

BUILT ON KNOWLEDGE

Bord na Móna

Derryadd, Derryarogue and Lough Bannow Bogs – Application for Substitute Consent

Remedial Environmental Impact Assessment Report

Chapter 8 – Land, Soils and Geology March 2025



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8.0 LAND, SOILS AND GEOLOGY

8.1 INTRODUCTION

This chapter reports on the results of assessment of any significant effects on Landscape as a result of peat extraction and all ancillary works at the Application Site (Derryaroge, Derryadd and Lough Bannow Bogs) during the Peat Extraction Phase, the Current Phase, and the Remedial Phase. The assessments in this chapter will determine the any impacts on lands, soils and geology that have occurred (or are likely to occur) during three differing timeframes termed 'phases' (as described in Chapter 4):

- 'Peat Extraction Phase': peat extraction activities and all ancillary works at the Application Site from July 1988 to the cessation of peat extraction in July of 2019 (July 1988 July 2019). The Peat Extraction Phase is described in detail in Chapter 4 Section 4.7.
- 'Current Phase': the management of the Application Site since July 2019 (July 2019 to present). The Current Phase is described in detail in Chapter 4 Section 4.8.
- 'Remedial Phase': the activities intended to be carried out at the Application Site into the future. The Remedial Phase is described in detail in Chapter 4 Section 4.9.

As stated in Section 2.5 of Chapter 2 – Methodology, 1988 is the baseline year for this assessment, as this is the year in which the EIA Directive (Directive 85/337/EEC) was required to be transposed into Irish Law. There is no legal requirement to complete a rEIAR on any of the activities occurring at the Application Site prior to the transposition of the EIA Directive (i.e. it does not have retrospective effect). Nevertheless, for completion, a description of the activities occurring at the Application Site from the onset of site preparation works in 1949 up to 1988 is provided in Chapter 4.

8.1.1 Statement of Authority

This chapter has been completely by John Dillon of TOBIN Consulting Engineers. TOBIN Hydrologists and Hydrogeologists are intimately familiar with the site characteristics of the Derryadd, Derryaroge and Lough Bannow Bogs, having worked on the preparation of the previous wind farm planning application (Ref. No. ABP-303592-19).

John Dillon (BSc, MSc, MCIWM, PGeo) has over 18 years of experience in hydrogeological/hydrological assessment for EIS/EIA. John is a Senior Environmental Consultant in the Environment and Planning section of TOBIN Consulting Engineers. John has an active involvement in the compilation of environmental impact assessment reports, planning applications and wind farm.

8.2 ASSESSMENT METHODOLOGY

The main considerations based on the IGI and EPA Guidance with regard to the assessment of effects on land, soils and geology from peat harvesting activities relate to the changes in land, geological environment and peat stability.

8.2.1 Guidance and Legislative Review

This chapter has been prepared having regard to the general guidance documents presented in Chapter 1 and the following policy documents specific to this chapter:

- S.I No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments. These instruments implement EU Directive 2011/92/EU and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No. 296 of 2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of Directive 2014/52/EU into Irish law;
- S.I. No. 293 of 1988: European Communities (Quality of Salmonid Waters) Regulations;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended);
- European Communities (Drinking Water) Regulations 2007 (As amended);
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended); and,
- S.I. No. 296 of 2009: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (as amended by S.I. No. 355 of 2018).

Guidance

The assessment was carried out in accordance with the following guidance and tailored accordingly based on professional judgement and experience:

- Institute of Geologists Ireland (IGI) (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Environmental Protection Agency (EPA) (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the preparation of Environmental Impact Statements);
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (NRA) (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- CIRIA 2006: Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors. CIRIA C532. London, 2006; and,
- Environmental Protection Agency (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

8.2.2 Consultation

The rEIA scoping correspondence was issued to appropriate statutory and non-statutory bodies in August 2022 and September 2024 in accordance with Article 28 of the Planning and Development Regulations, 2001 (as amended). A full list of responses to these scoping correspondences is provided in Table 2-1 of Chapter 2. The responses which are relevant to Land, Soils and Geology have been provided in Table 8-1 below.

Consultee Name	Summary of Response Received (2022)	Summary of Responses Received (2024)			
Longford Co. Co. Planning Department	Longford County Development Plan 2021-2027 contains policies concerning the future of cutaway bogs. These include supporting the preparation of a holistic plan for the development of industrial peatlands at a regional scale that promotes economic development, tourism, rural diversification, environmental protection and natural and cultural heritage awareness.	No response received			
Minister for Housing, Local Government and Heritage c/o The Manager, Development Applications Unit Department of Housing, Local Government and Heritage	The bogs and the surrounding low lying lands on peaty soils should be subject to carbon budget analysis to assess carbon sequestration.	No response received			
Environmental Protection Agency	No response received	The response confirmed receipt by the EPA. No further response was received.			
Irish Peatlands Conservation Council (IPCC)	No response received	The response from IPCC details their observation of Bord na Móna Mandate to develop peat bogs and the loss of this valuable habitat. The response goes on the detail specific case studies of peat extraction, bog drainage and the Bord na Móna Raise Bog Restoration Programme.			
Geological Survey of Ireland	GSI recommended that the application reviews GSI datasets relevant to the assessment.	No response received			

Table 8-1 – List of Consultees and Record of Consultations

8.2.3 Desk Study

A desk study was undertaken in July 2023 and 2024, in order to collate and review background information relevant to the Application Site and surrounding study area, as defined in section 8.3.1, during the assessment. The sources of the information obtained to inform this desk study are listed below:

- Details of hydrological features associated with peat extraction and ancillary activities at the Application Site (e.g. drains, silt ponds, surface water outfalls) provided by Bord na Móna;
- Integrated Pollution Control Licence (IPC) Mountdillon Bog Group (Ref: P0504-01) Environmental Protection Agency, Appendix 4-1;
- Bord na Móna Rehabilitation Plans, Appendix 4-3.;
 - > Derryaroge Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2023;

Derryadd Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025;

Derryaroge Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025; and

- Lough Bannow Bog Draft Cutaway Bog Decommissioning and Rehabilitation Plan 2025.
- Annual Environmental Reports 2000 to 2023as shown in Appendix 4-4 (2008 to 2021 are publicly available on the EPA website¹)
- IPC Licence P0504-01 Application (available at EPA Headquarters on request);
- Inspection of extraction records at Mountdillon Works;
- Aerial Maps from 1973 to 2019, Appendix 4-5;
- Bord na Móna databases on peat depth and drainage;
- Bord na Móna LiDAR data;
- Geological Survey of Ireland (GSI) online mapping (www.gsi.ie);
- Environmental Protection Agency database (www.epa.ie);
- Teagasc Soils Map Viewer (www.gsi.ie);
- Met Éireann Meteorological Databases (www.met.ie);
- National Parks and Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directives Catchments Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet No. 6; Geological Survey of Ireland (www.gsi.ie);
- Geological Survey of Ireland Groundwater Body Characterisation Reports (www.gsi.ie);
- OPW Indicative Flood Maps (www.floodmaps.ie);
- Environmental protection Agency HydroTool Map Viewer (www.watermaps.wfdireland.ie/HydroTool);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.floodinfo.ie);
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie); and
- The 2019 Derryadd Wind Farm Planning Application (Ref. No. ABP-303592-19)

8.2.4 Site Walkover and Site Investigation Data

TOBIN staff completed four site inspections and walkover surveys at the Application Site as part of this remedial Environmental Impact Assessment (rEIAR) and to inform the proposed Derryadd Wind Farm planning application. These site investigations comprised of peat probing, geological mapping and detailed walkover surveys completed by Tobin between 7th of November 2022, 19th May 2023 and 25th November 2024. These visits are outlined in Table 8-2 below. Information obtained during these site surveys are included in the discussions on the baseline environment in Section 8.3 of this chapter.

¹ Annual Environmental Reports 2018-2023 available at: <u>https://leap.epa.ie/licence-profile/P0504/compliance</u>

Table 8-2 – Summary of Site Survey Works

Date	Types of investigation conducted
January 2017 and March 2018	Field Monitoring Results
September 2022	Site walkover
Nov-Dec 2022	Site walkover, supervision of SI works
May 2023	Site walkover
November 2024	Site walkover

In addition to the surveys completed by TOBIN, several additional site investigations have been completed at the Application Site to further inform this rEIAR and the proposed Derryadd Wind Farm planning application. These site investigations included detailed ground investigations (trial pits and boreholes) completed by Irish Drilling Ltd (IDL) as part of the previous wind farm application (Planning Ref. No. 303592-19) between the 8th of February and 25th of May 2021. A copy of the Site Investigation reports are included in Appendix 8-1. More recently, site investigations to inform the proposed Derryadd Wind Farm planning application and this rEIAR, in the form of trial pits and boreholes, were also carried out by IDL between December 2022 and February 2023. In addition, Bord na Móna staff undertook trial pitting at the proposed substation location for the proposed Derryadd Wind Farm on the 7th of November 2022.

The combined geological dataset collated by TOBIN, IDL and Bord na Móna have been used in the preparation of this rEIAR Chapter.

In summary, site investigations undertaken at the Application Site include the following:

- A total of 200 no. peat probe depths/investigations points were carried out by TOBIN and BNM at the Application Site;
- Logging of subsoil exposures across the site where mineral soils and peat profiles are exposed;
- Mineral subsoils and peat were logged according to BS: 5930 and Von Post Scale respectively; and
- Ground investigations completed by IDL in the form of 450 no. trial pits, 101 no. boreholes as part of the previous and proposed wind farm applications between 2017 and 2023.

SI locations are attached as Appendix 8-2. Bord na Móna has also provided volumes of peat extracted at the Application Site which have been utilised in the preparation of this rEIAR Chapter.

8.2.5 Impact Assessment Methodology

The importance/sensitivity of the geological, hydrogeological and hydrological receptors was assessed on completion of the desk study and baseline assessment. Examples of the sensitivity classification were included in the NRA *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (2008) and also presented in Appendix C of the IGI *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements* (2013). Additional classification

criteria was added based on professional judgement to address the importance/sensitivity of the geological environments at the Application Site, which have been set out in Table 8-3.

