums in front of it and carrying chain/bar conveyors extending from the pick-up drums to the rear of the tractor unit. The tractor unit is supported on caterpillar type, power driven tracks and steered by coil clutch and brake arrangement. The power unit is an air cooled diesel engine. The pick-up drums (8off) are independently supported and free to follow the bog surface. As they pass over the spread, the spikes penetrate the sods and lift them to the level of the conveyors, where fingers force them off the spikes and are carried away by the conveyors. The sods are discharged at the rear of the machine in windrow form, ½ metres apart.

Sod Turning Machine

This machine does the same work as the Single Turning Machine but has greater output. The elevator mechanism is exactly the same as the single machine and the components are interchangeable. These elevator units are located in front of the tractor tracks and they discharge either into a cross conveyor, rubber belt type, or two return conveyors, rubber belt type, positioned over the tracks. The cross conveyor is reversible and moveable to either side of the machine. The tractor unit consists of a strong main frame mounted on caterpillar type tracks suitable for high idle travel speeds. It is powered by a standard diesel engine and transmission gearbox which is fitted with a proprietary clutch and brake steering equipment. A standard hydraulic pump is also built into this transmission and is used to operate the hydraulic lift of the elevators for idle travel. A special chain reduction drive is inserted between the half shaft of the standard tractor transmission and the track drive sprocket. The drive to the elevators and conveyors are taken off from the standard power take-off shaft of the transmission unit. Plate 4-20 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 20 Sod turning machine. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/sod-turning-machine/

Sod Peat Bagger/Excavator

The purpose of the machine, and the various versions of it, is to excavate, macerate and spread turf for the production of sod peat. This is necessary as the high spread ground area diminishes to the point where it will not take a full spread. The machine consists of a sturdy main frame, supported on power driven caterpillar tracks, which carries the various units and their transmission drives, and to which is attached a spreader arm. The turf is excavated by a multi-bucket type digger boom which is retractable to facilitate operation at varying depths and is pivoted on the main machine so that it can be stowed for idle travel. The boom cuts a face bank at 600 to the horizontal. The turf is discharged from boom buckets into a scraper conveyor, and in turn, into a screw conveyor and twin-screw macerator. The macerator extrudes the turf onto the spreader plate chain which carries the extrusion for a distance of 54 metres, when it is discharged to the bog surface. Cutting discs trailing behind the spreader arm, marks the extrusion into sods as the machine advances. The machine is powered by electricity, and friction clutches are fitted to all motor drives for starting up. All unit drives are protected by shear pins. The machine is fitted with lights for night work and equipped with a short-wave radio transmitting /receiving set. Plate 4-21 and Plate 4-22 show this type of machinery operating on a Bord na Móna bog.

Plate 4- 21 Sod Peat Bagger/Excavator. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/sod-peat-baggerexcavator/

Plate 4- 22 Sod Peat Bagger/Excavator. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/sod-peat-baggerexcavator/

Cutaway Boom Attachment

The attachment comprised a short boom complete with a catchment conveyor overhung from the main machine by wishbone frames.

The boom had a lightweight framework fabricated in square hollow steel sections, within which the motor, gearbox, and chain drive, common to the original boom, were housed. The boom supporting wishbones were fabricated in square hollow steel sections of generous proportions, the pivots of which were arranged to maintain the same angle of the boom relative to the bank for various depths of cut. The upper wishbone frame was supported on a hydraulic ram from the side of the main machine, which was operated by a valve from the driver's cab, providing convenient control of cutting depths and lift for idle travel. The pivots of the lower wishbone frame were carried on arms from the main machine and were hydraulically adjustable to alter the slope of the bank cut.

The catchment conveyor, supported from the boom frame, was a rubber/canvas conveyor belt running on conventional driver, end roller, and troughing idlers. The section of the belt receiving the turf from the buckets was supported on a series of slides of self-lubricating nylon to prevent deflection of the belt and ensure more efficient sealing. The conveyor had an independent motor/gearbox drive. The catchment conveyor discharged into the original scraper conveyor of the main machine.

The attachment could be readily fitted to or removed from the machine by five pins. Plate 4-23 is an image of this type of machinery operation on a Bord na Móna bog.

Plate 4- 23 Cutaway Boom Attachment. Source: https://www.bordnamonalivinghistory.ie/equipment-detail/cutaway-boom-attachment/

Sod Peat Loading Machine

The purpose of this machine was to load sod peat from bog ricks into railway wagons on one side of the rick only. The machine consisted of a lightly constructed mainframe mounted on caterpillar-type power driven tracks and carried a short scraper elevator in front, extending over the width of the tracks, and a low-level cross conveyor which elevated as it projected from the side of the machine. These loading machines were either diesel- or electric-powered and would be fitted with either a diesel engine or electric motor as required. Plate 4-24 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 24 Sod Peat Loading Machine. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/loading-machine/

Fóidín Machine

The fóidín machine originated from an experiment, the 'short cycle harvesting project' conducted at Oweninny bog Co. Mayo in 1965. The aim of the experiment was to produce fast drying peat sods from the surface of milled peat fields that were easy to crush in power stations, this led to the development of the fóidín machine in 1966. It came in two sections: the towing unit, which cut the peat, and the towed unit, which would macerate, extrude and spread the sods. Each of these sections was powered by its own diesel engine. It was steered by coil clutch and all other controls were operable from a cab which overlooked the working parts of the machine. The collection and stockpiling of the sods could be carried out with a combination of existing sod and milled peat machinery, modified in some cases. Fóidín production was suspended in most areas in 1972 and was abruptly terminated in 1973 due to several reasons, mainly that the yield from the fóidín system was small and insignificant compared to that of milled peat, complications arose burning crushed sods at ESB stations due to the higher calorific content of fóidín peat, and the cost of production was high relative to other peat extraction methods. Out of the 25 fóidín machines owned by Bord na Móna, one was sold to the Finnish State Fuel Supply Department, four were retained, and 20 sold as scrap. Plate 4-25 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 25 Fóidín Machine. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/loading-machine/

Chain Saw Excavator

A machine of compact, sturdy construction with a high output for its size was used in Bord na Móna primarily for drainage with turf production as a secondary feature. The tractor unit was powered by a diesel engine, had proprietary transmission gearboxes, and final chain drive to caterpillar-type tracks.

The excavator, macerator, and spreading equipment were carried on the rear of the tractor unit, while a guide roller was carried on the front. All this equipment was lifted and lowered by hydraulics. The turf was excavated by a high-speed chain sword carrying cast steel teeth and discharged by centrifugal force at the upper sprocket into a screw/conveyor/macerator unit. This unit extruded the turf through a fan-tail spout, with an adjustable outlet, onto the spread ground. A series of cutting discs and a marking frame divided the layer of turf into the required sod size.

After the first cut was made, using the clutch and brake steering on the tractor unit, the front guide roller could be lowered into the excavation made to steer the machine for subsequent cuts.

A pair of loaded rollers were trailed behind the cutting sword to close the top of the excavation just made, preparing the spread ground for the next run of the machine. In this way, all available bog could be covered with spread turf, leaving only nominal spaces between the extrusions. Plate 4-26 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 26 Chain Saw Extractor. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/chain-saw-excavator/

4.2.2.3.3 Milled Peat Machinery

Miller Attachment

Miller attachments were used to break the surface of the bog into fine, milled crumbs which were left on the surface of the bog to be dried by the wind and sun. Milling attachments initially comprised single or triple units. Both single and triple units worked in the same way, with the difference between the two being the number of milling drums, and thus the output (which was approximately 2.25 times higher with the triple unit). Miller attachments were mounted on the rear of tractors and drew power from the tractor's PTO. The single and triple miller units attachments were later replaced by an offset miller attachment known as a 'Type – I'.

Single Miller Attachment

Single miller attachments consisted of a simple but strong tubular steel frame, the main members of which extended to, and were pivoted, at the mid-position of the tractor tracks. Rigidly mounted on the underside of the frame was a pin-type milling drum which was driven from the tractor PTO shaft through a bevel gearbox and chain drive. The single miller attachment was supported by a ground roller, through springs, located immediately in front of the milling drum and by a depth control castor a few feet behind the milling drum. For idle travel, the single miller attachment was lifted by hydraulic ram so that the pin milling drum is clear of the bog surface. This attachment, by virtue of the sprung main supporting roller, caused the milling drum to cut deeper on the hills and shallower in the hollows, thus having a levelling effect on the bog surface. The drive to the milling drum is protected by a tension bolt safety device. Plate 4-27 is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 27 Single miller attachment. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/miller-attachment/

Triple Miller Attachment

As mentioned above, the triple miller attachment operated in much the same manner as the single miller attachment, but with a higher output.

The triple miller attachment consisted of units similar to the single attachment, ganged together. The front centre unit was attached to the tractor drawbar, while the two side rear units were drawn by brackets from the side of the front centre unit frame. These brackets were pivoted, and the level of the front of the side unit frame was controlled by roller castors running on the bog surface. The drives to the three milling drums were by universal jointed propeller shafts with splined slip sleeves, two bevel gearboxes and final chain drives. The milling drum speed was lower than the single unit, but in all other respects the behaviour of the individual units is the same as the single miller attachment. For idle travel the units were lifted on hydraulic rams incorporated in the rear castor roller assemblies. Depth of cut was also adjusted by these rams from the driving seat. The drive to each of the three units was protected by a tension bolt safety device. Plate 4-28 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 28 Triple miller attachment. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/miller-attachment/

Offset Miller Attachment (Type-I)

This attachment was used to form a bevel on the edges of milled peat fields, to assist surface drainage. The attachment was a miller drum, projecting from the rear of the tractor unit on a casing arm which is pivoted at a central position on the rear of the tractor main frame and extended to carry a ballast weight. The drive was taken from the tractor PTO shaft, through a bevel gearbox which formed the pivot assembly of the arm and a universally jointed propeller shaft extended to the actual milling drum. The milling drum was set backwards as it extended from the tractor so that the spoil was thrown back towards the centre of the milled peat field, where it could be harvested. A supporting trolley fixed to a projecting bracket at the centre of the tractor track and supported on a roller behind the drum, carried the drum arm on an adjustable suspension. The trolley, complete with extension arm and drum could be lifted by a winch rope passing over a mast frame mounted on the tractor. For bogs in early development a bladed drum was used, while a pin drum was used on production bogs. Plate 4-29 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 29 Offset (Type-I) Miller attachment. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/miller-attachment/

Harrow

The attachment was made up of four spoon frames, each supported on two twin rollers, and towed by a common frame, which was also supported on rollers and hitched to the tractor. The spoon frames were made of steel tubes and were triangular in shape, with two spars projecting at 45 degrees from the base of the triangle at the rear, each to carry a bank of spoons. The spoon was a curved plate, the base of which was a straight line, set at an angle to the line of travel, and while the front was curved back from its base, the rear was curved forward. The actual spoon was welded to an arm made of spring steel, which was pin jointed to the 45-degree spar to allow movement in the vertical plane. These spoons were pitched to ensure that all the peat was turned.

The four spoon frames were each free to follow the bog surface on their supporting wheels but were connected to each other by a pin-jointed link to facilitate turning. The supporting wheels of the towing frame were located in line with the towing points of the rear frames and were free to move laterally to facilitate turning.

Plate 4-30 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 30 Harrow. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/harrow/

Harvester

The purpose of this machine is to harvest milled peat from the bog fields in exactly the same way as the Type II harvester attachment on the HD Tractor. The tractor was a full track unit comprising a lightly constructed mainframe mounted on caterpillar-type tracks; on one side of the tracks returned at a high level to accept the harvesting attachment. The track chain was the cast link type running on cast sprockets and intermediate rollers. It was powered by a diesel engine, and the transmission consisted of a primary gearbox of special design, with a PTO shaft, and increased the transmission RPM through a standard automobile change-speed gearbox and a standard agricultural tractor transmission unit. The final drive reduction between the rear transmission half shaft and track sprocket was by a special spur gear reduction box.

The tractor was steered by a clutch and brake system of proprietary manufacture, which was built into the rear transmission unit. A driver's cab of generous proportions was fitted, with sliding doors and safety glass panels all around. Some of these cabs were of fiberglass construction, and others were of steel. The attachment consisted of a single or double spiral unit and a single belt conveyor, articulated at two points.

The spiral unit was a steel sheet casing suitably stiffened with standard steel sections, capable of housing one or two spirals. The front and rear of the casing were open. The peat ridge was allowed to enter on the front side as the machine advanced, while the rear opening was blanked off by a trailing board, which was raised and lowered in guides as required, and when in the lowered position, was free to move in these guides as the surface of the bog demanded. The spiral or spirals were supported in this rigid casing by a bearing at each end of the shaft. The revolving spiral or spirals conveyed the peat along the bog surface and trailing board and up a sloping plate of the casing, discharging it onto the belt conveyor.

The spiral unit was supported on two inner and two outer rollers, each pair arranged so that each roller was free to follow the surface of the bog while carrying its share of the load. The drive to the spiral or spirals was by a double universally jointed propeller shaft, and the casing was pin-jointed to a structural frame, which in turn was pin-jointed to the tractor unit, allowing complete flexibility of the spiral unit to follow the contour of the bog.

The belt conveyor was partly constructed on the structural framework connecting the spiral unit and tractor unit, including the conveyor drive pulley, and partly on the tractor unit, and the remainder

formed the jib, projecting from the machine. While flat carrying idlers were used for the receiving end of the belt, flexible shaft type troughing idlers were used over the articulated portion, and conventional type troughing idlers on the jib. At the discharge end of the jib, a moveable deflector was fitted to control the trajectory of the peat.

The attachment was carried on the tractor unit, and a mast on the tractor unit was braced back to the spiral casing by a wire rope, while a multiple rope system actuated by a hydraulic ram on the mast was passed over the top of the mast and connected to the projecting conveyor jib. The top of the mast was also controlled relative to the tractor unit by a wire rope and hydraulic ram.

The driver of the machine could raise or lower the jib and the trailing boards and raise the spiral casing completely off the bog surface by hydraulics and control the jib deflector by a simple rope winch. Plate 4-31 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 31 Harvester. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/harvester/

Milled Peat Loading Machine

The purpose of this machine was to load milled peat from peat stockpiles into railway wagons. The machine consisted of a tractor unit carrying a ground spiral on the front, extending either side of the bottom shaft was a bucket elevator which sloped back over the tractor unit. As the buckets overtopped the top sprockets of the elevator, they discharged onto a rubber belt conveyor which discharged into the railway wagons. Plate 4-32 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 32 Milled Peat Loading Machine. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/loading-machine/

Polywrapper

As described in Section 4.2.2.2.2 above, a polywrapper was used in the uncovering of milled peat stockpiles. The polywrapper was mounted on the three-point linkage of a tractor (see Plates 4-33 and 4-34 below). The eye of the polywrapper was attached to a pendulous swivel arm, which, as the tractor moved forward, oscillated from left to right to ensure that the polythene being collected was being dispensed evenly across a metal shaft, which was internally fitted with a plastic pipe ,on the polywrapper. This ensured an even spool of polythene was collected. Once the spool was at capacity, one side of the polywrapper was opened (see Plate 4-34 below), which allowed the metal shaft to be removed leaving just the plastic pipe in the roll of polythene.. The entire spool was then removed and sent for appropriate disposal/recycling. The metal shaft was reinserted into the polywrapper, fitted with a new plastic pipe internally, the side closed, and the process began again until the stockpile was fully uncovered and all the polythene collected.

Plate 4- 33 Polywrapper

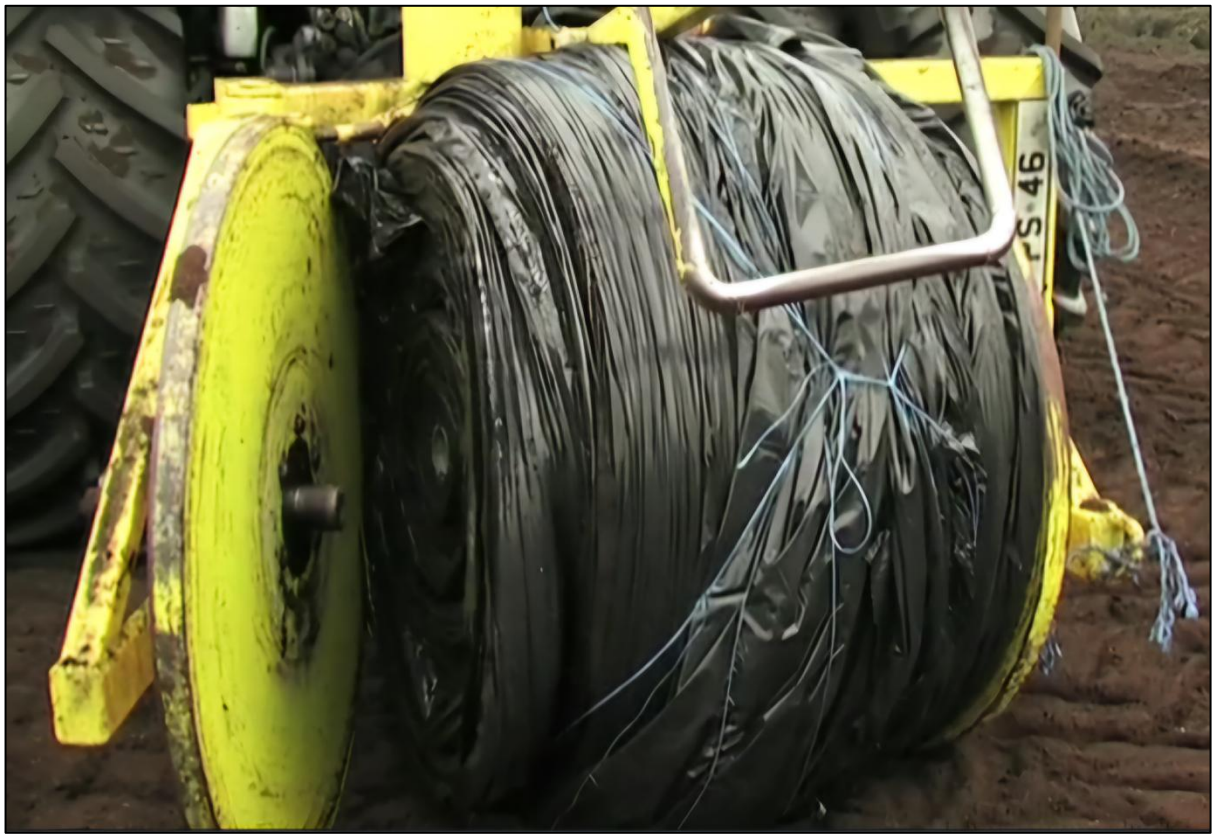


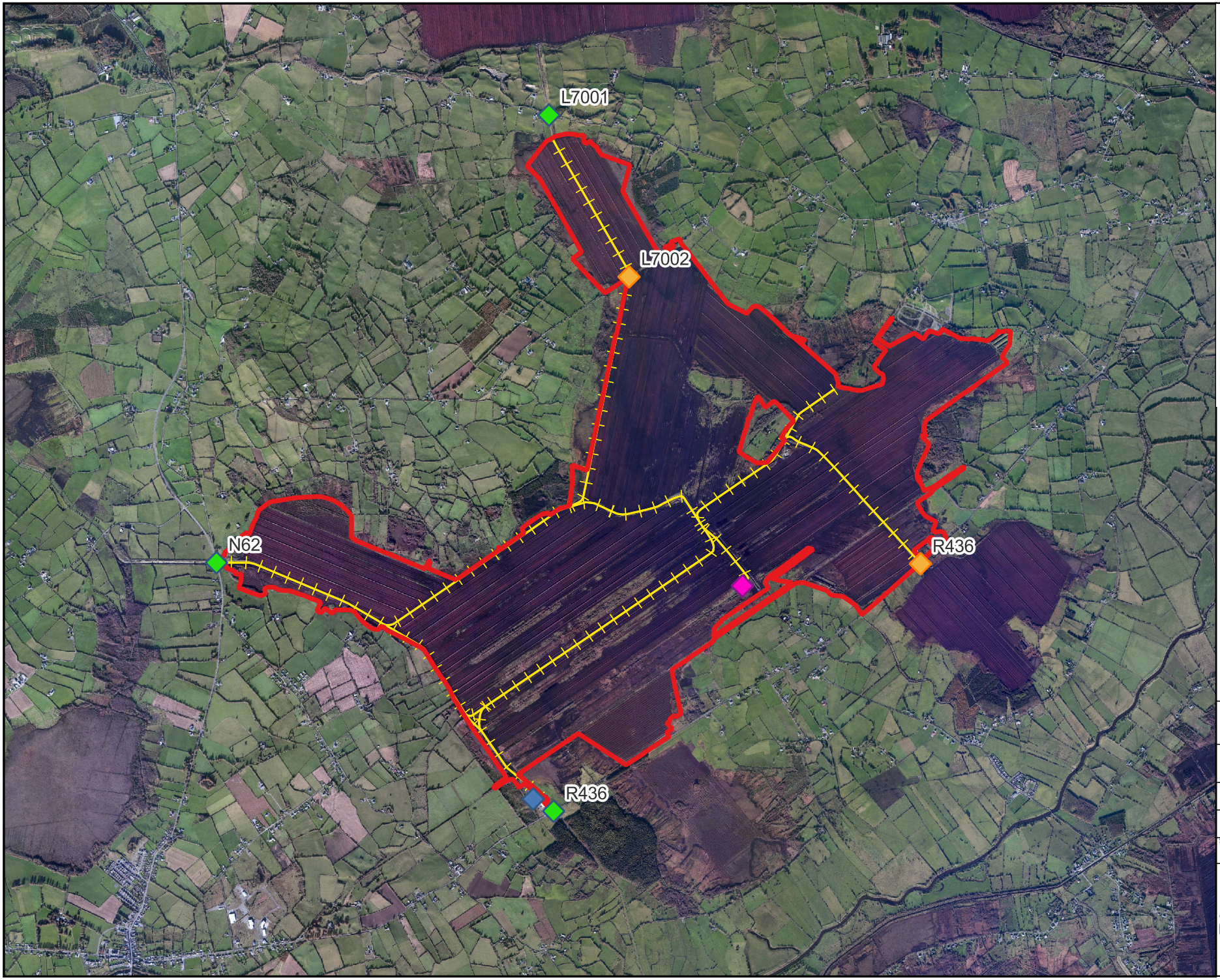
Plate 4- 34 Polywrapper with the frame opened to allow access to the collected bale of polythene

4.2.3 Ancillary Services and Infrastructure

There are a number of ancillary structures and infrastructure associated with peat extraction and ancillary activities. These include:

- Workshops;
- Works offices;
- Welfare Facilities;
- Mobile fuel tanks;
- Fixed fuel tanks and;
- Railway infrastructure

With the exception of railway infrastructure, and a welfare facility, the remaining ancillary infrastructure, having been subject to its own planning consent as applicable, is located outside of the Application Site boundary and as such substitute consent is not being sought in respect of this ancillary infrastructure. Nonetheless, in order to provide as detailed a description as possible of the Project, all of the ancillary infrastructure is described below This infrastructure can be seen below in Figure 4-1.



Map Legend

- Application Site Boun
- Bord na Móna Rail Line
- Lemanaghan Works, inclusive of:
  - Workshop
  - Works Offices
  - Welfare Facilities
  - Fixed Fuel Tank
- Additional Welfare Facility including Septic Tank

Rail crossings

- Level crossing
- Rail underpass

N

Drawing Title
Existing Infrastructure at the Application Site

Project Title
Extraction in Lemanaghan Bog, Co. Offaly

Drawn By	Checked By
SD	EC
Project No.	Drawing No.
200804	Figure 4-1
Scale	Date
1:40,000	2025-09-04

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4.2.3.1 Workshop

The Lemanaghan Works (also referred to as 'the Works'), located to the south, adjacent to the Application Site, provided a central location for support and management services to the Application Site and includes workshops, offices and welfare facilities such as toilets, a canteen, and staff parking. A section of the Works was sold to Offaly County Council for the development of enterprise in the area in 2004. A smaller section of the Works area was also leased to a third party. This section of the Works was subsequently sold to a third party in 2015. While the entirety of the Works area would have provided a centralised location which supported activities at the Application Site, neither the area sold to Offaly County Council nor the area sold to a third party have supported any activities at the Application Site since the dates of their respective sale, and lease and sale. An area of the Works remains in the ownership of Bord na Móna and remains a central location for activities at the Application Site.

During the Peat Extraction Phase, the majority of bog workers would arrive to the centralised Works area prior to mobilising machinery stored on the Works site and moving out into the peat extraction fields. Machinery was parked at the Works and refuelling of machinery was carried out from dedicated refuelling areas at fixed fuel tanks located at the Works. Concrete bunds and oil interceptors were provided to prevent release of fuels to the ground or surface water bodies. These standard practices were in place prior to the implementation of the IPC Licence in 2000. The workshops were mainly used to carry out repairs and maintenance on machinery which was brought in from the peat extraction areas.

4.2.3.2 Works Offices

The offices at the Lemanaghan Works provided an administration centre for the Application Site. Permanent administration staff were employed throughout the Peat Extraction Phase from the time of construction of these buildings.

4.2.3.3 Welfare Facilities

Welfare facilities were provided for staff at the Application Site. These took the form of small buildings and temporary structures to provide workers on peat extraction fields a clean area to take lunch/tea breaks and provide welfare facilities. While facilities were available at the Lemanaghan Works offices, a smaller welfare facility is located in the centre of the Application Site which consists of a canteen, toilets and a septic tank is further detailed in Section 4.5.5.3.

4.2.3.4 Fuel Storage

As mentioned in Section 4.3.5.2, fuel was stored within above ground tanks alongside the main workshop at the Lemanaghan Works. The fixed fuel tanks were bunded to contain any potential fuel spills or leaks. The practice of bunding at the Works and for mobile refuelling units was introduced in the 1970s. Refuelling procedures were subsequently upgraded to standard bunding specifications to comply with IPC Licence requirements in 2000 (refer to Appendix 4-1 for details). Refuelling of vehicles and machinery was primarily carried out at Lemanaghan Works, but in some circumstances where machinery could not be tracked back to the Works buildings, refuelling was also carried out on the bogs at designated areas, away from drains or rivers, as required. Service trains/railcars with a bunded fuel dispensing unit, travelled from the Works to the designated bog area to refuel the machine in question. This occurred at a frequency of up to three times a week during peak times of the Peat Extraction Phase. This frequency was significantly reduced outside peak peat extraction.

The filling of tanks from the fuel supplier took place at the main fixed tanks at the Lemanaghan Works. The service trains were filled from the main tanks at the Lemanaghan Works and travelled by rail to refill the plant machinery on the bog.

4.2.3.5 Railway Infrastructure

Peat extraction areas were served by a network of permanent and temporary narrow-gauge rail tracks (approximately 1m in width and with track lengths of approximately 9m), the majority of which was constructed in the 1950s and 1960s. During the early years of peat extraction activities, the lifting and laying of rail was done by hand before equipment was designed for that purpose.

Annual reports from 1954 indicate that development works were underway at Lemanaghan, including installation of railway for peat extraction, which began in 1960. Aerial photographs from 1973 indicate that railway infrastructure was in place by this time.

The track sleepers were approx. 1.8m in length and 0.76m apart. The total length of permanent track at the Application Site is 16.7km. The remaining track is termed temporary track, i.e., it was lifted and laid as required for transport of extracted peat from stockpiles. Figure 4-1 above shows the greatest extent of permanent rail line within the Application Site.

There are 3 no. rail underpasses located adjacent to the Application Site boundary.

There is 1. no rail underpass located adjacent to the western boundary of the Application Site (Offaly Co. Co. Ref. 93182). The underpass is located at an existing site entrance along the N62 and facilitates the connection between the Application Site and the Ballaghurt and Glebe Bogs, which form part of the Blackwater Bog Group (IPC Licence Ref P0502-01). The structure itself is a single underpass constructed using precast concrete arch sections. The plaque on the underpass is dated 1993.

There is 1 no. rail underpass located adjacent to the northern boundary of the Application Site (Offaly Co. Co. Ref. 021305). This underpass is located along the L7001 and facilitates connection between Bellair Bog, which forms part of Boora Bog Group (IPC Licence Ref P0500-01) and is located north of the Application Site, and the Application Site itself. The structure is a single line precast concrete underpass. The underpass appears to have been constructed in 2003 based on the plaque.

There is 1 no. rail underpass located adjacent to the Works and the southern boundary of the Application Site (Offaly Co Co Ref. 8557). This underpass is located along the R436 and facilitated the connection between Curraghalassa Bog, which forms part of Boora Bog Group (IPC Licence Ref P500-01) and is located south of the Application Site, and the Application Site itself. The structure is an in situ concrete underpass. No plaque is displayed on the underpass.

The Bord na Móna railway infrastructure was designed to be moveable, supporting infrastructure that was laid to facilitate the transportation of peat off the bog. Once peat stocks were exhausted from one area, the temporary tracks were taken up and re-laid in new areas of bog which were subject to peat extraction. Thus, over the decades the railway line layout changed shape regularly. Furthermore, as areas were no longer subject to peat extraction, and in line with the decommissioning measures outlined in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, some railway lines were lifted and removed from the Application Site.

A map of the permanent railway network at its greatest extent within the Application Site is presented in Figure 4-1 above.

4.2.3.6 Level Crossings

The Applicant received permission for 3 no. level crossings in 1991 by Offaly County Council in townlands of Rosfaraghan, Lemanaghan, and Tumbeagh..

Two of these level crossings were constructed to enable access to bogs lying across the R436 Ballycumber Road in the to the south of the Application Site and the L7002 local road passing through

the north of the Application Site. The third level crossing was permitted but was ultimately not constructed.

While standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all Bord na Móna crossing gates, these were decommissioned when peat extraction ceased in June 2020. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trains before reaching the level crossing

4.2.3.7 Railway Equipment

Extracted peat was transported from stockpiles on the Application Site via a series of permanent and temporary railway tracks to either directly to end destinations (in the case of milled peat, which over the lifetime of the Project went to Ferbane and Shannonbridge (now West Offaly Power since 2005) power stations, the Bord na Móna Blackwater Works, or Derrinlough Briquette Factory), or to Lemanaghan Works (in the case of sod peat, the extraction of which at the Application Site ceased by 1984). The equipment which facilitated the installation and maintenance of the railway tracks, as well as the equipment used to transport peat on the railway lines, are described below.

Rail Shifter

A rail shifter was an attachment fitted on to tractors which was used to lift temporary railway tracks in sections and build them onto bolster bogies for transport to a new area. The rail lifter consisted of a lightly constructed main frame supported on two bogies and an overhead lattice work beam supported from the main frame to allow the passage of the rail sections through the machine. When seven sections were built on the bolster bogies, they were hauled away by a locomotive. Plate 4-35 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 35 Rail Shifter. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/rail-shifter/

Rail Moving Attachment

The purpose of the rail moving attachment was to lift and lay temporary railway track along sod peat ricks and milled peat piles. The attachment was fitted to a tractor and consisted of an A-frame jib pivoted on a bracket secured to the track frame of the tractor and braced back at the top by wire rope to a projected ballast box on the other side of the tractor. A short jib was used for sod peat operations while a longer and a longer jib was used for milled peat operations. Plate 4-36 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 36 Rail Moving Attachment to lift and lay temporary railway track, along Sod Peat ricks and milled peat piles. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/rail-moving-attachment/

Locomotive 80HP (Wagonmaster)

The locomotive hauled peat from the stockpiles across the Application Site either directly to end destinations (in the case of milled peat, which over the lifetime of the Project went to Ferbane and Shannonbridge (now West Offaly Power since 2005) power stations, the Bord na Móna Blackwater Works, or Derrinlough Briquette Factory, or to Lemanaghan Works adjacent to the Application Site (in the case of sod peat, the extraction of which at the Application Site ceased by 1984). The locomotive was powered by a water-cooled diesel engine driving through a fluid coupling, automotive type clutch, standard automobile change speed gearbox, a special reversing bevel/spur reduction gearbox and drive and coupling rods to the wheels. The main frame was fabricated steel plate. The axles ran in self-aligning double row roller bearings in cast steel housings sliding in horn guides with manganese steel wearing faces. A cab of generous size was included, with a tumbling-type seat to facilitate driving in both directions. The clutch control pedal was duplicated for the two driving positions. The braking system was mechanical hand operated. The locomotive was fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel. Plate 4-37 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 37 Locomotive with wagons. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/diesel-locomotive/

Wagons

Wagons had a capacity of 16 cubic metres and were designed with two diamond bogies for sod and milled peat haulage. One bogie of each wagon was free to float 152mm in any direction to prevent derailment on uneven temporary track. The diamond bogie with its centre springs gave great flexibility and prevented axle failures. The wagon bearings were taper roller bearings which were grease-packed and fitted in the wheel hubs.