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and / or soft organic soil underlying route is significant on a national or regional scale.	 Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource Intact Peatland
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and / or soft organic soil underlying site is significant on a local scale.	 Contaminated soil on site with previous heavy industrial usage. Wetlands/Mires Large recent landfill site for mixed wastes. Geologically feature of high value on a local scale (County Geological Site). Well drained and / or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and / or soft organic soil underlying site is moderate on a local scale.	 Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed wastes. Moderately drained and / or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource Inactive raised bog/peat headlands
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and / or soft organic soil underlying site is small on a local scale.	 Large historical and / or recent site for construction and demolition wastes. Small historical and / or recent site for construction and demolition wastes. Poorly drained and / or low fertility soils. Uneconomically extractable mineral resource. Cutover Peatlands

Table 8-3: Estimation of Importance of Geological Attributes

8.3 BASELINE ENVIRONMENT

The baseline geological/hydrogeological environment of 1988 is described in this section.

8.3.1 Site Location

The Application Site is located approximately 1 km east of Lanesborough in County Longford as shown in Figure 1-1 and comprises an area of approximately 2,244 ha. The regional review of geological conditions covers a minimum zone of 2km from this Application Site boundary, as recommended in the IGI *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements* (2013). The study area has been reviewed against the geological/hydrogeological environment as well as the scale of peat extraction activities. While the focus of the assessment is on the Land, Soils and Geology within the Application site, the total extent of the study area is 2km from the Application Site boundary as shown in Figure 8-1.

Derryaroge Bog is located in the north of the Application Site, between the N63 National Road and the River Shannon. Derryadd Bog is located in the centre between the N63 and the R398 and Lough Bannow Bog is located in the south between R398 and R392 Regional Roads.



8.3.2 Topography

8.3.2.1 <u>Pre-Extraction Topography</u>

The topography across the site prior to the onset of peat extraction activities is estimated to be 39 – 62 mOD. These estimations have been deduced from the 6-inch OSI maps where point data is available. The topography prior to the commencement of peat extraction in 1949, was a relatively uniform low-lying bogland within the Application Site, while the surrounding landscape consisted of low-lying agricultural grassland and peatlands, as referenced in the benchmark notes on historical 25" OSI mapping (1897 – 1913) and Cassini 6" (1940s) mapping from the area. The topographical levels were highest on the boundaries of mineral islands (drumlins) to the south and centre of the Application Site and tapered towards the surrounding water features. Some drainage features were evident on the historical 25" maps. No detailed elevation survey of these bogs were available from before peat extraction commenced by Bord na Móna.

The estimated topographic changes through time for each individual bog are shown in Table 8-4 below.

Bog Name	Pre-Extraction (1948) (mOD)	1988 Topographic Range (mOD)	2019 Topographic Range (mOD)
Derryaroge	39-46	36-45	35-45
Derryadd	45-51	41-48	39-48
Lough Bannow	51-62	47-58	43-58

Table 8-4: Estimated Site Topography Changes

8.3.2.2 1988 Baseline Topography

Historically, the topographic profile of the Application Site was higher than that observed at present day, with the topographic changes varying across the Application Site depending on each particular bog unit's initial drainage and vegetation removal (refer to Section 4.5.2, Chapter 4). For example, peat extraction commenced in Derryaroge Bog in 1952, while peat extraction did not commence in Derryadd and Lough Bannow until 1964.

As described in Chapter 4, the topography of the site in 1988, is based on an average depth of milled peat extraction of <0.1m per year over the 31-year period from 1988 to the cessation of peat extraction in 2019. The OSI 25" maps have a number of topographical elevations on both Derryaroge and Derryadd bog. By subtracting the current levels from the elevations, the heights reduced by 0.03m to 0.09m per year. As seen in Table 8-4 above, the baseline topography of the Application Site from 1988 ranges from 36 – 58 mOD, with the highest elevation located at Lough Bannow Bog at the south of the Application Site.

All areas of the Application Site will have experienced some decrease in topography since 1988 due to the installation of drainage and removal of peat during peat extraction.

8.3.2.3 <u>Current Topography</u>

The current topography of the Application Site is relatively flat and low lying with an elevation range between approximately 40m to 60m OD (meters above Ordnance Datum), with higher elevation areas located in the Lough Bannow Bog in the south, and lower areas in Derryaroge Bog in the north.

Topography at the Application Site has been modified through the peat extraction and ancillary activities. At present day, the highest elevations are found at headlands around the perimeter of the Application Site, which create a boundary berm, forming a basin effect within the former peat extraction areas. These headlands provide an approximation (albeit drained and subsided) of the original ground elevations which existed across the site prior to the commencement of any peat extraction related activities.

The Bord na Móna LiDAR map for the Derryaroge Bog (refer to the Derryaroge Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2023 and Derryaroge Bog 2025 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-3), shows the current topography at the Application Site. Currently the highest elevations at Derryaroge Bog are found along its southern margins where the topography ranges from 45-46 mOD. Ground elevations in the interior of the bog, which have been subject to historic peat extraction, range from 38-42 mOD.

The Bord na Móna LiDAR map for Derryadd Bog (refer to Derryadd Bog 2025 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-3), shows the current topography at Derryadd Bog. Currently the highest elevations at Derryadd Bog are found in the west and centre of the site, with maximum elevations ranging from 46-48 mOD along the boundary with the mineral islands (drumlins). The topography slopes gently to the east and north, with the lowest elevations recorded in the northeast of Derryadd Bog (39mOD).

The Bord na Móna LiDAR map for Lough Bannow Bog (refer to Lough Bannow Bog 2025 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-3), shows the current topography at Lough Bannow Bog. Currently the highest elevations at Lough Bannow Bog are located in the southeast, where ground elevations range from 56-58m OD where a number of rock outcrops and drumlins occur. Ground elevations are lower in the northwest of Lough Bannow Bog where the topography ranges between 44-45 mOD.

8.3.3 Land (Land take)

8.3.3.1 Land – Historical Change Summary

The primary change to land during the peat extraction process occurs during the initial drainage of the bog and the removal of vegetation in advance of peat extraction as outlined in Chapter 4. Drainage ditches drain the upper surface of the bog by lowering the local peat water table (full details on the drainage implemented at the Application Site are provided in Chapter 4). During the peat extraction phase ancillary features were also constructed including railway lines, machine passes, canteens, work sites, extraction centres, mobile fuel tanks and fixed fuel tanks. After the site was drained vegetation was removed from the bog surface, leaving only bare peat fields between the drains. Initial drainage at the Application Site occurred at Derryaroge Bog in 1949, and in Derryadd and Lough Bannow Bogs in 1960, many years prior to the baseline assessment year of 1988.

During the Peat Extraction Phase only minimal soils/land use change occurred. All areas within the Application Site were subject to peat extraction in 1988. The main change in land use since 1988 was in the gradual cessation of peat extraction in certain areas of each bog unit within the Application Site, up to the point of the complete cessation of peat extraction in 2019. A mosaic of habitats has established across the Application Site, as the areas subject to industrial peat extraction gradually reduced. There is a mosaic of both wet and dry cutaway habitats present including wetlands and Birch scrub and woodland.

Land use changes within the Application Site have been investigated using available aerial imagery dating from 1973 to 2019. Annual Bord na Móna Reports were also consulted to help develop the timeline of changes across the Application Site. The observed changes in land use for the individual bogs comprising the Application Site are discussed in the following paragraphs.

Derryaroge Bog

Drainage and peat extraction commenced in Derryaroge Bog in 1949 and 1952 respectively. At this time Derryaroge bog would have experienced a relatively abrupt land cover change (land take) from raised bog to industrial peat extraction. The earliest available aerial imagery dating from 1973 shows the east of Derryaroge Bog to be subject to sod peat extraction, with small areas of bog existing along the eastern boundary/headland of the bog. An aerial image dating from 1995 shows the entirety of Derryaroge Bog subject to milled peat extraction. Aerial imagery from 1995 to present day do not show any major land changes at Derryaroge Bog with the exception of some revegetation (regrowth) in the centre of the bog and increased flooding in the east of the bog. Peat extraction ceased in all areas of Derryaroge Bog in July 2019.

Derryadd Bog

Drainage and peat extraction at Derryadd commenced in 1960 and 1964 respectively. The entirety of Derryadd Bog was subject to peat extraction by 1973, as shown in the aerial imagery. Aerial imagery from 1995 to 2019, included in Appendix 4-5 do not show any major land changes at Derryadd Bog with the exception of some revegetation (regrowth) in the centre of the bog. Peat extraction ceased in all areas of Derryadd Bog in July 2019. The areas subject to peat extraction in 1973, 1988, 1995, 2004 and 2019 are shown in Figures 4-9, 4-11 to 4-14 in Chapter 4.

Lough Bannow Bog

Drainage and peat extraction commenced at Lough Bannow Bog occurred in 1960 and 1964 respectively. The majority of Lough Bannow Bog was subject to milled peat extraction by 1973, as shown on aerial imagery, with only small areas of the bog drained but not in peat extraction, including a small area adjacent to Lough Bawn pNHA in the southeast of the bog. Aerial imagery do not indicate any major land changes between 1973 and 1988. While peat extraction maps in Figures 4-9, 4-11 to 4-14 in Chapter 4 show that significant areas of the bog were no longer subject to peat extraction between 1995 and 2004, aerial imagery from 1995 to present day do not show any major land changes in the area, with the exception of some revegetation (regrowth) in the areas which have been out of extraction for a number of years. Peat extraction ceased in all areas of Lough Bannow Bog in July 2019.

8.3.3.2 <u>Land – 1988 Baseline</u>

As described in Chapter 4, by 1988 the land use and landcover at the Application Site was well established as being industrial peat extraction, with c. 1,963 ha of the Application Site subject to peat extraction. At this point in time, all drainage and bog preparation works had been complete, and sod peat extraction had ceased at Derryaroge, with only milled peat extraction carried out within each of the three bogs in the Application Site from 1984 onwards. Furthermore, permanent railway infrastructure was present across all bogs within the Application Site to allow for the movement of materials across the site.

Each bog was made up of large peat extraction fields which were separated by drainage channels generally orientated in a northwest-southeast direction and typically spaced every 15 m to 20

m. Typically, peat fields discharged 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 peat field. These bogs utilised pumps where levels did not allow for gravity drainage. This can be seen in Chapter 4, Figure 4-1 the main drainage channels which existed pre-1988, the locations of silt ponds and outfalls which existed pre-1988 and the pump stations which were used to lift water from low points across the Application Site to maintain an effective surface water drainage network. There were 11 no. pumps installed on Derryaroge Bog, between 3 – 6 no. pumps installed on Derryadd Bog and an assumption of 3 no. pumps installed on Lough Bannow Bog by 1988, as detailed in Section 4.5.3, Chapter 4.