The use of aluminium to fabricate the sides and floor of milled peat wagons reduced the unladen weight of the wagon when compared to heavier materials such as wood and steel and therefore facilitated a greater payload (i.e. a greater amount of peat) to be transported per train. Furthermore, the use of aluminium resulted in considerable reduction in the maintenance and painting costs.

Rail Car

Rail cars were used by the Manager or authorised members of his staff, to make inspection tours of the bog. Rail cars were equipped with first-aid equipment and also worked as a bog ambulance if needed. Rail cars were fitted with a water-cooled petrol engine, the power from which was transferred through an automotive clutch to a gearbox and then transferred to each axle via a chain drive. Beam lights and electric windscreen wipers were fitted at each end of the rail car and a short-wave radio transmitting and receiving set enabled the occupants to keep contact with the Works and the larger machines that were fitted with radio units on the bog. Plate 4-38 below is an image of this type of machinery operating on a Bord na Móna bog.

Plate 4- 38 Rail Car. Source: https://www.bordnaMónalivinghistory.ie/equipment-detail/rail-car/

4.2.4 Site Services

Water consumption across the Application Site is primarily at the Lemanaghan Works for domestic use. The water supply at Lemanaghan Works is from the local mains water supply.

Wastewater from the welfare facility is discharged to an on-site septic tank with the effluent discharged to a percolation system through peat before penetrating to ground. The septic tank is inspected bi-annually and de-sludged as required by a licenced waste permit holder to ensure the treatment system is working optimally.

Electricity supply to Lemanaghan Works buildings and workshops, and also to the drainage pump stations, are powered by mains electricity from the national grid connected to overhead electrical power lines.

Compressed air (oxygen and acetylene) was used mainly at the Lemanaghan Works for welding and cutting purposes to maintain plant and equipment.

4.3 1950 to June 1988 – Initial Development & Peat Extraction (Pre EIA-Directive)

4.3.1 Site Description 1950 (Pre-Extraction)

Prior to the commencement of drainage works, which first occurred at the Application Site in 1950, the Application Site was covered by an active raised bog, with the surface being wet, acidic and deficient in plant nutrients, with open Sphagnum-dominated vegetation. Raised bogs are accumulations of deep acid peat where peat can range from 3-12m deep. The “raised bog” name is derived from the elevated dome which develops as the bog grows due to the accumulation of peat. Pre-development topographies would have been higher (in the ranges of 54m to 79mOD) than those observed today, with the remnant areas of high bog located around the perimeter of the Application Site resembling pre-development ground elevations more closely.

Water in a raised bog is continuously circulating, and pre-development, the Application Site would have been nutrient-poor and waterlogged on the surface. The principal supply of water to the Application Site would have been from rainfall. Water would have been lost from the Application Site from surface water runoff particularly during the winter months when the storage capacity of the bog would have been fulfilled due to higher levels of seasonal precipitation. Water may also have been lost through the lower levels of the peat deposits, especially where the bog is underlain by gravels or sands without underlying low permeability lacustrine deposits (i.e., clay layer). The pre-development water table at the Application Site was likely very stable with only minor fluctuations and remaining within a few centimetres of the bog's surface.

The primary land-use change associated with peat extraction and ancillary activities occurs during the initial drainage of the bog in advance of peat extraction. Constructed drainage ditches drain the upper surface of the bog by lowering the local peat water table. After the Application Site was drained, vegetation was removed from the bog surface, leaving only bare peat fields between the drains. Around this time and in the years that followed, ancillary infrastructure were also constructed including railway lines, workshops and welfare facilities. Historical mapping (Cassini fourth edition data (1935-1938)) of the Application Site indicate entrances prior to the commencement of peat extraction were broadly located in the same locations as present day along the local road network.

4.3.2 Drainage and Peat Extraction

The timing of the installation of drainage and initiation of peat extraction varied across the Application Site. As outlined above, clearance and drainage commenced at the Application Site in 1950, and the Application Site would have experienced a relatively abrupt change in land cover with the commencement of peat extraction in 1960. The earliest aerial mapping available (1973) confirms that by this period, drains were already inserted at the Application Site, shown on Figure 4-2 below. The Application Site was mapped as a raised bog in the Peatland Map of Ireland produced by the National Soil Survey in 1978[5]. Figure 4-2 below presents an overview of the peat extraction and ancillary activity on the Application Site in 1973, which has been deduced from the earliest available aerial mapping for the Application Site (1973 aerials included as Appendix 4-4).

As discussed above, drainage ditches to drain the upper surface of the bogs by lowering the local water table were inserted across the Application Site at different stages throughout the decades (please see Table 4-2 below and Section 4.2.2 for details on drainage construction methods practiced at the Application Site). As drainage was installed, vegetation clearance was undertaken once ground conditions were suitably dry to facilitate the movement of machinery to complete such works. The earliest aerial imagery of the Application Site available was captured in 1973. It is estimated that at that point, approximately 409.5ha across the Application Site was cleared, drained and subject to peat extraction, and a total of 5.6ha were drained, but not cleared of vegetation or subject to peat extraction. In 1988 this increased to 968.7ha across the Application Site being cleared, drained, and subject to peat extraction, and a total of 78.6ha were drained but not subject to peat extraction.

The topography of the Application Site prior to the commencement of peat extraction and ancillary activities is estimated to have been 54m – 79mOD. This is deduced from the presence of benchmarks noted on historical 25" OSI mapping (1897-1913 and) Cassini 6" (1940s) of the area. It is assumed that prior to the installation of drainage to facilitate peat extraction, the Application Site was virgin bog and was therefore an active raised bog.

As previously stated, the primary and greatest land-use change associated with the peat extraction and ancillary activities on the Application Site occurred during the initial drainage and clearance of the bogs in advance of the commencement of peat extraction. This impact would have occurred in advance of 1988 at the Application Site, as drainage and clearance works were complete by 1988. A photographic

[5] https://www.teagasc.ie/media/website/environment/soil/Peatlands-of-Ireland-Map.pdf

accompaniment illustrating the types of activities described below can be found in Appendix 4-10 *Bord na Móna: Peat Development in Ireland 1954.*

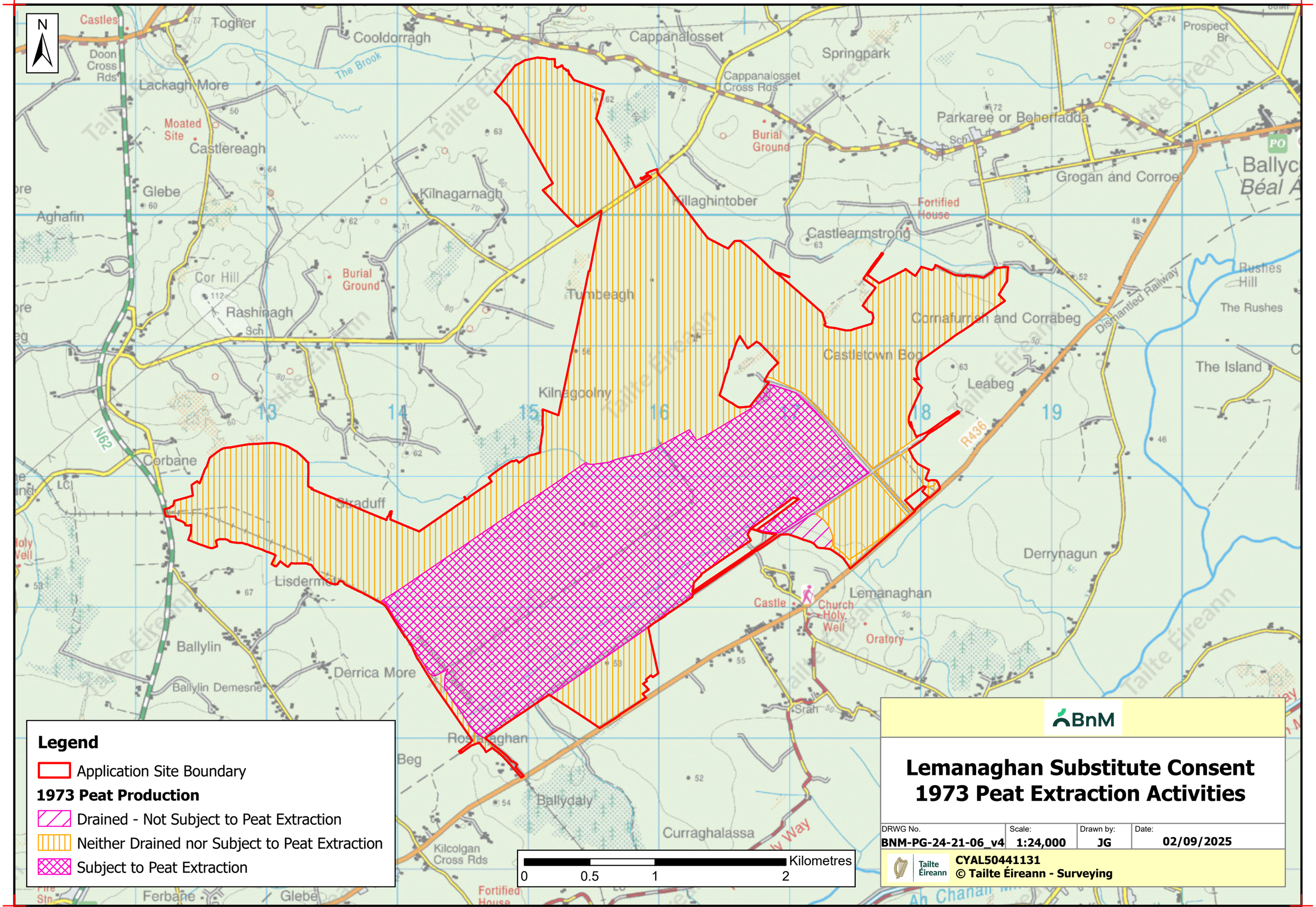
Table 4-2 Peat extraction timelines taken from Annual Reports (1951 – 1970, 1984 to 1987) and sources listed in Section 4.1.2

Bog	Commencement of Site Preparation Works (vegetation clearance and drainage insertion)	Extraction Began	Extraction Ceased
Lemanaghan	1950	1960	June 2020

The following table describes the general activities within the Application Site over a calendar year during each of the four quarters from 1960 when peat extraction commenced to July 1988. Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season (i.e. undertaken between October and March, weather-dependent). Levels of fuel handling and refuelling would have increased significantly during the peat extraction season (i.e. between March and October, weather-dependent) due to the increased activity of the peat extraction machinery.

Table 4-3 Annual Peat Production Activities 1960 – June 1988

Calendar Quarter	Activities
January to March	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation
April to June	Peat extraction, Stockpile development/removal, peat transportation
July to September	Peat extraction, Stockpile development/protection/removal, peat transportation
October to December	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation



Legend

- Application Site Boundary

1973 Peat Production

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

BnM

Lemanaghan Substitute Consent
1973 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-06_v4	1:24,000	JG	02/09/2025

Tailte Éireann

CYAL50441131

4.3.3 Peat Extraction Volumes 1960 – June 1988

Peat extraction commenced at the Application Site in 1960. An estimate of the volumes produced during that period was determined based on the estimated area in production and an average of production tonnages over the 1961 to June 1988 period. Peat extraction volumes are not available for 1960; on the basis that peat extraction only commenced at the Application Site in 1960, it is assumed that the volumes generated were not significant and not comparable to the volumes generated in subsequent years. The volumes of peat removed from the Application Site varied from year to year with a general and gradual increase with time as more of the Application Site was developed and became available for peat extraction. Fluctuations in peat extraction volumes are generally attributable to weather conditions in any given year, with wetter weather resulting in lower volumes of peat extraction due to poorer ground conditions for operating machinery, and poorer peat drying conditions; conversely, dryer weather usually resulted in higher volumes of peat extraction due to better ground and drying conditions.

Bord na Móna records indicate that approx. 904,128 tonnes (sod and milled combined) were extracted from the Application Site for the period 1961 to June 1988 inclusive. Extraction of sod peat commenced in Lemanaghan in 1960 and continued until 1984. Records indicate that sod peat was used for sale to the public for domestic heating purposes, for heating in Bord na Móna buildings, and for sale to larger users for heating purposes.

Bord na Móna records indicate that approx. 402,324 tonnes of sod peat was extracted from the Application Site for the period 1960 to 1984 inclusive. This is based on available records from 1971 to 1984 inclusive and an average production of 17,967 tonnes of sod peat annually for the remaining years during this period. An average of the 1971 to 1984 extraction volumes (excluding 1973 due to low production that year) was used to estimate the extraction volumes for 1961 to 1970. In 1984 sod peat extraction was ceased and the transition to milled peat extraction commenced.

Figure 4-3 and Table 4-4 below outline the peat extraction volumes over the 1961 to July 1988 period.

It is assumed that milled peat extraction commenced in 1984. In 1986 milled peat from the Application Site was first delivered to Ferbane Power Station via rail. Extraction volumes for milled peat are not available during the period from 1984 to 1988 inclusive. However, estimations of extraction volumes are made for these years based on data from the following years which are available. An average of the 1992 to 1995 extraction volumes was used to estimate the extraction volumes for 1984 to 1988 (i.e. pre-Peat Extraction Phase), which are presented in Table 4-4 below. A volume of 43,124 tonnes was estimated to have been extracted for the period of January to June inclusive 1988. This has been extrapolated by halving (i.e due to the 6-month period) the total tonnes of peat extracted for 1988. The latter half of the year 1988 (i.e July to December) is identified in Table 4-6 below.

Figure 4-3 and Table 4-4 below outlines the peat extraction tonnages over the 1961 to June 1988 period.

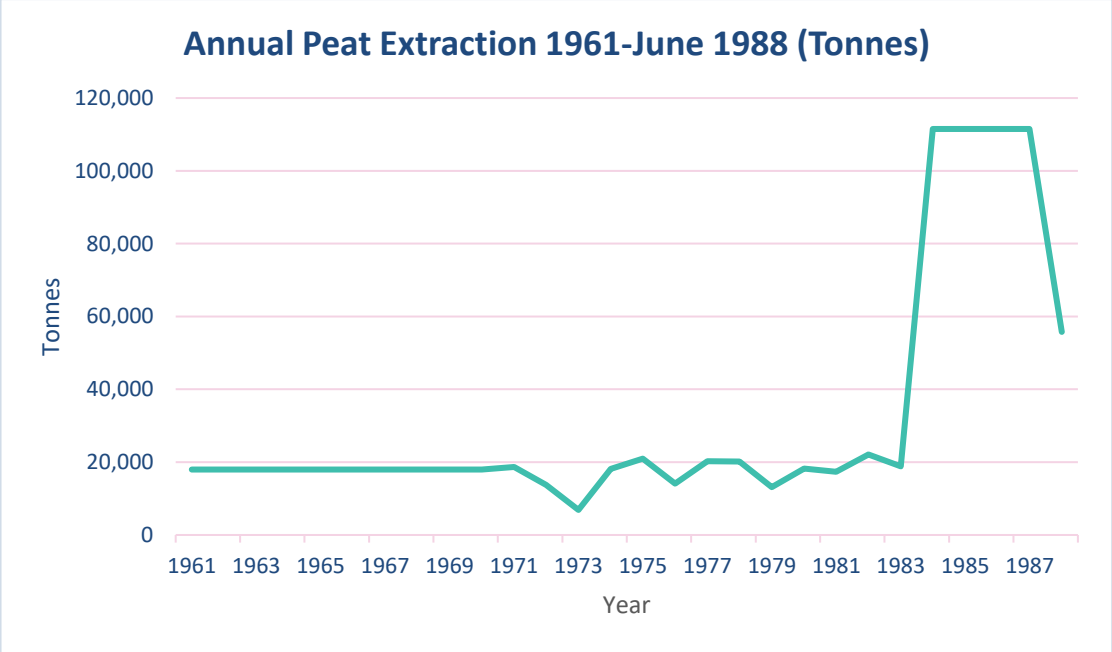


Figure 4-3 Annual Peat Extraction (Tonnes) 1961 to June 1988

Table 4-4 Peat Extraction (Tonnes) 1961 to 1988

Year	Tonnes	Year	Tonnes
1961	17,967*	1975	20,969
1962	17,967*	1976	14,128
1963	17,967*	1977	20,280
1964	17,967*	1978	20,191
1965	17,967*	1979	13,165
1966	17,967*	1980	18,207
1967	17,967*	1981	17,347
1968	17,967*	1982	22,101
1969	17,967*	1983	18,843
1970	17,967*	1984	111,512**
1971	18,665	1985	111,512**
1972	13,737	1986	111,512**
1973	6,885	1987	111,512**
1974	18,140	January – June 1988	55,756**

Year	Tonnes	Year	Tonnes
		Total Volume Extracted (Tonnes)	904,128

17,697 Denotes that data are not available for this year and the average annual peat extraction figure is assumed in its place.*

*111,512** Denotes that data is not available for this year and average annual peat extraction volume is assumed in its place. 55,756** is for the period January – June 1988.*

Records indicate that the Application Site supplied milled peat exclusively to ESB's Ferbane Power Station in the period pre-1988.