8.3.3.3 Land – Current Condition

Corine land cover maps (2018) show that the Application Site is located predominantly on "peat bogs" with some areas of "transitional woodland scrub", "agricultural pastures" and "broad leaved mixed forests" along its margins. The present day landuse and land cover surrounding the site comprises primarily of agricultural lands, peatland, and small areas of woodland and coniferous forestry. A scattered pattern of rural dwellings and farmhouses are located along the local road network which surrounds the site. Corine (2018) map land cover in the wider area as predominantly "agricultural pastures" with some pockets of "non-irrigated arable land". The closest mapped urban centres are the villages of Lanesborough to the west and Keenagh to the southeast.

The following paragraphs discuss the current land cover at each of the three bogs comprising the Application Site.

All areas in the application site were in operation in 2018. As shown in Figures 4-9, 4-11 to 4-14 in Chapter 4, areas were gradually removed from peat extraction with the main changes occurring in the 2000s as areas of Cutaway bog were removed from extraction.

Derryaroge Bog

The peat extraction area in 2004 comprised of 344ha within a total area of 863ha (40% of bog area). At the point of the cessation of peat extraction in 2019, the peat extraction area comprised of 57ha within a total area of 863ha (7% of bog area). Following the cessation of peat extraction activities, the land-use/land cover in this former extraction area changed from peat extraction to areas of bare peat which are currently experiencing natural re-vegetation in some places. The Bord na Móna current habitat map (refer to Derryaroge Bog Cutaway Bog Decommissioning and Rehabilitation Plan 2023 and Derryaroge Bog 2025 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-3) shows the existing land cover at Derryaroge. Some small areas in the west and southwest of the bog is characterized by areas of "bare peat". The lack of vegetation in these areas indicates that they were the most recent areas of Derryaroge Bog from which peat was being extracted i.e., there has not been enough time for vegetation to colonise these areas post extraction. Meanwhile, areas in the centre and east of Derryaroge Bog contain a mosaic of "birch woodland", "heath", "heath and scrub" and "pioneer open cutaway habitats". Based on Bord na Móna historic extraction areas, peat extraction ceased in many of these areas of Derryaroge c.2004. Therefore, given the time which has elapsed since extraction, vegetation has had time to establish itself in these areas.

Derryadd Bog

The extraction area in 2004 comprised of 480 ha within a total area of 649 ha (74% of bog area). At the point of the cessation of peat extraction in 2019, the peat extraction area comprised of 132ha within a total area of 649ha (20% of bog area). At the point of the cessation of extraction

in 2019, and a relatively large area of dry cutaway located to the north and south of the farmland at the centre of the site have developed as calcareous grassland and Birch scrub/woodland, the remainder of the cutaway is dominated by bare peat.

The Bord na Móna current habitat map for Derryadd Bog (refer to Derryadd Bog 2025 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-3, shows that much of the bog comprises of "bare peat" fields. Note that approximately half of the bog was subject to milled peat extraction up to the point of cessation of peat extraction in 2019. However, the centre of the bog has not been subject to peat extraction since c.2000 and has begun to revegetate with areas of "heath and scrub" and "bog woodland".

Lough Bannow Bog

The extraction area in 2004 comprised of 529 ha within a total area of 731 ha (72 %). At the point of the cessation of peat extraction in 2019, the peat extraction area comprised of 81ha within a total area of 731ha (11% of bog area). The final years of peat extraction were concentrated in a small section in the centre of the bog, and along the edges, with large areas of the bog out of extraction since 2019 or prior. Therefore, following the cessation of peat extraction changed from peat extraction to areas of bare peat which are currently experiencing natural revegetation. The Bord na Móna current habitat map for Lough Bannow (refer to Lough Bannow Bog 2025 Draft Cutaway Bog Decommissioning and Rehabilitation Plan included in Appendix 4-3) shows there is also bare peat remaining. According to Bord na Móna estimated historic extraction areas, extraction ceased in approximately half of Lough Bannow Bog prior to 2000.

Since the cessation of peat extraction in 2019, decommissioning and removal of equipment associated with peat extraction works including rail tracks, detailed in Chapter 4 (Project Description,) within the peatland area have been ongoing.

Land-use changes within the bog since the commencement of peat extraction to 1988 and onto the present day are presented in detail in Chapter 4 – Project Description.

8.3.4 Peat/Soils and Subsoils

8.3.4.1 Peat Extraction

Derryaroge Bog was the first bog to be subject to extraction at the Application Site, with drainage commencing in 1949 and peat extraction commencing in 1952. Derryadd and Lough Bannow Bogs later began peat extraction in 1964 as outlined in Section 8.3.3. Peat extraction formally ceased at the Application Site in the summer of 2019.

The bogs were developed for the extraction of peat to supply the power station (Lanesboro Power Station from 1958 to 2004 and Lough Ree Power Station from 2004 to 2020), the tiphead for sale to the public (sod peat only between 1952 and 1984), or peat loading facility for export to Edenderry Power Station or Derrinlough Briquette Factory (post-December 2020). Further detail in Section 4.4.5.8, Chapter 4.

8.3.4.1.1 Peat Extraction 1952 – July 1988

The Applicant's records indicate that approx. 9.99 million tonnes (sod and milled) were extracted from the Mountdillon Bog Group for the period 1952 – July 1988 inclusive, as detailed in Section 4.5.4.4 Chapter 4. Peat extraction volumes are not available pre-1952. On the basis that drainage commenced in 1949 and peat extraction activities and all ancillary works only

commenced at the Application Site in 1952, it is assumed that the volumes generated were not significant and not comparable to the volumes generated in subsequent years.

8.3.4.1.2 Peat Extraction 1988- July 2019

The Applicants records indicate that approximately 9,222,879 tonnes of milled peat was extracted from the Applications Site from the period 1988- July 2019 inclusive.

As outlined in Chapter 4 and Section 8.3.3, the Application Site remained subject to peat extraction until 2019. Based on figures supplied by the Applicant relating to peat tonnage extracted (1988 – 2019), Table 8-5 presents a summary of the weight of peat extracted (in tonnes), calculated volumes of peat extracted and an estimate of

the overall removed depth of peat. A bulk estimate of 1.2 m³/tonne was used to calculate volumes of peat removed.

In a typical year with suitable weather conditions, ~12 – 18 cm of peat would be removed during the milled peat extraction. Based on the 31-year period from 1988 - 2019, it can be estimated that a depth of ~3.8 m of peat was removed from the Application Site. This estimation is based on the worst-case assumption that all areas of the Application Site were continuously and uniformly subject to consistent levels of peat extraction. This would not always have been the case owing to combinations of weather conditions, local topography, peat depths, and the efficacy of surface water drainage, and therefore the depth of peat removed is likely to be less than 4m. By 1988, some small areas in Derryaroge and Derryadd were no longer subject to peat extraction. An area of drained peat to the south of Lough Bannow Bog was never subject to peat extraction, and targeted drain blocking occurring there in 2017.

Table 8-5: Peat Extraction Volumes from 1988 to 2019

Bogs in Extraction	Peat Weight 1988 - 2019 (Tonnes)	~Peat Volume (m3)
Derryaroge Derryadd	9,222,879	11,279,500
Lough Bannow		

Subsoil Thicknesses

The remaining depth of peat in 2019, post the cessation of any peat extraction activities, across the Application Site is generally between 0m and 2.6 m, however there are some areas where peat depths are greater than this.

Data provided by the Applicant indicate that the peat depths have changed between 2008 to 2019 and are summarised and presented in Table 8-6 below. The datasets for peat depths in 2008 and in 2019 are similar in scale and hence easily compared. In general, the peat depth between 2008 to 2019 has decreased overall.

Table 8-6: Estimated peat depth 2008 - 2020

	Peat Depth 2008	Peat Depth 2015	Peat Depth 2019/Survey in 2020
Derryaroge	Predominently 0 – 1 m thick in the north, south and centre of the bog. Depths are 1.1 m to over 2.6 m along the eastern boundary and in the southwestern portion of the bog.	Peat depths in the southwestern portion of the site have decreased and are generally 1.1 m to 2.5 m thick but with some areas over 2.6 m thick. The remainder of the bog is between 0m to 1m thick.	Peat depths are similar to those recorded in 2008 but areas of thicker peats have reduced in extent.
Derryadd	Depths in the northeast of the bog are between 0m to 1 m thick. The southeast and the full western side have depths between 1.1 m to over 2.6 m.	Peat depth throughout the bog has decreased and there are only sporadic areas where peat depth is greater than 2.6 m. The southern portion of the bog has depths between 0 m to 2.5 m, whereas the northern portion generally has peat depth between 0m to 1 m.	Peat depths are similar to those recorded in 2008 across a number of areas but areas of deeper peat have reduced in extent due to extraction between 2008 and 2019.
Lough Bannow	Depths in the centre of the bog and the eastern side are between 0m to 1 m thick. The remaining areas are between 1.1 m to 2.5 m thick with isolated patches of bog greater than 2.6 m thick.	Peat depth througout the bog has decreased and depths are generally between 0m to 2.5 m.	Peat depths are similar to those recorded in 2008 but areas of thicker peats have reduced in extent.

8.3.4.2 <u>Current Environment</u>

8.3.4.2.1 <u>Soils</u>

Information on soils in the region was gathered from the Teagasc soils map and the GSI Online Map Viewer in July 2023. The following soils are present in the study area (i.e. within 2km of the Application Site):

- Cutaway/cutover peat (Cut)
- Peaty poorly drained acidic and basic minerals (AminPDPT and BminPDPT)
- Poorly drained acidic and basic minerals (AminPD and BminPD)
- Shallow well drained acidic and basic minerals (AminSW and BminSW)
- Deep well drained acidic and basic minerals (AminDW and BminDW)
- Basic, shallow, rocky, peaty/non-peaty mineral complexes (BminSRPT)
- Alluvial Mineral Soils (AlluvMIN)
- Lacustrine type soils (Lac)
- Made Ground (Made)

The area around the Application Site is dominated by peat and peaty soils. Peat is an organic soil derived by the accumulation of partially decomposed plant matter in favourable locations, following a change in climate conditions. Raised bog peat accumulates at a slow rate but has gradually enveloped the landscape.

Alluvial soils have been deposited and characterise the banks and floodplain of the River Shannon to the north and northwest of the bogs. The rest of the soil types within the study area

are mainly a combination of acidic and basic mineral soils, the most common being basic, peaty, poorly drained minerals. Basic soils are present throughout the surrounding area. Acidic soils are present in the southeast of the study area. The published soils map (www.gsi.ie) for the area as outlined in Figure 8-2 shows that cutover/cutaway peat is mapped exclusively over the site. Please note that this map is a predictive map whereby key soil forming factors vegetation and topography are mapped and a set of rules applies to these datasets to predict the soils that may occur at any given location.