4.3.4 Drainage Design

As part of the development of Lemanaghan for peat extraction, parallel surface water drains as per the methodology outlined in Section 4.2.2.2 were created by machine excavators at intervals of 15m and the strip of bog between these drains were retained to form the peat production 'fields'. During this period, the Application Site was drained via gravity.

Drainage works first commenced at the Application Site in 1950. The earliest available aerial imagery dating from 1973 shows the Application Site to be subject to sod peat extraction with areas of bog neither subject to drainage nor peat extraction in the north, northeast and south of the site. Aerial imagery shows that by 1988 the full extent of the Application Site was drained, cleared and subject to milled peat extraction. Figure 4-5 through to Figure 4-11 below detail the peat extraction areas of the Application Site in key years between 1973 and 2020.

4.3.5 Control Measures pre-July 1988

With the exception of silt control (which from 1974 was subject to a formal management program as discussed in Section 4.3.5.9 below), formal documentation outlining dedicated measures referred to as control measures practised on site from 1950 - July 1988 are not available. However, based on personal communication with a retired Bord na Móna manager, the following measures below were enacted at the Application Site, as part of daily, monthly, and annual bog management and operations, and were outlined in the 1999 IPC Licence application.

4.3.5.1 Peat Extraction Machinery – Maintenance Programmes and Storage

- All peat extraction machinery listed above in Section 4.2.2 were stored at the Lemanaghan Works at the end of the workday;
- All machinery was regularly inspected serviced and maintained;
- All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release; and,
- Self-contained machine parts washer was located at the Works.

4.3.5.2 Refuelling Facilities

As discussed above, refuelling and maintenance of all vehicles was undertaken at the Lemanaghan Works adjacent to the Application Site. When machinery required refuelling on site, it was done so by a bunded mobile (rail or tractor transport) fuelling unit which travelled out from the Lemanaghan Works across the Application Site where the machinery was located. The following emergency action procedure was implemented at the Application Site prior to IPC licencing (pre-2000) and was recorded as part of the IPC Licence application process:

1. When a spill occurred, the General Manager was immediately informed of the incident;
2. The spill was required to be assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences;
3. If there was a risk of explosion, all personnel in the area were required to be evacuated from the area;
4. The spill was sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%);
5. All efforts were made to prevent the spill from entering a storm drain or nearest outfall;
6. Once the spill had been contained, a suitable absorbent (dry peat) was to be used to soak the spillage;
7. All possible ignition sources such as electoral equipment, naked lights, machinery were removed from the area. Any combustibles in the spill area were removed;
8. Follow up action measures taken included the implementation of appropriate remedial work to prevent such a spillage recurring in the future; and,
9. In the event of a significant spillage, the General Manager was required to notify the local authority.

4.3.5.3 Fire Safety

1. Annual training provided for bog fires crew and factory personnel and all general staff was provided with a minimum of 2 hours training in fire prevention;
2. All fire exits were designated. These doors were required to be fitted with push-bar mechanisms only and lighted from independent sources. They were required to be unobstructed inside and outside at all times and open outwards;
3. Each canteen/office was equipped with a fire blanket and fire extinguisher;
4. There were required to be at least 1 fire point at all office premises;
5. Petrol and other oils were required to be stored in designated oil stores;
6. Batteries were not charged in working areas unless suitable protection was provided;
7. Training was provided for Oxygen cylinder storage and use;
8. Fire Wagons: Designated rail wagons were provided for fire prevention which contained: hoses, shovels, fire beaters, baskets, buckets, breathing apparatus, first aid kit, drums of foam and foam making machine, extinguishers etc.;
9. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat. This prevented spontaneous combustion of certain peat types by excluding air as much as possible; and,
10. Fire Safety Audits were undertaken at six monthly intervals along with random audits. Yearly assessments of all audits

4.3.5.4 Dust Management at Bog Boundaries and Headlands

Dust emissions were higher from the milled peat extraction process than the sod peat extraction process. Tree cover along the fringes of bogs minimised the amount of dust that would travel off-site. In 1976 Bord na Móna established a policy to preserve the vegetation and tree cover on all bog fringes

and on any mineral islands[6]. . In addition, the following measures were undertaken at a minimum to minimise dust emissions and later expanded under IPC licence.

1. Stockpiles were compacted on either side by large rollers drawn by tractors;
2. Stockpiles were covered with polythene film gauge sheets and secured in position by spreading an even layer of high moisture content milled peat;
3. Peat extraction during windy weather was to be avoided;
4. The headlands were to be kept clean and loose peat removed;
5. Drivers were required to drive slow along dusty headlands; and,
6. All road crossing points were to be maintained clean.

4.3.5.5 Internal Rail Network Maintenance

Railway tracks and railway locomotives underwent continuous inspection and maintenance to prevent de-railments, fires, accidents and fuel leaks. The locomotives were fitted with beam lighting, electric windscreen wipers and driving mirrors for both directions of travel.

4.3.5.6 Surface Water Management

1. Onsite water emissions from the workshop and hard standing areas drained via onsite surface water drainage systems implemented as part of building and hardstand construction over the decades, into adjacent peatlands surface water drainage network.
2. All machinery was regularly inspected and serviced. All machinery was regularly cleaned via power steam wash system at a wash bay and drained into an interceptor tank and associated gravel soak pit. The interceptor unit facilitated the removal of any floatable oil/grease components. This was done to minimise dust and particle release.

Formal silt control measures adopted in 1974 are outlined in Section 4.3.5.9 below.

4.3.5.7 Maintenance Programme for Internal Drains

1. Internal drains cleaned on a regular basis in suitable weather, mainly prior to and post the peat extraction season (i.e. between October and March). This was necessary to remove sludge from the bottom of milled peat field ditches and dispose of it by spreading it on the adjacent field.
2. Drain maintenance was carried out using ditchers.
3. These works were programmed to ensure that the drainage servicing the peat extraction areas were fit for purpose.
4. Drain maintenance was carried out mainly prior to and post the peat extraction season (i.e. between October and March).

4.3.5.8 Silt Management

As part of the Third Development Programme in the 1970s (which is discussed in further detail in Section 2.1.3.2 in Chapter 2 Background), Bord na Móna decided in 1974 to control all effluent by means of specially designed and constructed silt ponds, thereby trapping more than 90% of the suspended solids present in the drainage water. A silt committee was set up in October 1975 to study the feasibility of removing silt from the bog effluents. Recommendations of an interim report prepared by the committee in 1975/1976 were as follows:

1. *Provision of silt ponds should be a basic feature of new bog development for milled peat and their construction should be planned for all outlet systems;*

[6] *Brown Gold 'A History of Bord na Móna and the Irish Peat Industry', 2010 Clarke, Donal, Chapter 10 Pg 206*

2. *Ideally, silt ponds should be located in cutaway bog;*
3. *Sufficient area should be acquired at the initial stage to provide for silt ponds;*
4. *In production bogs, existing large catchments should be broken up into manageable proportions and ponds constructed to accord with local topography;*
5. *Revision of drainage techniques should be considered such as arranging flatter gradients in external and internal outfalls and extending their width and length in the lower reaches to encourage settlement of silt;*
6. *Initial drainage effluent should be allowed to spill over face banks (where practicable) until adequate silt ponds have been provided. This should be applied to all new bog development immediately. Similarly, growth and vegetation should not be removed from external outfalls until interference with drainage and/or complaints force us [Bord na Móna] to act;*
7. *It is recommended that catchments to be protected by silt ponds should not be greater than 500 acres;*
8. *Ponds should be designed for maximum run-off of 1 cubic foot per minute per acre and run-off controlled by provision of small diameter culverts, weirs or sluices;*
9. *For milled peat, 50 square foot of pond per acre of catchment. For 500 acres, 45-foot wide by 555-foot long by 7-foot deep, i.e., 6-foot maximum of silt and 1 foot minimum of water;*
10. *Ponds should be provided in pairs each sufficient for the catchment protected;*
11. *Ponds should be cleaned out at regular intervals as required but at least four times a year using dragline or Hymac retained permanently for this purpose. Investigations to be made into the suitability of pumping units;*
12. *Second parallel pond should be used during excessively large water flow (storm water); and,*
13. *The problem of discharging into the Clodiagh River at Monettia [County Offaly] has become difficult in view of ESBs requirement that the entire river be kept free of silt. Silt ponds will be essential and provision should be made in their layout to allow for further extension of the ponds if decantation needs to be improved further.*

A copy of the meeting minutes from the Bord na Móna Production Manager in March 1976 setting out the recommendations of the silt committee is included in Appendix 4-8, which directs that *"at all milled peat bogs in production, works should carry out surveys and select sites for silt ponds as recommended"*. Accordingly, the selection of locations for the establishment of silt ponds at the Application Site commenced around this time. Further Bord na Móna records show that silt pond measures were introduced across all Bord na Móna bogs in the early to mid-1980s in response to the 1977 Water Pollution Act.

Silt ponds were installed to trap and reduce the emission of suspended solids to surface water bodies originating from activities associated with peat extraction, such as suspended peat particles generated from the extraction fields and collected in the bog drainage network as well as run-off from workshop areas.

Silt ponds were designed and constructed, primarily, with a width of 8m, however, in some cases, silt ponds of up to 12m in width were constructed. The larger silt ponds up to 12m wide are only provided in areas where access is available to both sides of the silt ponds for cleaning. The length of the silt pond varies depending on the capacity required (i.e., the length is proportional to the area of catchment being drained). In some locations, baffles (i.e., obstructing panels or vanes) have been installed within the ponds to reduce the energy in the flow and elongate the pond thereby increasing residence time and aiding settlement. Silt ponds are generally excavated to a depth of 1.5m below the pipe invert level, however in some locations, due to restricted space, the silt pond depth is greater than this. Low-velocity flow through the silt pond is generally controlled by inlet and outlet pipes at the silt ponds or upstream of the silt pond. These pipes control the velocity of the flow into and out of the silt ponds so that the velocity within the silt pond itself is less than 0.1 m/sec. This slow flow through the pond allows suspended sediment (mainly peat) particles to fall out of suspension and build up on the base of the pond, thereby reducing the sediment loading of the outflow from the pond. The principle behind the

design of the silt ponds is an application of Stoke's Law. Stokes' Law describes how small solid particles move through a viscous fluid, stating that the drag force on these particles is directly proportional to their size, velocity, and the fluid's viscosity. The silt ponds are cleaned twice a year and are all located hydraulically upgradient of discharge/outfall points to the adjacent surface watercourse. Access to the silt ponds is via headlands and machine passes which were created to facilitate vehicle movements within the Application Site. Figure 4-4 below presents the typical silt pond design of those that were implemented on the Application Site.

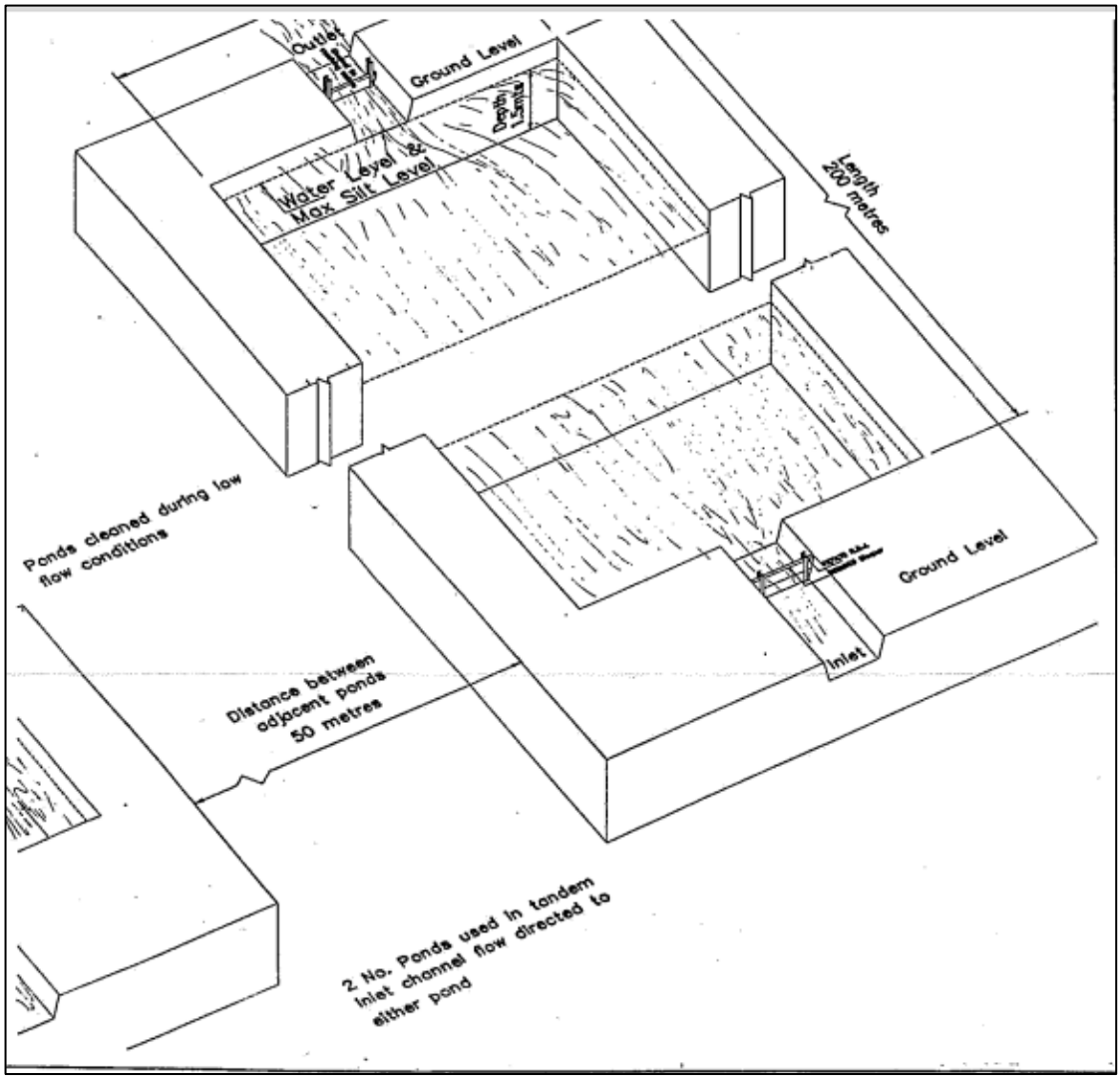


Figure 4-4 Typical Silt Pond Design Implemented at the Application Site. Source IPC Licence Application to EPA 1999

Other records of Silt Committee meetings in April 1984 (which are included in Appendix 4-8) set out acceptable standards of effluent and note a decision from ABP (now An Coimisiún Pleanála) on a licence for effluent from the Littleton Briquette Factory in County Tipperary, which set an upper limit of 100mg/l for suspended solids. The records note that *"although the legalities regarding obligation to treat bog effluent and briquette factory effluent may be dissimilar the waste involved is similar. It would, therefore, seem reasonable to assume that a target value of 100mg/l in the case of bog effluent would satisfy potential complainants whose complaints are based on genuine dissatisfaction with the present standard of our* [Bord na Móna] *effluents"*.

These records are evidence of early control measures implemented across the Bord na Móna landbank, including the Application Site, to control sediment levels in effluent.