Soils in the surrounding lands are predominantly basic deep well drained mineral soils (BminDW) with smaller areas of basic deep poorly drained mineral soils (BminPD), poorly drained soils with a peaty topsoil (BminPDPT) and basic shallow well drained soils (BminSW). Mineral alluvium (AlluvMin) is found along local watercourses surrounding the Application Site.

8.3.4.2.2 Subsoils and Quaternary Sediments

Information on subsoils and Quaternary sediments in the region was gathered from the GSI and EPA Map Viewers in July 2023. The following subsoils and Quaternary sediments are present within the bog boundary:

- Cut over raised peat (Cut)
- Till derived from limestones (TLs);
- Till derived from Carboniferous sandstones and cherts (TCSsCH)
- Till derived from Devonian and Carboniferous sandstones (TDCSs)
- Gravels derived from limestones (GLs);
- Eskers comprised of gravels of basic reaction (BasEsk);
- Alluvium (A);
- Lacustrine sediments (L);
- Bedrock outcrop or subcrop (Rck);
- Karstified bedrock outcrop or subcrop (KaRck).

Cut over raised peat covers the majority of the site and till derived from limestones covers the majority of the area surrounding the Application Site. The depth of peat will have reduced due to peat extraction. Alluvial deposits are found along the floodplain of the River Shannon.

The quaternary sediments present at the Application Site and how they are distributed across the study area is shown in Figure 8-3.





The published subsoils map (www.gsi.ie) shows cut over raised peat (Cut) underlies the site. Other subsoil types mapped in the wider study area include Glacial Tills derived from Limestone (TLs) and Gravels derived from Limestone (GLs).

A summary of the soils and subsoils in each bog are included in Table 8-7. A map of the local subsoil cover is attached as Figure 8-3.

Bog Name	Soils	Subsoils
Derryaroge	Cutover peat surrounded by basic deep well drained mineral soils with localised pockets of basic deep poorly drained mineral soils, basic shallow poorly drained mineral soils and lacustrine deposits. Mineral alluvium occurs along nearby watercourses. An area of made ground is recorded in the north of the bog in the vicinity of the Bord na Móna works depot.	Cutover peat surrounded by Till derived from limestones, Alluvium along streams/rivers. Some Gravels derived from limestones are located to the southeast and southwest but are remote from bog boundaries.
Derryadd	Cutover peat surrounded by basic deep well drained mineral soils with localised pockets of basic deep poorly drained mineral soils, basic shallow poorly drained mineral soils and lacustrine deposits. Mineral alluvium occurs along nearby watercourses	Cutover peat surrounded by Till derived from limestones, Alluvium along streams/rivers. An area of Till derived fro Devonian and Carboniferous sandstones is located approxianely 0.45km to the east of the site, outsite the site boudanry.
Lough Bannow	Cutover peat surrounded by basic deep well drained mineral soils with localised pockets of basic deep poorly drained mineral soils, basic shallow poorly drained mineral soils and lacustrine deposits. Mineral alluvium occurs along nearby watercourses	Cutover peat srounded by Till derived from limestones, Alluvium along streams/rivers.

Table 8-7: Summary of soils and subsoils at the Application Site

The soils and subsoils present at the site have been verified during site walkover surveys and intrusive site investigations completed as part of site investigations, dates of which are outlined in Section 8.2.4.

The presence of subsoil peat on-site has been confirmed by peat probing investigations conducted by IDL in 2021. Overall peat depths ranged from 0.1 to 5 m with an average of 1.4m. The subsoils encountered typically comprised of marl, clay, sandy or gravelly mineral soils. Peat depth information for the individual bogs comprising the site is summarised in Table 8-8. Peat depths at all site investigation points in Derryaroge Bog ranged from 0 – 3 m with an average of 1 m. Peat depths in Derryadd Bog ranged from 0.1 – 4 m with an average peat depth of 1m. Peat depths in Lough Bannow Bog ranged from 0 – 3 m with an average peat depth of 1m.

Bog Name	Average Peat Depth (m)	Summary of Subsoil Lithology
Derryaroge	1.2	Calcerous - Clay or gravelly mineral soil.
Derryadd	1.4	Calcerous - Marl, Sandy/gravelly mineral soil.
Lough Bannow	1.1	Calcerous and Non-Calcerous Sandy/gravelly mineral soil

Table 8-8: Summary peat depths across the Application Site

Additionally, the Applicant has conducted peat probing investigations as part of the ecological reporting which formed the basis of the draft Cutaway Bog Decommissioning and Rehabilitation plans. The Draft Cutaway Bog Decommissioning and Rehabilitation Plans (2025) include peat depth maps for each of the bogs (refer to Appendix 4-3). The surveying was completed over the time period from 2010 to 2016. The ecological survey report for Derryaroge, Derryadd and Lough Bannow bogs state that peat depths are predominantly in excess of 1 m. The report states that the main peat type left at each of the three bogs is an acidic red peat with mixed gravel till exposed at several places.

8.3.5 Site specific Investigation

Site investigations (SI) have been carried out across the bogs since the 1970's, with more recent investigations between 2021 and 2023 as detailed in Section 8.2.4. Examples of the various site investigation methods include trial pitting, peat probing and boreholes. These processes have confirmed the geology indicated in the previous sections.

Table 8-9: Site Investigation in each bog				
		Borenoies		
Derryaroge	TP 001-002	BH/RC 01A/B – BH/RC 09A/B		
	TP 280 – TP 372	BH/RC MMA		
	ТРАСРА	BH/RC PSA – BH/RC PSE		
	TP AR01 - TP AR18	BH/RC SSA09 - BH/RCSSA10		
	TP MMA01 – TP MMA02			
	TP PSA01 – TP PSA04			
	TP PSD01 – TP PSE04			
	TP T01 – TP T07			
	TPTCCA			
Derryadd	TP 100 – TP 107	BH/RC 10B - BH/RC 17A/B		
	TP 206 – TP 282	BH/RC BPA1 – BH/RC BE2		
	ТР АСРВ	BH/RC MMB		
	TP BPA01 – TP BPE02	BH/RC PSF – BH/RC PSK		
	TP I.D.L	BH/RC SSA01 - BH/RC SSA08		
	TP MMB01 – TP MMB02			
	TP PSF01 - TP PSJ02			
	TP SSA01 – TP SSA06			
	TP T11 – TP T14, TP T17			
	TP TCCB – TP TCCD			
Lough Bannow	TP 108 -TP 200	BH/RC 18A/B - BH/RC 24A/B		
	TP ACPC	BH/RC MMC		
	TP MMC01 – TP MMC02	BH/RC PSL - BH/RC PSN		
	TP T19 – TP T23			
	TPTCCE			

The 2021 to 2023 SI carried out in each bog is summarised in Table 8-9 below.

Table 8-9: Site	investigation	in each bog

The Application Site is covered in cutover peat, which is generally shallower than 2 m in thickness, but has been identified up to 5.0 m thick. As shown in Table 8-6 there are isolated areas of peat over 2.6 m in thickness. Borehole and trial pit records from the site investigation identified these areas to be:

Derryaroge bog - north-eastern corner, isolated areas along the eastern side of the bog, south-western corner and along the southern boundary;

- Derryadd bog along the northern boundary, in the centre of the western side of the bog and along the southern boundary;
- Lough Bannow bog isolate area along the eastern border and a single point on the western border.

The peat typically overlies glacial tills consisting of slightly gravelly silt/clay with cobbles and bounders and/or silty sands and/or gravels with cobbles and boulders, which in turn overlies bedrock. Bedrock was encountered at depths between 1.0 m and 19.5 m below ground level (mbgl) using rotary core boreholes.

8.3.6 Bedrock Geology

Information on the bedrock geology was obtained from the Geological Survey of Ireland (GSI) online map viewer in July 2023. The bedrock geology underlying the Derryadd, Derryaroge and Lough Bannow bogs can be seen in Figure 8-4.

The Derryaroge and Derryadd bogs are underlain by undifferentiated Visean Limestones. The southern area of Derryadd bog and the northern area of Lough Bannow bog is underlain by argillaceous Limestones described as dark limestone, shale and chert. The southern area of Lough Bannow bog is underlain by a number of different bedrock types. These are, from north to south, the Ballysteen Formation, described as dark, muddy limestone and shale; the Moathill Formation comprised of limestone, calcareous sandstone; Basal clastics, Waulsortian Limestones described as massive, unbedded lime-mudstones; and the Lucan Formation comprised mostly of dark limestone and shale.

Additional bedrock types within the study area but which do not underlie the bogs are dolomitised limestone within the Dartry Limestone Formation in the southwest and east and mudbank limestone in the east.

There are a number of faults in the area that cross through the Lough Bannow Bog. These are predominantly orientated in a general southwest to northeast direction. An unconformity separates the younger undifferentiated Visean Limestones from the various older bedrocks in the south of the study area.

Bedrock outcrops are present throughout the study area but are not mapped within the bogs.

There are 15 karst features within 2 km of the Derryaroge bog. These are all identified as enclosed depressions and are located between 0.8 km to 2.0 km east to northeast of the bog. Additionally, karst is mapped on an elevated plateau 2.5 to 4 km west of the site and includes Cordara and Fortwilliam Turloughs.

Bedrock was encountered in 350 no. trial pits completed at the site which extended to a maximum depth of 4.5mbgl and were terminated due to obstruction (possibly due to bedrock or large boulders in the underlying glacial till). The 101 no. cable percussion boreholes extended to depths ranging from 6 to 30 mbgl (Appendix 8-1). Depth to bedrock at the site form the 2021 IDL SI varies from 1 m to 15 m across the Application Site.



8.3.7 Soil Contamination

An evaluation was undertaken to determine the presence and extent of potentially contaminated land in the study area. This evaluation is based on the identification of potential source pathways and receptors.

A review of the EPA website for existing and historic licenced and illegal waste activities, mines and industries was carried out to identify any potential contamination sources present in the area to identify any potential contaminating activities near the Application Site. Based on the site walkovers of the Application Site, as well as site investigation data, there is no evidence of contaminated lands on the site. Some fly-tipping was noted within the Application Site during the site walkover in October 2023. No fly tipping was noted in the site walkover, October 2024.

8.3.7.1 <u>Waste Facilities</u>

The EPA/WFD online water maps contain a points dataset of the location of current Waste facilities (including licensed, applied, surrendered, rejected etc.). In 1996 the EPA began licensing certain activities in the waste sector. These include landfills, transfer stations, hazardous waste disposal and other significant waste disposal and recovery activities. There are no waste facility licences recorded within the Application Site boundary.

8.3.7.2 Industrial Emission Licences (IEL)

The EPA/WFD online water maps contain a point dataset of Industrial Emissions Licensing facilities. The EPA is the competent authority for granting and enforcing Industrial Emissions Licences (IEL) for specified industrial and agriculture activities listed in the First Schedule to the Environmental Protection Agency Act 1992 as amended. There are two IELs within 2km of the bog boundary – See Table 8-10.

	Industrial Emissions Licence P1082	Industrial Emissions Licence P0610-03
Name	JMW Farms (IRL) Limited	Electricity Supply Board (Lough Ree Power)
Location	Northeast of Derryaroge	Lanesborough Town, 1km west of Derryaroge
Licence Status	Licensed	Licensed
Date From	2018	2015
Category	Industry	Industry
Main Class of Activity	6.2 (b) (intensive agriculture)	2.1 (energy)
Active Licence Number	P1082-01	P0610-03

Table 8-10: IEL Licenses within 2km of the bogs

8.3.7.3 Integrated Pollution Control (IPC) Sites

The EPA/WFD online water maps contain a points dataset of Integrated Pollution Control (IPC) sites. The EPA has been licensing certain activities since 1994. IPC licensing is governed by the Environmental Protection Agency Act 1992 as amended. Detailed procedures concerning the

IPC licensing process are set out in the EPA Act 1992 as amended, and the associated licensing regulations.

IPC licences aim to prevent or reduce emissions to air, water and land, reduce waste and use energy/resources efficiently. An IPC licence is a single integrated licence which covers all emissions from the facility and its environmental management. All related operations that the licence holder carries in connection with the activity are controlled by this licence. There are two IPC licenced sites within 2 km of the Application Site boundary. As detailed in Table 8-11 below, the Application Site is within P0504-01.

	Integrated Pollution Control Site P0504-01	Integrated Pollution Control Site P0629
Name	Bord na Móna Lanesboro (Longford)	Electricity Supply Board (Lanesborough)
Licence Status	Licensed – harvesting finished 2019	Surrendered - 2019
Date From	2015	2003
Category	Industry	Industry
Main Class of Activity	1.4 (peat extraction)	2.1 (Energy)
Active Licence Number	P0504-01	P0629-01

Table 8-11: Nearb	v Sites with	Registered	IPC Licences
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The desk study indicated that no illegal waste activities were present within 2km of the Application Site boundary. Minor spills etc may have occurred during the lifetime of the Project however there has been no on-site evidence of contamination resulting from spills detected. Spill management and other control measures are in place under the current IPC licence requirements for the Application Site.

8.3.8 Economic Geology

The GSI Online Aggregate Potential Mapping Database (www.GSI.ie), shows that there are no active quarries within the Application Site. The closest mapped active quarry is located approximately 13km to the northwest of the Application Site, in Castlemine Quarry, within the townland of Cashelmeehan, Co. Roscommon.

There is one mineral location present within the study area which consists of marl located within the Derryaroge bog. Additional areas of marl and lacustrine deposits were noted to the south of Derryadd bog and represent an area of former lake deposits. It is described as shelly marl/ calcareous mud approximately 55cm in thickness underlying organic muds with shells.

The GSI online Aggregate Potential Mapping Database (www.gsi.ie) shows that the crushed rock aggregate potential of the Application Site ranges from Very Low to Very High potential. The areas of Very High potential are located along the western boundary of Derryaroge. However, majority of Derryaroge and Derryadd Bog are located within Moderate areas, with Lough Bannow bog located within predominantly Low crushed rock aggregate potential areas. The limestone bedrock underlying the Application Site could be classified as "Medium" importance. The bedrock could be used on a "sub-economic" local scale for construction purposes. The bedrock has not been used in the past at the site for this purpose, likely because of the covering of peat and glacial till overburden in the area.

The majority of the Application Site is not located within an area mapped for granular aggregate potential (i.e. potential for gravel reserves). The overlying peat deposits at the site could be classified as "Low" importance as the peat is not designated in this area and is significantly degraded in most places at the Application Site as a result of industrial peat extraction activities and all ancillary works and drainage.

8.3.9 Geological Heritage

The GSI provides scientific appraisal and interpretive advice on geological and geomorphological sites and is responsible for the identification of important sites that are capable of being conserved as Natural Heritage Areas (NHA).

There is a designated geological heritage site immediately south of Lough Bannow bog which is the Corlea Trackway (Site Code: LD006). The site comprises an Iron Age trackway, or togher, which was constructed from oak planks in 148–147 BC. At the time that the trackway was laid down, the landscape consisted of bog, marsh, quicksand and ponds and was surrounded by dense (oak) woodlands. Such terrain was dangerous and impassable for much of the year. The trackway was approximately 1 km in length and ended on a small island from which a second trackway connected to dry land on the far side of the bog. The purpose of the trackway is uncertain and was only usable for a few years. It was gradually covered by the rising bog and sank under its own weight into it within a decade. This disappearance of the feature gives the site its geological interest. It is possible that the trackway was used for a period as part of the ceremonial highway connecting the Hill of Uisneach (Westmeath), the ritual centre of Ireland, and the royal site of Rathcroghan (Roscommon).

The trackway is situated in Corlea Bog where peat was extracted on an industrial-scale by Bord na Móna to supply the peat-fired power stations of the ESB. The timbers were recovered from Corlea in 1984 and an archaeological project was established to investigate the site. Excavations to 1991 revealed fifty-nine toghers in an area of around 125 ha, and further work raised the total to 108 with a further seventy-six in the nearby Derryoghil bog. Since the 1990s, Corlea Bog serves as a public amenity area with a visitor site and walkway located within the bog.

Corlea trackway is not located within the Application Site and therefore there was no significant direct effects on the land soils and geology of the Corlea Trackway site from works conducted at the Application Site. Further details on Corlea bog Trackway are included in Chapter 13 Archaeology.

There have been no other additional geological heritage sites identified within 2 km of the site boundary.

8.3.10 Peat and Slope Stability

The Applicant's records do not document the occurrence of any historic landslides at the Application Site. Similarly, the GSI's online database (www.gsi.ie) does not report any historic landslides within the Application Site or in the surrounding study area. The majority of the site has Low susceptibility for landslides. The more elevated areas within the bog have a Moderately Low susceptibility. Figure 8-5 shows the landslide susceptibility classification of the bogs.

Given that the Application Site is relatively flat lying and that the peat across the site has generally been drained and worked, the risk of slope or peat instability associated with the extent of the site is low. The GSI have developed a landslide susceptibility map which identifies areas which are subject to landslides and is measured from low to high. The landslide

susceptibility map considers where the landslides occur and what causes them (slope, soil type and the impact of the flow of water in an area). The site and the surrounding areas are classified as **Low** susceptibility. No evidence of peat instability (i.e., peat pipes) was noted on the site during any of the site walkovers.

As the Application Site was subject to peat extraction for close to 40 years prior to 1988, the residual peat depths across the Application Site in 1988 were reduced and the bogs were drained with shallow slopes. No peat slide/slope failures occurred during the period from 1988 to present day.

A qualitative assessment of geohazards at each of the 3 no. bogs of the Application Site has been completed and is presented in Table 8-12. The assessment reviews any local historical failures, residual slopes within each bog, and residual peat depths at each bog. The assessment presents an evaluation of slope failure risks associated with each bog unit. Each of the bogs are drained, and peat extraction has now ceased. Each of the bogs have very low ground slope levels within the extraction areas, they occur within low-lying enclosed basins, and these in combination with the historical and continued drainage reduces the peat failure risks significantly.

Bog Name	Local Geohazards	Average Residual Peat Depths (m)	Slope Failure Risks
Derryaroge	None recorded	1.4	Negligible
Derryadd	None recorded	1.5	Negligible
Lough Bannow	None recorded	1.1	Negligible

Table 8-12 Peat depths (based on 2017 and 2021 SI)



8.4 ASSESSMENT OF SIGNIFICANT EFFECTS ON LAND, SOILS & GEOLOGY

8.4.1 Do-Nothing Scenario

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing Effects' relates to the environment as it would be in the future should the project not be carried out.

A description on the approach to the 'Do-Nothing Scenario' in this rEIAR is presented in Section 2.11 of Chapter 2 (rEIA Methodology). All the associated infrastructure (e.g. workshop, railway infrastructure, tea-stations, canteens etc) were present at the Application Site prior to 1988.

In the event that commercial peat extraction activities had ceased in 1988 (the baseline year for this assessment) a total of 11,279,549m³ of peat which has been extracted since 1988, would not have been extarcted from the Application Site. The topographic changes associated with the removal of this volume of peat would not have arisen and the topography across much of the Application Site would be greater (<1 to c.4m) than it is today. However, small scale private turbary activities would likely have occurred outside the margin of the bogs and along access tracks. Any resulting changes in topography would have been very localised in nature and around the accessible edges of the bogs.

The EPA was established post-1988, following the enactment of the S.I. 7 of 1992 *Environmental Protection Agency Act 1992*. The EPA was established post-1988, following the enactment of the S.I. 7 of 1992 *Environmental Protection Agency Act 1992*. Under the donothing scenario, in which there would be no IPC Licecne in place, the EPA Cutaway Bog Decommissioning and Rehabilitation Plans would not have been prepared. Other land uses may have occurred under the do-nothing scenario as a result of the cessation of peat extraction, including the development of areas of forestry, or the management of lands to facilitate agriculture (see Chapter 3 – Alternatives for descriptions of alternative land uses explored by the Applicant).

Areas of the Application Site which already comprised bare peat extraction fields by 1988 would have been gradually recolonised by vegetation (scrub) and commenced natural rewetting (due to drains becoming blocked over time). Today, former peat extraction fields across the site have re-vegetated naturally so it is reasonable to assume that if peat extraction had ceased in 1988, the bare peat fields would have re-vegetated. In this scenario, the site would likely be covered in a mosaic of heath, scrub and woodland habitats.

However large-scale peat extraction has occurred at the Application Site since 1988, ceasing in the summer of 2019. There is no intention to carry out further peat extraction activity at this site in the future and therefore the option of continuing peat extraction has been discounted and does not arise.