4.3.5.9 Waste Management

1. Waste oils and break fluids drained from machinery during servicing were collected in drums and emptied to a designated waste oil storage tank;
2. Waste oil storage tank contents were transported off-site by a licenced waste disposal contractor;
3. Oil and fuel filters were changed at vehicle service intervals;
4. Spent filters were collected and disposed thorough a waste disposal contractor;
5. Used batteries were collected by a licensed battery collection contractor;
6. Off-washings form the self-contained machine parts washer were collected within a sludge tank at the Works;
7. Ash from the onsite boiler was stored in a skip onsite and collected by a licenced contractor and taken to landfill;
8. Waste polythene removed from stockpiles was collected at the roadside by plastic recycling company; and,
9. Workshop waste and general refuse from canteens/offices were historically burned on site or disposed into waste disposal areas at the Works. This practise changed to the use of skips which were then collected by licenced contractors.

4.3.5.10 Archaeological Disturbance

All Bord na Móna employees which worked on the bogs were required to read and adhere to the recommendations set out in the Department of Education publication entitled, 'Ancient Objects in Irish Bogs and Farmlands: A Guide for Finders' (1942).

All workers were required to stop all works and report to the Bog Manager if archaeological finds were encountered. If materials thought to be of archaeological interest were encountered, the Bog Manager was required to report the findings to the Garda Síochána within 7 days who were then required to contact the Commissioner of Public Works. A record of archaeological finds and observations within the Application Site can be found in Section 13.3 of Chapter 13: Archaeology Cultural Heritage of this rEIAR.

4.4 July 1988 - rEIAR Baseline

As described in Chapter 1 and in Section 4.1, the application for substitute consent, and therefore this rEIAR covers the period from July 1988,[7] the timeframe for when the EIA Directive was required to be transposed into Irish Law, to present day.

As such the activities carried out as of July 1988 form the initial baseline date for the description of the existing Application Site and combined with the activities from July 1988 onwards, form the Project. The remedial impact assessments are presented in the subsequent specialist chapters.

Table 4-6 details the operations and activities carried out on the Application Site in each quarter of the 1988 calendar year. Figure 4-5 below illustrates the areas drained, undrained and undergoing peat extraction in 1988.

As detailed in Section 4.3.3 above, the peat extraction volumes for the period July – December 1988 has been extrapolated by halving (due to the 6-month period between July and December) the total tonnes of peat extracted for year 1988. The first half of the year 1988 (i.e January to June) is identified in Table 4-4 above. The total tonnage of peat extracted from January to December 1988 is estimated to

[7] *Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment*

be 111,512 tonnes. Therefore, the total tonnage of peat estimated to be extracted at the Application Site from July to December 1988 is 55,756 tonnes.

The estimated topography of the Application Site in July 1988 is based on an average depth of milled peat extraction of 0.135m per year over a 32-year period, which has been worked back from the 2020 topography. As most of the Application Site was subject to milled peat extraction, this approach is considered to be the most robust in determining the peat height in 1988.

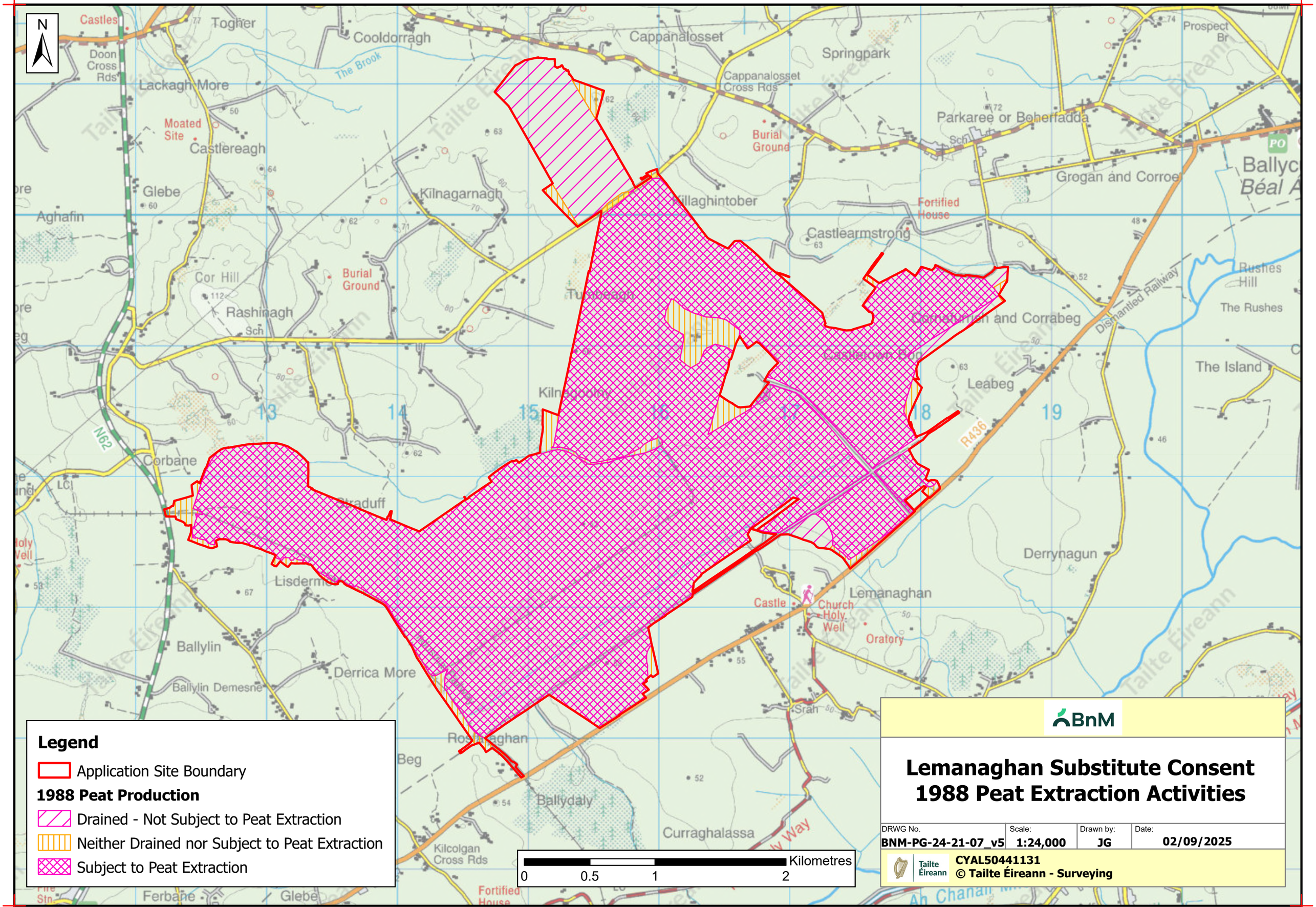
4.4.1 Site and Activity Description –1988 rEIAR Baseline

By 1988, land use at the Application Site was well established as industrial peat extraction. The Application Site was drained, milled peat extraction was underway, and railway infrastructure was in place. The main access point to the Application Site was off the Regional Road R436 to the south of the Application Site, into the Works area. The Lemanaghan Works, which comprised a canteen, storage sheds, and maintenance buildings, was located to the south, adjacent to the Application Site, where it is still located in present day. The following ancillary infrastructure was established at the site by July 1988:

- Railway infrastructure;
- Internal machine passes/tracks;
- Silt ponds and drains.

4.4.1.1 Lemanaghan Bog 1988

Aerial imagery indicates that by July 1988, approximately 968.7ha of the Application Site was subject to milled peat extraction. Thus, the main landcover type at this time was cutover peat. Drainage was already installed, predominantly in a northeast-southwest orientation. Railway infrastructure was laid in the bog (since the 1950s). The Works area housed a canteen and welfare facilities, waste storage areas, carparking facilities, [peat] Harvester Repair Bay (Planning Ref. 81/375), and a refuelling area. The Application Site included 9 no. artificial silt ponds, 9 no. surface water discharge points and 8 gravity flow surface water outflows which remain *insitu* today. These surface water outfall locations discharge directly into the Lemanaghan Stream and Brosna waterbody (Please see Appendix 8-1 Flood Risk Assessment for more detail). The topography of the Application Site is estimated to have been approximately 54-66mOD by 1988. Peat production areas for the Application Site are shown below in Figure 4-5.



Legend

- Application Site Boundary

1988 Peat Production

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

BnM

Lemanaghan Substitute Consent
1988 Peat Extraction Activities

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BNM-PG-24-21-07_v5	1:24,000	JG	02/09/2025

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4.4.2 1988 Peat Extraction Activities

Table 4-5 below describes the general activities within the Application Site over a calendar year during each of the four quarters in 1988. Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season (i.e. from October to March). Fuel handling and refuelling would have increased significantly during the peat extraction season due the activity of the peat extraction machinery. More detailed information regarding end users, quantities of supply, frequency of travel and travel routes in 1988 is not available.

Table 4-5 1988 Peat Extraction Activities

Calendar Quarter	Activities
January to March	Drain/Machinery/Pump/Silt Pond maintenance, stockpile removal, peat transportation
April to June	Peat extraction, stockpile creation/removal, peat transportation
July to September	Peat extraction, stockpile creation/protection/removal, peat transportation
October to December	Drain/Machinery/Pump/Silt Pond maintenance, stockpile removal, peat transportation

4.5 1988 to June 2020 (Drainage, Peat Extraction and Ancillary Activities)

As demonstrated above, by July 1988 peat extraction was well established at the Application Site. Drainage was installed and railway infrastructure was laid as required. Drainage construction methodologies are described above in Section 4.2.2.

All peat extraction had ceased at the Application Site by the end of June 2020, with all stockpiles removed from the Application Site by 2024. Decommissioning works relating to the railway network within the Application Site are estimated to be completed by 2025.

As peat extraction has now ceased, the land use on the Application Site is primarily comprised of bare cutaway peat with developing pioneer vegetation. Archaeological features that have been uncovered on the Application Site include timber trackways and artefacts such as shoes. The eastern section of the Application Site found further archaeological features, notably a trackway consisting of re-deposited boulder clay, large flagstones, split timbers, round woods, and brushwood deposited over five phases of construction.

The Application Site includes 9 no. silt ponds, 9 no. surface water discharges and 8 gravity flow surface water outflows which remain *insitu* today. These surface water outfall locations discharge directly into the Lemanaghan Stream and Brosna waterbody (Please see Appendix 8-1 Flood Risk Assessment for more detail). The topography of the Application Site today ranges from approximately 46m-60mOD.

4.5.1 Drainage Systems 1988 – June 2020

After 1988, peat extraction well underway at the Application Site. The deepening and maintenance of the drains continued beyond 1988, up until the cessation of peat extraction in June 2020. As the areas subject to active peat extraction from 1988 to June 2020 reduced in their extent (refer to Figures 4-5 to 4-8) and the depth of peat available was reducing after each harvest, the extent and number of drains requiring deepening and maintenance reduced accordingly.

Machinery used for drainage works would have been largely the same as that described in Section 4.2.2 with ever-improving engine efficiency in tractors and excavators.

Pumps

Two pumps were active at the Application Site during the Peat Extraction Phase. It is estimated the first pump was installed in 2009 with the second pump installed by 2019. These two pumps were installed to supplement the drainage on site where additional dewatering was deemed necessary. Discharges from the pumps would have been to the drainage on site and eventually to the silt ponds for treatment before eventually discharging off site.

Silt Ponds

By viewing aerial imagery it is indicated that a number of existing silt ponds at the Application Site were in place prior to 1988 as described in Section 4.3.5.9.

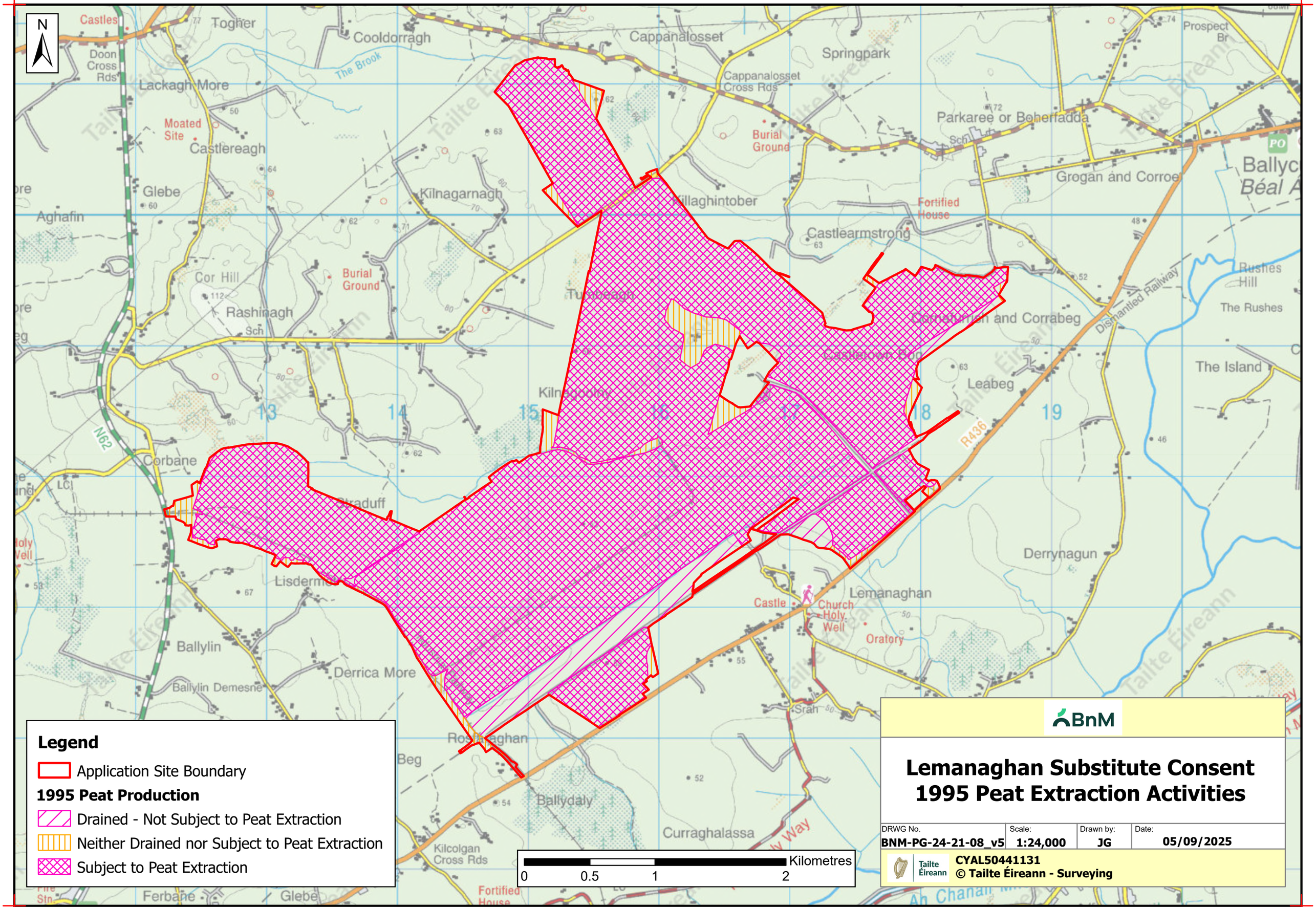
A total of 9 no. silt ponds are currently in place across the Application Site. Upgrades to silt ponds were undertaken at the Application Site following a 1990 survey undertaken by Bord na Móna which involved a daily sampling and analysis programme at different locations in the Bord na Móna landholdings over a full calendar year to determine the quantity of silt within the runoff from bogs (Harkins Report Appendix 4-9). The study determined that an average of 50m^3 of sludge per hectare was typically discharged. Following this, the silt ponds were designed to cater for the settling of sufficient amounts of silt providing the ponds were de-sludged at least twice per annum. A second pond was installed adjacent to the first to facilitate de-sludging (i.e., used as a backup when the first pond reached silt storage capacity and underwent de-sludging).

Condition 6 of the IPC Licence details the requirements for Bord na Móna to implement a programme to ensure all drainage water from all boglands is discharged into an appropriately designed silt pond treatment arrangement, an operational procedure for desilting was prepared and desilting is carried out twice per year. Please see Appendix 4-1 for details. The silt arising from these de-silting operations was either stockpiled a distance from drains and the silt pond or placed back out onto the peat extraction fields. Up until the cessation of peat extraction, this material would then have been incorporated into the subsequent harvests.