Under the current phase, there is limited activity on the site (i.e., ongoing decommissioning activities and settlement pond maintenance), but Cutaway Bog Decommissioning and Rehabilitation Plans will be implemented as required by EPA Licence P0504-01. In the case that the Cutaway Bog Decommissioning and Rehabilitation Plans were not implemented, it is likely that the lands would evolve in an uncontrolled way and would continue to naturally revegetate over time. This is already occurring in several areas of the site which have been out of peat extraction for a considerable time prior to 2019. However, if the bogs were to evolve in an uncontrolled fashion the potential positive environmental effects (primarily hydrological and ecological effects) which the Cutaway Bog Decommissioning and Rehabilitation Plans aim to

support based on best practice and scientific evidence, would not be fully realised or realised in a timely manner. If the Cutaway Bog Decommissioning and Rehabilitation Plans are not implemented the effect of the cessation of peat extraction activities on the land, soils and geological environment would be positive in nature primarily in relation to the revegetation of the bare peat fields. In the Do-Nothing scenario the likely effect on land and soils/land is a Slight, Positive, Long-Term effect on land and soils/land.

Had peat extraction not taken place since 1988, it is assumed that the Application Site would have been utilised for alternative land uses, possibly forestry with small-scale agriculture, and small-scale turf cutting.

8.4.2 Identification of Effects

8.4.2.1 <u>Peat Extraction Phase (1988- July 2019)</u>

The peat extraction phase of the development includes all works undertaken from 1988 to the cessation of peat extraction activities in July 2019.

Effects on Land (Change of Land Use)

Land and land-use changes at the Application Site were investigated between 1988 and 2022 (refer to Section 8.3.3). Due to the nature of peat extraction activities, the primary land change occurs during the initial site preparation works (from 1949) where drainage and the removal of vegetation in preparation for the peat extraction operations. Therefore, the greatest change of Land Use associated with the peat extraction works at the Application Site pre-dated 1988.

By 1988 industrial peat extraction by the Applicant was well-established at the Application Site. Derryaroge Bog was first drained in 1949, with peat extraction beginning there in 1952. Site preparation and drainage works commenced at Derryadd and Lough Bannow bogs in 1960, with milled peat extraction commencing there in 1964.

Therefore, by 1988 the soils/land at these bogs had already been significantly altered and ancillary structures already in place. In 1988 these areas were utilised for industrial peat extraction with landcover consisting of drained bare or vegetated peat fields separated by field drains. Slight annual topographic changes (~0.12-0.18m/year) associated with peat extraction will have occurred in the extraction areas at the Application Site. Areas under peat extraction were progressively reduced during the application period. The effect of the excavation of the peat on soils, geology and land did not result in a loss of peat habitat due to the disturbance of bare peat.

The baseline sensitivity of the receiving Land use has been assessed as Low on the basis of the no removal of raised bogs (post-1988) in the context of the Application Site. Based on the low sensitivity, low magnitude change of land use during the 1988-2019 extraction phase, the potential effects on land use change are not significant and medium term.

Effect on Contamination of Soil

Accidental spillage during refuelling of machinery and plant (static and mobile) with petroleum hydrocarbons is a pollution risk. The accumulation of small spills of fuels and lubricants during routine plant use can also be a significant pollution risk over time. Hydrocarbons have high toxicity to humans, and all flora and fauna, including fish and is persistent in the environment. Large spills or leaks have the potential to result in significant effects (i.e., contamination of peat, subsoils and pollution of the underlying aquifer) on the geological and water environment.

There was no widespread contamination of soil at the Application Site as the machinery and equipment were well maintained and that if any spills did occur, they were localised. If the correct preventative measures were not put in place leakages and spillages could have altered the peat and soil geochemistry. There are no outstanding issues identified as part of the annual reporting associated with the IPC licence.

Discharges from the wastewater system (septic tanks) at the office buildings, and at the extraction centres and maintenance workshops could potentially have caused surface water and groundwater contamination. However, following review of available AER (Annual Environmental Reports submitted to the EPA under the IPC licences) it can be concluded that no significant pollution events/spills to groundwater have occurred since 2000 (surface water is dealt with separately in this rEIAR). Furthermore, following a review of the available data on the EPA website in relation to pollution and water quality of the surface water features at the bogs, had such an event occurred prior to the year 2000, the effects were either insignificant or slight and short-term.

Effect on Geological Heritage

There are no Geological Heritage sites within the Application Site. Based on the review of the information there is no potential for impact on geological heritage at the site.

Effect on Peat Stability and Failure

Disturbance of natural peatland can lead to an increased risk of peat instability and failure. Peat instability or failure refers to a significant mass movement of a body of peat that would have a negative effect on individual bogs such as the Application Site and potentially the surrounding environment. Some minor peat instability could have occurred during initial development of bog drainage or ancillary activities associated with peat extraction. The significant effects of peat failure at the site could have resulted in:

- Death or injury to personnel;
- Damage to machinery;
- Damage or loss of infrastructure;
- Drainage disruption by blockage of drainage pathway by relocated peat;
- Contamination of watercourses, water supplies by particulates; and,
- Degradation of the peat environment by relocation of peat.

Based on the absence of peat stability issues during the peat extraction phase (1988-2019), the potential effects on peat stability are negligible.

8.4.2.2 <u>Current Phase (July 2019 – Present)</u>

The current phase of the Project encompasses the period of time between the cessation of peat extraction activities at the site in July 2019 to the present day.

Effect on Land and Land-Use

Following the cessation of peat extraction activities in July 2019, land-use at the Application Site is no longer classified as industrial peat extraction. The Application Site is no longer subject to peat extraction, and the current phase of peat extraction activities will have a positive effect on land and land-use. The Cutaway Bog Decommissioning and Rehabilitation Plans entail the removal of all tea centres, maintenance sheds and railway lines from the peatland areas.

The decommissioning of the bog from peat extraction activities will have positive effects on land use in terms of facilitating alternative uses and sustainable energy development on these peatlands, for example the proposed development of a wind farm, as outlined in Section 4.10.1.

In terms of the land itself the current phase will have a slight positive effect on the landscape of the bog as peat layers are no longer being stripped for harvesting and redundant infrastructure around the bogs will be removed. There are no significant effects during the current phase on land and land-use.

Effect on Contamination of Soil

The current phase is underway across the Application Site and is being carried out in accordance with Condition No. 10 of the IPC Licence. The Applicant is required to:

"Decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or ant waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution".

Despite the cessation of peat extraction activities at the Application Site, there is still limited activity at the site involving machinery and plant with which there is always a risk of accidental spillage of hydrocarbons. Similarly, the office buildings at the Mountdillon Works depot remain occupied and discharges from wastewater systems (septic tanks) etc. have the potential to cause surface water and groundwater contamination. These risks are the same as those outlined in Section 8.4.2.2 but to a lesser extent due to the lower volumes of plant, machinery and workers operating at the site during the current phase.

Based on the absence of significant contamination events at the application site, the effects were insignificant or slight, short-term and reversible.

Effect on Geological Heritage

There are no Geological Heritage sites within the Application Site. Based on the review of the information there is no potential for significant effects on geological heritage at the site.

Effect on Peat Stability and Failure

Disturbance of natural peatland can lead to an increased risk of peat instability and failure. No peat extraction has occurred at the Application Site since the cessation of peat extraction in 2019. Therefore, no significant change in topography and/or drainage has occurred during the period. The removal of ancillary infrastructure e.g., the railway track embankments, has the potential for minor disturbances to peat stability. The rail track will be removed however the railway embankment will remain in place, therefore there is no effect. However, there are no records of any landslides in relation to peat failure or instability to date and it is highly unlikely that the removal of ancillary infrastructure would cause any perceptible changes to peat stability given the low-lying/flat nature of the local topography.

Significance of Effects

Hence, it is concluded that the ongoing current phase of the peat extraction activities has not significantly impacted peat stability at the Application Site. The effect on peat stability and failure as a result of the current phase is negligible as no instability has occurred.

8.4.2.3 <u>Remedial Phase</u>

This section presents an assessment of likely significant effects resulting from the Applicant's final and draft Cutaway Bog Decommissioning and Rehabilitation plans for the 3 no. bogs comprising the Application Site on the land, soils and geological environment. Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies based on environmental characteristic.

Change of Land Use

Industrial peat extraction has now ceased, and several other decarbonisation measures are being implemented. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

The optimum habitats on the site are a mosaic of wetlands, scrub and heaths/peatlands. As the former raised bogs are basin peatlands, it is unlikely that the overall area will revert to peatlands in the short to medium term.

One of the main criteria which will be used to define the success of the Cutaway Bog Decommissioning and Rehabilitation plans will be the stabilisation of the former peat extraction activities and all ancillary works areas. The peatland stabilisation will be achieved primarily through natural colonisation of the former peat extraction activities and all ancillary works fields.

The potential effect is considered to be – not significant, positive, direct, long-term, certain effect on land use. On this basis no mitigation is required. Any works undertaken as part of the Cutaway Bog Decommissioning and Rehabilitation plans will be completed in compliance with the licence from the EPA until the IPC Licence is surrendered.

Effect on Contamination of Soil

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development. Proven and effective measures to mitigate the risk of spills and leaks were implemented by the Applicant at the Application Site. The management of fuel on site is in accordance with the IPC Licence. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock. Fuel tanks will be decommissioned and removed as part of the IPC Licence conditions.

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there is no significant effects on peat, subsoil and bedrock. The Applicant will continue to comply the existing IPC Licence conditions.

Effects on Geological Heritage

No significant effects were identified. There are no geological heritage sites present on the site. No additional mitigation is required.

Effect on Peat Stability and Failure

The remedial phase aims to stabilise and revegetate the surface of the peat. No peat will be removed from the Application Site during the remedial phase, and no drainage will be installed. The risk of peat failure at the Application Site will remain very low. There were no significant long-term effects at the bogs on peat stability. The effect on peat stability and failure during the current phase of the Application Site was negligible and there were no records of peat instability recorded in the bog. No additional mitigation is required.

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on peat stability.

8.5 CONTROL/MITIGATION AND MONITORING MEASURES

The impact assessment of this rEIAR identifies where an aspect of the project was likely to give rise to significant environmental effects and identifies any control and/or monitoring measures that were put in place in order to avoid effects or reduce them to acceptable levels where possible. The assessment also identifies the requirement for any additional mitigation and/or monitoring measures.

8.5.1 Peat Extraction Phase (1988-2019)

8.5.1.1 Effects on Land (Land Use Change)

No known control measures for land and soils/land exist in the context of the activity being assessed here, other than working on Bord na Móna owned land, and operating peat extraction in an established extraction area.