4.6 Peat Extraction and Ancillary Activities

Milled peat extraction, under the same processes described in Section 4.2.2.2.2 above, continued at the Application Site from 1988 until June 2020 when peat extraction ceased across the Application Site. Improvements and modernisation of machinery occurred between 1988 and June 2020 which increased the efficiency and speed of operations over this time period. There were significant developments in diesel-powered engines which would have resulted in the use of more fuel-efficient tractors on the bogs with significantly cleaner exhaust emissions compared to the baseline year of 1988 or pre-1988.

A peat extraction map for the year 1988 is shown in Figure 4-5 above; peat extraction maps for the years 1995, 2004, and 2020 are shown below in Figure 4-6 through to Figure 4-8 and illustrate the activity on the Application Site and the increasing area which was no longer subject to peat extraction over time.



Legend

- Application Site Boundary

1995 Peat Production

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

BnM

Lemanaghan Substitute Consent
1995 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-08_v5	1:24,000	JG	05/09/2025

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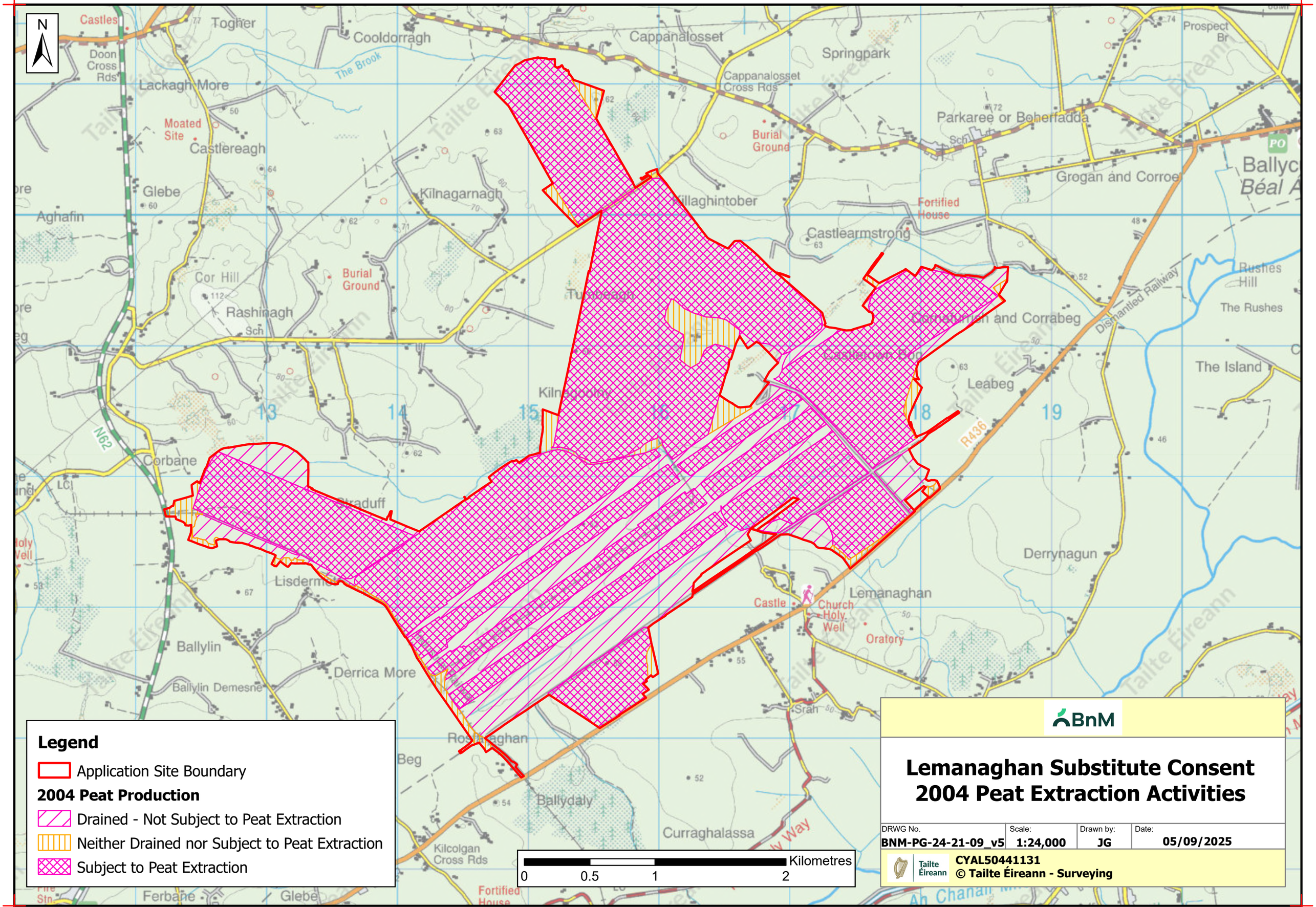

Legend

- Application Site Boundary

2004 Peat Production

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

BnM

Lemanaghan Substitute Consent
2004 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-09_v5	1:24,000	JG	05/09/2025

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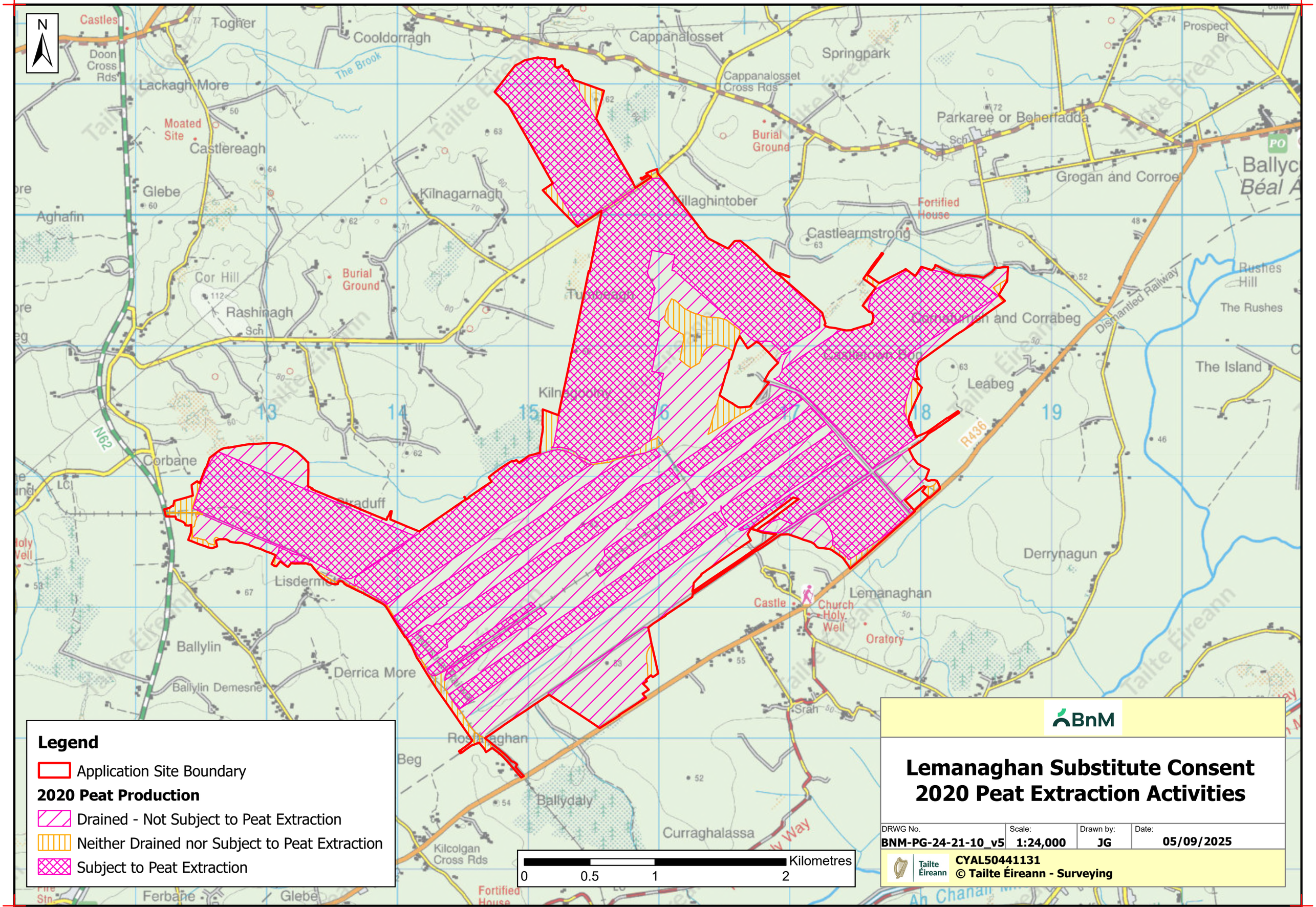

Legend

- Application Site Boundary

2020 Peat Production

- Drained - Not Subject to Peat Extraction
- Neither Drained nor Subject to Peat Extraction
- Subject to Peat Extraction

BnM

Lemanaghan Substitute Consent
2020 Peat Extraction Activities

DRWG No.	Scale:	Drawn by:	Date:
BNM-PG-24-21-10_v5	1:24,000	JG	05/09/2025

Tailte Éireann

CYAL50441131

4.6.1 Annual Peat Extraction Activities 1988- June 2020

The following table describes the primary activities within the Application Site over a calendar year during each of the four quarters.

Table 4-6 Annual Peat Extraction Activities 1988 - 2020

Calendar Quarter	Activities
January to March	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation
April to June	Peat extraction, Stockpile development/removal, peat transportation
July to September	Peat extraction, Stockpile development/protection/removal, peat transportation
October to December	Drain/Machinery/Pump/Silt Pond maintenance, Stockpile removal, peat transportation

Some drain maintenance was carried out during the full year, but it was mainly restricted to outside the peat extraction season (i.e. October to March). Fuel handling and refuelling would have increased significantly during the peat extraction season due the increased activity of the peat extraction machinery. During the period of gradual decline in peat extraction volumes towards the end of the Peat Extraction Phase, a corresponding decline in fuel handling/refuelling, machinery maintenance and stockpile development was observed. Stockpile removal was completed by the end of 2024, with the maintenance of drainage infrastructure ongoing at present. Further detail on this is provided in Section 4.8 below which details the Current Phase of the Project.

4.6.2 Peat Extraction Volumes July 1988-June 2020

The volumes of peat extracted at the Application Site varied from year to year and were mainly weather dependent. Bord na Móna records indicate that from 1992 and until 2018 inclusive, on average 111,512 tonnes of milled peat were extracted from the Application Site per annum. There are no peat extraction records for the period 1988-1991 inclusive. An average of the 1992 to 2018 peat extraction volumes was used for the 1988, 1989, 1990 and 1991 seasons. As detailed in Section 4.3.3 above, the 1988 July – December peat extraction volume has been estimated by halving (i.e due to the 6-month period) the total tonnes of peat extracted for the year 1988. An average of the 2017 to 2018 peat extraction volumes was used to estimate the peat extraction volumes for the 2019 season (i.e., 148,063 tonnes). A volume of 68,205 tonnes was estimated to have been extracted for the period of January to June inclusive 2020. This has been extrapolated by halving (i.e due to the 6-month period) the total tonnes of peat extracted for 2019. The total volume of peat extracted at the Application Site from 1988 to 2020 is estimated to be 3,351,248 tonnes.

The tonnages of peat extracted are outlined in Figure 4-9

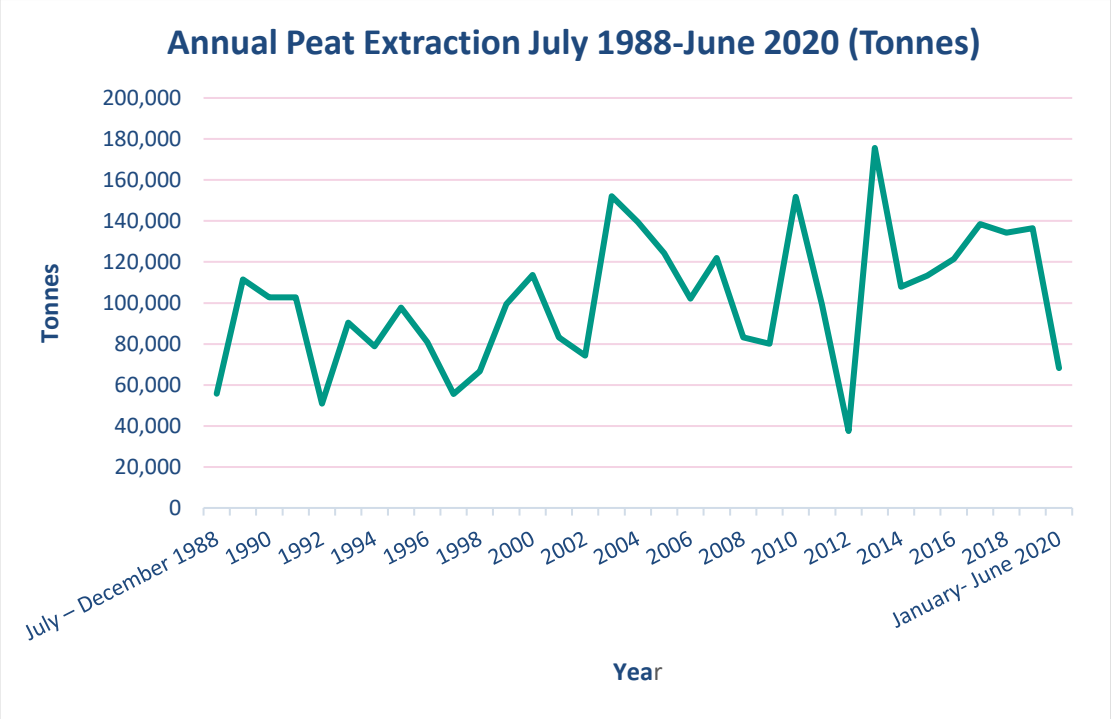

Figure 4-9 Annual Peat Extraction Volumes July 1988-June 2020

Table 4-7 Peat Extraction July 1988–June 2020 (Tonnes)

Year	Tonnes	Year	Tonnes
July – December 1988	55,756[a]	**2005**	124,324
1989	111,512*	**2006**	102,138
1990	102,736*	**2007**	121,895
1991	102,736*	**2008**	83,177
1992	50,844	**2009**	80,054
1993	90,412	**2010**	151,754
1994	78,850	**2011**	99,101
1995	97,736	**2012**	37,516
1996	80,801	**2013**	175,628
1997	55,508	**2014**	107,879
1998	66,628	**2015**	113,289
1999	99,444	**2016**	121,528

Year	Tonnes	Year	Tonnes
2000	113,605	2017	138,551
2001	83,188	2018	134,271
2002	74,265	2019	136,411**
2003	152,077	January – June 2020	68,205**
2004	139,429		
		Total Volume Extracted (Tonnes)	3,351,248

111,512 Denotes that data are not available for this year and the average annual peat extraction volume is assumed in its place. 55,756* is for the period July – December 1988.*

*** Denotes that data is not available for this year and average annual peat extraction volume is assumed in its place. 68,205** is for the period January – June 2020.*

Milled peat from the Application Site continued to be delivered to Ferbane Power Station during the Peat Extraction Phase, up to the closure of Ferbane Power Station in 2000. In 1994 milled peat from the Application Site was delivered for the first time to Shannonbridge Power Station (now West Offaly Power since 2005). Milled peat was also delivered to the Bord na Móna Blackwater Works in Co. Offaly from 1995. Following the cessation of peat extraction in June 2020, stockpiled peat from the Application Site was supplied to the Derrinlough Briquette Factory until its closure in June 2023, West Offaly Power until its closure in 2020, and to horticultural peat processing plants. All deliveries of peat from the Application Site were made by rail until 2023 when milled peat was delivered by HGV via the road network road to a third party. The removal of stockpiled peat was completed in 2024.

4.6.3 Third-Party Peat Extraction Activities

With the establishment of the Turf Development Act of 1981 (which amended and extended the rights of the Turf Development Act 1946-1980), Bord na Móna oversaw a private turf development scheme which provided grants to private bog developers. At the Application Site, minor third-party works occurred. Third party extraction was undertaken on turbary plots within the periphery of the Application Site and as such exact locations and volumes are not available.

4.6.4 Ancillary Services and Infrastructure

4.6.4.1 Railway Infrastructure

As discussed above, peat extraction areas were served by a dynamic network of narrow-gauge rail tracks, laid down at the Application Site. The temporary railway infrastructure was moved around using the methods described in Section 4.2.3.5 as areas of bog came in and out of production.

There are 3 no. rail underpasses located adjacent to the Application Site boundary.

There is 1. no rail underpass located adjacent to the western boundary of the Application Site (Offaly Co. Co. Ref. 93182). The underpass is located at an existing site entrance along the N62 and facilitates

the connection between the Application Site and the Ballaghurt and Glebe Bogs, which form part of the Blackwater Bog Group (IPC Licence Ref P0502-01). The structure itself is a single underpass constructed using precast concrete arch sections. The plaque on the underpass is dated 1993.

There is 1 no. rail underpass is located adjacent to the northern boundary of the Application Site (Offaly Co. Co. Ref. 021305). This underpass is located along the L7001 and facilitates connection between Bellair Bog, which forms part of Boora Bog Group (IPC Licence Ref P500-01) and is located north of the Application Site, and the Application Site itself. The structure is a single line precast concrete underpass. The underpass appears to have been constructed in 2003 based on the plaque.

There is 1 no. rail underpass located adjacent to the Works and the southern boundary of the Application Site (Offaly Co Co Ref. 8557). This underpass is located along the R436 Regional Road and facilitated rail connection between Curraghalassa Bog, which forms part of Boora Bog Group (IPC Licence Ref P500-01) and is located south of the Application Site, and within the Application Site itself. The structure is an in situ concrete underpass. No plaque is displayed on the underpass.

The majority of railway infrastructure across the entire Application Site is still present today. The railway lines are regularly maintained. Prior to the taking of effect of the IPC Licence in 2000, railway infrastructure was subject to regular inspection, with rail equipment maintained to ensure no damage, leaks, or flaws that could result in accidental fuel spillage. As discussed, the Application Site activities fell under IPC Licence from May 2000 onwards. Many of the management practices of railway infrastructure and equipment were carried through to the IPC Licence, with Condition 9.1.15 of same requiring biannual inspection and maintenance of the railcars to ensure no damage, leaks, or flaws in that could result in accidental fuel spillage.

4.6.4.2 Refuelling Activities

The refuelling methods described in Section 4.3.5.2 continued throughout the Peat Extraction Phase. However, all tank and drum storage areas have been modernised and bunds have been integrity tested bi-annually since 2000 in line with the IPC Licence requirements. Please see Condition 9.1.15 of the IPC Licence for details.

4.6.4.3 Welfare Facility

The Welfare Facility comprises a c. 6m by 11m building covering approx. 52m^2, in Lemanaghan Bog in the townland of Lemanaghan, Co. Offaly. The facility includes a septic tank and provided welfare facilities for workers at the Application Site during the Peat Extraction Phase. This facility was constructed between 2004 and 2009.

4.6.4.4 Level Crossings

The Applicant received permission for 3 no. level crossings in 1991 by Offaly County Council in townlands of Rosfaraghan, Lemanaghan, and Tumbeagh, all outside the boundary of the Application Site.

The level crossings were supplied to enable access to bogs lying across the R436 Ballycumber Road in the to the south of the Application Site and the L7002 local road passing through the north of the site. The third level crossing was ultimately not constructed.

While standard level crossing lamps with light sensors that switched to light on when daylight faded were fitted across all Bord na Móna crossing gates, these were decommissioned when peat extraction ceased in June 2020. Catch points are also fitted into railway tracks on either side of level crossing gates as a standard safety practice to de-rail any runaway trains before reaching the level crossing.

4.6.5 Non-Peat Related Activities

4.6.5.1 Wind Monitoring Mast

The Applicant was granted a five-year permission for a 100-metre-tall guyed meteorological wind mast to be erected at the Application Site in 2017 (Offaly Planning Reference 16341) for the purposes of assessing the site for potential future wind energy development. A three-year retention permission for the mast was granted by Offaly County Council in August of 2024 (Planning Reference 2475). Further details on this can be found in Section 4.10.1.

4.7 Control Measures July 1988 to June 2000

Post- July 1988 but prior to the implementation of the IPC Licence at the Application Site in 2000, the environmental management measures set out in Section 4.3.5 were in place across the Application Site. In addition, as evidenced in the 1991 Harkins Report (Appendix 4-9), silt control measures in the form of silt ponds were in place prior to 1988, with Bord na Móna carrying out further studies and surveys throughout the 1980s and 1990s to make improvements to how silt ponds operated so that suspended solids emissions in surface run-off were reduced. This included the construction of new ponds (as described in Section 4.3.5.9) to maintain treatment of run-off while cleaning of existing ponds was in progress.

4.7.1 Archaeological Code of Practice

Bord na Móna has a long history of co-operation with the National Museum of Ireland, the National Monuments Service and the relevant governmental departments overseeing heritage at the time, in relation to the cultural and archaeological importance of wetlands as well as the potential for, and handling of, archaeology discovered in bogs. After the discovery and subsequent preservation of trackways at Corlea Bog, Co. Longford by Bord na Móna employees in the 1980s, a new programme for peatland archaeology was established. Since 1991 an annual programme of archaeological survey, initially funded by the National Monuments Service, has been conducted in Bord na Móna Bogs, with the results being forwarded for inclusion in the Sites and Monuments Record.

Since 1998, Bord na Móna has a statutory duty under the Turf Development Act 1998 (Section 56) to afford appropriate protection for the environment and the archaeological heritage.

> Section 56.- *The Company and each subsidiary shall ensure that its activities are so conducted as to afford appropriate protection for the environment and the archaeological heritage.*

The 1998 Act was in accord with the development of an *Agreed Principles for the Protection of Wetlands Archaeology in Bord na Móna Bogs* (1998) between the Minister for Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna. The Agreed Principles set out 10 standards within which archaeology in the Bord na Móna peatlands were managed. Five Archaeological Liaison Officers were spread across the Bord na Móna Bog Groups and received training on how to deal with and report finds. Since 1998, all archaeological surveys were funded by Bord na Móna. The surveys have been accompanied by an annual programme of selective archaeological excavation and paleo-environmental analysis. By 2013, 64,000 of the c. 80,000-hectare land holdings of Bord na Móna had been subject to archaeological survey.[8]

[8] *Department of the Arts, Heritage and the Gaeltacht 2013 Review of Archaeological Survey and Mitigation Policy relating to Bord na Móna Peatlands since 1990.* https://www.archaeology.ie/sites/default/files/media/pdf/bnm-peatland-review-final-report-20-06-2013.pdf

A Code of Practice between the Department of Arts, Heritage and the Gaeltacht, the National Museum of Ireland and Bord na Móna was established in 2012. This Code superseded the Agreed Principles. The Code provided a framework within existing legislation, policy and practice to enable Bord na Móna to progress with peat extraction and ancillary activities and simultaneously ensure archaeological control measures are in place. The measures Bord na Móna are responsible for are listed below:

Bord na Móna will

1. *Engage a Project Archaeologist*
2. *Maintain the network of Archaeological Liaison Officers.*
3. *Disseminate a set of Archaeological Protection Procedures*
4. *Ensure that any monuments or archaeological objects discovered during peat extraction are protected in an appropriate manner by following the Archaeological Protection Procedures.*
5. *Ensure that any newly discovered monuments on Bord na Móna lands are reported in a timely manner to the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht.*
6. *Ensure that any archaeological objects discovered on Bord na Móna lands are reported immediately to the Duty Officer of the National Museum of Ireland.*
7. *Prioritise monuments for investigation taking account of monument vulnerability, contractual obligations and peat production targets.*
8. *Prepare tenders for archaeological mitigation of impacts on monuments, to include excavation and recording, in consultation with the Project Archaeologist and the Minister.*
9. *Engage professional Consultant Archaeologists to carry out mitigation of monuments, including the required palaeo-environmental assessment and post-excavation studies.*
10. *Provide the necessary finance to fulfil the post-excavation requirements of the Minister and the Director including the conservation of archaeological objects and the provision of scientific analyses and dating, as well as the production of reports on all archaeological work, to a standard which will meet the approval of the Minister.*

4.8 Control Measures 2000 to Present Day (Post-IPC Licence)

4.8.1 Environmental Monitoring and Conditions under IPC Licence

Bord na Móna was granted an IPC Licence (P0500-01) for the Boora Bog Group (which encompasses the Application Site) in May 2000. Following this grant, the control measures listed in Section 4.6 above have been updated and expanded. The background to the IPC application and implementation at the Application Site can be found in Chapter 2 Background and a copy of the licence is provided in Appendix 4-1. The licence application is publicly available and can be viewed on request at EPA headquarters PO Box 3000 Johnstown Castle Estate County Wexford Y35 W821.

Following the grant of the IPC Licence in May 2000, Bord na Móna staff underwent an EPA IPC training programme, which resulted in the development of an environmental management system. This system addresses emissions to water and air, noise, vibration and odour emissions, waste management, use of natural resources, visual effects and the natural environment and eco-system. Please see Appendix 4-5 for the Bord na Móna IPC Licence Compliance training programme.

The conditions of the IPC Licence are intended for the protection of the environment and apply from the time of grant of the IPC Licence. The EPA has undertaken Technical Amendments of the IPC Licence for the purpose of aligning the conditions of the IPC Licence to the objectives of national and

European environmental protection legislation enacted over the lifetime of the IPC Licence. The IPC Licence was subject to a Technical Amendment for the purpose of the European Communities Environmental Objectives (Surface Water) Regulations, 2009 and it now contains an objective to 'maintain' or 'restore' the water surface water quality to the defined 'Good Status'. With the implementation of conditions listed in the IPC Licence, the potential environmental effects of peat extraction and ancillary activities on water quality (such as the release of elevated concentrations of suspended sediments, and by association on aquatic ecosystems and protected species), have and continue to reduce through the implementation of IPC Licence conditions. Please see Chapter 8 Hydrology and Hydrogeology of this rEIAR and the Annual Environmental Reports (AER), included as Appendix 4-3, for details.

The IPC Licence is subject to 14. No. conditions pertaining to the ongoing monitoring and maintenance to ensure any emissions from site activities will comply with and not contravene, any of the requirements of Section 83(3) of the Environmental Protection Agency Act, 1992 outlined below:

(3) The Agency shall not grant a licence or revised licence for an activity unless it is satisfied that—

> *(a) any emissions from the activity will not result in the contravention of any relevant air quality standard specified under section 50 of the Air Pollution Act, 1987, and will comply with any relevant emission limit value specified under section 51 of the Air Pollution Act, 1987,*
>
> *(b) any emissions from the activity will comply with, or will not result in the contravention of, any relevant quality standard for waters, trade effluents and sewage effluents and standards in relation to treatment of such effluents prescribed under section 26 of the Local Government (Water Pollution) Act, 1977,*
>
> *(c) any emissions from the activity or any premises, plant, methods, processes, operating procedures or other factors which affect such emissions will comply with, or will not result in the contravention of, any relevant standard including any standard for an environmental medium prescribed under regulations made under the European Communities Act, 1972, or under any other enactment,*
>
> *(d) any noise from the activity will comply with, or will not result in the contravention of, any regulations under section 106,*
>
> *(e) any emissions from the activity will not cause significant environmental pollution, and*
>
> *(f) the best available technology not entailing excessive costs will be used to prevent or eliminate or, where that is not practicable, to limit, abate or reduce an emission from the activity, and, where appropriate, the Agency shall attach conditions relating to the matters specified in the foregoing paragraphs to the licence or revised licence.*

Conditions 1-4 of the licence outlined the Scope, Management, Interpretation and Notification procedures required by the Applicant, respectively. Conditions 11 to 14 detail the Monitoring (equipment use), Recording and Reporting, Emergency Response and Financial Provisions duties of the Applicant. Conditions 5 to 10 pertain to environmental monitoring and management:

- Condition 5 Emissions to Atmosphere
- Condition 6 Emissions to Water
- Condition 7 Waste Management
- Condition 8 Noise
- Condition 9 Water Protection
- Condition 10 Decommissioning and Cutaway Bog Rehabilitation

In compliance with Condition 5, the Applicant must undertake annual tests on boiler combustion efficiency and dust monitoring. Although no boiler was installed at the Application Site, other sites within the bog group would have and so must comply with Condition 5 where applicable. Please see Chapter 9: Air Quality for further details. Condition 6 ensures the Applicant establishes a surface water discharge monitoring programme which is reviewed annually. and a report submitted to the EPA quarterly. The Applicant is also required to submit water sample results annually, implement and maintain silt ponds. Condition 9 pertains to the 'Water Protection' and outlines the daily, weekly, monthly, quarterly, and annual inspections Bord na Móna must carry out to provide for the protection of surface and groundwater. There are currently silt pond inspections and maintenance including quarterly grab sampling ongoing at the Application Site. Please see Chapter 8 Hydrology and Hydrogeology for further details. Condition 7 compels the Applicant to correctly dispose of waste to licenced facilities. Please see Chapter 14 Material Assets for details. Condition 8 ensures that any on site activities do not give rise to noise exceedances at noise sensitive locations. Please see Chapter 11 Noise and Vibration for further details. Condition 10 pertains to site decommissioning followed by peatland rehabilitation and is detailed in section 4.8 below, which details the Remedial Phase, and Chapter 6 Biodiversity. It is the intention of the of the Applicant to continue implementing and practising the mitigation and monitoring measures as listed in the Licence after the site is decommissioned, where applicable.

4.8.2 Standard Operation Procedures

To facilitate the production of AERs, Bord na Móna produced an *Environmental and Operational Procedures for Protection of Surface Water* document which comprises a suite of Standard Operation Procedures (SOPs) which have the overall aim of promoting and maintaining environmental integrity throughout all Bord na Móna activities. The document includes SPS for drainage planning and implementation, silt pond and outfall maintenance, waste management, peat extraction methods, and general bog housekeeping. The SOPs also set out emergency preparedness and response procedures, how to deal with complaints, effective communication with Bord na Móna operatives, the local community and local authorities. Please see Appendix 4-11 Environmental and Operational Procedures for Protection of Surface Water for details.

4.9 Current Phase – June 2020 to Present Day

4.9.1 Decommissioning Process

In January 2021, Bord na Móna formally announced that peat extraction across all bogs within its landholding had ceased, although peat extraction had ceased at the Application Site prior to this in June 2020. The Application Site still operates under the requirements of IPC Licence P0500-01, and any decommissioning works undertaken with respect to peat extraction and ancillary activities are in accordance with Condition 10 of the IPC Licence, which states that:

> '***10.1*** *following termination of use or involvement of all or part of the site in the licenced 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.*

In compliance with Condition 10.1 of the IPC Licence, it is a requirement to decommission the Application Site by removing/disposing/recovering buildings, equipment, waste etc from the Application Site. The main criteria pertaining to successfully complying with this condition is ensuring that no environmental liability remains from this infrastructure and material and that the bog can be deemed suitable for surrender of the license under Section 95 of the EPA Act. This is achieved by Bord na Móna identifying and quantifying any mechanical and infrastructural resources that were installed in

the bog to enable the development and production operation at the Application Site. This list is then refined to identify any items that would be deemed as possibly resulting in environmental pollution, should they not be removed.

Typically, these items/infrastructures would be any remaining, unconsolidated plant, equipment and attachments, waste materials, unused raw materials such as land drainage pipes, remaining peat stockpiles, stockpile covering, pumps, septic tanks and fuel tanks. To date, the only decommissioning underway at the Application Site was the removal of remaining peat stockpiles from the bog. This was completed by the end of 2024. Infrastructure to be decommissioned at the Application Site is listed in Table 4-8 below. The decommissioning programme and activities are detailed in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan which can be found in Appendix 4-2.