Peat extraction ceased at the Application Site in July 2019 and much of the Application Site has begun to naturally revegetate.

8.5.1.2 Effect on Contamination of Soil

Pre-IPC Licence:

As described in Chapter 4, there is no formal documentation available for the control measures implemented at the site prior to 2000. However, as outlined in section 4.1.2, personal communication with former Bord na Móna employees reveal a suite of management measures which were in effect across the site. The following best practice procedures were implemented at the site pre-2000 in order to prevent the occurrence of hydrocarbon leakages and spillages at the site:

- All peat harvesting machinery were stored at the Mountdillon Works at the end of each workday.
- All machinery were regularly inspected, serviced by dedicated Bord na Móna staff.
- 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.
- A self-contained machine parts washer was located at the Workshop.
- All refuelling and vehicles maintenance was undertaken at the Mountdillon Works depot.
- If on-site refuelling was required it was done so with a mobile fuelling unit.
- In the event of a spill, the General Manager was immediately informed of the incident.

- The spill was assessed by the General Manager for potential risk to the health and safety of employees and the potential environmental consequences.
- A spill would be sourced, isolated and contained with polystyrene booms or dry peat (moisture content of 10%).
- All effort should be made to prevent the spill from entering a storm drain or nearest outfall.
- Once the spill has been contained, a suitable absorbent (dry peat) is to be used to soak the spillage.
- All possible ignition sources such as electoral equipment, naked lights, machinery should be removed from the area. Any combustibles in the spill area should be removed.
- Follow up action measures taken must include the implementation of appropriate remedial work to prevent such a spillage recurring in the future.
- In the event of a significant spillage, the General Manager must notify the local authority.
- All waste oil and break fluids drained from machinery were collected in drums and emptied into a waste oil storage tank which were transported off-site by a licenced disposal contractor.
- All used oil and fuel filters and used batteries were collected by licenced disposal and battery collection contractors respectively.
- All washing from the self-contained machine parts washer was collected within a sludge tank at the Mountdillon Works.

Post-IPC licence:

These control measures were upgraded to comply with the IPC Licence conditions in 2000:

- Effective spill/leak management of mobile fuelling units.
- Replacement (and remediation where necessary) of all underground fuel tanks.
- There shall be no other emissions to water of environmental significance.
- All tank and drum storage areas shall be rendered impervious to the materials stored therein. In addition, tank and drum storage areas shall, as a minimum be bunded.
- Drainage from bunded areas shall be diverted for collection and safe disposal.
- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall be tested and demonstrated by the licensee to the satisfaction of the Agency and shall be reported to the Agency within eighteen months from the date of grant of this licence and every two years thereafter.
- The loading and unloading of fuel oils shall be carried out in designated areas protected against spillage and leachate run-off.
- While awaiting disposal, all materials shall be collected and stored in designated areas protected against spillage and leachate run-off.
- With the exception of roof water, all surface water discharges from workshop areas shall, be fitted with oil interceptors.
- An inspection for leaks on all flanges and valves on over-ground pipes used to transport materials other than water shall be carried out weekly.
- Inspections and monitoring of wastewater systems and associated discharges in accordance with the IPC licence.

8.5.1.3 Effects on Geological Heritage

No significant effects on geological heritage were identified, therefore no mitigation required.

8.5.1.4 Effect on Peat Stability and Failure

There are no records of Peat instability on the Application Site or surrounding area. The GSI or Bord na Móna records do not document the occurrence of peat slides or evidence of peat instability or failure within the Application Site throughout the duration of peat extraction. Since the baseline assessment year of 1988, an active and extensive drainage design has been in place. The residual peat depths across much of the Application Site are shallow, and slopes are small, so the risk of large-scale peat failure is negligible. Mitigation/control and management measures that have been implemented relating to peat stability include:

- All drainage works were completed by experienced and competent operatives;
- All works were designed and overseen by experienced and qualified Bord na Móna personnel;
- The drainage design around the Application Site was maintained and managed by Bord na Móna throughout the duration of the peat extraction phase (1988 2019); and,
- Bord na Móna implemented their own best practice drainage maintenance pre-2000 when these were updated to comply with IPC licence conditions in 2000 (refer to Chapter 4).

8.5.2 Current Phase (2019 – Present Day)

Measures that mitigated and will continue to mitigate against contamination of peat, subsoil and bedrock are outlined in Section 8.4.2.2 and are currently being adhered to at the site. These mitigation measures reduce the risk of soil contamination. These measures/controls have been implemented as part of compliance with IPC licence conditions across the Mountdillon Bog Group, including the Application Site. No further mitigation, beyond that implemented to date, are deemed necessary. The existing wastewater services at the Application Site have been in operation for years with no reported issues.

8.5.3 Remedial Phase

Measures that mitigate and will continue to mitigate against contamination of peat, subsoil and bedrock are outlined in Section 8.4 and are currently being adhered to at the site. These mitigation measures reduce the risk of soil contamination. These measures/controls have been implemented as part of compliance with IPC licence conditions across the Mountdillon Bog Group, including the Application Site. No further mitigation, beyond that implemented to date, are deemed necessary. The existing wastewater services at the Application Site have been in operation for years with no reported issues.

8.6 **RESIDUAL EFFECT**

8.6.1 Peat Extraction Phase (1988 – July 2019)

8.6.1.1 Change of Land Use

A significant change to the land/soil environment occurred following the cessation of the peat extraction works, with natural revegetation of peat extraction areas gradually taking place across the Application Site. Some areas previously in production in 1988 had revegetated by 2019. The residual effect on soils/land of this natural revegetation in the peat extraction phase can be classified as *Medium term, Not significant Effect* on soils/land at the Application Site.

The residual effect on areas still subject to peat extraction by 2019 is imperceptible.

Significance of Effects

For the reasons outlined above there are no significant effects on landcover and topography, but there is a significant positive impact on soils/land, having changed from industrial peat extraction to recovering peatland/scrub and wetland habitats.

8.6.1.2 Effect on Contamination of Soil

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development. Proven and effective measures to mitigate the risk of spills and leaks were implemented by Bord na Móna at the Application Site. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock. No evidence of contamination was identified on site.

Significance of Effects

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there has not been significant effects on peat, subsoil and bedrock.

8.6.1.3 Effects on Geological Heritage

No significant effects were identified. There are no geological heritage sites present on the site.

8.6.1.4 Effect on Peat Stability and Failure

There were no significant long-term effects from peat harvesting at the bogs on peat stability. There were no records of peat instability recorded within the Application Site. The effect on peat stability and failure during the extraction phase of the Application Site was negligible.

Significance of Effects

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on people, land and infrastructure have occurred.

8.6.2 Current Phase (July 2019 to present day)

The current Phase of the Project encompasses the period of time between the cessation of peat extraction activities at the Application Site in July 2019 to the present day.

8.6.2.1 Change of Land Use

Following the cessation of peat extraction in July 2019, land-use at the Application Site for industrial peat extraction ceased. Peat stockpiles and loose peat on the active peat extraction areas were removed and the area was allowed to re-vegetate and benefit from natural recolonisation. Areas where the mineral soil are exposed and areas of surface water drains have begun to recolonise first. Recolonisation of bare peat areas has begun with pioneer species such as rush and scrub. Areas where scrub is present have slowly expanded since 2019.

However, given the relatively short time period which has elapsed since the cessation of peat extraction, there has been no significant change in land cover to date, with much of the Application Site containing bare peat fields or pioneer open cutaway habitats.

Significance of Effects

For the reasons outlined above, it can be concluded that there has not been significant effects on peat, subsoil and bedrock.

8.6.2.2 <u>Effect on Contamination of Soil</u>

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development. Proven and effective measures to mitigate the risk of spills and leaks were implemented by the Applicant at the Application Site. The management of fuel on site is in accordance with the EPA licence. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

Significance of Effects

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there has not been significant effects on peat, subsoil and bedrock.

8.6.2.3 Effects on Geological Heritage

No significant effects were identified. There are no geological heritage sites present on the site.

8.6.2.4 Effect on Peat Stability and Failure

There were no significant long-term effects at the bogs on peat stability. The effect on peat stability and failure during the current phase of the Application Site was negligible and there were no records of peat instability recorded in the bog.

Significance of Effects

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on people, land and infrastructure have occurred.

8.6.3 Remedial Phase

This section presents an assessment of likely significant effects resulting from the Applicant's draft Cutaway Bog Decommissioning and Rehabilitation plans for the 3 no. bogs comprising the Application Site on the land, soils and geological environment. Peatland restoration and rehabilitation requires detailed planning and the use of data from desktop surveys and field surveys. This data in association with topographical and hydrological modelling will be important in planning the future peatland landscapes and planning the use of the most appropriate rehabilitation methodologies based on environmental characteristic.

8.6.3.1 Change of Land Use

Industrial peat extraction has now ceased, and several other decarbonisation measures are being implemented. In addition, the carbon emission mitigation benefits associated with the post-peat extraction rehabilitated peatland following re-wetting, revegetation and colonisation of significant areas with native woodland will make a significant contribution to achieving the State's carbon emission reduction targets.

The optimum habitats on the Application Site are a mosaic of wetlands, scrub and heaths/peatlands. As the former raised bogs are basin peatlands, it is unlikely that the overall area will revert to embryonic bog/mirein the short to medium term.

One of the main criteria which will be used to define the success of the Cutaway Bog Decommissioning and Rehabilitation Plans will be the stabilisation of the former peat extraction activities and all ancillary works areas. The peatland stabilisation will be achieved primarily through natural colonisation of the former peat extraction areas.

The residual effect is considered to be - moderate, direct, long-term, likely effect on land use.

8.6.3.2 Effect on Contamination of Soil

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with many types of development including rehabilitation works. Proven and effective measures to mitigate the risk of spills and leaks were implemented by Bord na Móna at the Application Site. The management of fuel on site will be in accordance with the EPA licence. These control measures break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

Significance of Effects

For the reasons outlined above, and with the implementation of the control measures it can be concluded that there will not be significant effects on peat, subsoil and bedrock.

8.6.3.3 Effects on Geological Heritage

No significant effects were identified. There are no geological heritage sites present on the site.

8.6.3.4 Effect on Peat Stability and Failure

There will be no significant long-term effects on peat stability at the 3 No. bogs. The effect on peat stability and failure during the current phase of the Application Site was negligible and there were no records of peat instability recorded in the bog.