Table 4-6 Infrastructure Decommissioning List for the Application Site. Sourced from the Cutaway Bog Decommissioning and Rehabilitation Plan 2024 for Lemanaghan Bog

Item	Description	Application Site Decommissioning Plan
1	Clean-up of remaining or unconsolidated waste or materials located in Bogs, Yards, Buildings and Offices	To be completed
2	Clean Silt Ponds	Ongoing annually
3	Decommission Peat Stockpiles	Completed
4	Decommission or Remove Buildings and Compounds	To be completed
5	Decommission Fuel Tanks and associated facilities	To be completed
6	Decommissioning and Removal of Bog Pump Sites	To be completed
7	Decommissioning or Removal of Septic Tanks	To be completed

In relation to waste management, Condition 7 of the IPC Licence requires these now defined waste items to be disposed of or recovered as follows:

"Condition 7.1: Disposal or recovery of waste shall take place only as specified in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery of this licence and in accordance with the appropriate National and European legislation and protocols. No other waste shall be disposed of/recovered either on-site or off-site without prior notice to, and prior written agreement of, the Agency.

Condition 7.2: Waste sent off-site for recovery or disposal shall only be conveyed to a waste contractor, as agreed by the Agency, and only transported from the site of the activity to the site of recovery/disposal in a manner which will not adversely affect the environment.

Condition 7.3: A full record, which shall be open to inspection by authorized persons of the Agency at all times, shall be kept by the licensee on matters relating to the waste management operations and practices at this site. This record shall as a minimum contain details of the following:

7.3.1: The names of the agent and transporter of the waste.
7.3.2: The name of the persons responsible for the ultimate disposal/recovery of the waste.
7.3.3: The ultimate destination of the waste.
7.3.4: Written confirmation of the acceptance and disposal/recovery of any hazardous waste consignments sent off-site.
7.3.5: The tonnages and EWC Code for the waste materials listed in Schedule 2(i) Hazardous Wastes for Disposal/Recovery and Schedule 2(ii) Other Wastes for Disposal/Recovery sent off-site for disposal/recovery.
7.3.6: Details of any rejected consignments.

A copy of this Waste Management record shall be submitted to the Agency as part of the AER for the site."

As required by the Licence, waste items are and will continue to be removed for recycling or disposal, using external contractors with the required waste collection permits, approved under Condition 7.2, and waste records are and will continue to be maintained as required under Condition 7.3.

Where possible, Bord na Móna will target preferred waste treatment methods from the waste hierarchy to identify waste that can be reused or recycled in lieu of recovery or disposal.

The validation of the success of compliance with Condition 10.1 of the IPC Licence is carried out through an Independent Closure Audit (ICA) which is followed by an EPA Exit Audit (EA) and the eventual partial or full surrender of the licence.

4.10 Remedial Phase

4.10.1 Peatland Rehabilitation Plans

It is also a requirement of '*Condition 10 Cutaway Bog Rehabilitation'* of the IPC Licence that following the above decommissioning of use of all or part of their bogs, Bord na Móna, prepares (to the satisfaction of the EPA) and implements a Cutaway Bog Rehabilitation Plan.

***10.2** Cutaway Bog Rehabilitation Plan:*

> ***10.2.1** The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for permanent rehabilitation of the cutaway boglands within the licensed area. This plan shall be submitted to the Agency for agreement within eighteen months of the date of grant of this licence.*
> ***10.2.2** The plan shall be reviewed every two years and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.*

***10.3** The Rehabilitation Plan shall include as a minimum, the following:*

> ***10.3.1** A scope statement for the plan, to include outcome of consultations with relevant Agencies, Authorities and affected parties (to be identified by the licensee).*
> ***10.3.2** The criteria which define the successful rehabilitation of the activity or part thereof, which ensures minimum impact to the environment.*
> ***10.3.3** A programme to achieve the stated criteria.*
> ***10.3.4** Where relevant, a test programme to demonstrate the successful implementation of the rehabilitation plan.*
> ***10.3.5** A programme for aftercare and maintenance.*

***10.4** A final validation report to include a certificate of completion for the Rehabilitation Plan, for all or part of the site as necessary, shall be submitted to the Agency within six months of execution of the*

plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.

Reason: To make provision for the proper closure of the activity ensuring protection of the environment.'

Bord na Móna has produced a draft Cutaway Bog Decommissioning and Rehabilitation Plan for the Application Site, and it is the intention of Bord na Móna to rehabilitate the bog in a phased approach under IPC Licence. Please see Appendix 4-2 for details. The rehabilitation plan was developed from a combination of the following:

- Experience of 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (Clarke, 2010; Bord na Móna, 2016);
- Significant international engagement during this period with other countries in relation to best-practice regarding peatland rehabilitation and after-use through the International Peat Society and the Society for Ecological Restoration (Joosten & Clarke,2002; Clarke & Rieley,2010; Gann et al., 2019);
- Ongoing consultation and engagement with internal and external stakeholders regarding rehabilitation, biodiversity and other general issues over the years about the Application Site;
- GIS Mapping;
- Bord na Móna drainage surveys;
- Bog topography and LIDAR data;
- Previous research studies on site, and;
- Hydrological modelling.

The draft plan also takes cognisance of the EPA Guidance on the Process of Preparing and Implementing a Bog Rehabilitation Plan (2020). Each draft plan contains within a detailed ecological report and GIS mapping pack. The key objective of Bord na Móna peatland rehabilitation is environmental stabilisation. In addition, peatland rehabilitation will bring a range of benefits to the local community via improvements in the local landscape and it is also complying with national policies and strategies regarding the reduction of carbon emissions, supporting biodiversity and enhancing water quality. It is anticipated it will take up to 30 years for naturally functioning wetland and peatland ecosystems to fully re-establish.

To inform the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, both national and local stakeholders, including neighbours whose land adjoins the relevant bog units and local representatives of national bodies (such as Regional National Parks and Wildlife Service staff) and relevant offices in County Councils (such as the Heritage or Environmental Offices) will be contacted. Any identified local interest groups will be sought and informed of the opportunity to engage with this rehabilitation plan, and when identified invited to submit their comments or observations in relation to the proposed rehabilitation. All correspondence received will be acknowledged and evaluated against the rehabilitation work proposed and the final draft of plans will contain a review of the consultation.

Prior to the finalisation of and submission of the cutaway bog decommissioning and rehabilitation plan to the EPA, a baseline ecology survey will be carried out to determine the status of natural colonisation, the potential for targeted revegetation and/or rewetting and the future development at the Application Site to ensure stabilisation of the future cutaway. The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan which outlines the proposed rehabilitation for the Application Site has been prepared and is detailed below. Table 4-9 outlines a high-level overview of the actions proposed and Table 4-10 gives a programme overview of when these works will be undertaken. Further details can be found in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan in Appendix 4-2.

Table 4-7 Types of and areas for rehabilitation measures at Lemanaghan Bog.

Type	Code	Description	Area (Ha)
Deep peat cutover bog	DPT1	Regular drain blocking (3/100 m) + modifying outfalls and managing water levels with overflow pipes	441
Dry cutaway	DCT1	Modifying outfalls and managing water levels with overflow pipes	328
Wetland cutaway	WLT1	Modifying outfalls and managing water levels with overflow pipes	122
Marginal land	MLT1	No work required	110
Constrained area	Constraint	Constraint - active turbary	113
Total Area			**1114**

**Note that the types of rehabilitation and areas of rehabilitation may change in response to stakeholder consultation and refinement of the rehabilitation measures. Total Area also includes areas outside of the Application Site*

Table 4-8 Application Site Rehabilitation Programme. Please see Appendix 4-2 for more details.

Completed & Ongoing	Short-term planning actions 0-1 years	Short-term practical actions (0-2 years)	Long-term (>3 years)
› All stockpiles have been removed from the Application Site (completed 2024) › The majority of the site is still bare peat. Bare peat areas within the older cutaway areas are reducing due to natural re-colonisation of the cutaway. A small part of the site has already re-vegetated, with pioneer vegetation developing a mosaic of typical cutaway peatland habitats including scrub and Birch woodland	› Seek formal approval of the enhanced plan from the EPA. › Develop a detailed site plan outlining how the various rehabilitation methods will be applied to Lemanaghan Bog. This will take account of peat depths, topography, drainage and hydrological modelling (see rehabilitation map for an indicative view of the application of different rehabilitation methodologies). › › A drainage management assessment of the proposed enhanced rehabilitation measures will be carried out and any issues identified resolved and the rehabilitation plan adapted. › A review of known archaeology and an archaeological impact appraisal of the proposed rehabilitation will be carried out. The results of this assessment will be incorporated into the rehabilitation plan to minimise known archaeological disturbance, where possible. › A review of issues that may constrain rehabilitation such as known rights of way, turbary and existing land agreements is to be carried out. › A review of remaining milled peat stocks is to be carried out. › An ecological appraisal of the potential impacts of the planned rehabilitation on the presence of sensitive ground-nesting bird breeding species (e.g. breeding waders) is to be carried out. The scheduling of rehabilitation operations will be adapted, where required. › Ensure all activities comply with the environmental protection requirements of the IPC Licence. › Carry out Appropriate Assessment of the Rehabilitation Plan. Incorporate any required mitigation measures from the AA in the plan for the delivery of rehabilitation and decommissioning across the site. › Track implementation and enforcement of the relevant IPC Licence conditions, any proposed mitigation measures and other environmental control measures during the implementation of the rehabilitation plan.	› Carry out proposed measures as per the detailed site plan. This will include drain blocking on deep peat, and fertiliser application targeting bare peat areas of headlands, high fields and other areas (where required) in addition to wetland creation and management prescriptions. All rehabilitation will be carried out with regard to best practice environmental control measures (See Plans Appendix III). › Monitor the success of rehabilitation measures in relation to developing suitable hydrological conditions. › Carry out the proposed monitoring, as outlined. › Silt ponds will be monitored during this period and there will be continued maintenance and cleaning to prevent potential run-off of suspended solids from the site during the rehabilitation phase.	› Evaluate success of short-term rehabilitation measures and remediate where necessary. › Delivery of a monitoring, aftercare and maintenance programme (See Section 10.2 of Plan below). › Decommissioning of silt-ponds will be assessed and carried out, where required. › Reporting to the EPA will continue until the IPC Licence is surrendered.

4.10.1.1 Description of Proposed Rehabilitation Measures

Rehabilitation works have not commenced on the Application Site (as described in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan (Appendix 4-2) and in Table 4-10 above). Rehabilitation work will commence immediately following the decommissioning of the Application Site. The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan included provides a description of the Application Site and its ecology. It also provides a framework and outline of the works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be implemented.

The details necessary to achieve the aims set out in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan (and shown on the potential Future Habitats map) will include the exact locations of the drains to be blocked and bunds to be constructed etc. These details are based on the existing habitats present and the topography of the Application Site. This level of detail will only be available and will be included in the final Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan for Lemanaghan Bog once the Application Site has been fully decommissioned which is estimated to be 2025. The remedial measures to be undertaken will follow proven and standard procedures that have been successfully applied by the Applicant and known to be effective as detailed below.

4.10.1.1.1 *Drain Blocking*

Drains will be blocked using a number of methods depending on the size and type of drain. Methods will include:

- Peat dams within small drainage channels on the cutover bog;
- Removal or blocking of drainage pipes, or modification of drainage levels, where required.

These methods are fully described in the Irish Wildlife Manual 'Best Practice in raised bog restoration in Ireland' (Mackin et al, 2017).

4.10.1.1.2 *Monitoring*

As per the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan, a programme of monitoring will be implemented to validate the efficacy of the rehabilitation measures in achieving environmental stabilisation. Monitoring will initially involve quarterly monitoring assessments of the site to determine the general status of the site, the condition of the silt ponds, assess the condition of the rehabilitation work, monitoring of any potential impacts on neighbours' land, general land security, boundary management, dumping and littering. The number of these site visits will reduce after 2 years to bi-annually. Monitoring visits will also consider any requirements for further practical rehabilitation measures.

A programme of water quality monitoring at the bog will be established. The main objective of this water quality monitoring will be to establish a baseline and then monitor the impact of peatland rehabilitation on water quality from the bog. Monitoring results will be maintained, trended and reported on each year and as required, as part of the requirement to report on Condition 10.1 of the IPC Licence on Bog Rehabilitation in the Annual Environmental Report, and will be provided to Local Authority Water Programme (LAWPRO) and the EPA as required to inform progress and national monitoring requirements under the WFD. These results will also be publicly available as a requirement of the Annual Environmental Report. The parameters to be included (as per condition 6.2 of the IPC Licence) include monthly monitoring for pH, Flow, Suspended Solids, Total Solids, Total Phosphorus,

Total Ammonia, Colour, and COD. This monthly sampling regime on a selected number of silt ponds will be carried out over a two-year cycle.

If, after two years, key criteria for successful rehabilitation are being achieved and key targets are being met, then the water quality monitoring will be reviewed, with consideration of potential ongoing research on site. The water quality data, the aerial surveys and the habitat mapping will be collated and will be submitted to the EPA as part of the final validation report.

If, after two years, key criteria for successful rehabilitation have not been achieved and key targets have not been met, then the rehabilitation measures and status of the site will be evaluated and enhanced, where required. This evaluation may indicate no requirement for additional enhancement of rehabilitation measures but may demonstrate that more time is required before key criteria for rehabilitation has been achieved. Monitoring of water quality will then also continue for another period to be defined based on scientific evidence and expert opinion.

4.11 Potential Future Land Use

4.11.1 Proposed Lemanaghan Wind Farm

The Application Site is an important natural asset and has the potential to play a strategic role in meeting national climate action targets, which have become all the more significant in light of the Climate Action and Low Carbon Development (Amendment) Act 2021, the Climate Action Plan 2025 the Climate Change Performance Index 2025 and the Change Advisory Council's Annual Report 2025. These reports provide an updated assessment of both global climate change and climate change in the context of Ireland and identify the increasingly discernible impacts climate change is having on both the environment and society. In line with the Applicant's vision to assist in achieving a climate neutral Ireland by 2050, it is intended to utilise the Application Site for both peatland rehabilitation and wind energy infrastructure, and to facilitate environmental stabilisation of the bog group and the optimisation of climate action benefits.

Lemanaghan DAC, a joint venture between SSE Renewables and Bord na Móna (BnM). (i.e the Applicant) are proposing a wind energy development consisting of 15 turbines with an overall blade to tip height of 220m.[9] This application will be made directly to An Coimisiún Pleanála as 'Strategic Infrastructure Development' (SID) under the provisions of Section 37E of the Planning and Development Act 2000, as amended (the Act). At the time of writing, this position has not been confirmed by An Coimisiún Pleanála in correspondence to the Applicant though has been discussed in pre-application consultations with An Coimisiún Pleanála under Section 37B of the Act (ACP-310844-21). A separate EIAR and accompanying NIS are being undertaken for the proposed Lemanaghan Wind Farm development. At the time of writing, the planning application for this development has not yet been submitted to An Coimisiún Pleanála, therefore a decision had not yet been made by An Coimisiún Pleanála with regards this application.

The overall permanent footprint of the proposed Lemanaghan Wind Farm development will be approximately 3% of the total area of Lemanaghan Bog, and therefore does not impact or change the overall goals and outcomes of the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan. As such, it is the intention of Lemanaghan DAC to integrate the peatland remedial measures with the proposed future wind farm should it receive a successful grant of permission. The key objectives of environmental stabilisation and re-wetting of the cutaway areas will occur between and surrounding the proposed windfarm infrastructure. The EIAR for the proposed Lemanaghan Wind Farm will detail issues related to peat management during wind farm construction. In summary, during construction for access tracks, hardstands and other areas, peat is excavated from the cutaway, moved

[9] https://www.lemanaghanwindfarm.ie/

to the side, graded into berms not more than 1m and allowed to naturally re-vegetate. This has proven successful during construction of Mountlucas, Cloncreen and Derrinlough Wind Farms. In the event that natural re-vegetation was unsuccessful, then other measures such as re-seeding would be considered.

The Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan which will accompany the planning application for the proposed wind farm will detail how the Application Site will be rehabilitated alongside the construction and operation of the proposed Lemanaghan Wind Farm; should the proposed Lemanaghan Wind Farm be consented. It should be noted that irrespective of the consenting or construction of the proposed Lemanaghan Wind Farm, the measures outlined in the Draft Bord na Móna Cutaway Bog Decommissioning and Rehabilitation Plan will be implemented by Bord na Móna in agreement with the EPA, as per the Bord na Móna's IPC Licence obligations. Further details of this proposed Lemanaghan Wind Farm can be obtained at the project website. As mentioned, the wind farm footprint will comprise 3% of the total area of Lemanaghan Bog and the wind farm application includes proposals to rehabilitate the site to support wetland habitats.

Both the remedial measures and the proposed Lemanaghan Wind Farm are cumulatively assessed with the future remedial measures that will be carried at the Application Site.