Significance of Effects

For the reasons outlined above, and with the application of the control measures outlined above, no significant effects on people, land and infrastructure are likely to have occurred.

8.6.4 Cumulative and Indirect Effects

As outlined in Section 2.9.2 the projects considered in relation to the potential for cumulative effects, and for which all relevant data was reviewed, include existing and historical large-scale developments in operation surrounding the Application Site. This included developments which were constructed prior to 1988 but were operational between 1988 and the present day at the same time as the peat extraction works, as well as developments which were built after 1988 and operational at the same time as the peat extraction works.

The developments identified are listed in Table 2-3 to 2-5 of Chapter 2 and the main projects with potential cumulative effect on the land use, soils and geological environment are described in the subsequent sections. To account for the potential effects which may occur from the ongoing current of the peat extraction works at the Application Site and the future rehabilitation of the lands in accordance with the IPC Licence requirements, consideration was also given to the planned future uses of the lands within the Application Site, namely for renewable energy development as well as enhanced rehabilitation under the Peatlands Climate Action Scheme (PCAS).

Peat Extraction Phase

Lanesborough Power Station

Lanesborough Power Station (LPS) was constructed in 1958, 30 years before the baseline assessment year of 1988 and prior to commencement of formal planning legislation in Ireland. Therefore, only the operation of the plant since 1988 until it was decommissioned in 2004 and demolished in 2007 is relevant for the cumulative impact assessment. Peat extracted from the bogs at the Application Site was transferred to the power station by a dedicated narrow gauge rail line. When considered cumulatively with the Peat Extraction Phase there is no potential for significant cumulative effect with the Application Site.

Lough Ree Power Station (01/115)

The 100 MW generating Lough Ree Power Station (LRPS) was commissioned in 2004, to replace the LPS. LRPS had a 15-year contract to burn peat supplied by Bord Na Móna and closed at the end of 2020. Peat extracted up to July 2019 from the bogs at the Application Site was transferred to the power station by a dedicated rail line. The demolition of Lough Ree Power station was granted in December 2022. When considered cumulatively with the Peat Extraction Phase there is no potential for significant cumulative effect with the Application Site.

Derraghan Ash Disposal Facility (ADF)

The Derraghan Ash Disposal Facility (ADF) was constructed in 2004 to manage ash produced from the LRPS. Consent for the facility was provided for as part of the power station. The ADF is located 0.5km west of Lough Bannow Bog. The site occupies an area of approximately 33 ha within the Derraghan Bog, which is also part of the Mountdillon Bog Group. The ADF was designed to exclusively accept peat ash from the power station.

The Derraghan ADF was operated in accordance with an Industrial Emissions (IE) Licence (Reg. No. P0610-02) issued by the EPA. This licence covers both generation and ash disposal facility activities. The facility is maintained by the ESB with ongoing aftercare and maintenance.

Ash was transported from the LRPS exclusively by Bord na Móna rail line, which traversed the Application Site bogs between the power station and ADF, crossing under the R392 Regional Road, at the entrance to the facility in Derraghan Bog, and continuing south to the ADF.

The 2022 Annual Environmental Report (AER) for the facility states that no waste was accepted at the facility in 2022 as the power plant had ceased operations in 2020. A ground investigation was undertaken by ESB at the existing Ash Disposal site and no discernible contamination of the soils at the site was found. The presence of low permeability overburden, and bunding protect the locally important groundwater resource present in the bedrock beneath the ADF. In addition, the ADF facility is not located within the Application Site.

When considered cumulatively with the Peat Extraction Phase there is no potential for significant cumulative effect with the Application Site.

Sliabh Bawn Wind Farm (ABP-PL20.239743)

The planning permission for Sliabh Bawn Wind Farm was granted by ABP in 2012. Slieve Bawn is an operational windfarm located to the northwest of Lanesborough to the west of the River Shannon. The wind farm is located on a upland Coillte site underlain by shallow soils and

bedrock. When considered cumulatively with the Peat Extraction Phase there is no potential for significant cumulative effect with the Application Site.

Material Disposal Sites (Ref. 0673 and 0688)

Permission was applied for two material disposal areas outside of the Application Site, which included for inert materials, soils and subsoils. The sites are located 1km east of Derryadd Bog, at Cloonfiugh, Killashee, Co. Longford.

Due to the location outside of the Application Site boundary there is no potential for significant cumulative effects during the Peat Extraction Phase.

Current Phase

Renewable energy projects and grid upgrade works (See Table 2-4, Chapter 2)

There are a number of applications for renewable energy projects including solar farms, battery energy storage systems, substations, grid uprate works applied for during the Current Phase. The location of these projects are outside the Application Site and therefore do not result in potential for significant cumulative effects during the Current Phase.

Permission has been granted for an underground electrical cable and transformer compound to connect permitted solar farms to the national grid at Lough Ree Power Station (22275). Construction is currently underway on this cable which crosses sections of the Derryaroge Bog. There is a potential for a slight adverse cumulative effect during the construction of the cable route within the Application Site due to the temporary stripping of soils and excavations needed for cable trenching.

Material Disposal Site (20215)

Permission was applied for a single inert material disposal area at Carrowmanagh, Killashee, Co Longford, 3km outside of the Application Site. Due to the location outside of the Application Site boundary there is no potential for significant cumulative effects during the Current Phase.

Active travel network (2460132)

Permission was granted for a network of walking and cycling trails on lands to the west of the Application Site. These trails will be outside of the Application Site and thus their construction and operation during the Current and Remedial Phases will not result in cumulative effects.

Other industrially harvested bogs operated by Bord na Móna and private operators (Peat Extraction and Current Phase)

Consideration has been given to other industrially harvested bogs located in close proximity to the Application Site. These primarily consist of other bogs owned and operated by Bord na Móna which are also part of the Mountdillon Bog Group, however it also includes privately owned and operated commercially harvested bogs. Industrial peat extraction on all Bord na Móna bogs ceased by January 2021, although many of the Bord na Móna bogs ceased extraction much earlier than this, similar to the Application Site which ceased in July 2019.

Third party peat cutting (turbary plots) are much smaller areas of bog compared to the Bord na Móna (BnM) extraction areas.

Bogs in the Mountdillon Bog group were subject to peat extraction between 1988 and the cessation of peat extraction on all Bord na Móna bogs in 2021. The Derryshanoge Bog (located to the east of Lough Bannow Bog) and the Killashee Bogs to the east of Derryaroge Bog. The activities carried out on the other bogs would have been similar to those carried out at the Application Site with a gradual reduction in the extent of the areas subject to peat extraction.

Potential effects were mitigated through the adoption of operational good practice (pre-2000) and IPC licence procedures and hence, it is unlikely that the development give rise to any significant cumulative effects.

Remedial Phase

The Mountdillon Bog Group, and in particular 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 2024, the Climate Change Performance Index 2024, and the Change Advisory Council's Annual Report 2023. 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 Application Site and the optimisation of climate action benefits.

The overall permanent footprint of the proposed wind farm will be less than 4% of the total area of the Application Site, and therefore does not impact or change the overall goals and outcomes of the proposed rehabilitation plans. As such, it is the intention of the Applicant to integrate the peatland remedial measures with the proposed future wind farm. 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 Derryadd Wind Farm development details 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 to the side, graded into berms not more than 1 m and allowed to naturally re-vegetate. This has proven successful during construction of Mountlucas and Cloncreen Wind Farms. In the event that natural re-vegetation was unsuccessful, additional measures such as re-seeding would be considered.

The Cutaway Bog Decommissioning and Rehabilitation Plans which accompany the wind farm application detail how the site will be rehabilitated along with the construction and operation of the proposed Wind Farm; on the assumption the wind farm will be granted. It is intended to develop lands at the Application Site for enhanced rehabilitation on the bogs as part of PCAS scheme in the north and west of Derryaroge Bog (See Section 4.10.2). Further details of this proposed windfarm development can be obtained at the project website (https://www.derryaddwindfarm.ie/). A separate planning application for the proposed Derryadd Wind Farm will be submitted directly to An Bord Pleanála through the Strategic Infrastructure Development planning process. As mentioned, the wind farm footprint comprises approximately 4% of the Wind Farm Application Site and the wind farm application includes proposals to rehabilitation the site to support wetland habitats. This would offset any potential loss of cutover and revegetating peatland because of the wind farm construction and facilitates the undertaking of a robust environmental assessment.

Both the rehabilitation measures and the proposed Derryadd Wind Farm are cumulatively assessed with the future remedial measures that will be carried at the Substitute Consent application site.

The future rehabilitation of the bogs at the Application Site will have a cumulative effect on water with the proposed future uses of the lands for renewable energy and enhanced rehabilitation. The proposals for future land uses have been accounted for, to the extent that information is available, in the preparation of the Cutaway Bog Decommissioning and Rehabilitation Plans for the bogs which are included in Appendix 4.3 of this rEIAR. The rehabilitation plans for the bogs identify the proposed wind farm footprint and the proposed measures take account of the infrastructure which will be constructed.

Significance of Effects

For the reasons outlined above, and with the implementation of the Bog Decommissioning and Rehabilitation Plan in accordance with the IPC licence conditions, there will be no significant cumulative effects with regards to land, soils and geology. It is considered that there will be a long-term slight positive effect on land use arising from the rehabilitation of the bogs and the future development of the subject lands.

8.6.5 Major Accidents and Disasters

Major Accidents and Disasters assessment considers the potentially significant effects of a development on the environment as a result of its vulnerability to, or introduction of, risks of major accidents and/or disasters. It is clear from the EIA directive that a major accident and/or natural disaster assessment should be mainly applied to Control of Major Accident Hazards (COMAH) sites, SEVESO sites or nuclear installations. The project is not a COMAH or nuclear installation, however the assessment is included for completeness. The potential for a significant peat slide is negligible at the site and no peat slides occurred between 1988 and 2019.

It can be concluded that the risk of accidents associated with this development is low and did not cause unusual, significant, or adverse effects on the soils and geology environment during the Peat Extraction Phase, Current, or Remedial Phase.

8.7 **REFERENCES**

- Institute of Geologists Ireland (IGI) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Environmental Protection Agency (May 2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft Advice Notes on Current Practice (in the preparation of Environmental Impact Statements);
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- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- CIRIA 2006: Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors. CIRIA C532. London, 2006; and,
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- Hennessy, R., Meehan, R., Parkes, M & Gatley, S. 2015. The Geological Heritage of Longford. An audit of County Geological Sites in Longford. Geological Survey of Ireland. Unpublished Report.

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